

Ervia CCS

Northern Lights Summit

9 June 2020

Brian Murphy – European Affairs Manager

Presentation Overview:

- **Ervia Vision 2050**
 - How the network can be decarbonised by 2050 through the use and development of CNG, Bio-Methane, CCS and Hydrogen
- **Hydrogen Strategy Development – National Solution**
 - Assessment and identification of 5 Industrial clusters with significant H2 demand potential
 - Production and supply of Blue H2 will be central to this assessment based on opportunity to store or export the CO2 via CCS
 - Ervia leading in development of full chain CCS and Hydrogen strategy in Ireland
- **Highlight the Commission support mechanisms being sought by Ervia:**
 - CEF – CO2 storage infrastructure
 - H2020 – CO2 Geological Storage Pilot
 - Innovation Fund – H2/CCS industrial cluster

Vision 2050 - for Ireland's Gas to be net zero carbon – Pillars



Compressed Natural Gas (CNG)

CNG is natural gas stored under high pressure. Replacing diesel in HGVs and buses with CNG delivers immediate emission reductions, air quality improvement and noise reduction. There are over 24m CNG vehicles operational internationally



Renewable Gas

Renewable gas is net zero carbon, extremely versatile and fully compatible with existing gas network infrastructure. It is produced by anaerobic digestion from sustainable sources such as animal waste, grass, crop residues and food waste



Carbon Capture and Storage (CCS)

CCS captures emissions from natural gas power plants and large industry preventing emissions entering the atmosphere – the 'abated' natural gas is net zero carbon

