

## Technical Annex 4: Industry

This Technical Annex supports the Industry chapter of the report *Meeting Carbon Budgets - 2016 Progress Report to Parliament* in two sections:

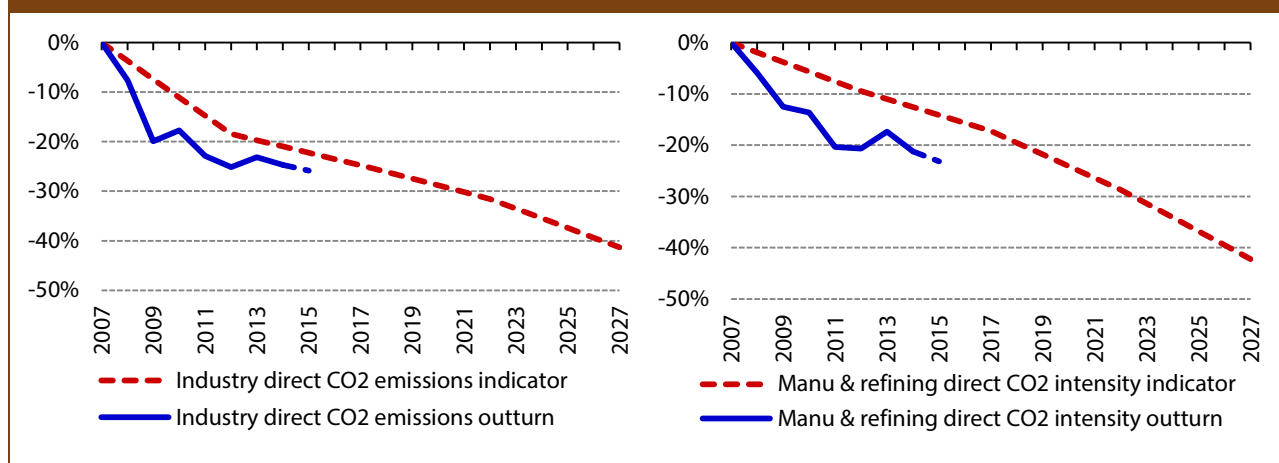
1. CCC indicators – energy and emissions trends
2. The impact of planned infrastructure on meeting carbon budgets

### 1. CCC indicators – energy and emission trends

In our 2014 Progress Report we set out an indicator framework for monitoring progress in industry towards meeting the first four carbon budgets (Table A4.2). This included industrial direct CO<sub>2</sub> emissions and manufacturing & refineries CO<sub>2</sub> emission intensity, energy consumption and energy intensity. Estimates suggest that industry is ahead of these indicators, and the industry chapter in the main report considers the part of this which is due to structural changes in industry as well as to change in the fuel mix.

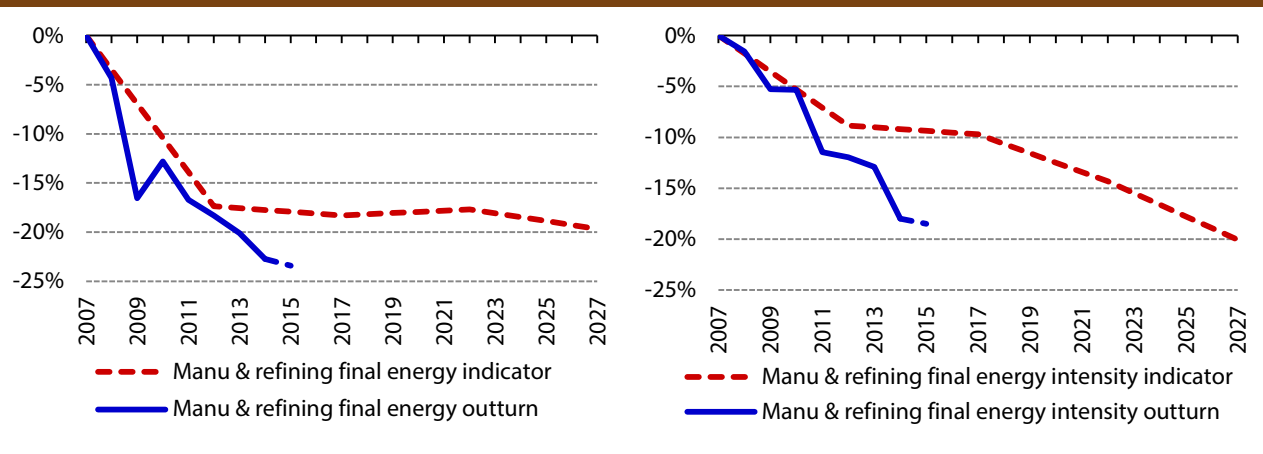
Changes in the total level of energy/emissions and their intensity in relation to output since 2007 are presented below (Figures A4.1 to A4.4).

