

# Chemical Sciences Scotland

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 **Scottish Enterprise**

# Scotland's Industry Leadership Groups

Aerospace, Defence & Marine Advisory Group

**Chemical Sciences Scotland (CSS)**

Construction Scotland (CS)

Digital Media Advisory Group

Financial Services Advisory Board (FiSAB)

**Life Sciences Advisory Board (LiSAB)**

National Textiles Forum

Scotland Food & Drink

Scottish Energy Advisory Board

Oil & Gas Industry Advisory Group

**Renewables Industry Advisory Group**

**Thermal Generation and Carbon Capture and Storage Industry Advisory Group**

Scottish Forest & Timber Technologies Advisory Group (SFTTAG)

Technology Advisory Group

Tourism Leadership Group



## Objectives of CSS:

*‘To sustain a vibrant and competitive Scottish Chemicals industry, which will contribute to the growth of Scottish Economy consistently over the 20 years’*

### Exports

Increase manufactured exports by 50% by 2020

### Low Carbon

Developing & manufacturing innovative products processes & solutions which reduce GHG emissions over total product lifecycle

### Collaboration

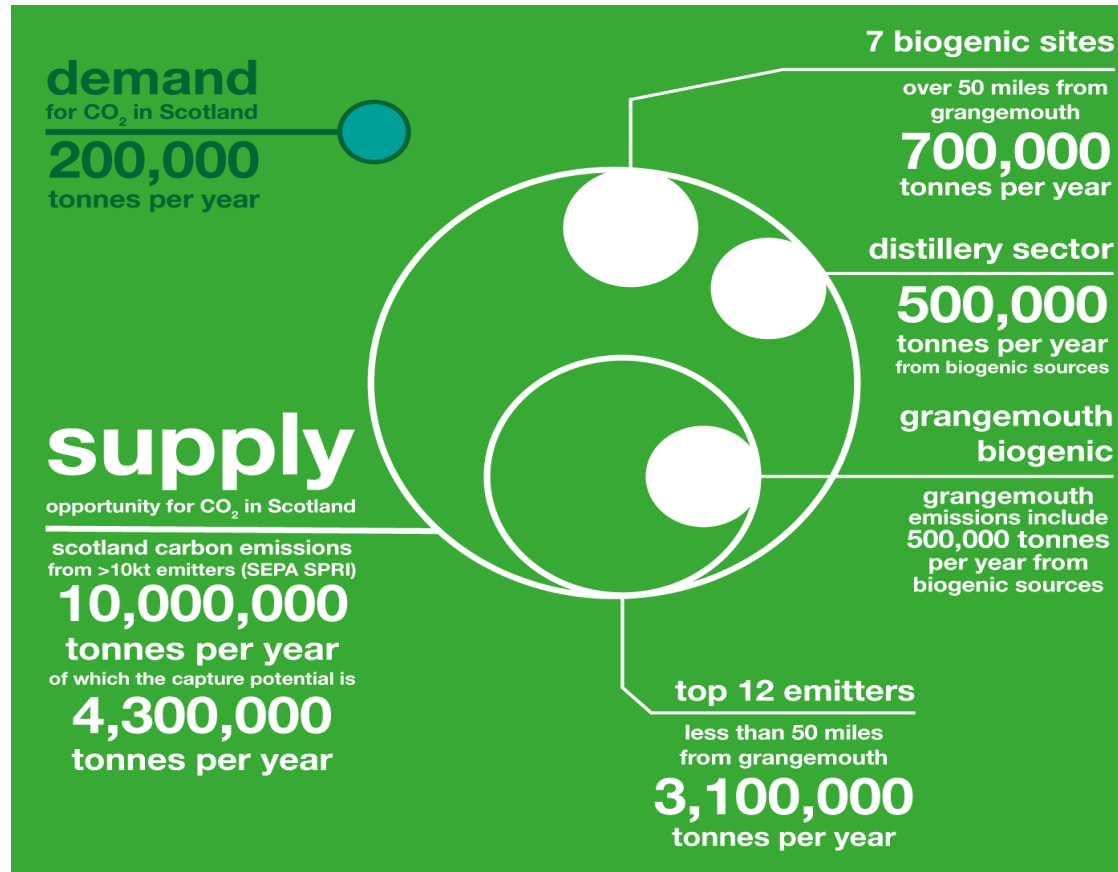
Within the chemical sciences sector with other dependent sectors

