Industrial Decarbonisation Strategy

What it means for the ECITB

March 2021

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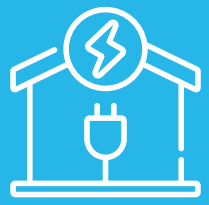
Industrial decarbonisation in numbers

By **2050** the potential for **hydrogen consumption** in the clusters only is 24TWh/yr and the UK hydrogen consumption could be as high as **86TWh/yr**



Electrification could reduce emissions by between **5 $MtCO_2e$ and 12.3 $MtCO_2e$ per year** by 2050

Industrial emissions need to **reduce by 90%** to meet 2050 targets

Adoption of **digital technology** could **reduce CO_2 emissions by 4.5%**

3$MtCO_2$/yr is required to be captured **via CCS by 2030** – CCUS is essential to meeting net zero targets

Over 5 million indirect jobs

2.6 million direct jobs

metals and minerals, chemicals, food and drink, paper and pulp, ceramics, glass, oil refineries and less energy-intensive manufacturing

Contribute 16% of UK emissions (around half from clustered sites)

Up to **4 $MtCO_2e$/yr** by 2050 could be saved in industry by **implementing efficiency measures**

20TWh/yr of fossil fuels **to be replaced with low carbon alternatives** by 2030

Technology & Infrastructure

7 8 9 Building infrastructure will involve collaboration between multi stakeholders. Engineers working on projects will need tools to help them.
PMs will have a need to understand the government policy especially in relation to financing and business models as they emerge

10 Operators at some sites (particularly the dispersed ones) will not be used to working in high hazard COMAH environments – the ECITB will aim to support operators with some of their existing, industry recognised standards

11 New safety training will be needed for operators working
12 with equipment firing hydrogen instead of NG (different flammability properties, safe distances etc.)
13 Longer term biomass may be part of the solution in combination with CCS. It may be useful for individuals to have some knowledge of sustainable biomass and the regulations around the use of biomass as a fuel
14 An increased knowledge among those skilled in working in
15 traditional ECI industries on how sites can be electrified, how costs can be accommodated and flexibility requirements to deal with fluctuating supply from renewable sources

ECITB Implications

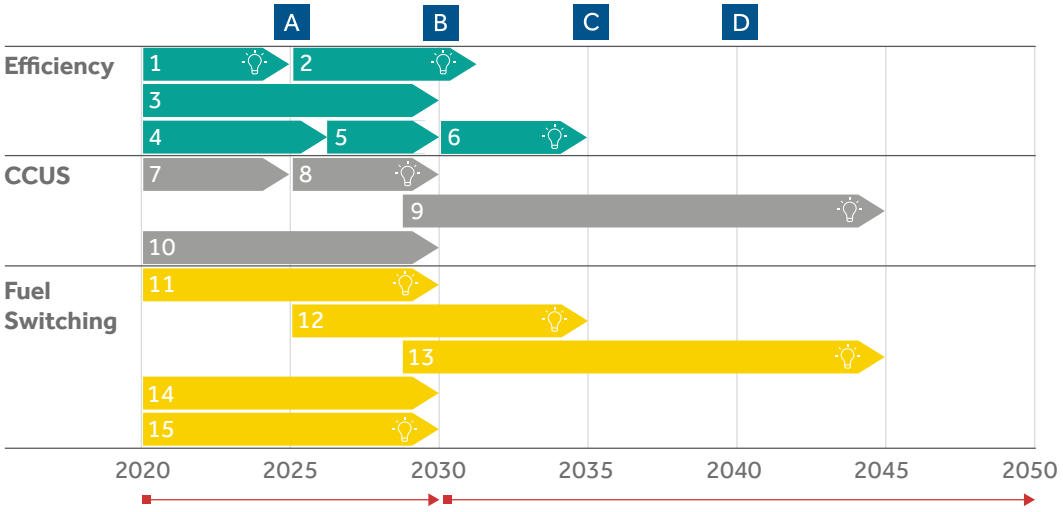
1 Installation and use of digital tech for site based technicians and interpretation of data for engineers as well as awareness of the various available technologies and their potential

2 Circular economy awareness

3 Awareness of energy efficiency technologies for site based qualifications

6 Awareness of heat recovery technologies and opportunities. Applicable for those working at site and those designing for revamps and new sites

Things to watch out for
2022 : Bioenergy Strategy
2021 : Net Zero Strategy
2021 : Hydrogen Strategy
2021 : CCS Sequencing