**Figure A4.1.** Industry direct CO<sub>2</sub> and manufacturing & refining CO<sub>2</sub> intensity indicator trajectories (2007-2027)



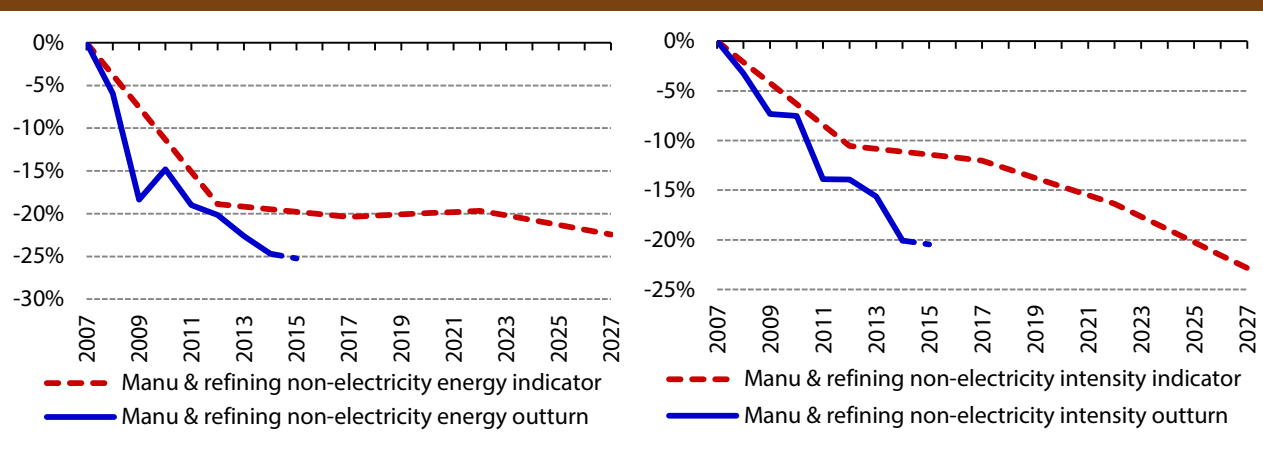
Source: CCC analysis

**Figure A4.2. Manufacturing & refining final energy and intensity indicator trajectories (2007-2027)**



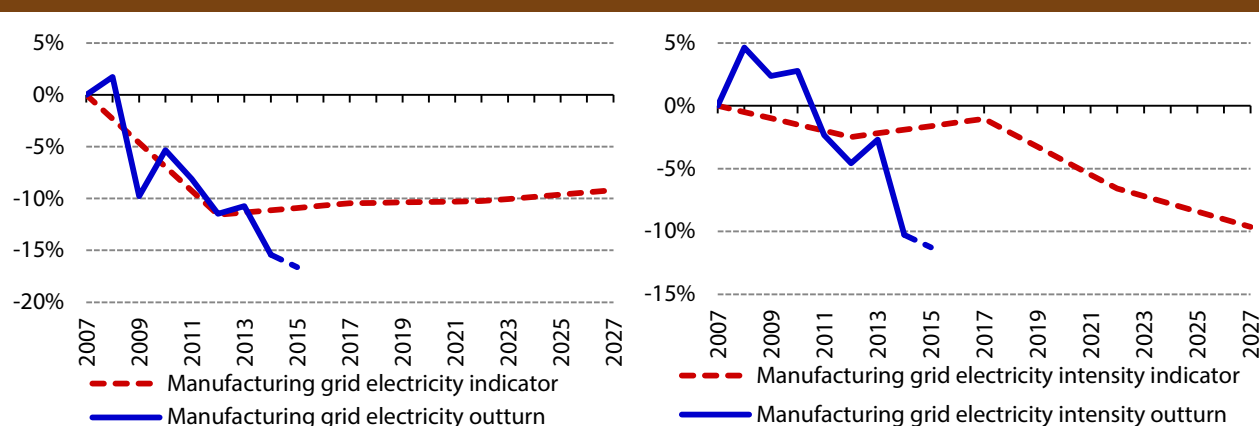
**Source:** CCC analysis

**Figure A4.3. Manufacturing & refining non-electricity energy and intensity indicator trajectories (2007-2027)**



**Source:** CCC analysis

**Figure A4.4. Manufacturing grid electricity energy and intensity indicator trajectories (2007-2027)**



Source: CCC analysis

