SGN and the Gas Task Force

11th September 2019

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SGN
Your gas. Our network.

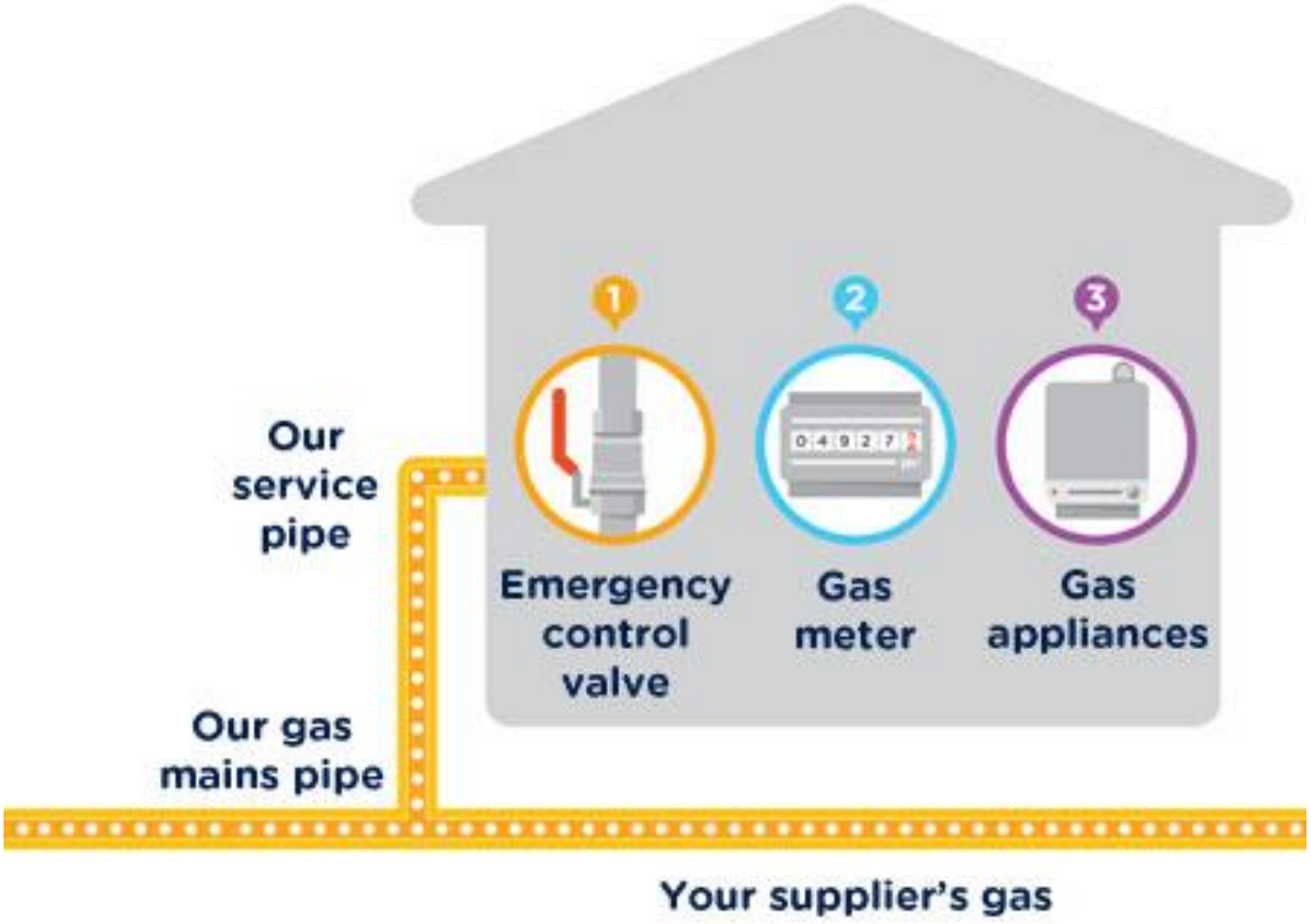
Today’s agenda

1. What is SGN?
2. Why does SGN need telemetry?
3. Telemetry trials
4. Gas Task Group
5. The future

Section 1

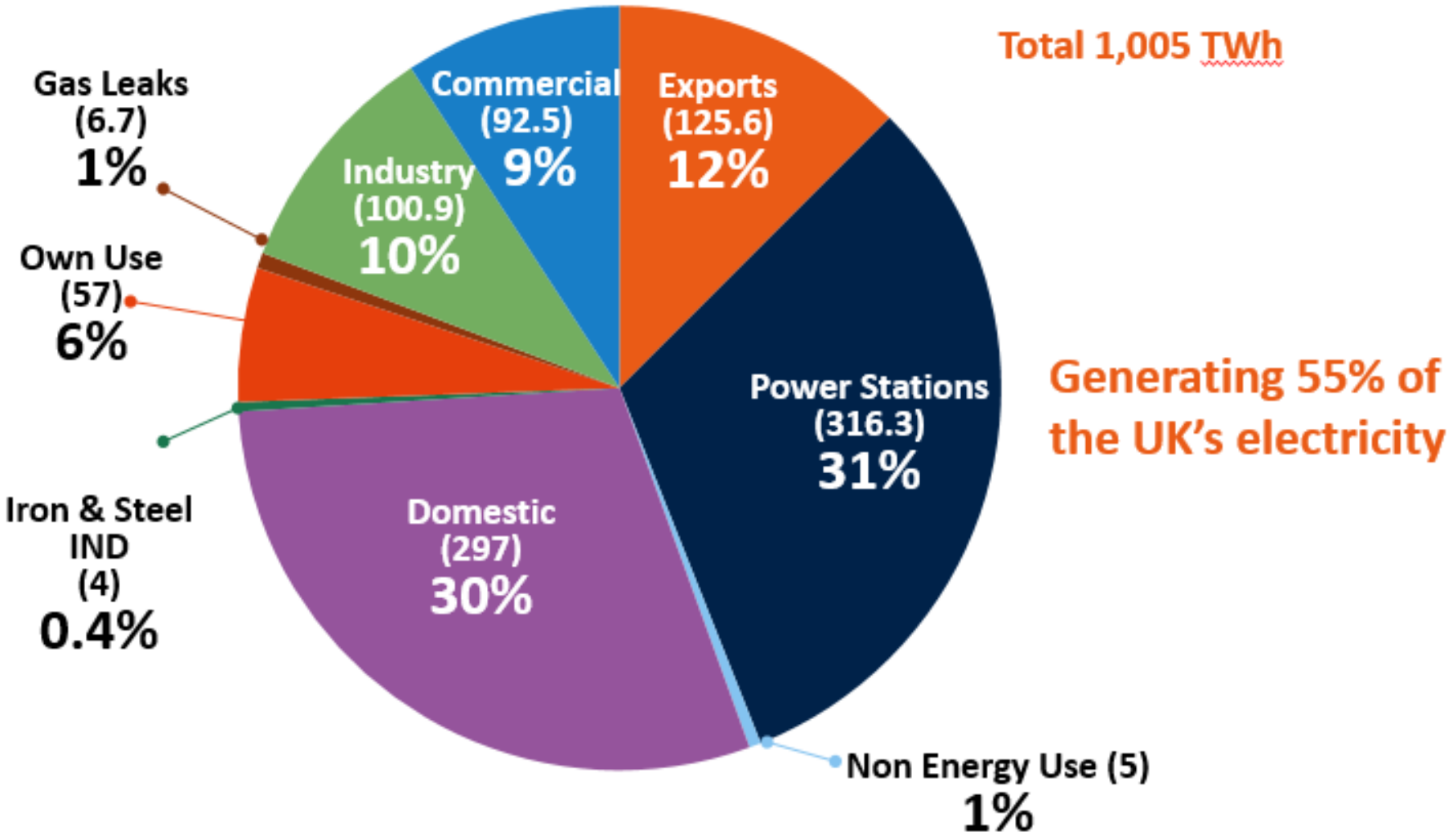
What is SGN?

We’re a gas distribution company



Our operational area

UK gas usage 2017 (TWh)