# Why Scotland is focussing on CO<sub>2</sub> Utilisation

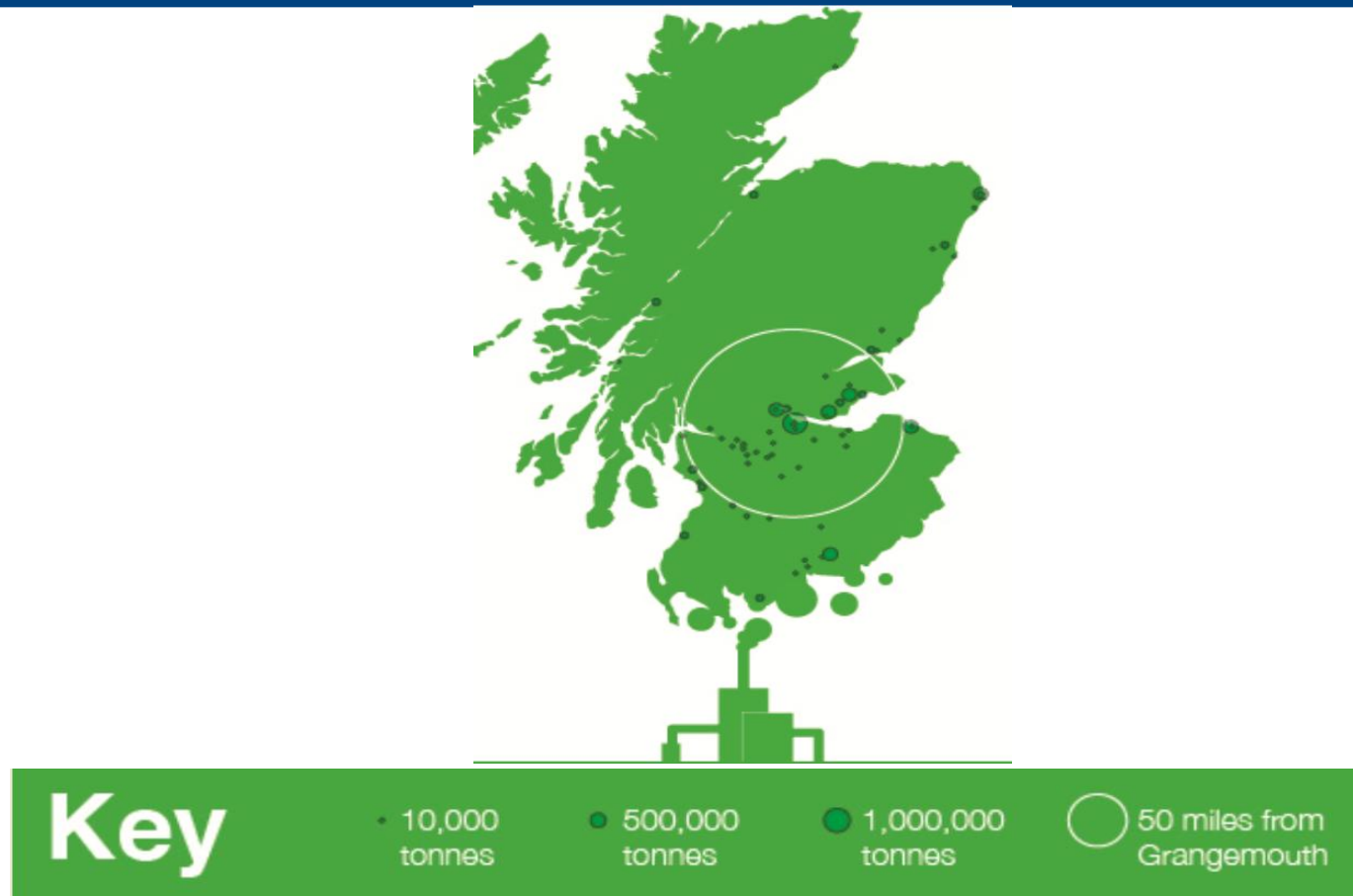
Scotland has at least two world class advantages when it comes to the utilisation of CO<sub>2</sub>