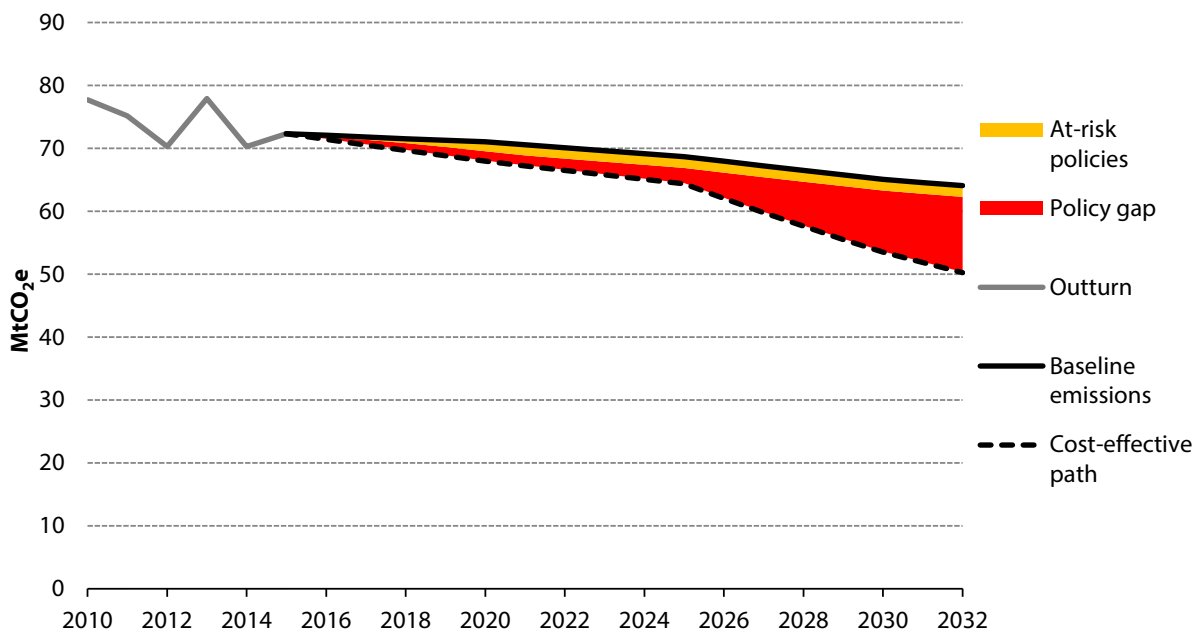
## 2. Forward look

In our fifth carbon budget advice we suggested that direct industry GHG emissions could fall to 87 MtCO<sub>2</sub>e in 2030 to meet carbon budgets. According to DECC's Updated Energy and Emission Projections, industry emissions in the absence of policy would be 100 MtCO<sub>2</sub>e in 2030, falling to 94 MtCO<sub>2</sub>e when estimated savings of current and planned government policies are included. This leaves a gap of around 7 MtCO<sub>2</sub>e in 2030 to be addressed to stay on the cost-effective path we have identified to meet carbon budgets.

