The Structure of Industrial Gases Business in the UK

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Global Gases Business
Current Realities of the Industry

- **World-wide the industry reached c. $74 Bn in 2011**
  - excl. equipment sales, wholesales and non-gas business
- **2012 growth has slowed to an estimated $77.5 Bn**
  - Slow volume growth but solid pricing performance
- **Spiritus 5-year forecast sticks to a 7-7.5% CAGR growth**
- **The industrial gases business may have become global but is executed on a local basis**
- **Capex requirements very dependent on business mix (on-sites v bulk v cylinder) and demand for gases**
- **Consolidation Continues across the world**
- **Industrial gases remains moderately profitable**
  - c 16-17% EBIT but provides consistent shareholder value.

History of Industrial Gases in the UK

- Industrial gases first manufactured in the UK in 1886 by the Brin Brothers
  - Oxygen produced using a barium oxide process
    - Lamplight in theatre lighting
    - Major market emerged in 1903 with the invention of oxygen acetylene cutting process
  - Carl Von Linde developed the cryogenic process
    - Process licensed by the Brin Brothers
    - Basis of production to this day
- Industry developed as mass production was needed in both world wars for munitions manufacture
- In the 1950's increase in demand for cars, white goods etc and improved methods of steel production increased demand for industrial gases
  - Plants capable of producing 50-100 tpd were the norm
  - By the mid 1970's plants capable of producing 750 -1000 tpd were supplying British steel with oxygen through pipelines direct to their furnaces
  - Production trains supplying 3-5000 tpd are now possible

Safety

- The main hazards associated with liquid nitrogen are
  - Cryogenic temperatures
    - Double walled vacuum insulated vessel
    - Personnel protection insulation and barriers/fences
  - Asphyxiation
    - No confined spaces or low points for cold gas to collect in the event of a leak
      - Small leaks quickly disperse
    - Use of oxygen monitors
- Liquid Nitrogen storage systems are covered by internationally recognised codes of practice produce by The European Industrial Gases Association (EIGA) and the British Compressed Gas Association (BCGA)
- Less Hazardous than petroleum products and as such would not materially increase the level of risk on a public service station or a refuelling facility on an industrial premises.
  - Customers provided with appropriate safety and maintenance training

Economic Dimensions of the Industry

- Industry turnover in 2011 ~£ 1.25 billion
  - Low growth in the UK; however worldwide this is a vibrant industry with growth in the region of 7%
  - The main players are Linde/BOC, Air Products ,Air Liquid & Messer
    - All are very professional competitive organisations
- Three main types of supply by revenue
  - Pipeline and onsite plant : 20%
  - Liquid Deliveries: 32%
  - Cylinders and Packages: 39%
  - The balance of revenue is made up from equipment supplies e.g. welding consumables, regulators etc.

Locations of the Major Facilities

- The main users of industrial gases are
  - Steel manufacturing/metallurgy/electronics
  - Chemicals, refining, pulp & paper
  - Food

- Production is focussed around the main industrial conurbations
  - Glasgow/Motherwell
  - Teesside
  - Manchester
  - Sheffield
  - Scunthorpe/Hull/Eggborough
  - Margam
  - Thame/Didcott
  - Fawley

Production Capabilities

- Today the UK industry typically supplies
  - Pipeline Oxygen : 8000 tpd
  - Pipeline Nitrogen: 4200 tpd
  - Liquid Oxygen: 1100
  - Liquid Nitrogen: 3800
  - Liquid Argon: 360
    - There is an estimated 8500 tpd of off – peak gaseous nitrogen available for liquefaction
      - Exact quantities could only be determined after detail discussions with the industrial gas producers

- To minimise operating costs and maximise the use of off-peak electricity prices most liquefiers are run at night
  - Theoretical excess liquid production capacity of ~ 40%
    - Would need to be operated during the day at peak power prices

Power Storage

- The industrial gases industry uses mature and reliable technology
  - Plant availability of > 99.5% is not uncommon
- Liquid air plants and power storage units would use almost identical equipment and technology
- The initial plants could be located on existing industrial gases facilities
  - Some spare land available
  - Grid connections in place
  - Experienced operational and maintenance staff
  - Link with the existing remote operations infrastructure

Liquid Nitrogen Network

- Currently 5,500 -6000 storage tanks installed on customer sites
  - Liquid deliveries by a fleet of ~ 400 tankers
    - Carrying capacities of 5-22 tonnes
  - Tanks serviced by a network of regionally based project and maintenance engineers
  - Between 10 and 15 % of the tank population are churned or moved every year
    - New installations/contract terminations /refurbishments
    - Well established and efficient process
      - National crane hire contracts