- It has prime geographical access to a world class CO<sub>2</sub> storage sites
- It has a world class food and drink sector that provides an ongoing source of high quality biogenic CO<sub>2</sub>. It is thought that this will be at the high end of international comparisons on a per capita basis.
- It also has a successful program of triple helix activity in the Industrial Biotechnology program that provides a potential example to similarly develop the CO<sub>2</sub> utilisation sector

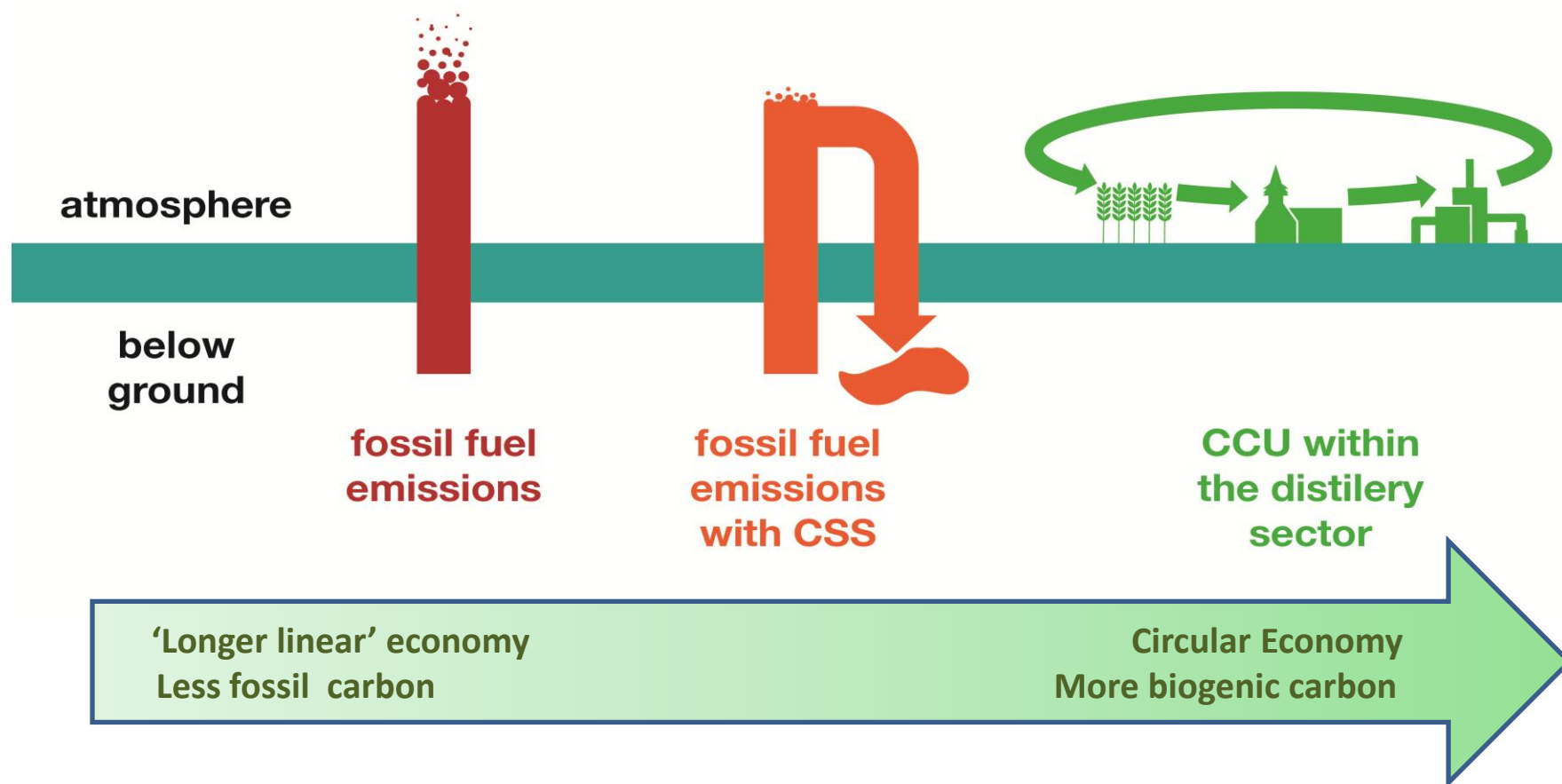
# Scottish CO<sub>2</sub> quantified



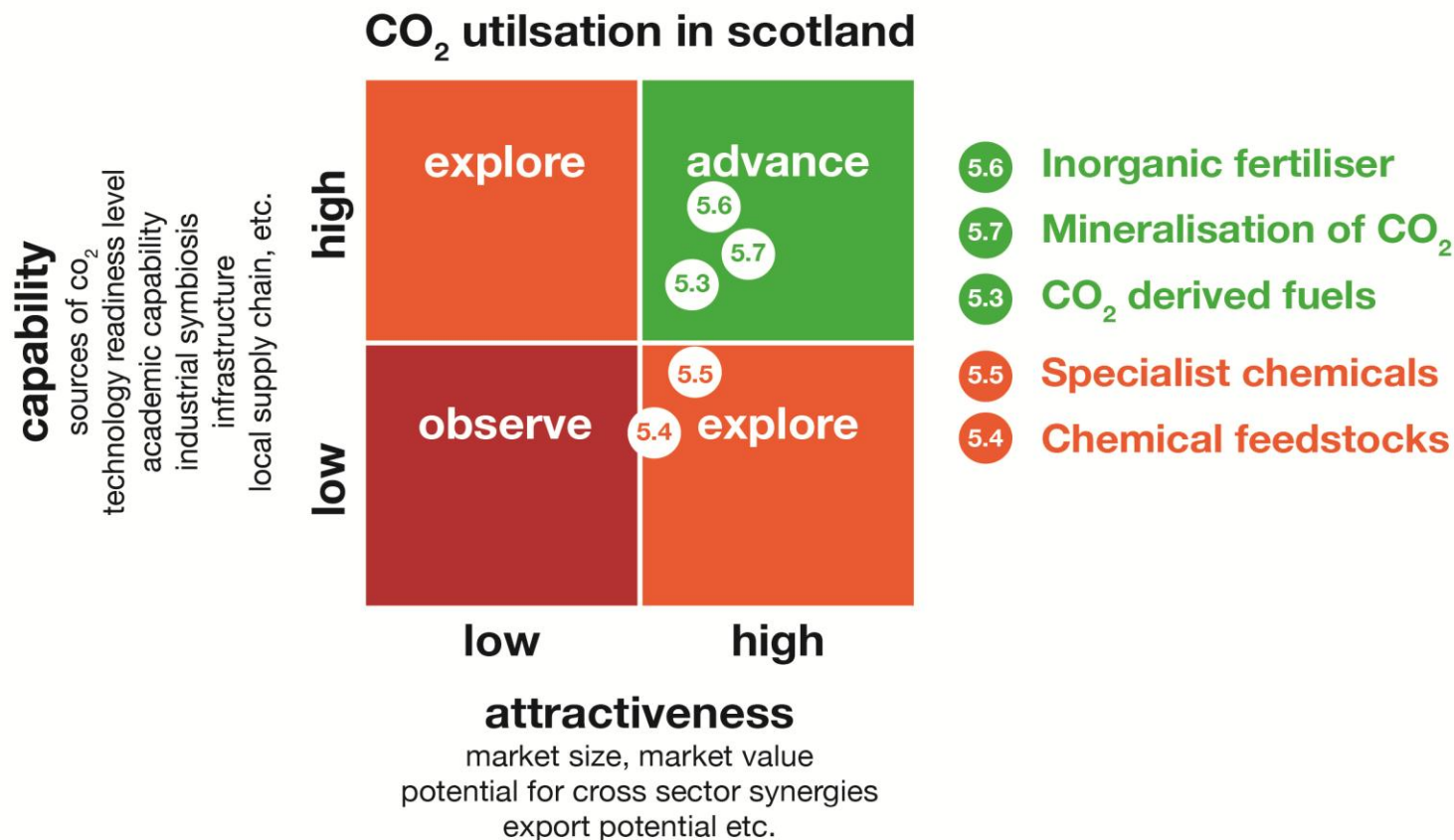
Most CO<sub>2</sub> is within 50 miles of our largest manufacturing site