- **Traded sector.** The gap is almost 10 MtCO<sub>2</sub>e in 2030 (Figure A4.5), comprising of uptake in energy efficiency (5 MtCO<sub>2</sub>e), low-carbon heat (2 MtCO<sub>2</sub>e) and initial deployment of industrial CCS (3 MtCO<sub>2</sub>e).
- **Non-traded sector.** DECC's projections with planned policy is below our cost-effective path due to assumed increase in low-carbon heat (Figure A4.6).

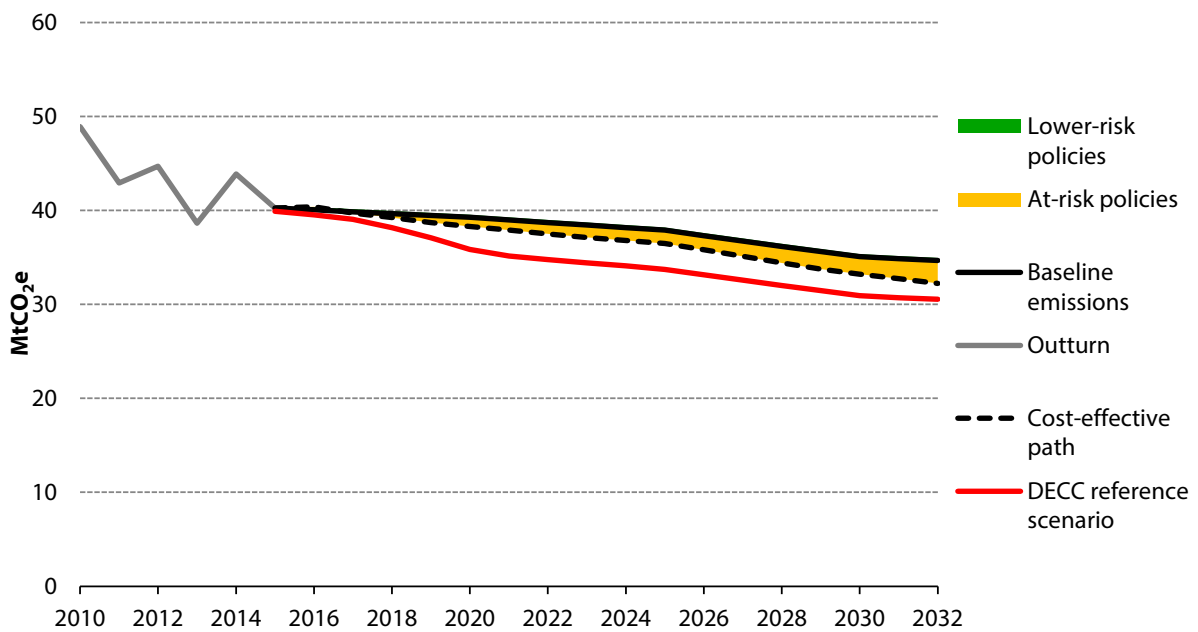
Not all policy savings are necessarily assured. We have assessed the risk associated with the policies in DECC's projections (reflecting policy consideration outlined in the main report). While 0.4 MtCO<sub>2</sub>e is to be delivered by lower-risk policies, 5.7 MtCO<sub>2</sub>e savings in 2030 are dependent on policies with design/delivery problems or are currently underfunded (Table A4.1).

