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Gas Networks Ireland

INNOVATION IN THE ENERGY SECTOR

Profitably meeting the demands of a low-carbon world

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Presentation overview

- Introduction
- Climate Change / GHG Emissions
- Market and Demand for Sustainable Gas
- The Renewable Gas Solution
- Collaboration Project Overview & Industry Support
- Sustainable Gas Network Vision

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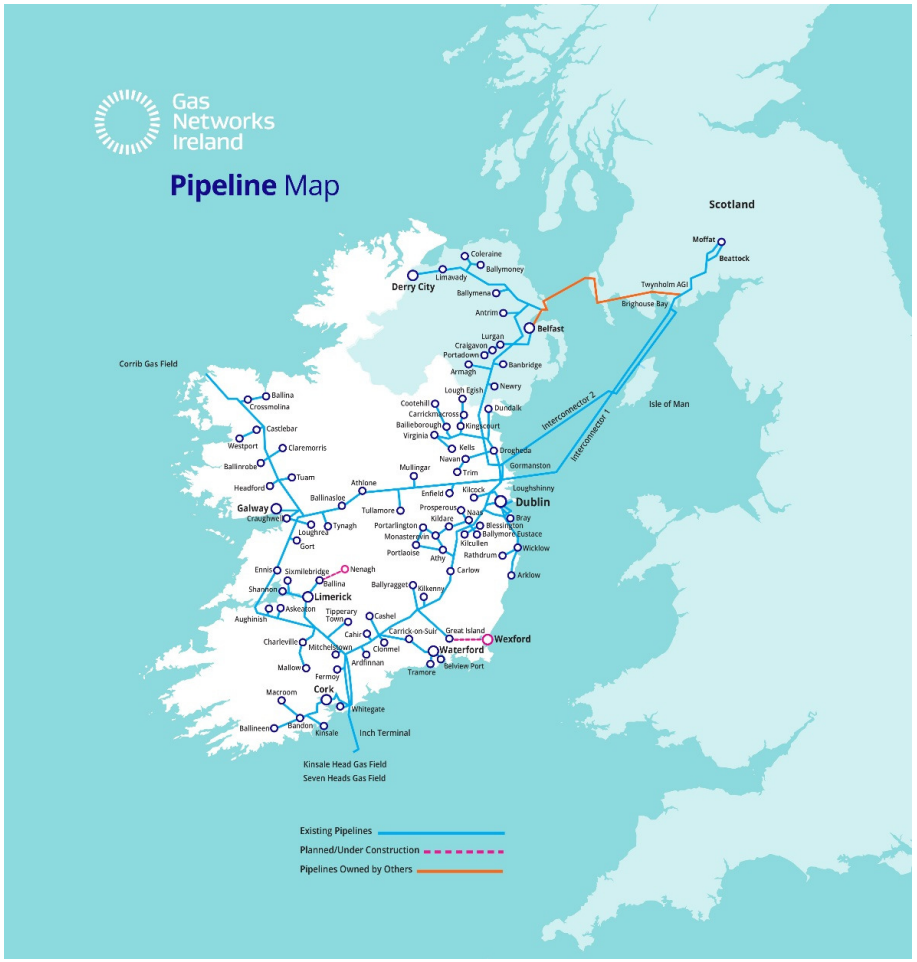

- Gas Networks Ireland owns, operates, develops and maintains the natural gas network in Ireland.
- World-class Modern Gas Network
- Over 13,500Km:
  - 2,422Km Transmission Network
  - 11,288Km Distribution Network
- More than 675,000 gas consumers
  - 650,000 homes
  - 25,000 businesses
- Over 160 population centres
- 19 counties