# A range of options: Emit, Mitigate, Utilise



# There are a number of options for CO<sub>2</sub> utilisation





# CCS and CCU have very different scales of deployment

Whilst the applications for CO<sub>2</sub> are varied, the potential near-term demand for CO<sub>2</sub> relative to the scale of supply of Scotland's CO<sub>2</sub> emissions is low, to the extent that **CCU should NOT be considered an alternative to CCS when looking to tackle and mitigate the scale of Scotland's CO<sub>2</sub> emissions..**

- **Scottish CCS Expertise**

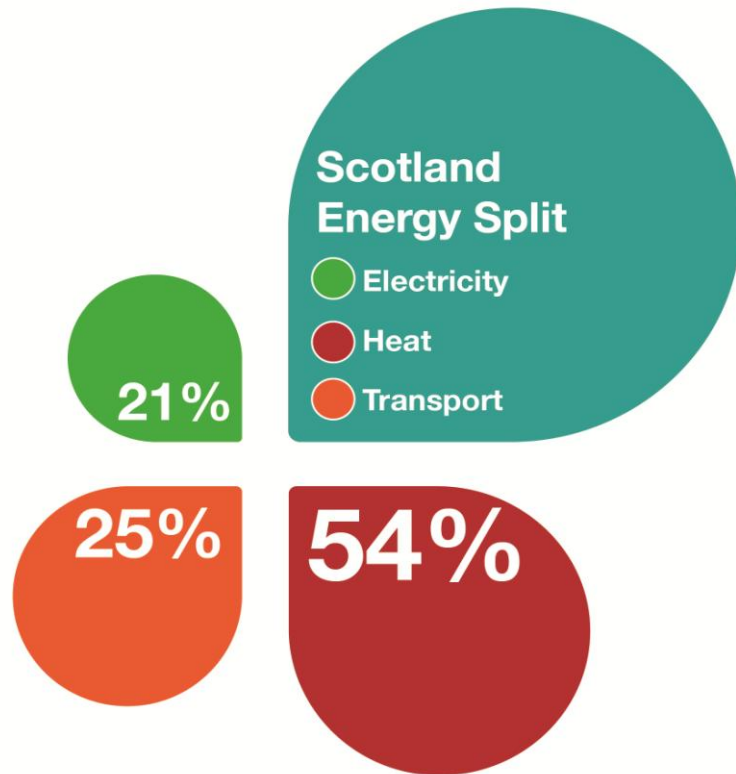
<http://www.sccs.org.uk/>

- ***European scale* resource / opportunity**

<https://youtu.be/Bi3-k6wfXh8>

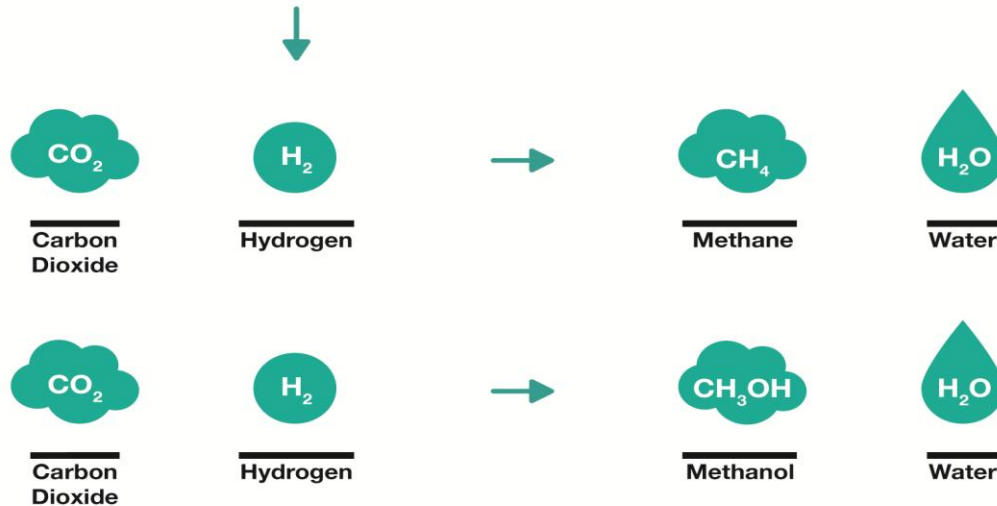


# Energy issues



- Biggest demand is heat
- Very ambitious climate targets
- Significant constrained renewable energy
- Burgeoning tidal energy industry
- Variable Interseasonal energy demand
- New Scottish strategy will include Energy Storage
- Potential for Utilisation solutions!

## An option would be to produce chemicals

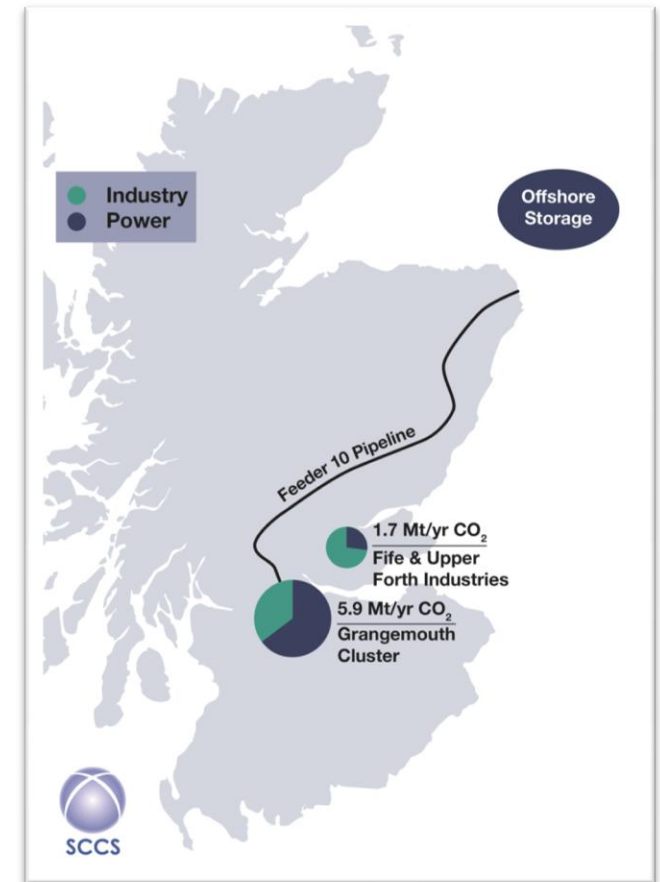


Currently Scotland imports an estimated £200m of fertiliser each year.

An opportunity?

