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# UK's International CCUS Programme

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Department for  
Business, Energy  
& Industrial Strategy

# Presentation Overview

## 1) Background

2) UK CCUS Policy

3) UK International CCUS Support

4) CCUS Deep Dive Workshop

# Background: UK's International Climate Finance (ICF)

- Since 1990, the UK has **reduced its emissions by 42% whilst growing its economy by 67%**
- The UK's **low carbon economy could grow 11% per year** between 2015-2030. Currently there are 430,000 low carbon jobs in the UK. We published our [Clean Growth Strategy](#) in October 2017
- The UK's [International Climate Finance](#) uses Official Development Assistance (ODA) to help developing countries to tackle climate change and move to sustainable economic growth
- We spent **£3.87 billion (~US \$5.15 billion)** of ODA on international climate finance between 2011-2016 and **£5.85 billion (~US \$7.79 billion) between 2016-2021**. This delivers the UK's share of the US \$100 billion/year by 2020 climate finance commitment under the Paris Agreement

  
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# Background: Evidence Base on CCUS

## Evidence review

- **12-14% of global decarbonisation efforts** from CCUS to meet 2°C Paris Agreement targets
- **>40% more expensive** (~US \$3.5 trillion) to meet targets without CCUS
- **22 large-scale CCUS plants** globally (37 MtCO<sub>2</sub>/year)
- **16/22 CCUS plants rely on CO<sub>2</sub> utilisation** (e.g. Enhanced Oil Recovery) to improve the investment case

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# UK CCUS Policy: New Approach to CCUS

- ❖ New approach to CCUS: see [Clean Growth Strategy](#)
- ❖ Become a **global technology leader in CCUS**
- ❖ Work internationally to **achieve global cost reductions**
- ❖ **Deploy CCUS at scale in the UK during the 2030s**  
(subject to sufficient cost reductions)
- ❖ **Deployment pathway** to be published in 2018
- ❖ **International collaboration** (e.g. Mission Innovation, CSLF, ERA-NET)
- ❖ **£130 million (~US \$173.1 million) invested in CCUS RD&D** to date
- ❖ Domestic CCUS investments: **£100 million (~US \$133.1 million) CCUS and industry fund** to achieve cost reductions
- ❖ International CCUS investments: **£70 million (~US \$93.2 million) ODA programme** to support non-OECD countries



# UK CCUS Policy: Wider Policies and Regulations

- **Innovation:** UK plans to invest £2.5 billion (~US \$3.3 billion) in low carbon innovation between 2015-2021
- **Coal Phase Out:** UK will phase out unabated coal power by 2025. 2012: coal accounted for 40% of UK electricity, 2017: just 7%
- **Powering Past Coal Alliance (PPCA):**
  - Initiated by UK and Canada in November 2017
  - Voluntary coalition of governments, businesses and states committed to ending unabated coal power by 2030 (OECD) or 2050 (rest of world)
  - End of 2017: 58 members (26 countries, 8 states/cities, 24 international businesses)
- **CO<sub>2</sub> Storage Regulations:** Energy Act 2008 and EU Directive (2009/31/EC)



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# UK CCUS Policy: Wider Policies and Regulations

- **Industrial Strategy**: helping businesses to invest in the industries and infrastructure of the future. Includes four grand challenges, including a **Clean Growth Grand Challenge** to create industries for low carbon technology
- **Emissions Performance Standard (Energy Act 2013)**: limits CO<sub>2</sub> from new fossil fuel power stations. Level set at 450gCO<sub>2</sub>/kWh 'base-load' (equivalent to around half that of unabated coal power)
- **Planning Policy (National Policy Statement 2011)**: all new thermal power stations, such as gas power, must be constructed 'carbon capture ready'
- **Carbon Price Floor**: this was introduced at £10/tCO<sub>2</sub>, rising to £18/tCO<sub>2</sub> between 2015-2020 and then projected to rise to £70/tCO<sub>2</sub> by 2030