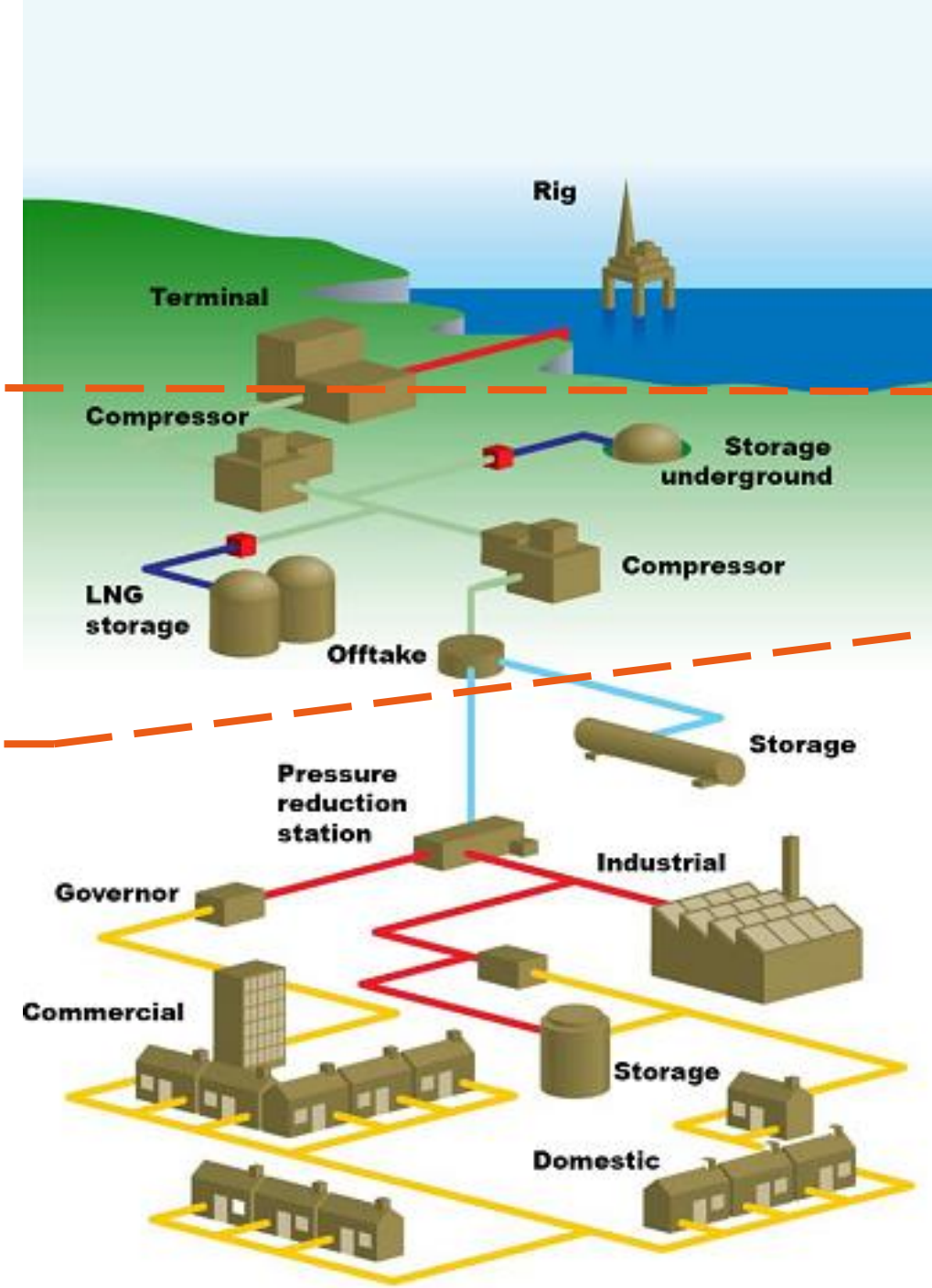


Who does what?

Gas producer

National Grid
National Transmission System

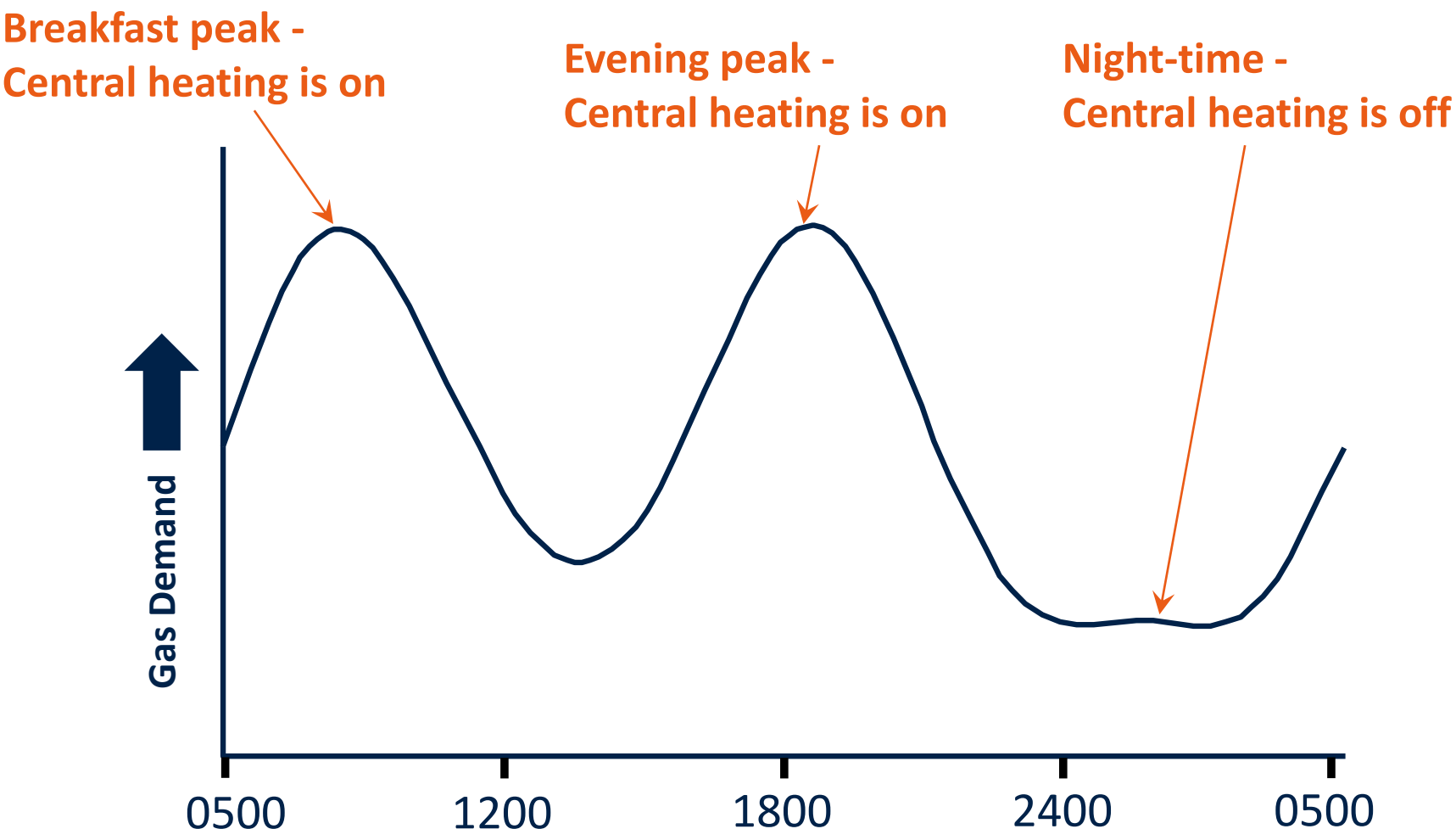
SGN/DN's



Section 2

Why does SGN need telemetry?