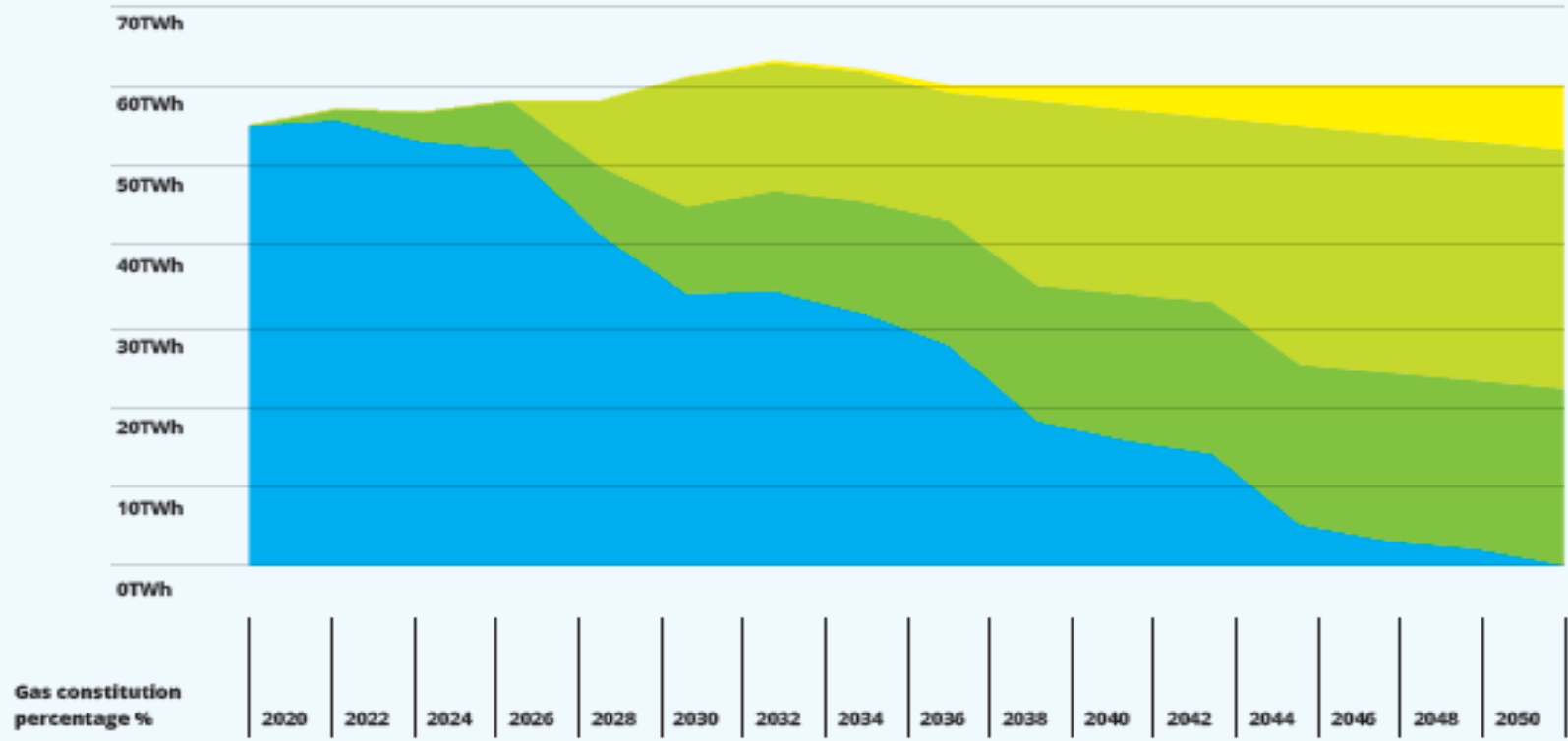


Hydrogen

Hydrogen produces zero CO2 emissions and can be blended with natural gas or used in its pure form. It is very flexible and can be used in transport, heat and power generation

Vision 2050 – Net Zero Pathway

Figure 6: Our vision for a net zero carbon gas network by 2050



Gas constitution percentage %	2020	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040	2042	2044	2046	2048	2050
Abated Natural Gas (with CCS)	0	0	0	0	14	26	25	26	27	38	38	38	50	50	50	50
Hydrogen	0	0	0	0	0	0	0	1	2	3	5	7	8	10	12	13

Vision 2050 – Emission Savings from use of the gas network (total potential 18.7Mt per annum)

ervia



Electricity
8.2Mt



Industry
2.7Mt



Heat
2.6Mt



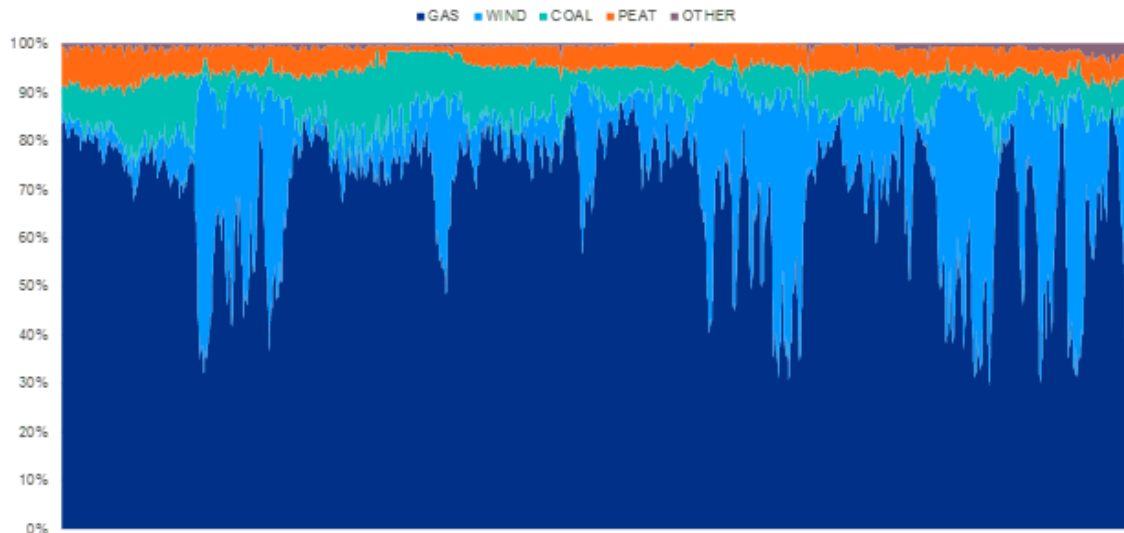
Transport
2.8Mt



Agriculture
2.4Mt

Natural gas currently contributes 1/6th of Irelands CO2 emissions. Implementation of Vision 2050 would reduce Irelands emissions by 1/3rd

Why CCS and H2 will be needed in Ireland



To support variable electricity renewables

Security of Supply

Longer term, zero emission, electricity Security of Supply

- ✗ Nuclear
- ✗ Hydro
- ✗ Biomass
- ✗ Electrical I/C

- ✓ CCGT with post combustion CCS
- ✓ CCGT or OCGT with pre-combustion hydrogen

Energy Storage

To provide longer term, zero emissions, energy storage for electricity, heat and transport.