Low regret actions in the 2020s
Main focus of this strategy

Uncertainty in the mix of technologies in later decades
Actions will need to be reviewed in response to innovation, wider system changes and demand changes

Key:

- A CCUS operational in two clusters (Mid-2020s)
- B Four low carbon clusters (2030)
- C Industrial emissions reduced by two thirds (2035)
- C Share of low carbon fuels increases to around half of total industrial energy consumption (2035)
- D First net zero cluster (2040)
- Icon denotes milestones which require developments in innovation (Chapter 6)

Efficiency

1 Development of industrial digital technologies
2 Increased reuse, recycling and substitution of materials within industry
3 All sites adopt EE technologies with low payback times already available in the market
4 Widespread implementation of improved energy management system
5 Smart reading widely adopted in industry
6 Heat recovery maximised in sites operating with high temperatures

CCUS

7 Build CCUS network infrastucture in the first two clusters
8 CCUS infrastructure expanded to additional clusters
9 CCSU networks expanded to remaining clusters and beyond dispensing on technical development
10 Demonstration of CO_2 capture across a range of industries

Fuel Switching

11 Testing hydrogen as a fuel for heating in industrial process
12 Widespread fuel switching (chosen technology depends on various factors)
13 Fuel switching extends to dispersd sites (hydrogen vs electrification depends on system changes such as repurposing the gas grid)
14 Installation of commercially ready electrification options in low temperature applications
15 Development of high temperature electrification technologies

Ref: HM Government Industrial Decarbonisation Strategy, March 2021, Page 47

Energy Efficiency

Encourage implementation of energy management systems using standards such as ISO50001 and the new ISO50005

Improve heat recovery by supporting through the IHRS* and IETF**

Helping less energy intensive and dispersed sites access energy efficiency measures already available

Communicate what support already exists for energy efficiency in industry better

Support increased resource efficiency and materials reuse as describes in the resources efficiency strategy

SMEs may need support with training on how to implement ISO standards

Energy efficiency technologies and methods should be incorporated into all new qualifications so all new entrants have an awareness

Training should be available to operators, particularly at dispersed sites to help with familiarisation with new equipment

Support to industry on what funding is available and how best to access it

Circular economy related training

*IHRS: Industrial Heat Recovery Support Programme
**IETF: Industrial Energy Transformation Fund