Gas demand

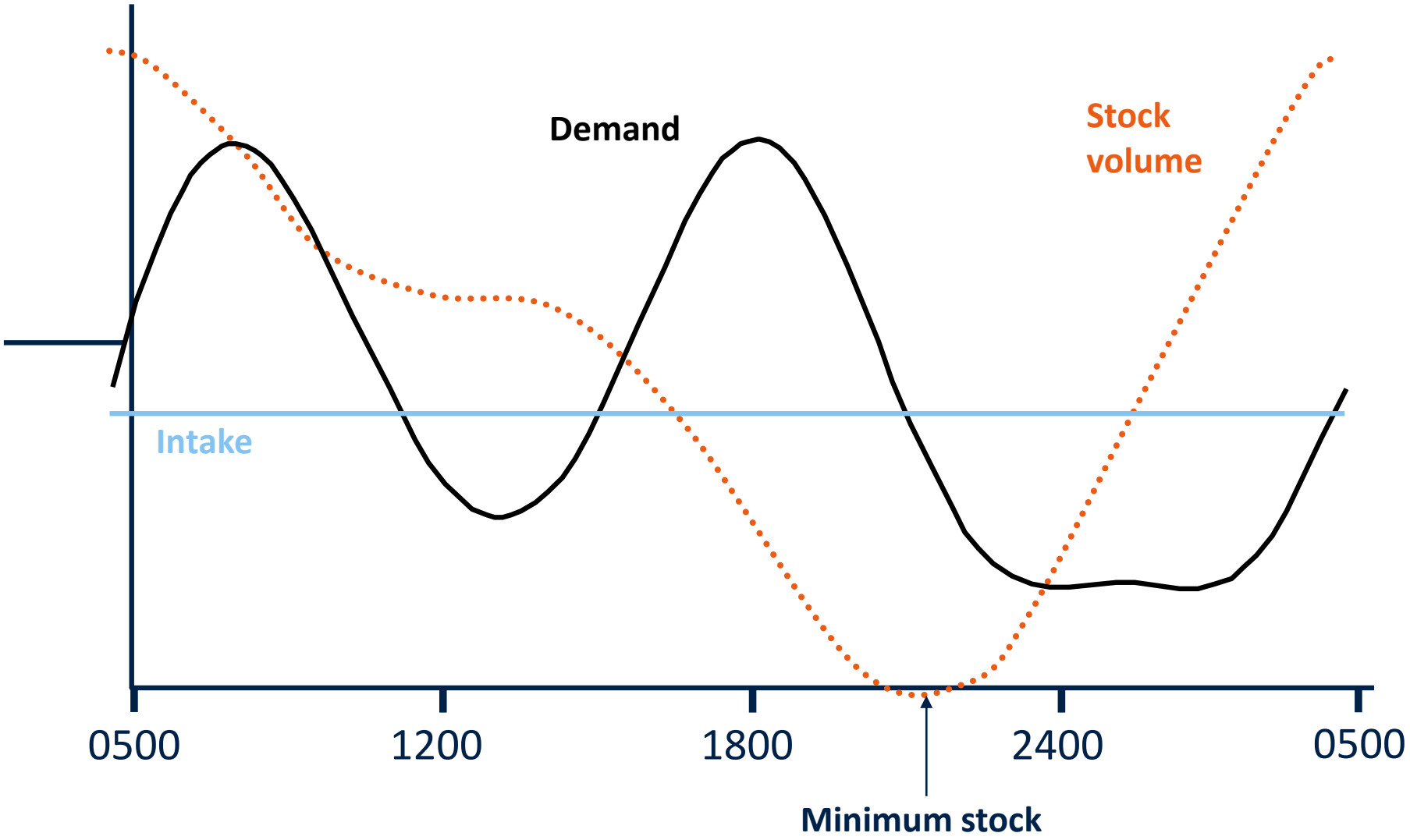

Breakfast peak -
Central heating is on
Evening peak -
Central heating is on
Night-time -
Central heating is off
Gas Demand
0500
1200
1800
2400
0500

Storage

Demand – Intake = Storage Requirment

- Storage is capacity in high pressure pipelines
- Pressure is increased at night when demand is low
- Pressure is decreased during peak times when demand is greater than supply