- ✗ Batteries
- ✓ Blue Hydrogen (with CCS) as pathway to Green Hydrogen

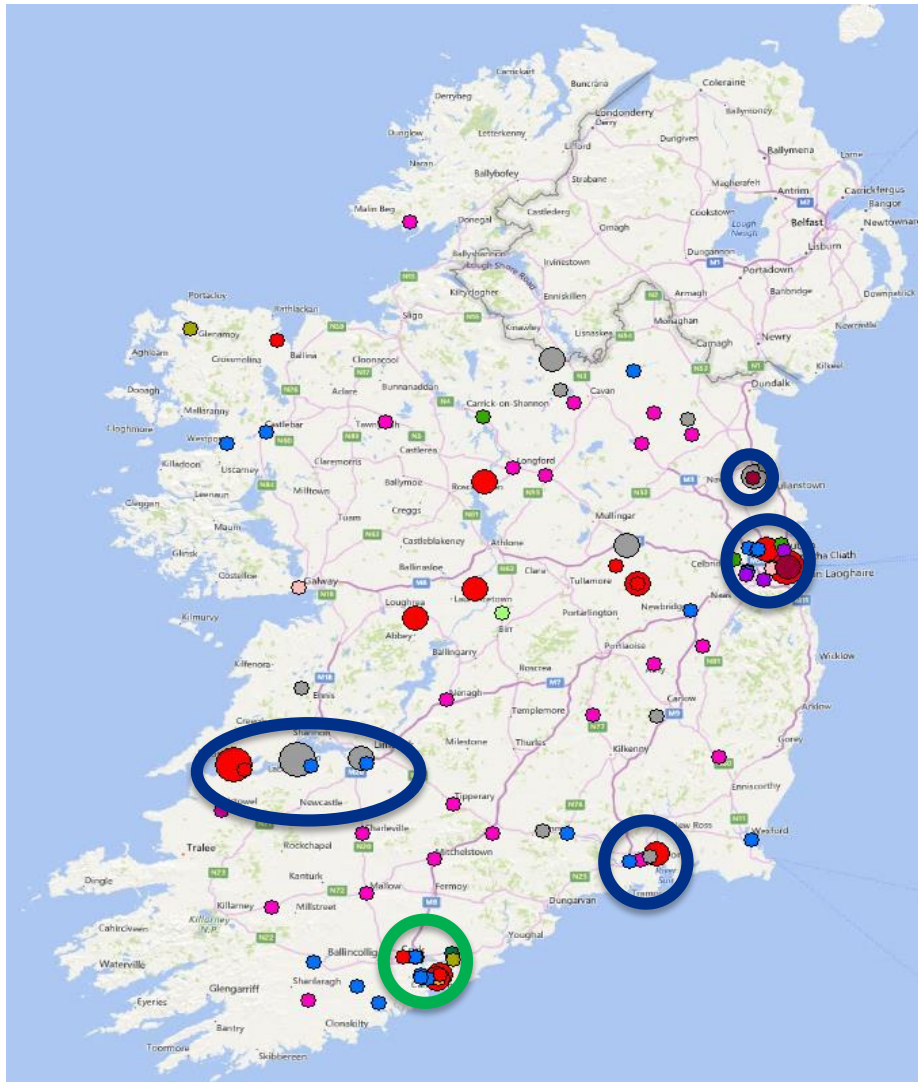
Negative Emissions

To provide a net zero GHG economy

- ✓ Biomethane with CCGT and CCS
- ✓ Negative emission Hydrogen (with biomethane and CCS)

- Rapid emergence of Hydrogen. What this means for Vision 2050
- The Irish gas network must still be decarbonised by 2050 - the only viable back-up for renewables - and to decarbonise many parts of economy
- But in the longer term (beyond 2050) only clean / green gas will be acceptable
- Hydrogen pivotal long term vector, but 'blue hydrogen' may be needed before 'green hydrogen' becomes a big enough factor
 - Biomethane potential in Ireland will not be sufficient to fully displace natural gas
 - But biomethane has significant potential to deliver negative emissions via CCS
- So, long term solution is likely to be:
 - Green hydrogen gradually replacing blue hydrogen
 - Biomethane either meeting 100% of part of the network, or converted to hydrogen with negative emissions

CO₂ Emitters in Ireland with potential electricity and industry Clusters for CCS/H₂ ervia



- Potential for five CCS/H₂ clusters.
- Four of the clusters would need a CO₂ shipping solution
- Existing emitters within potential clusters:
 - Gas fired power stations
 - Cement plants
 - Alumina production plant
 - Waste to energy facility
 - Oil refinery
 - Lime production
- Strong engagement recently with key emitters
- Potential to produce emissions free hydrogen with CCS within clusters emerging as a key enabler for CCS development

Potential EU Funding Sources



EUETS



Innovation Fund
Prequalification
application due mid-
2020

Initial funding
application to be for
Project Development
Assistance

PCI Status Granted Oct
2019

Ervia to seek CEF
support for studies into
the transport,
compression,
conditioning and
storage of CO₂
(import/export)

CCUS Capture Pilot

Participating in a
consortium for a
geological storage
pilot