**Figure A4.5. DECC Industry traded emission projection risk assessment (2007-2027)**



Source: CCC analysis

**Figure A4.6. DECC Industry non-traded emission projection risk assessment (2007-2027)**



Source: CCC analysis

<b>Table A4.1. Assessment of current and planned policies</b>	
<b>Policy</b>	<b>Comment</b>
<b>Lower-risk policies</b>	
<b>Renewable Heat Incentive (RHI) to April 2016</b>	The delivery under the RHI is not significantly below DECC's forecast deployment in 2015/16.
<b>Policies with delivery at risk</b>	
<b>EU Products Policy tranche 1 &amp; 2</b>	Minimum standards for products are set under the Ecodesign directive and ratcheted up over time. Realised savings are at risk due to delays to implementation and uncertainty around stock replacement rates. There is also uncertainty around the current modelling of uptake.
<b>Building Regulations part L 2010 &amp; 2013</b>	Focuses on the right barrier by regulating that developers meet certain CO2 reducing standards compared to previous 2006 regulations. Some questions around the modelled savings based on the Simplified Building Energy Model (SBEM). Leads to uncertainty around compliance and the 'performance gap' between buildings as designed, built and in-use. Also uncertainty around build-rates.
<b>Renewable heat incentive, post-CSR funding</b>	Committed funding to 2021/22, but need to overcome other barriers to uptake of large scale low-carbon heat projects.
<b>CRC energy efficiency scheme</b>	The scheme is targeting energy use not covered by existing policies, incentivising energy efficiency and addressing an information barrier. However, the scheme is to be abolished after 2018/19, and replaced with an increase in the Climate Change Levy. It is not yet known if this will deliver similar abatement.
<b>Private rented sector regulations</b>	This legislated policy for the introduction of minimum energy efficiency standards by 2018 relied on the Green Deal loans as a financing mechanism, which is no longer operational.
<b>Energy Savings Opportunities Scheme (ESOS)</b>	Poor compliance in the first reporting year and unclear the extent this policy will drive energy saving. A consultation on new reporting mechanism to be launched soon, there is uncertainty on how this may link to ESOS or its impact on the scheme abatement delivery.

## Indicator Table

**Table A4.2.** The Committee's industry energy and emissions indicators (% change from 2007)

Industry		Budget 2	Budget 3	Budget 4	2015 indicator	2015 outturn
Headline indicators						
<b>CO<sub>2</sub> emissions</b>	<b>Direct (non-electricity)</b>	-25%	-32%	-41%	-22%	-26%
<b>Final energy consumption</b>	<b>Total</b>	-18%	-18%	-20%	-18%	-23%
	<b>Non-electricity</b>	-20%	-20%	-22%	-20%	-25%
	<b>Grid electricity</b>	-10%	-10%	-9%	-11%	-17%
<b>Manufacturing &amp; refining CO<sub>2</sub> emission intensity</b>	<b>Direct (non-electricity)</b>	-17%	-29%	-42%	-14%	-23%
<b>Manufacturing &amp; refining energy intensity</b>	<b>Total</b>	-10%	-14%	-20%	-9%	-19%
	<b>Non-electricity</b>	-12%	-16%	-23%	-11%	-20%
	<b>Grid electricity</b>	-1%	-7%	-10%	-2%	-11%

**Table A4.2.** The Committee's industry energy and emissions indicators (% change from 2007)

Industry		Budget 2	Budget 3	Budget 4	2015 indicator	2015 outturn
Supporting indicators						
<b>Industrial CCS</b>	<b>DECC/BIS to set out approach to deploying initial industrial CCS projects compatible with widespread deployment from the second half of the 2020s</b>	End 2016				No progress
<b>Low-carbon heat</b>	<b>Low-carbon heat penetration</b>	7%	15% in 2020		3%*	5%*
<b>Industrial decarbonisation</b>	<b>Publish industrial sector 2050 decarbonisation roadmaps</b>	End 2015				Published March 2015
	<b>Publish industry strategy setting out milestones, incentives and mechanisms for meeting carbon budgets</b>	End 2017				No progress
<b>Compensation effectiveness review</b>	<b>Publish evaluation of effectiveness of compensation package to date</b>	End 2016				No progress

**Source:** CCC analysis

**Notes:** Energy and emission intensity here is different to that described in Box 4.2 of Chapter 4 in the main Progress Report. In this table intensity is change in energy or emissions over the change in output. Therefore it does not take into account structural or fuel switching effects. \*Figures are for 2014.