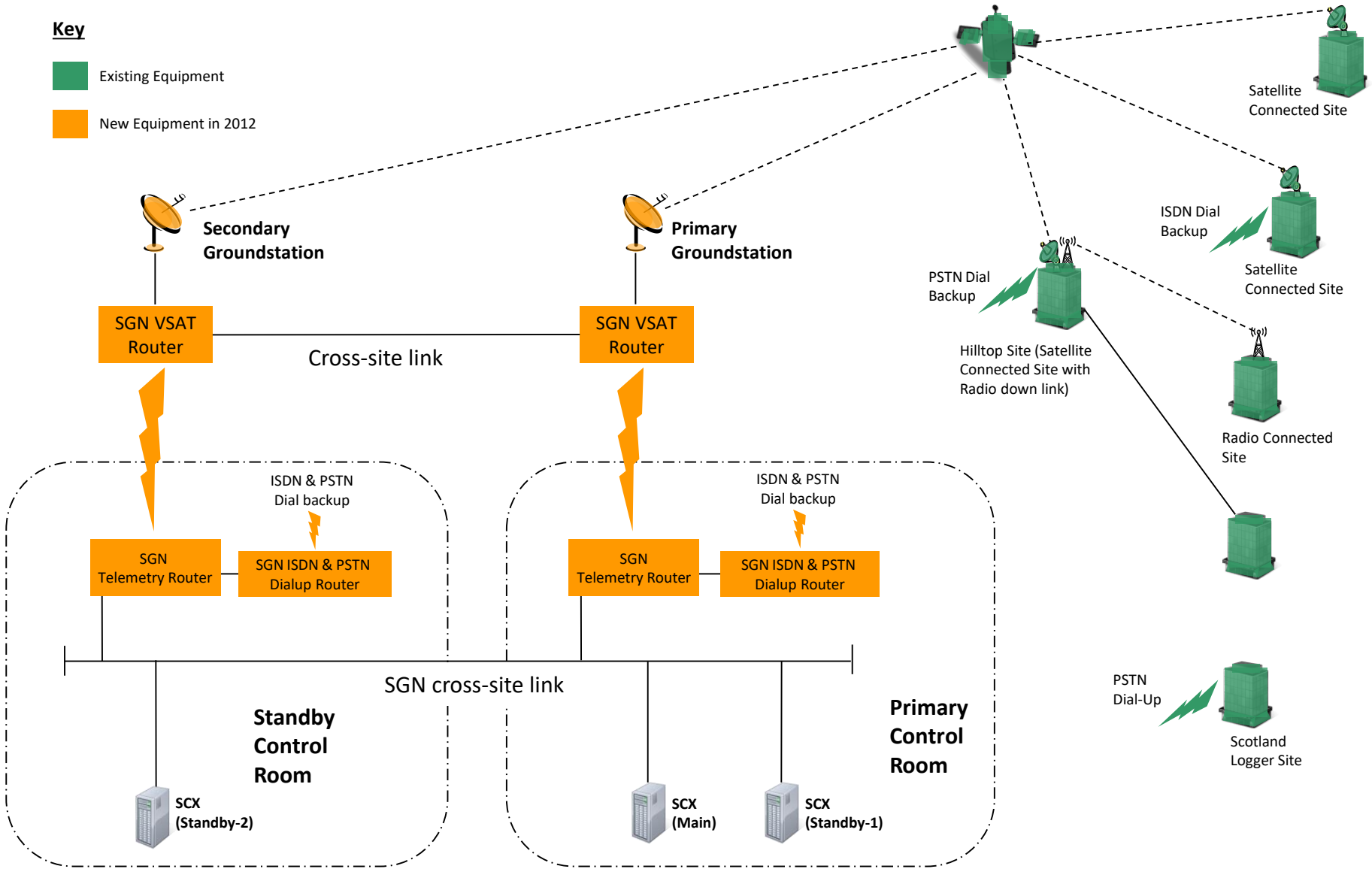
Stock volume



Section 3

Telemetry trials

Telemetry - existing system



Types of gas site

- Network entry point (Offtake, Biogas etc) – **Tier 1**
- Gas storage site – **Tier 1**
- Network exit point (power stations etc) – **Tier 1**
- Pressure reducing installation – **Tier 2**
- Telemetry required for network validation – **Tier 4**

Numbers of gas sites (as at 16/8/19)

Tier 1

- 63 - VSAT + dial back-up

Tier 2

- 169 - UHF Radio via 21 Hilltops
- 92 - VSAT + no dial back-up
- 4 – Kilostream (Private Wire)

Tier 3

- 11 - Standalone GPRS system (not connected to the main SCADA system)

Tier 4

- 42 - Data Logger

Total = 381 gas sites

What's wrong with the existing telemetry?

Too expensive

- Hilltop towers
- Dial back-up PSTN and ISDN circuits

Too unreliable

- Tropospheric propagation in UHF radio band
- UHF Radios (site and master) are obsolete
- Dial back-up PSTN and ISDN phone lines present maintenance issues and end of life 2023
- Kilostream circuits – end of life 31st March 2020
- Line-Of-Sight issues

No Tier 3 solution

- Currently there is no GPRS solution due to security concerns

Summary

Tier 1 – Satellite plus dial back-up

- Works well but it's expensive

Tier 2 – Satellite only

- Works well but it's expensive

Tier 2 – UHF radio via hilltop

- Normally reliable but subject to tropospheric interference
- Equipment is obsolete
- Hilltop sites are expensive and are subject to physical security concerns
- Line-of-sight issues due to the low trajectory of the signal path