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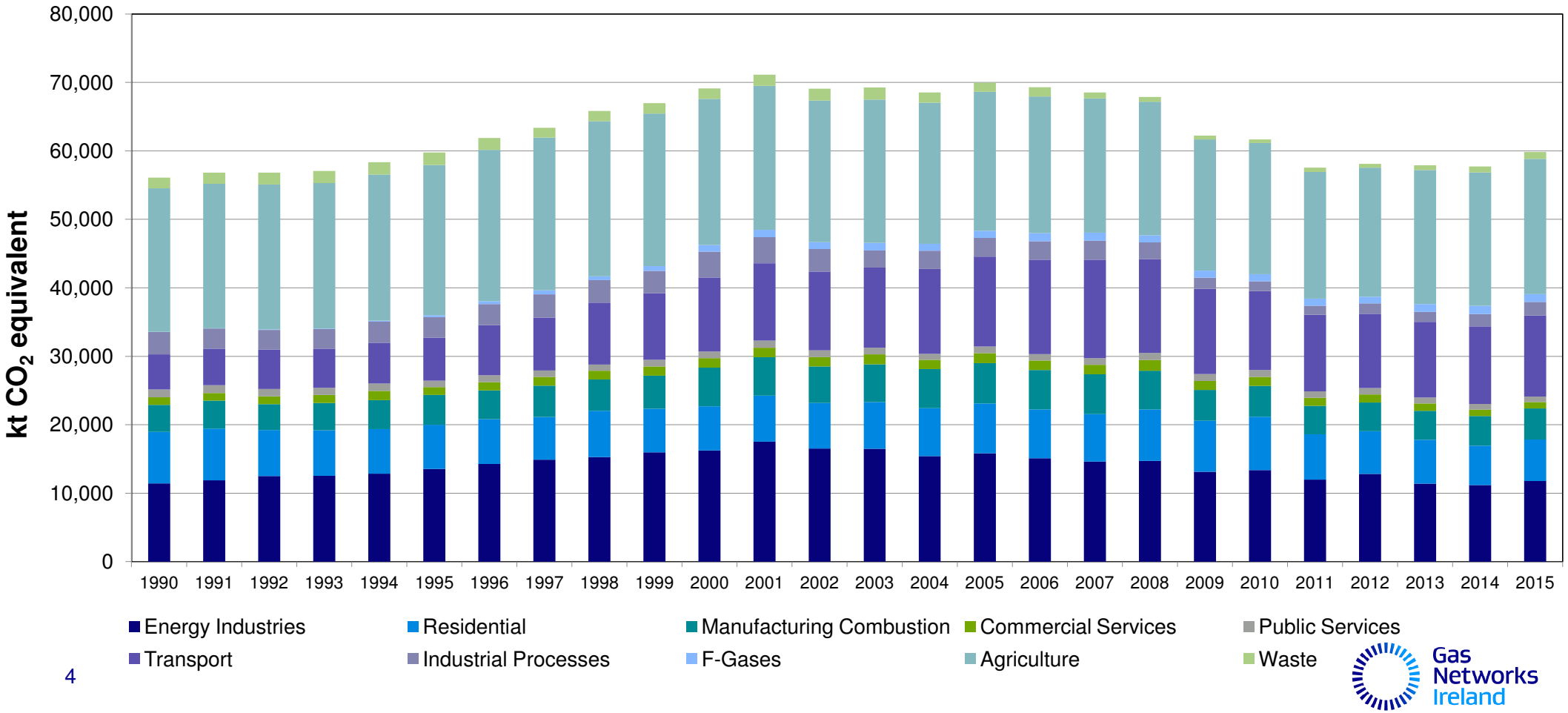
National GHG Emissions 1990 - 2015



Source: EPA

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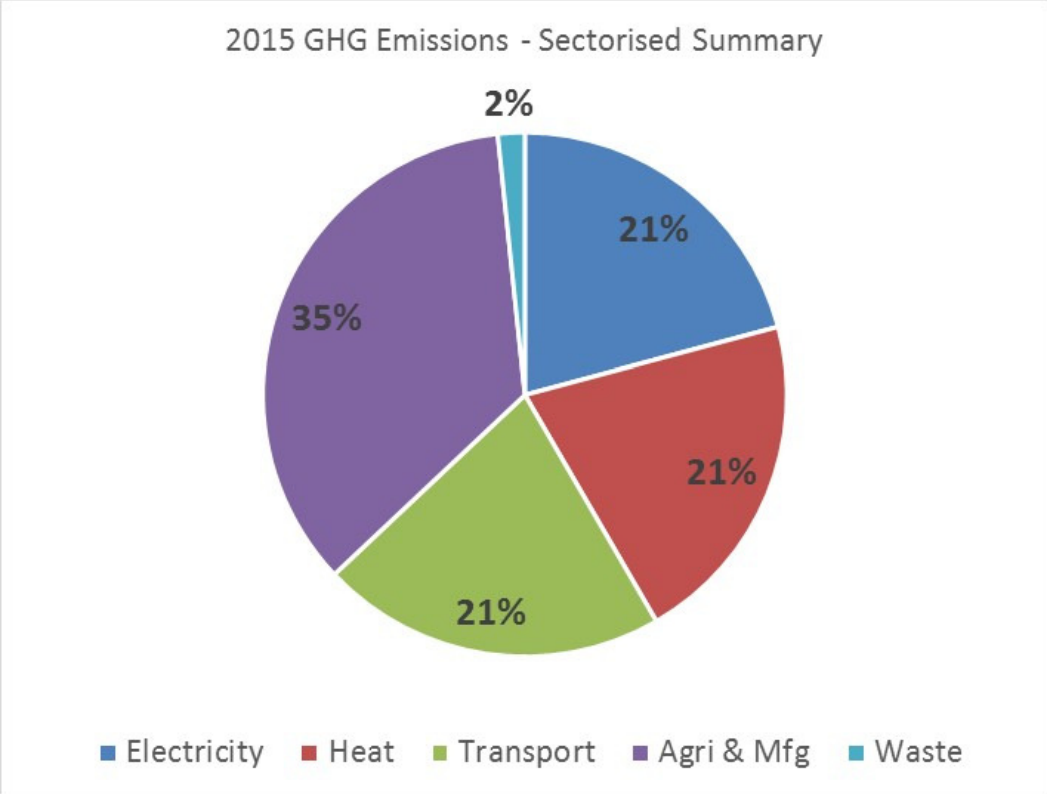
GHG Emissions – Energy & Non-Energy Emissions