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# UK CCUS Policy: Current Pilots and Activities

- **ACORN** (Pale Blue Dot): initiate a low-cost full-chain CCUS project in the North East of Scotland
- **ALIGN** (British Geological Survey): joint-industry-led research initiative to support cost-effective deployment by addressing key R&D gaps and industry challenges
- **ELEGANCY** (Imperial College London): develop cost-effective technologies to decarbonise hydrogen through CCUS
- **PRE-ACT** (British Geological Survey): industry-driven initiative to improve strategies for CO<sub>2</sub> storage monitoring and management
- **DETECT** (Heriot-Watt University): improve the evaluation of risks of leakage across faulted and fractured caprocks to inform operators

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# UK International CCUS Support: ODA Support

- **UK is the largest multilateral ODA (aid) investor in CCUS.** Extended our funding by £10 million in December 2017
- **£70 million (~US \$93.2 million)** provided since 2012 to support the development and deployment of CCUS in emerging economies and developing countries
- **£35 million (~US \$46.6 million)** through ADB's CCUS Fund
- **£35 million (~US \$46.6 million)** through World Bank's CCUS Trust Fund
- The [2017 International CCUS Programme Annual Review](#) summarises progress
- **Activities (examples):**
  - CCUS Centres of Excellence
  - Training and knowledge-sharing events (e.g. ACEF)
  - Capacity building workshops to develop CCUS policy and regulatory frameworks
  - Feasibility studies
  - Pilot CCUS projects

# UK International CCUS Support: China

- Since 2012, the UK has supported China through technical assistance activities
- **CCUS pilot projects:**
  - ❖ GreenGen Tianjin project (2012-2017 through ODA funding)
  - ❖ Shaanxi-Yanchang project (2017-present through ODA funding)
  - ❖ Guangdong project (2009-present through the UK's Prosperity Fund)
- **CCUS Centres of Excellence:**
  - ❖ 3 CCUS Centres: Guangdong, Shanghai and Beijing
  - ❖ 5 workshops: 3 in 2013-2014, 1 in 2017, 1 in 2018
- **Policy support:**
  - ❖ China CCUS Roadmap: published in 2015 and CCUS included in 5-year plan
  - ❖ Guangdong CCUS Roadmap (2009): supported through the UK's Prosperity Fund
- **Reports and studies:**
  - ❖ 6 reports: see [UK International CCUS Programme Annual Review 2017](#)

*CCUS Conference and Site Visit, April 2018, Guangdong, China*



# UK International CCUS Support: Mexico

## ➤ *Through the World Bank CCUS Trust Fund:*

### ❖ CCUS pilot projects:

- **US \$4 million programmatic technical assistance** for the preparation of a 5MWe **CO<sub>2</sub> capture pilot** project at the Poza Rica gas power plant
- Supporting the construction of the **CO<sub>2</sub> capture pilot** project
- Supporting the development of a **CO<sub>2</sub> storage pilot** project

### ❖ Feasibility studies:

- **Regulatory framework** for the CO<sub>2</sub> capture and CO<sub>2</sub> storage pilots
  - Transitioning **EOR projects to permanent storage** projects assessment
  - Pre-feasibility study on a **CO<sub>2</sub> post-combustion** pilot capture plant
- ❖ **UK £5 million (~US \$6.7 million) extension** in December 2017 to support CCUS activities in Mexico

  
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# UK International CCUS Support: South Africa

- *Through the World Bank CCUS Trust Fund:*
  - ❖ CCUS pilot projects:
    - Supporting the development of a **CO<sub>2</sub> storage pilot**
    - Supporting the development of a **CO<sub>2</sub> capture pilot**
  - ❖ Allocations:
    - ❖ US \$27.4 million (planning phase)
    - ❖ US \$39.5 million (implementation phase)
  - ❖ **UK £5 million (~US \$6.7 million) extension** in December 2017 to support CCUS activities in South Africa

