Where we operate.....
Fast Facts.....

25,000km²
is the area we serve - spanning large urban centres and sparse rural areas

37,000km
the length of pipeline that we own & maintain

2,700,000
the number of customers to which we transport gas.
Present

R11O BAU

R11O - Business As Usual

Energy Trilemma
Sources of Gas
Off gas communities opportunities....

Value for Money

Electrical infrastructure is a minimum x6 capital cost of equivalent gas infrastructure.
Carbon Reduction
H21 Leeds City Gate
Steam Methane Reformer (SMR)

$\text{CH}_4 \xrightarrow{\text{H}_2\text{O}} \text{H}_2$

30% $\text{CO}_2$ (CCS)
70% $\text{CO}_2$ (CCS)
Infrastructure - New & Existing
- H₂ causes embrittlement on >7 bar networks
- 17 bar ring main (CH₄) - BAU spend
- PE conversion below 7 bar - BAU spend
- SMR/CO₂ pipeline/conversion - Additional spend

Hydrogen is... \( \frac{3}{4} \) the energy of methane
\( \frac{1}{4} \) the density of methane

The jigsaw....

Lessons of the past
Town gas used to be >50% H₂....
Hong Kong town gas is >70% H₂....

... The 80's & 90's saw a comparable in India & Japan.
We've done it before!

The three parts of energy
Production ➔ Transportation ➔ Consumption

The less change, more achievable & potentially cheaper!
Infrastructure - New & Existing

- H₂ causes embrittlement on >7bar networks
- 17bar ring main (CH₄) - BAU spend
- PE conversion below 7bar - BAU spend
- SMR's/CO₂ pipeline/conversion - Additional spend
The three parts of energy

Production → Transportation → Consumption

The less change, more achievable & potentially cheaper!
Hydrogen is... $\frac{1}{3}$ the energy of methane
&
$\frac{1}{8}$ the density of methane

Feasibility...

Pressure drop $\propto$ Density $\times$ Velocity$^2$

$\frac{1}{8} \times 3^2$

1.125
Lessons of the past

Town gas used to be >50% H₂......
Hong Kong town gas is >70% H₂......

.....the 60's & 70's saw a conversion to Natural Gas.

We've done it before!
The ultimate vision....
Can't see the future but we can help define it!