- **Electricity**
  - the main focus of National Policy to date.
- **Heat** – Space & Water Heating, Industrial processes, & CHP.
  - significant savings achieved with High Efficiency measures.
- **Transport** – predominantly Diesel & Petrol.
  - Biofuel blending measures.
- **Non-Energy** – Agriculture and Industrial emissions.
  - Strong demand from both sectors to decarbonise
    - FDI – Corporate Obligations
    - Origin Green – Compete on greener credentials

Data Source: EPA

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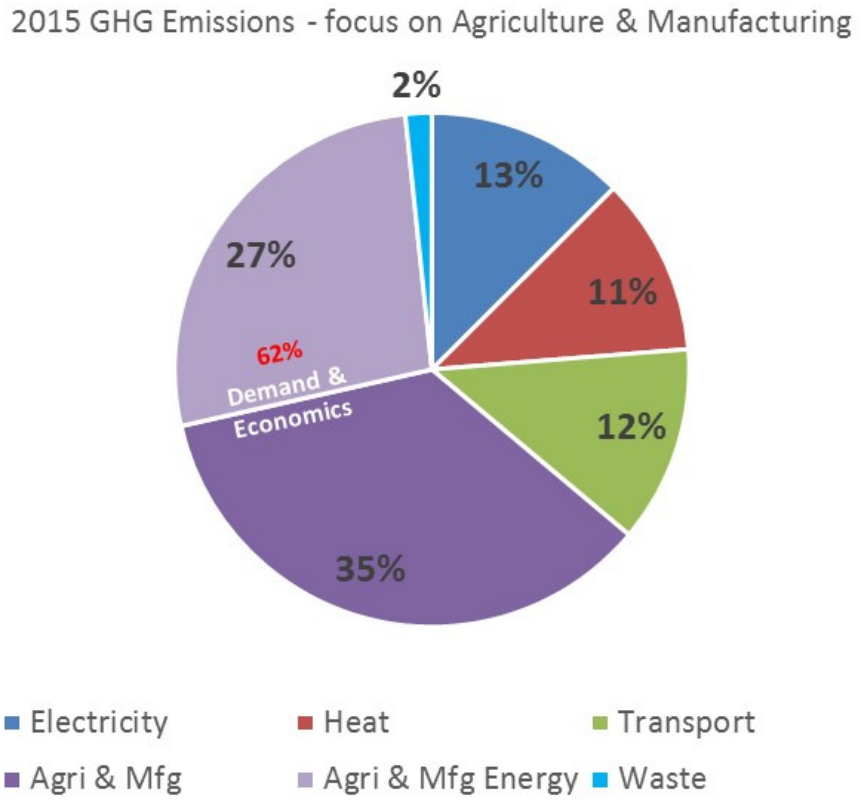
GHG Emissions – Demand & Economy



- Ireland population ~ 4½ Million People.
- Agri' Food & Beverage produced for 33 Million.
  - Also significant Pharma' & other Mfg.
- >40% Workforce directly employed or in direct material supply chain.
  - Service sectors highly dependent.
- Trade / Exports critical to economy.

- **Decarbonisation** – products, processes and energy
  - Essential for future growth and competitiveness.
    - FDI – Corporate Obligations
    - Origin Green – Compete on greener credentials
  - **Solutions need to address needs of multiple sectors.**

Data Source: EPA & SEAI

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Validation of market demand:
Survey of Manufacturing Industry in Ireland

Coordinated through Energy Suppliers (natural gas & lpg)

~ Top 300 companies surveyed; 18% response rate

- 89% confirmed Thermal Energy is their primary energy demand and critical to their business
- 87% use gas (natural gas or lpg) as their primary fuel
- 75% confirmed corporate / company specific carbon footprint targets
  - *& renewable gas would be instrumental in supporting them achieving these targets*

- 62% of companies confirmed they are looking to expand their business in Ireland
- 28% had no plans to expand
- 10% plan to expand outside of Ireland
  - *renewable gas supported and accessible in most other countries*