*5<sup>th</sup> Biennial CCUS  
Conference, October 2017,  
Umhlanga, South Africa*



# UK International CCUS Support: Indonesia

➤ *Through the ADB CCUS Fund:*

- ❖ Supporting the development of a **CO<sub>2</sub> storage pilot in the Gundih area** of Indonesia
  - US \$16.5 million for project due diligence and pilot project development
  - US \$225,000 has been allocated to undertake a feasibility study
- ❖ Supported the establishment of the **CCUS Centre of Excellence** (set up by the ITB and LEMIGAS)
- ❖ Supporting the development of a **draft regulatory framework for CO<sub>2</sub> storage**

*CCUS Legal and Regulatory  
Workshop, October 2017,  
Bandung, Indonesia*



# UK International CCUS Support: New Activities

## ➤ *New and Other Activities:*

### ❖ Through the ADB CCUS Fund:

- US \$1 million CCUS feasibility study in **Pakistan**
- Early discussions with **Bangladesh, India, Viet Nam and Kazakhstan**

### ❖ Through the World Bank CCUS Trust Fund:

- **Decarbonising gas study** to be launched in July 2018
- Expanding the size of the pilot CO<sub>2</sub> capture project in **Mexico** at the Poza Rica gas power plant
- Kick-off workshop for the CCUS activities in Mexico
- Planning a pilot CO<sub>2</sub> capture project in **South Africa**