Liquid Nitrogen Network

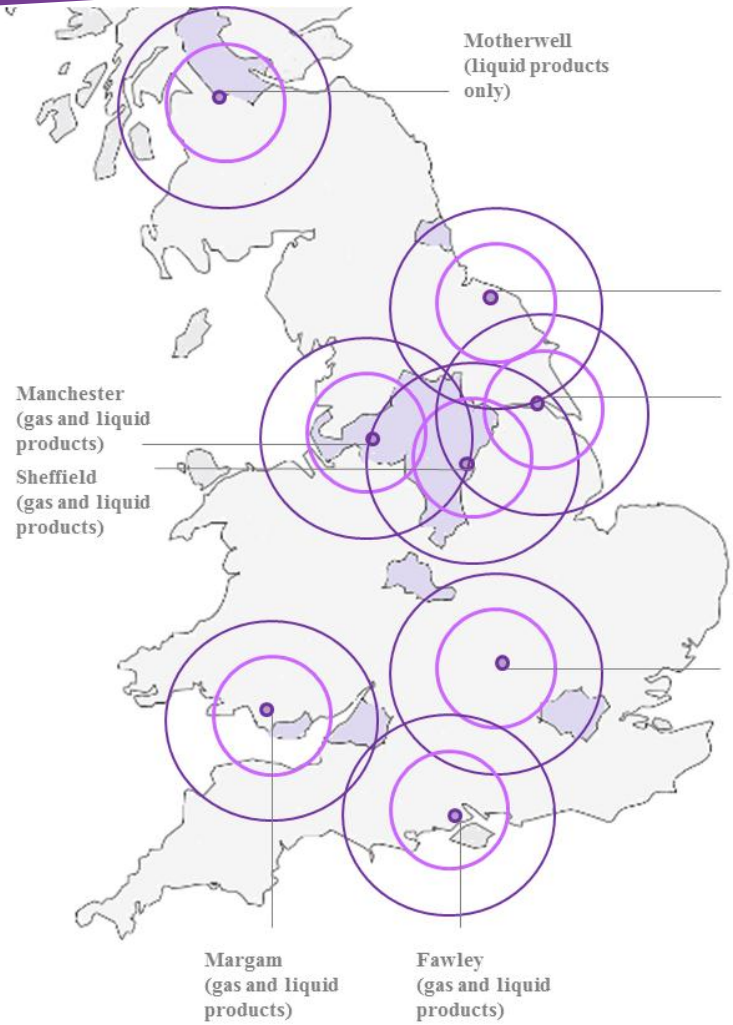
- A new tank could be installed on a distribution site, bus depot or service station forecourt with ~ 2 weeks
  - Industrial gas companies would see this process as a normal part of their business activities
- The following maps demonstrate how the existing production and distribution infrastructure and the motorway network all link in
- Refuelling systems will need to be designed; however these will be standardised units brought to site packaged and ready to drop in.
  - Fuel or LN usage can be remotely monitored
  - Deliveries automatically scheduled
  - Accurate cryogenic flow metering available

Liquid Nitrogen Network

Key:

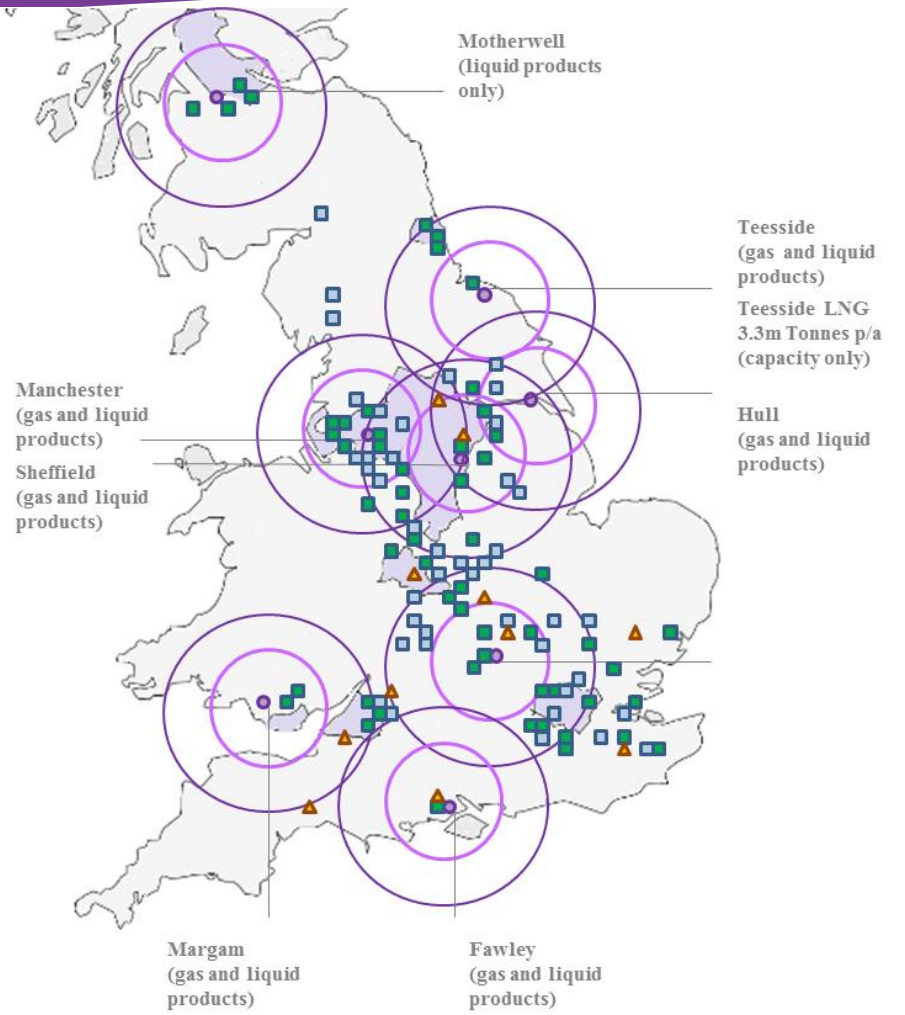
- Urban Areas (around major UK cities)
  Cities >350,000 people