Source : RGFI & Energy Suppliers

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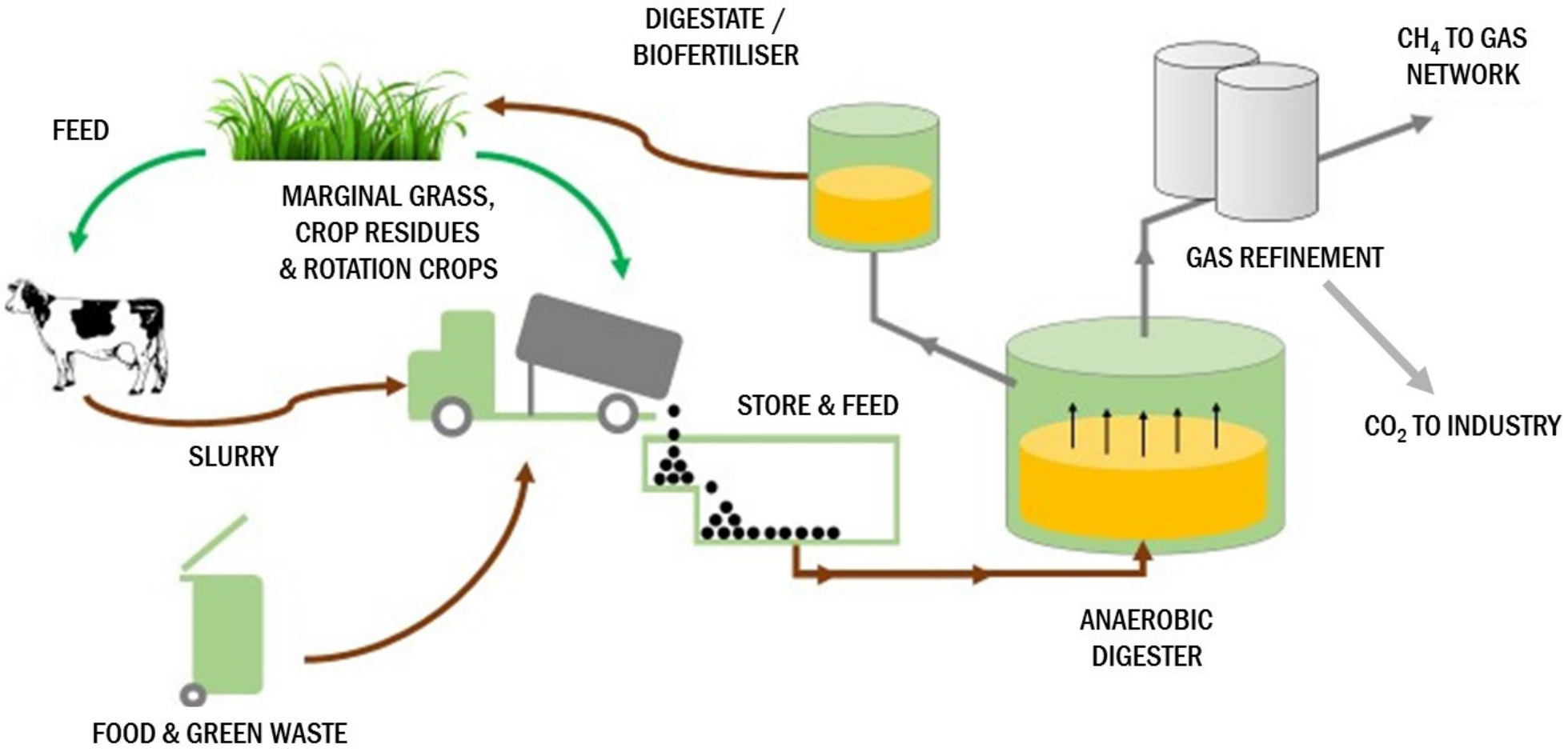
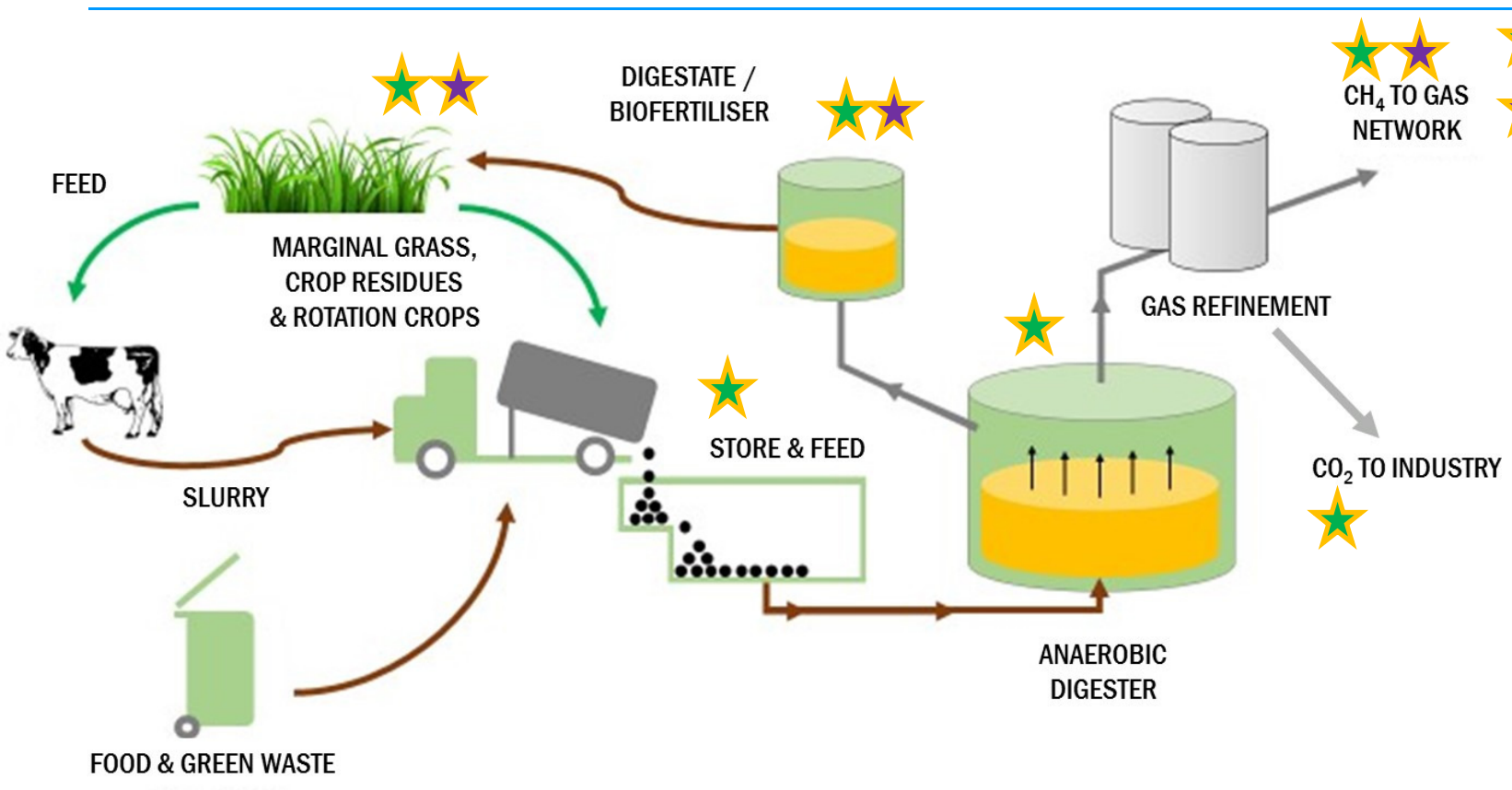
Renewable Gas Production



