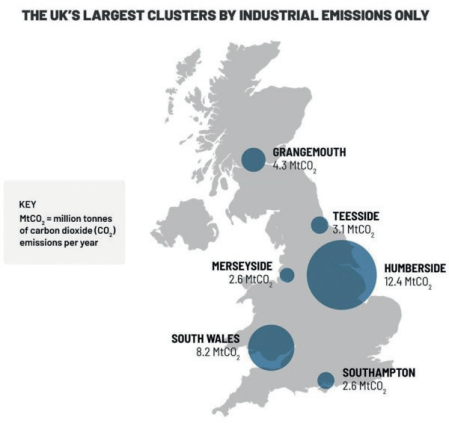
Decarbonisation

Emerging into a post-lockdown world of reduced demand and disrupted supply chains, it may be difficult to remember that climate change was one of the headline issues at the turn of the year. Decarbonisation is one part of the climate agenda and - for those who have attended a few on-line seminars during lockdown - hydrogen is not the only game in town.

The UK Government is investing to support industrial decarbonisation through University-based interdisciplinary research centres, such as The Industrial Decarbonisation Research and Innovation Centre (IDRIC) at Heriot-Watt University in Edinburgh. Part of IDRIC's role is to work closely with the UK's 6 major CO2-emitting industrial clusters to address the challenges of industrial decarbonisation. These include Merseyside



"Source idric.org" {Industrial Emissions UK.jpg}

How can my company decarbonise?

1. Become more energy-efficient

Energy savings lead to CO2 emissions reductions. Clean Growth UK https://www.clean-growth.uk/ whose northern hub is at Liverpool John Moores University, is one of several "free at the point of use" initiatives to help enhance resource efficiency: water, raw materials or energy. LJMU also offers support outside the CGUK wrapper, as do many other Universities.

CGUK offers workshops (formerly 2-day face-to-face, now virtual and spread over four weeks) followed by a free audit, which often find savings with zero or minimal capital investment.

Investing in Combined Heat and Power (CHP) often has a 2-3-year payback, according to Alex Marshall, Group Marketing and Compliance Director of CNW Member Clarke Energy at a recent webinar. CHP reduces CO2 emissions relative to electricity supply via the grid and provides stability against electricity power outages.

2. Substitute (Fuel Switching)

Air, water and ground-source heat pumps are all available for domestic and commercial space heating. Small scale on-site renewable electricity could include wind turbines or the almost ubiquitous solar PV array on the roof. Many of these can be purchased on the internet, but they can also be optimised with expert support (see above), which could include an assessment of batteries or other energy storage solutions.

3. Re-model the process

At the simplest conceptual level, this can involve directing waste process heat into space heating. More radically, it involves complete process re-design.

- Glass Futures in St Helens will establish a 30 tonne/day low carbon glass-melting furnace, supported by the Liverpool City Region and St Helens Borough Council.
- BASF is developing a (green) electrically-powered steam cracker. According to BASF's Corporate Affairs & Sustainability Director, Geoff Mackey, "If we could utilise renewable electricity instead of the natural gas to heat our crackers world-wide, BASF's CO2 emissions could be dramatically reduced, perhaps by as much as 90%."
- Steel producers are considering molten oxide electrolysis (the process by which aluminium is manufactured) as an alternative to smelting iron oxide with coke.

This is an interesting case in point. As energy production becomes decarbonised, the products of the chemical reactions become the major source of carbon dioxide, so why not...

4. Re-use the greenhouse gas

Utilisation is the "U" that has appeared in the last few years as CCS (Carbon Capture and Storage) has transformed to CCUS.

The UK-government supported Sustainable Aviation Fuel initiative, has supported several waste gas (usually CO/CO2 mixtures) to hydrocarbon processes towards commercialisation.

See **https://admin.ktn-uk.co.uk/app/uploads/2020/02/SAF-SIG-Report-Final.pdf**

Locally, Tata Chemicals Europe received planning permission and UK Government financial support in mid-2019 to build a demonstration-scale carbon capture and utilisation plant in Northwich. Flue gases from its CHP plant will be captured and CO2 extracted for use in food and pharmaceutical grade sodium bicarbonate manufacture.

According to Geoff Mackey, BASF is looking at chemistry to utilise CO2 as a feedstock for sodium acrylate manufacture.

Where can I start? Industrial Energy Transformation Fund

Innovate UK is running a competition with two strands on behalf of BEIS, with up to £30m available.

- "Studies" cover feasibility or engineering studies to develop either an energy efficiency or a deep decarbonisation project that enables possible subsequent deployment.
- "Deployment" projects must deploy technologies to improve the energy efficiency of industrial processes.

Applications for both close on 28 October.

https://apply-for-innovation-funding.service.gov.uk/

Trevor Gauntlett (trevor@gauntlettconsulting.co.uk) is an independent consultant in the Lubricants industry, a freelance science and technology writer and Secretary of the Chemical and Industrial Consultants Association (CNW Member).