Liquid Nitrogen Network



Key:
Urban Areas (around major UK cities)
- Existing Industrial Gas Production Site

Liquid Nitrogen Network

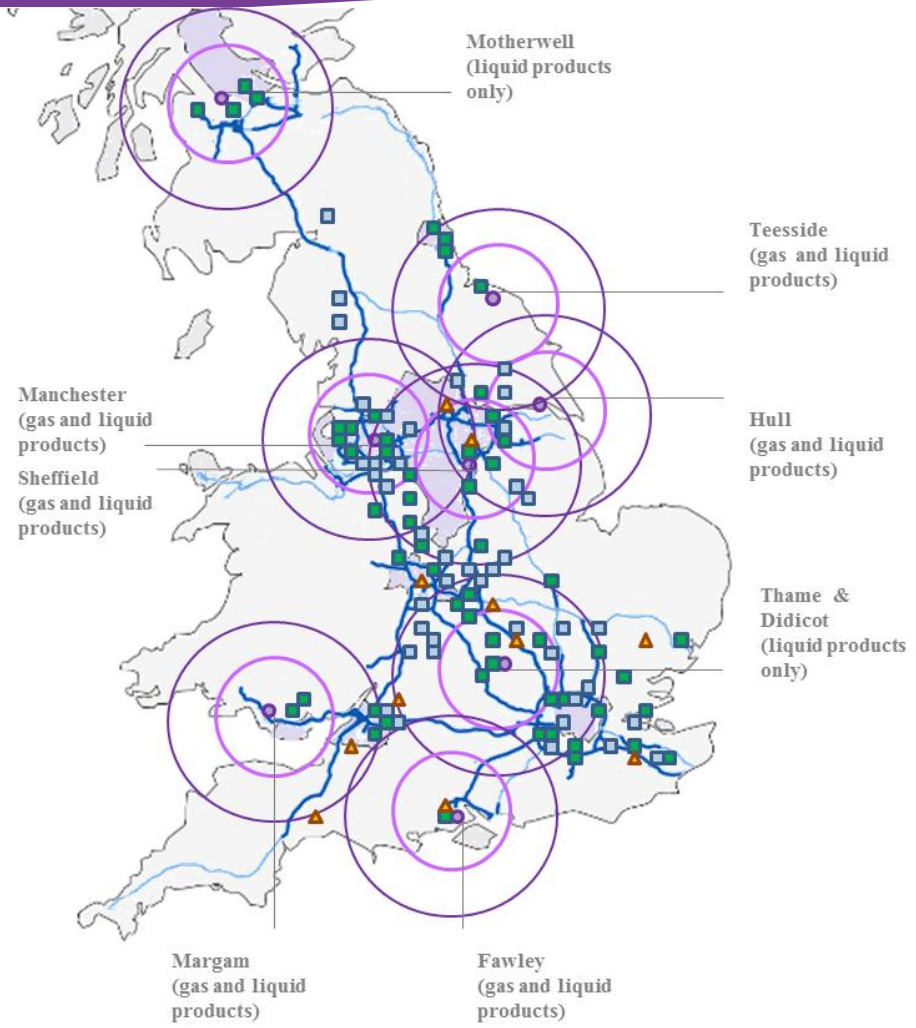


Key:

Urban Areas (around major UK cities)

- Existing Industrial Gas Production Site
- Supermarkets Distribution Centres (incl. Sainsbury's, Asda, Waitrose, Tesco)
- Hauliers Warehouses (incl. Eddie Stobbart, Nobert Dentressangle,)
- Hauliers Truck Depots (incl. Nobert Dentressangle)

Liquid Nitrogen Network



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Typical Customer Installation

Summary

- The Industrial Gases Industry is well positioned to fully support Liquid Air in the energy and transport sectors from within their existing businesses and operational frameworks
  - Mature and reliable technology
  - Production capacity and feedstock available to support the installation and operation of energy storage facilities.
  - Infrastructure and distribution network already in place to support the transport industry
  - New plant and equipment can be manufactured and installed using reliable technology within the existing supply chain
  - The properties of Liquid nitrogen are well know and are governed by internationally recognised codes.

Thank You

Q&A Time!