Tier 3 – GPRS

- No technical solution due to security concerns over the use of public internet

Tier 4 – Dataloggers in Scotland

- This is currently only used at 42 sites in Scotland

Telemetry trials - results

4RF UHF radio

- Works much better than existing MDS hardware

BT Dual Path

- Excellent product
- Difficulty with backhaul due to SGN Cloud programme

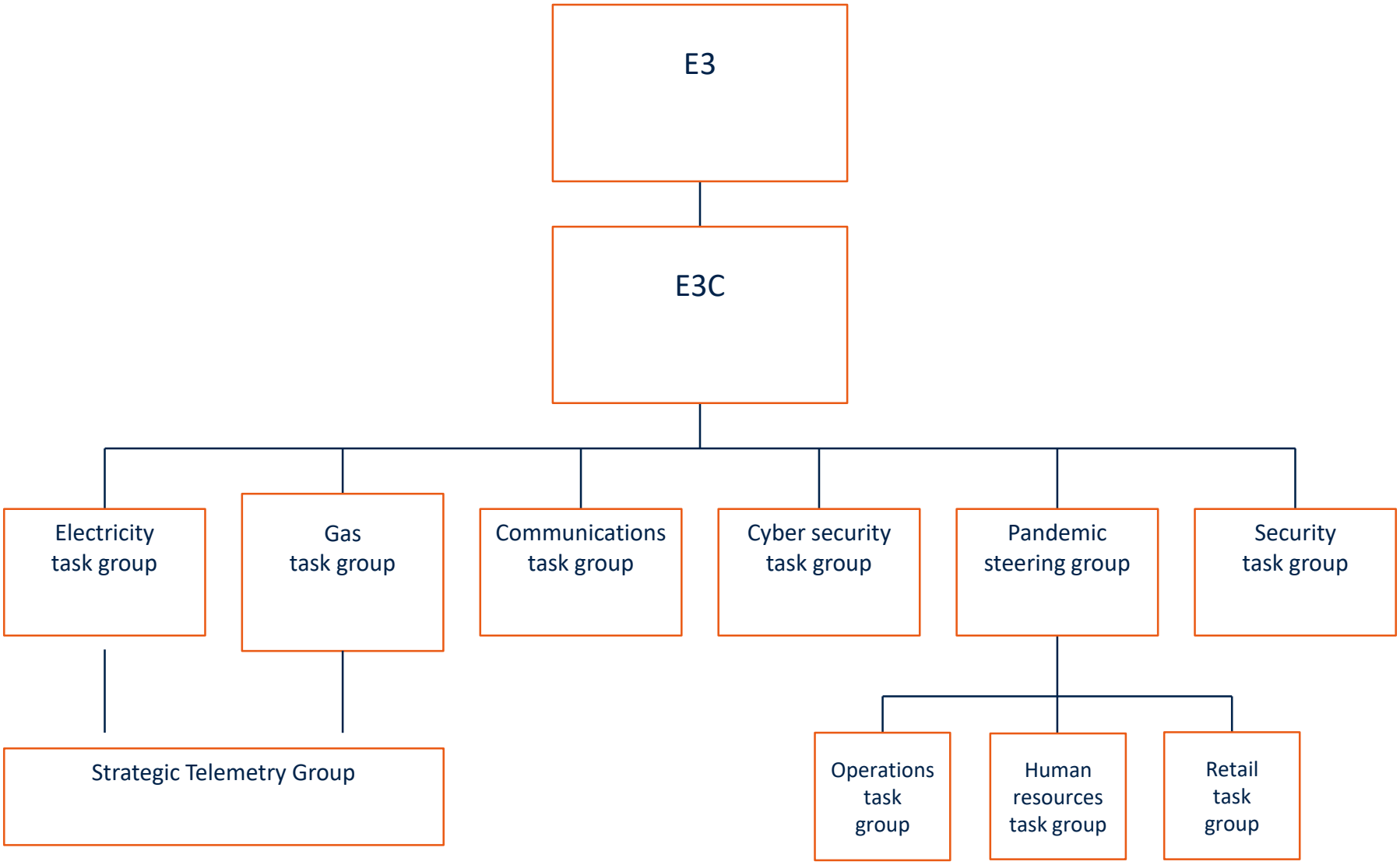
M2M solution with major mobile provider

- Poor data comms in areas with good signal strength
- Good data comms in areas with poor signal strength!

Section 4