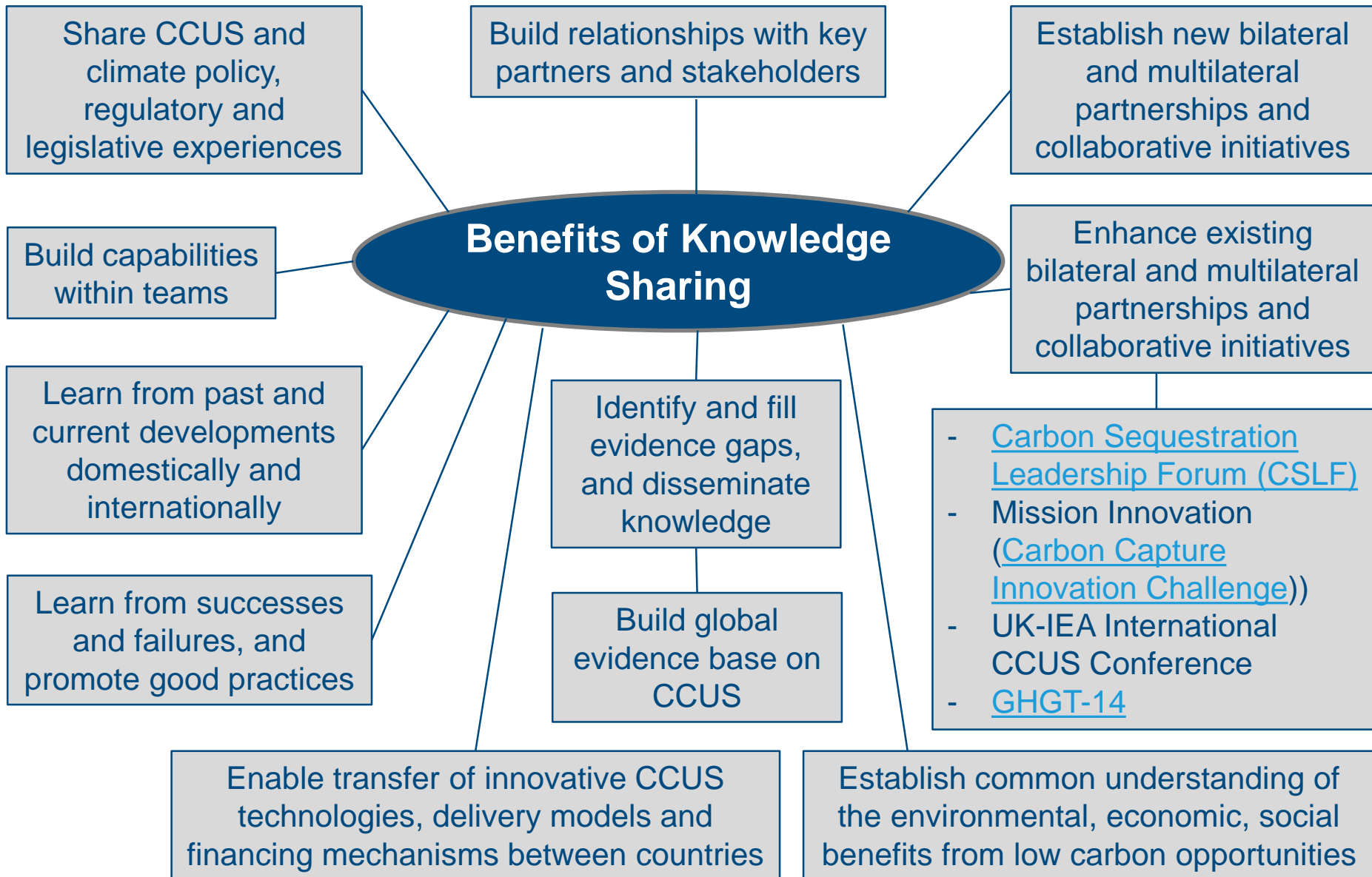


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# CCUS Deep Dive Workshop: Benefits of Knowledge Sharing



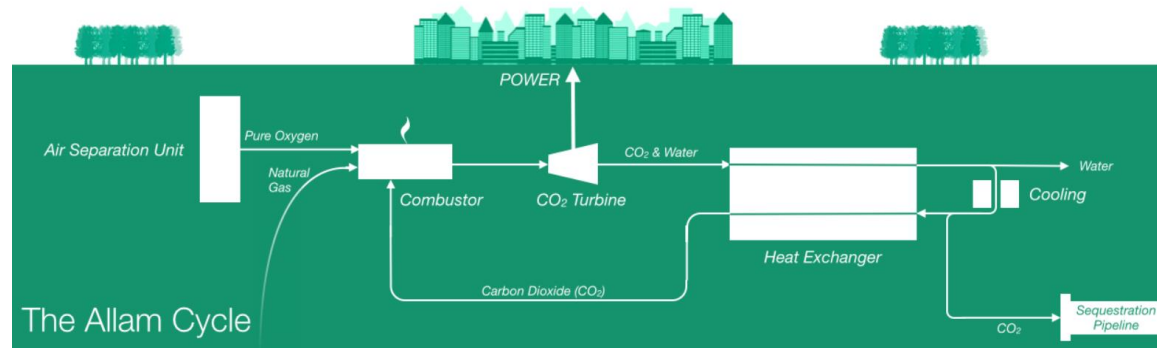
# CCUS Deep Dive Workshop: Key Considerations

## ➤ Improving the investment case for CCUS:

- ❖ Funding for CCUS innovation to reduce costs (e.g. £7.5 million (~US \$10.0 million) to develop Allam Cycle technology)
- ❖ Markets for CO<sub>2</sub> utilisation beyond Enhanced Oil Recovery (next slide)
- ❖ CCUS demonstrations to reduce costs
- ❖ CCUS policy incentives, roadmaps and regulatory frameworks
- ❖ OECD countries becoming donors to CCUS Trust Funds
- ❖ Identifying CCUS strengths against alternatives (e.g. renewables with storage)
- ❖ What delivery models work – UK report due by the end of 2018

## ➤ CCUS has applications beyond the power sector:

- ❖ Decarbonising industry
- ❖ Decarbonising hydrogen production
- ❖ Decarbonising gas processing and gas power



[NET Power](#)

# CCUS Deep Dive Workshop: CO<sub>2</sub> Utilisation Options