Renewable Gas (Biomethane)



- GHG Emissions Savings
- Improves soil, water & air quality
- Enhances food productivity
- Boosting rural economy
- Diversifies farm income
- Carbon negative
- Sustainable & indigenous
- Compatibility: No change for the customer
- Secure competitiveness and growth
- Attract & secure FDI
- Security of supply via the national gas network

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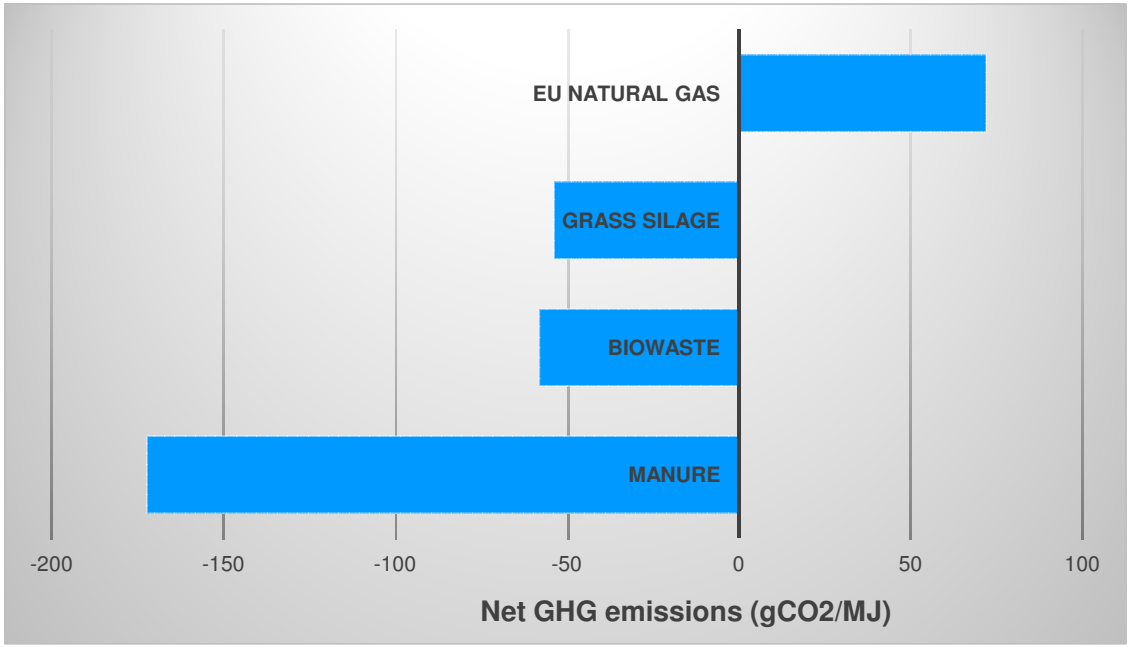
Typical GHG emissions/savings from different sources

- Net Greenhouse gas (GHG) savings from manure biomethane ~140% relative to natural gas (i.e. carbon negative)
- This includes carbon saving from avoided GHG emissions from conventional manure storage as per IPCC guidelines
- Net GHG savings from biowaste biomethane (including agri-food processing residues) ~80% relative to natural gas
- Net GHG savings from grass biomethane ~ 75% relative to natural gas



Data sources for biowaste and manure taken from *"Solid and Gaseous bioenergy pathways: input values and GHG emissions"* JRC. p.162. Available at: https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/solid-and-gaseous-bioenergy-pathways-input-values-and-ghg-emissions

Data for grass biomethane emissions savings taken from Korres et al., 2010, *"Is grass biomethane a sustainable transport fuel?* Biofuels Bioprod, & Bioref. Vol. 4. pp. 310-325