Gas Task Group

Structure of task group (E3C)



Gas Task Group

- Assurance to Government:
  - Plans for a pandemic
  - Mutual aid
  - Emergency contacts
- Black start plans
- Review Gas Safety (Management) Regulations 1996
- Winter preparedness
- Share best practice

Section 5

The Future

Gas for vehicle fuelling

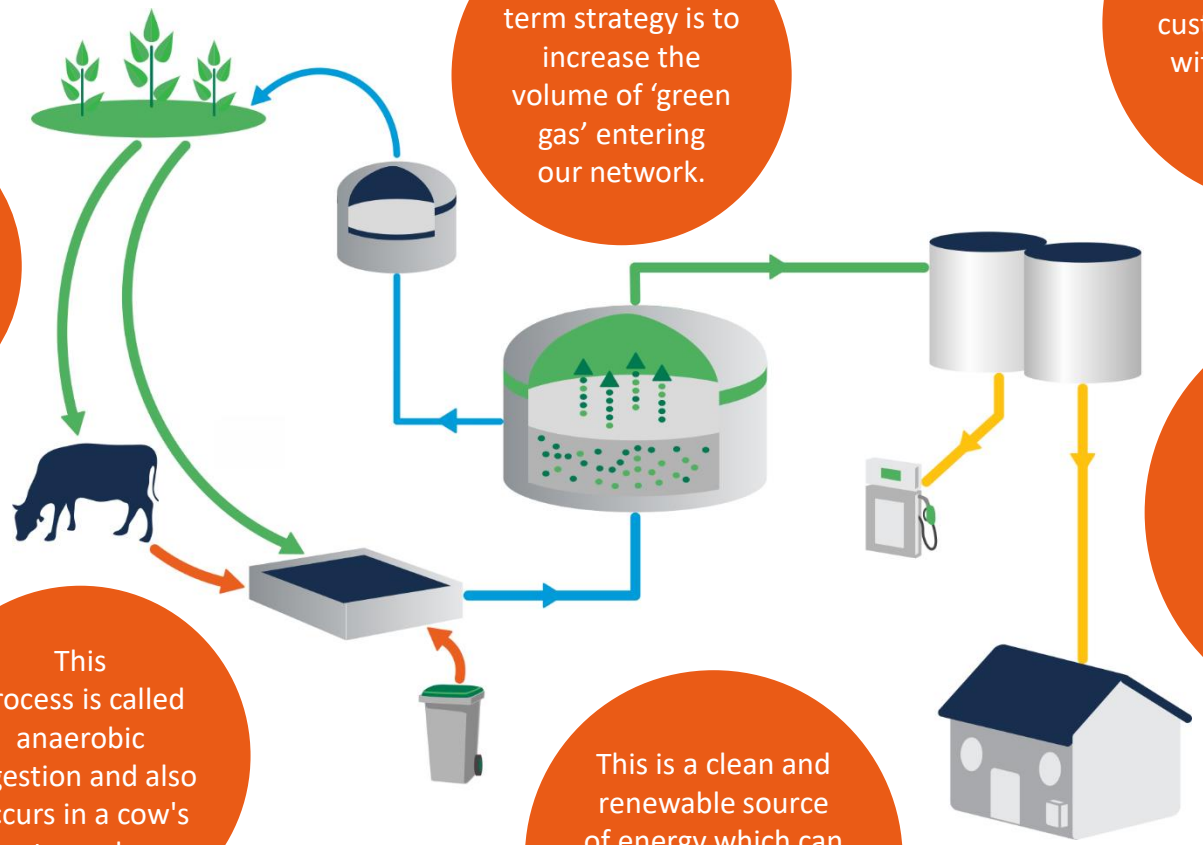
- ***Lower*** cost than petrochemical equivalents
- ***Technically*** viable
- Widely ***available*** in Europe
- Significant ***reduction*** in pollution
- Significant ***reduction*** in carbon emissions