# Grangemouth

Grangemouth is clearly the location for any longer-term strategic aspiration to create a CO<sub>2</sub> Utilisation hub of scale in Scotland, as the location houses the majority of Scotland's large emitters and has straightforward tie-ins to identified potential CCS infrastructure. Grangemouth is Scotland's largest manufacturing region, with a deep and broad chemical sciences knowledge base and its associated supply chains. Half of the 20 largest Scottish carbon emitters are in the Grangemouth Region, with 12 CO<sub>2</sub> emitters within 50 miles of Grangemouth producing CO<sub>2</sub> with an estimated capture potential of 3.1 million tonnes per year. As Grangemouth develops its potential as an Industrial Biotechnology cluster, there are likely to be synergies and industrial symbiotic opportunities that use CO<sub>2</sub> to provide additional value.



# Advantage Scotland

Scotland has a number of advantages for the development of a CO<sub>2</sub> Utilisation Sector

- Abundant biogenic CO<sub>2</sub>
- A vibrant CCU, hydrogen and CCS academic community
- World class renewable energy resources
- Industrial Biotechnology synergies & strategy
- Grangemouth connection to proven European scale CCS infrastructure

## NEXT STEPS

- Make things happen!
- Still early days
- Build multi-sector delivery team
- Find partners

Industry Leadership Group



Chemical Sciences  
**SCOTLAND**

***CSS is the voice of the Chemicals  
Sector in Scotland***