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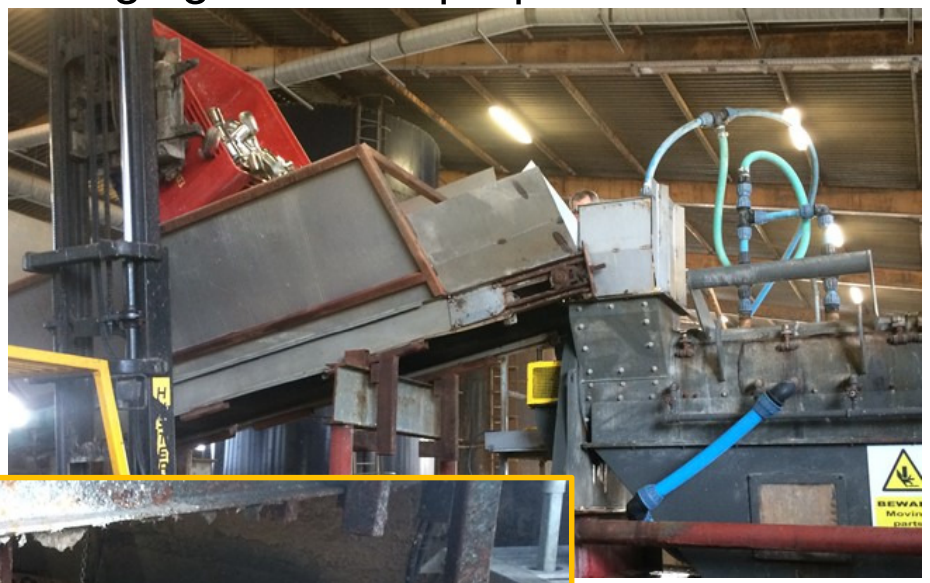
Collaboration project – overview

- Feedstock receiving hall and store
  - Pig slurry, belly grass, spent silage / crop residues, expired supermarket food, and food industry waste.

- De-packaging and feed preparation



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Collaboration project – overview

- Anaerobic Digesters

- Other facilities on site:
  - Digestate pasteurisation & storage
  - Boilers and CHP
- Current phase development
  - Gas purification and separation
  - Thermal energy circulation
  - Gas grid injection facility
  - CO2 processing facility
- Several industry partners
- CH_4 for Manufacturing Industry Client and for use in CNG vehicle trials
- CO_2 for industry applications

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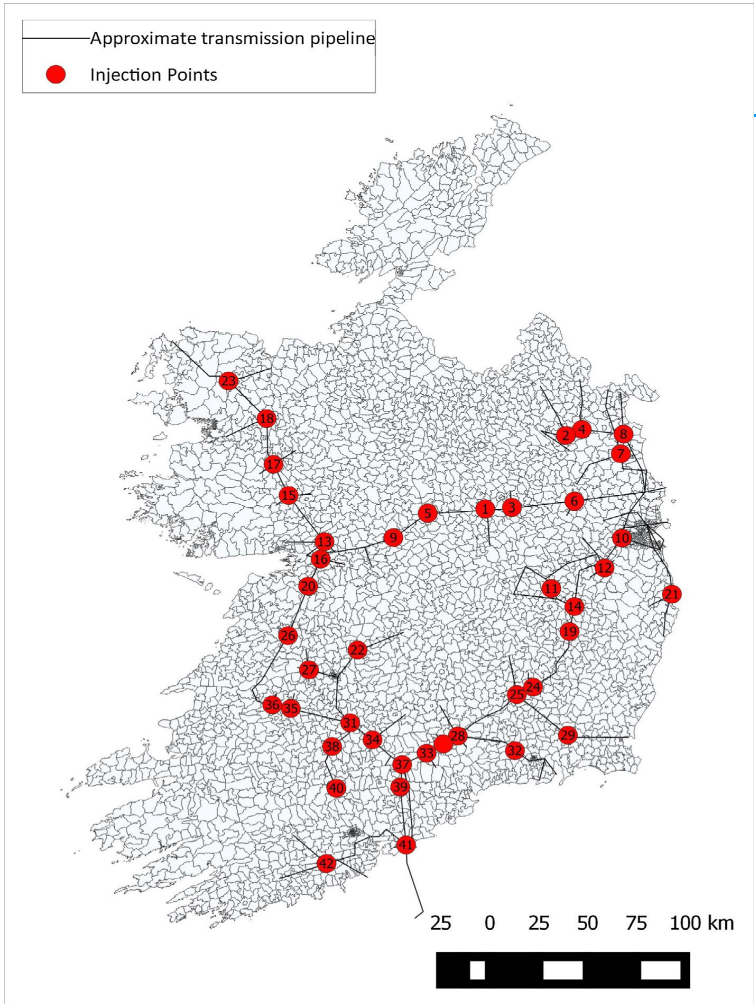
Guidance for the industry



Source:
UCC ERI, MaREI, Teagasc. Funded by SFI & GNI
Researchers: Richard O'Shea, David Wall, Prof' Jerry Murphy, Ian Kilgallon, & James Browne

- **Optimisation study and modelling - UCC MaREI/ERI**
  - Assessment of the impact of incentives and of scale on the build order and location of biomethane facilities and the feedstock they utilise
  - Available feedstock's within economic reach of AD / injection facility
  - Over 40% of available feedstock either on or close to the gas network