Gov Strategy **ECITB Impact**

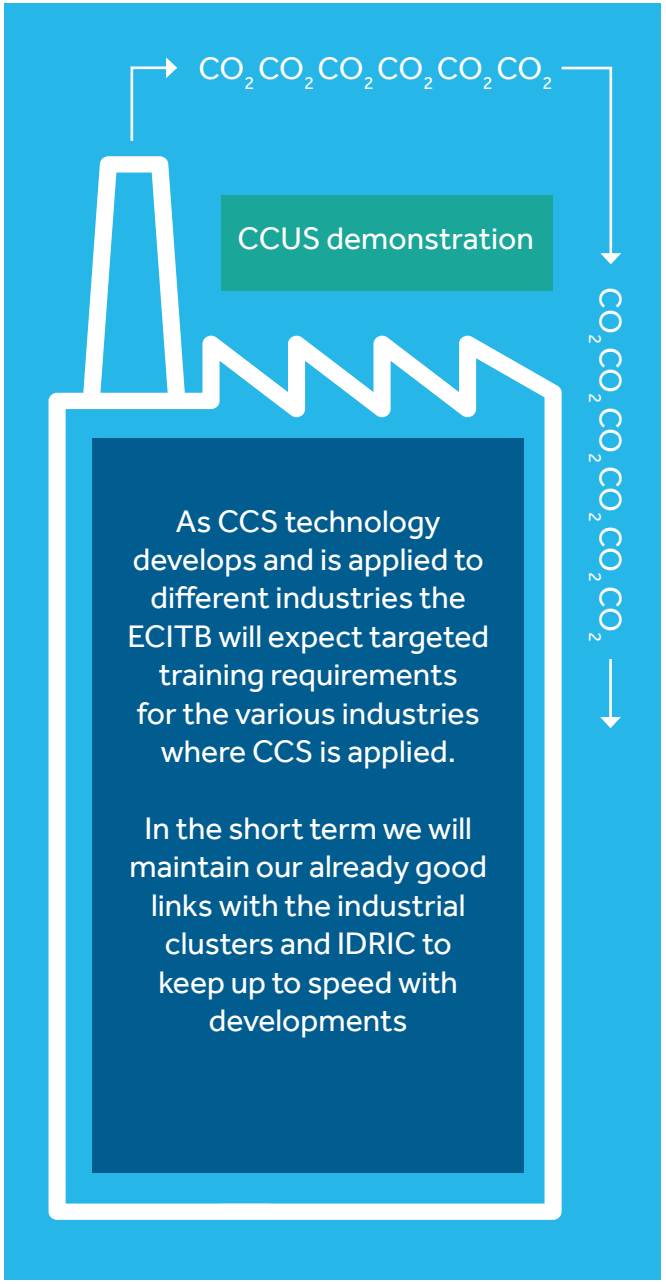
Accelerating Innovation

Supporting research into Fuel Switching

Long Term - End user training

Supporting innovation to develop low carbon products

Long term support training for manufacturing low carbon products. In the interim we will maintain our links with the CCS supply chain group and try to forge links with the AMRC groups



Energy Efficiency via digitalisation

The ECITB recognise that there is a need for people working in the ECI, both mid career professionals and new entrants, to have a good grasp of digital technologies available so that they can identify where they can be best applied in industry and used effectively in the field.

Supporting research into Advanced Technology, for example, SMRs and use of CO_2 from CCS

The ECITB already support the nuclear industry through a range of products and will continue to liaise closely with in scope employers as they develop the design, construction and operation of SMRs

Gov Strategy **ECITB Impact**

Unlocking investment

UK ETS

- Carbon pricing and trading scheme
- 2021 - Review and Consultation
- Businesses out of scope will be subject to Climate Change Levy Extension
- ECITB expect an increase in training demand from employers for carbon accounting and climate strategy as employers are driven by ETS caps

Funding

- Funding for engineering and technical design of CCUS and H2 projects
- Developing contracting models for CCUS, transport & storage and H2
- Increase in general training for CCUS and H2 for design engineers in EDP companies
  Increased interest in local content studies, workforce demand modelling from industrial clusters
  Increased demand for Project Colaboration Toolkit as projects move to pre-FEED and FEED
  Increased demand for training in policy and financing and possible impact on technology development and design

Fuel Switching

- Review impact of barriers to fuel switching and set out any government support by end 2021
- Any government support announced could increase interest from ECITB sectors using fuels such as food & drink and water in training for repurposing equipment and processes or new technology for energy from low carbon fuels

Negative Switching

- £100MM to support R&D for direct air capture technology
- Considering future policy to incentivise deployment
- As technologies develop expect emerging training needs, the ECITB need to continue to connect with employers and technology providers to stay aware of possible new needs in the longer term

Carbon Leakage

- Continue policy of free UKETS allowances to maintain UK industry competitiveness
- Diplomacy to encourage other countries to introduce similar emissions caps
- Review EUs carbon boarder adjustment mechanism when announced in June 2021 and impact on UK trade

Gov Strategy **ECITB Impact**

Things to watch out for in 2021

- More details of funding mechanisms for CCUS and H2
- Industrial Carbon Capture business model finalised
- UK Hydrogen Strategy
- Fuel switching policy

Levelling Up

Support for opportunities outside of the South East

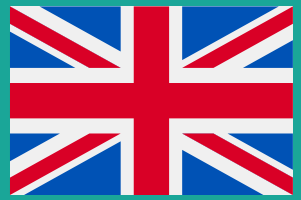
Supporting the transition from high to low carbon jobs based on the outcomes from the Green Jobs Taskforce and Green Apprenticeship Advisory Panel

Encourage investment in the UK

- Office for Investment
- High Potential Opportunities
- Investment Champions
- Freeports

Work with local governments as they develop plans for economic recovery

Work closely with devolved nations and continue to ensure funding takes into account unique challenges of different areas



Net Zero by 2050

Things to watch out for in 2021

- Green Jobs Taskforce findings
- Green Apprenticeship Advisory Panel findings
- Local economic plans and strategies for recovery

Gov Strategy **ECITB Impact**

ECITB need to ensure that training is geographical to take full advantages of the new opportunities emerging across the UK

Getting Consumers to Choose Low Carbon

The government will develop a proposal by 2023 on how reporting of emissions associated with individual products can be achieved

Help companies combine their purchasing power by facilitating the formation of voluntary buyers' alliances taking advantage of economies of scale

Proposal for new labelling of products

The government will consider the benefits of defining, accrediting and certifying products as low carbon