Greening the gas - biomethane

Organic material such as food waste is broken down by bacteria.

Our long term strategy is to increase the volume of 'green gas' entering our network.

We're aiming to have 250,000 customers supplied with green gas by 2021.

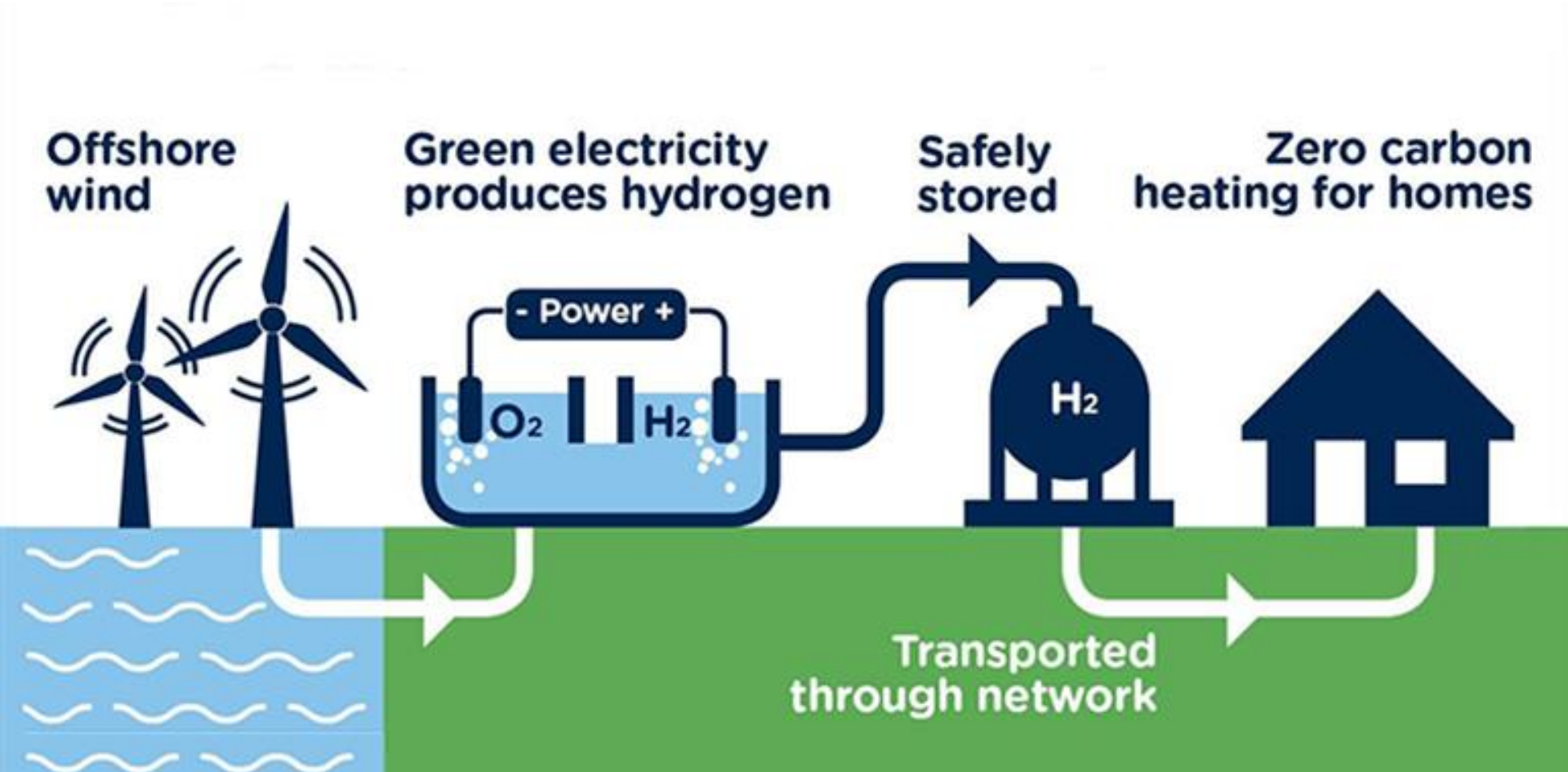


The bacteria produce biogas rich in methane. We remove any contaminants from the gas and inject it into our network.