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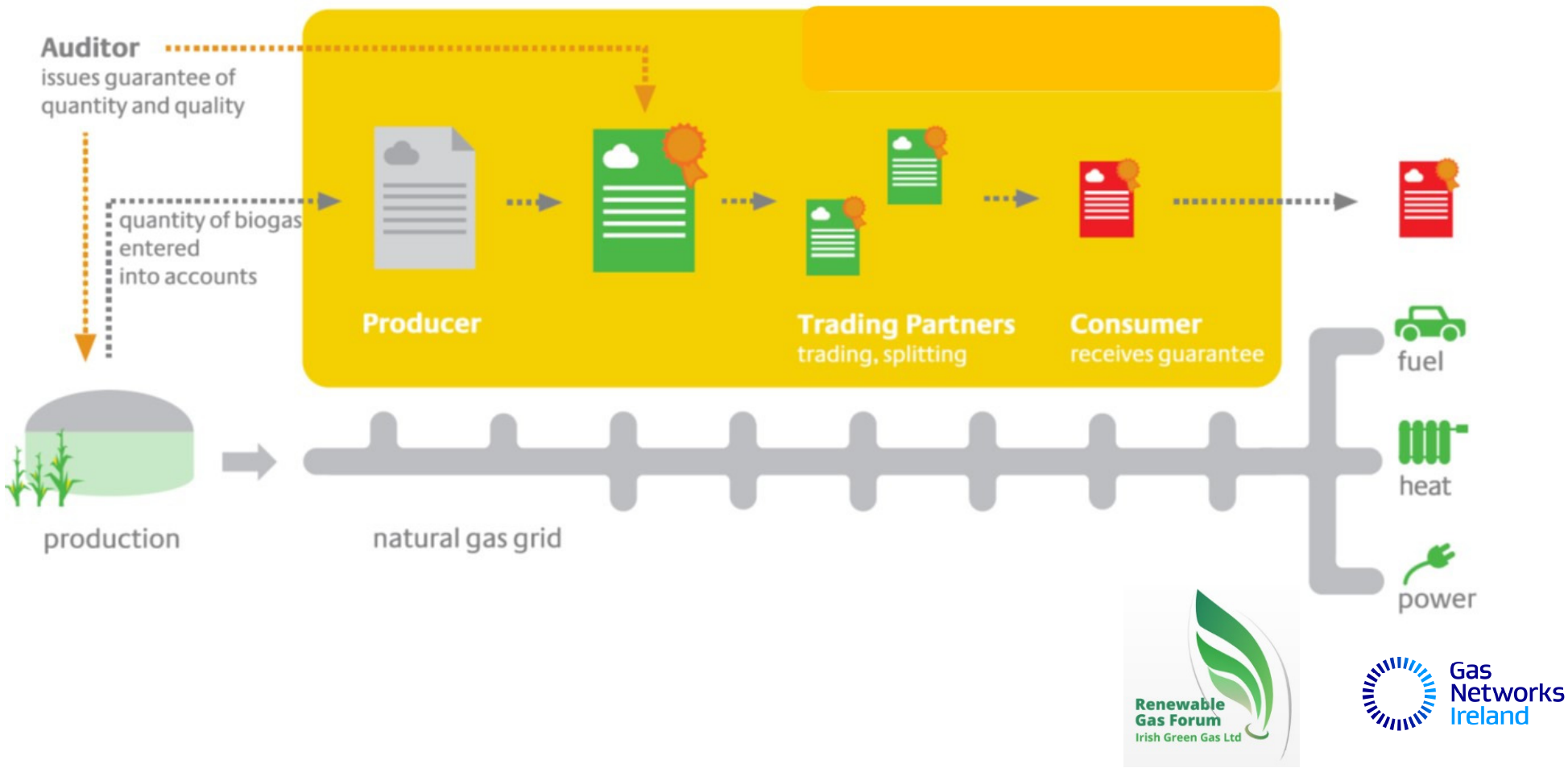
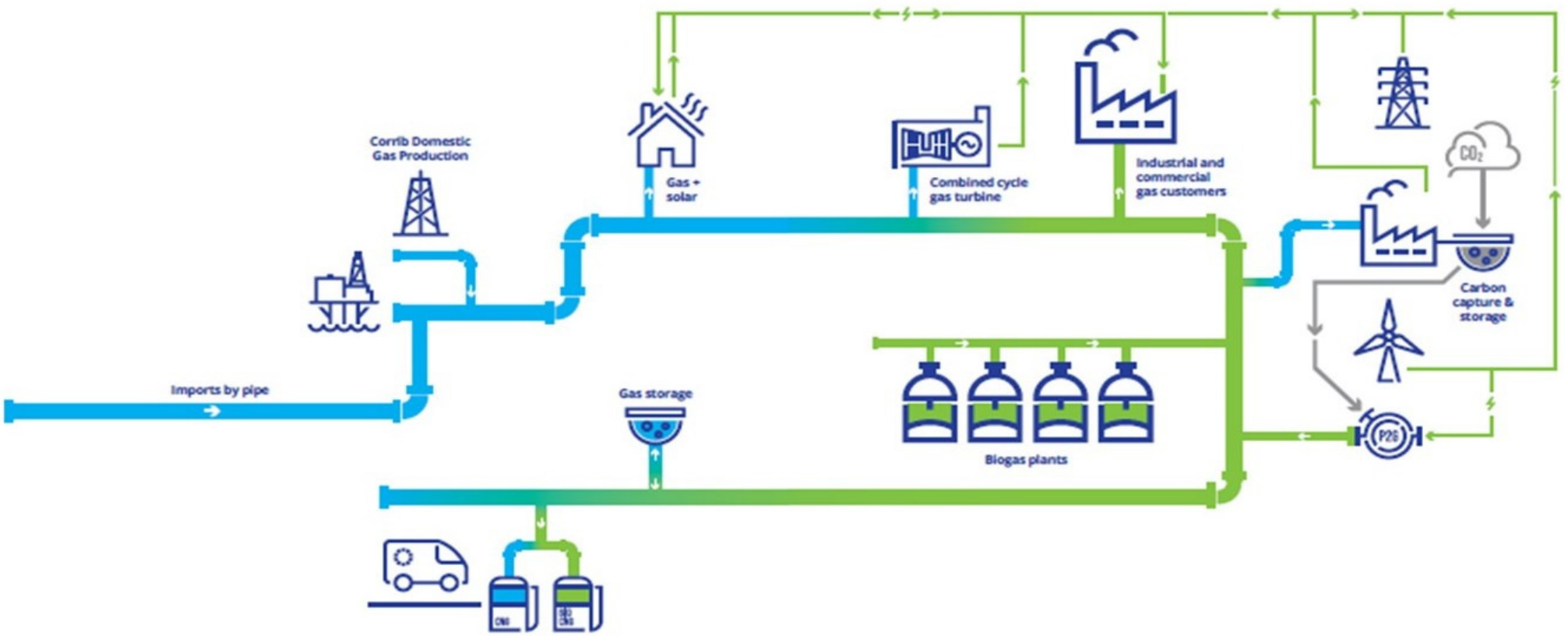
Green Gas Certification