Consider expansion of existing labelling to include assessment of embodied emissions

Exploring the role of co ordinated action on public procurement to increase demand for green industrial products

These initiatives will lead to decarbonisation of the ECI supply chain. ECITB would expect training in the area of carbon reporting and accounting to increase

Gov Strategy **ECITB Impact**

Things to watch out for in 2021

- Call for evidence on low carbon products

Conclusions

The government is focusing on 3 main pathways for industrial decarbonisation, **Energy efficiency**, **CCUS** and **Fuel switching** (hydrogen bioenergy and electrification) with varying timelines for implementation and with government financing and policy support aligned

2020-2025	2025-2030	2030-2050
In the short term the focus is on implementing energy efficiency technology available now, especially digital methods and implementation of energy management systems to ISO50001/50005 standards	As well as continued implementation of energy efficiency technology, more reuse and recycling of materials in industry will be encouraged	High temperature heat recovery maximised
Also in this period the government will support design development for CCUS which will involve pre-FEED and FEED engineering work. However there is an expectation that infrastructure will be built to support CCUS in the first 2 clusters.	This is the period expected to see widespread construction work both for cluster infrastructure and to implement CCS on various high emitting industries	Final clusters to be connected to CCUS network as well as expansion to more dispersed sites.
For fuel switching the focus will be on testing hydrogen in industrial applications and implementing electrification options where already proven and well as supporting research and development into electrification for high temperature applications.	This period should see widespread adoption of hydrogen and electrification across industry, provided the hydrogen infrastructure is in place	Fuel switching in dispersed sites.

The government also plan in this period to introduce reporting requirements and product standards to encourage low carbon consumer choices

What does this mean for the ECITB?

The picture will evolve as new approaches and new technologies emerge. There are some areas of **training** which can be implemented now but **research** and **continuous engagement** will also be key if we are to stay on the ball as things change.

2020-2025	2025-2030	2030-2050
Training: ISO 50001/50005 standards CCUS/hydrogen awareness training to be included in engineering design training. Key technologies for on site energy efficiency should be included in apprenticeships and training standards where appropriate. Safety training for hydrogen and CO_2 gas to be supported. Support for training in CO_2 and hydrogen equipment design. Training in carbon accounting and carbon footprinting. Training in policy (particularly funding) awareness	**Training:** Expect demand for construction training to increase – expect to work with local colleges and training providers in all of the cluster areas to deliver an increased volume of our existing training. Expect widespread need for safety training (particularly in non COMAH sites) for handling of CO_2 and Hydrogen as roll out of CCS and fuel switching becomes widespread. Expect an increased need for training in electrification technologies as they emerge	**Training:** By this stage it should be clear which technologies are being/going to be implemented and the ECITB should have them embedded in existing products and new products should be developed. More and more dispersed sites in industries not currently part of the ECI may start to employ the decarbonisation methods set out in this strategy. The ECITB should be ready to support them with it's training products when required.
Research: Identify the key technologies for energy efficiency Identify the practical ways in which digital technologies will be implemented	**Research:** Identify advances in technology which may emerge as the implementation phase progresses.	
Continuous Engagement: Create stakeholder engagement platforms to maintain relationships with key stakeholders as technology progresses. Identify how construction training could be implemented in each of the cluster locations when needed. Identify dispersed industries which may now need to engage or even become part of the ECI in order to decarbonise	**Continuous Engagement:** Maintain stakeholder relationships Continue to engage with industry as issues with technology implementation emerge to fill the gaps Maintain strong links with dispersed industries	There is still considerable uncertainty about the detail of future skills needs. It is essential that the ECITB maintains strong links with ECI employers, the Industrial Clusters and other stakeholders to respond as the picture evolves.

Glossary

AMRC	Advanced Manufacturing Research Centre
CCUS	Carbon Capture Utilisation and Storage
COMAH	Control of Major Accidents and Hazards
ECI	Engineering Construction Industry
ECITB	Engineering Construction Industry Training Board
EDP	Engineering Design and Procurement
EE	Energy efficiency
ETS	Emissions Trading Scheme
FEED	Front End Engineering Design
IDRIC	UK Industrial Decarbonisation Research and Innovation Centre
IETF	Industrial Energy Transformation Fund
IHRS	Industrial Heat Recovery Support
$MTCO_2E$	Metric Tonnes of Carbon Dioxide Equivalent
PM	Project Manager
SMR	Small Modular Reactor (Nuclear context)