This process is called anaerobic digestion and also occurs in a cow's stomach.

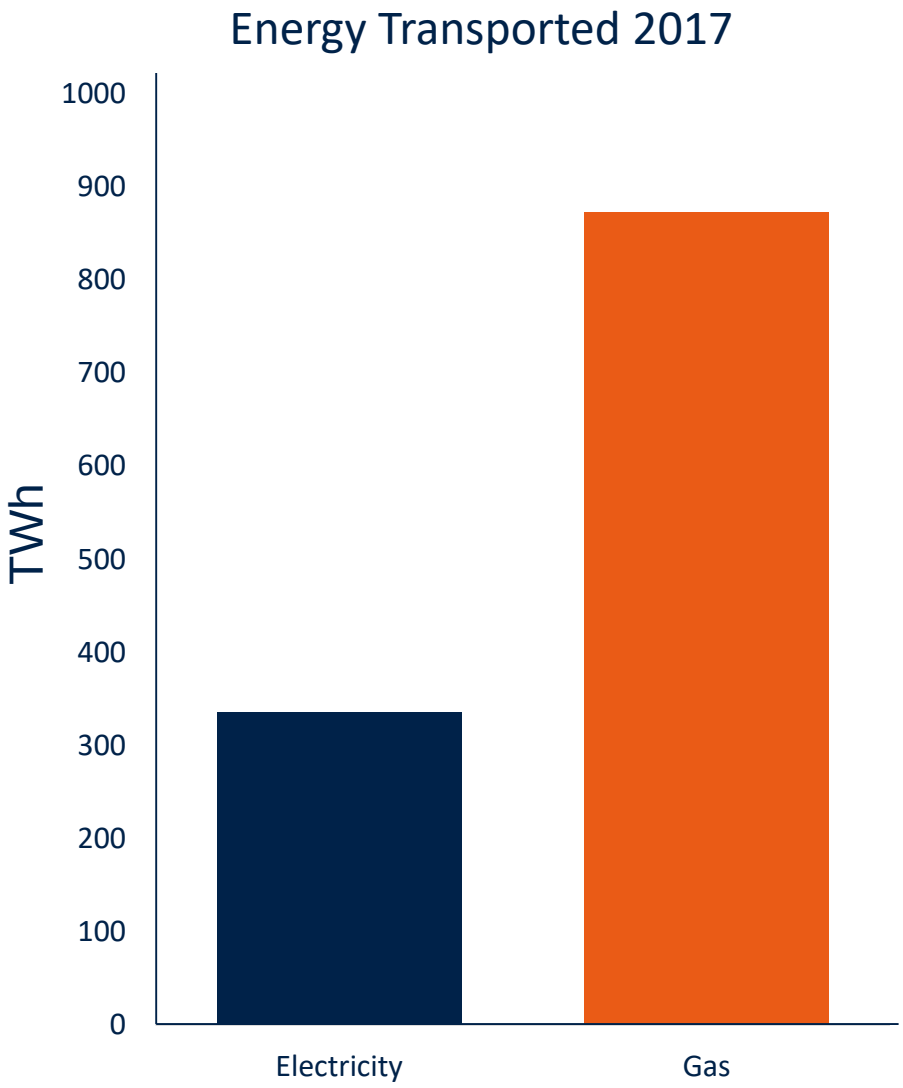
This is a clean and renewable source of energy which can help the country meet its climate change targets.

A world-first for green hydrogen



Energy transportation

- Gas pipes transport 2.6 times more energy than electricity cables
- It has been suggested that the UK should move to an all-electric energy transportation system



Energy transportation

- It would require thousands of miles of new pylons across the countryside
- And new cables in every street in the UK
- Reinforcing the electricity networks by this capacity would cripple the UK economy

Energy transportation

- The Gas Industry believes that it makes sense to re-purpose the existing pipe assets
- This can be achieved by converting the system to transport hydrogen and/or methane
- Hydrogen can be produced by a variety of methods which are carbon-neutral, sustainable and financially realistic
- The hydrogen gas grid can be used to absorb swings in supply and demand

Re-purpose the UK gas grid

- Hydrogen is environmentally friendly – the only emission is pure water
- Hydrogen can be manufactured from Methane or Electricity
- Hydrogen can be introduced into existing pipes in increasing concentrations
  - Up to 10% can be used with existing gas appliances
  - Above this level will require modifications

Further thoughts

- Gas and Electricity networks are becoming more integrated and more inter-dependant
- Might it be possible to combine our telemetry networks and add built-in resilience
- We have received over 300 enquiries for embedded generation with 60 accepted
- There’s lots of data but the clever part is to use it intelligently

Further thoughts - 2

- Pressure points: from minor site through to major offtake
- 9th August blackout. Power restoration as domestic boilers were off, and electricity peaking plants were on.
- Internet of things, how about the Internet of Energy!
- We have built in resilience in gas and electricity, comms systems needs to match this!
- New Security requirements
- Real time networks
- Transport refuelling
- Gas quality measurement

Conclusions

- The gas grid is here to stay
- It will be re-purposed and will transport hydrogen
- There will be a increasing need for more telemetry because
  - More injection points into the gas network
  - Varying composition of gas
  - Gas demand will not follow the ‘traditional’ diurnal pattern because of embedded small-scale electricity generation
  - Better understanding leads to better investment
- There is an increasing need for more secure telemetry together with more secure telephony

Thank you

Any questions?

SGN

Your gas. Our network.