Sustainable Gas Network Vision



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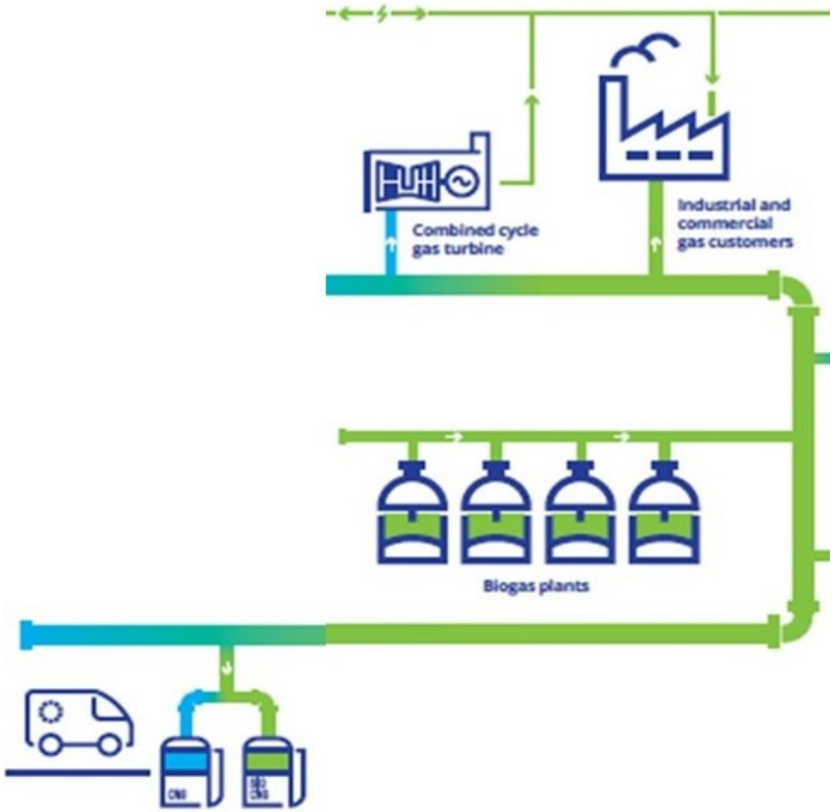
Our Vision for Renewable Gas

- Mitigating climate change needs collaboration across sectors; but significant synergies and opportunities exist.
- Develop a clean, renewable and carbon neutral fuel
- Contributes to security and diversity of gas supply
- Provide a sustainable way of managing organic waste
- Reduce CO_2 emissions by over 900,000 tonnes
- 20% of gas demand can be renewable by 2030
- Over 40% of biogas feedstock's are either on or close to the gas network.
- We want to support a national roll out of renewable gas production and injection facilities
- Initial rollout phase ~ 8 grid injection points across Ireland
- Meet the growing demand for renewable gas from multinationals that have signed up to corporate responsibility obligations with regard to climate change
- Facilitate the use of renewable gas in transport through CNG filling stations.



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Conclusion