

An independent assessment of the Clean Growth Strategy

Technical annex – Agriculture, land-use and forestry

Under the Climate Change Act, the government is required to publish a set of policies and proposals that will enable the legally-binding carbon budgets, on track to the 2050 target, to be met. The Clean Growth Strategy, published in October 2017, presents the Government's plans.

Our report, *An independent assessment of the Clean Growth Strategy: From ambition to action*, sets out our overall assessment of the Strategy. This technical annex sets out the analysis for the agriculture, and land-use and forestry sectors, underpinning that report, in three sections each:

- i) Emissions from the agriculture, land-use and forestry sectors today
- ii) Ambition in the Clean Growth Strategy
- iii) Policy development required to deliver ambition in the Clean Growth Strategy

Agriculture

i) Emissions from the agriculture sector today

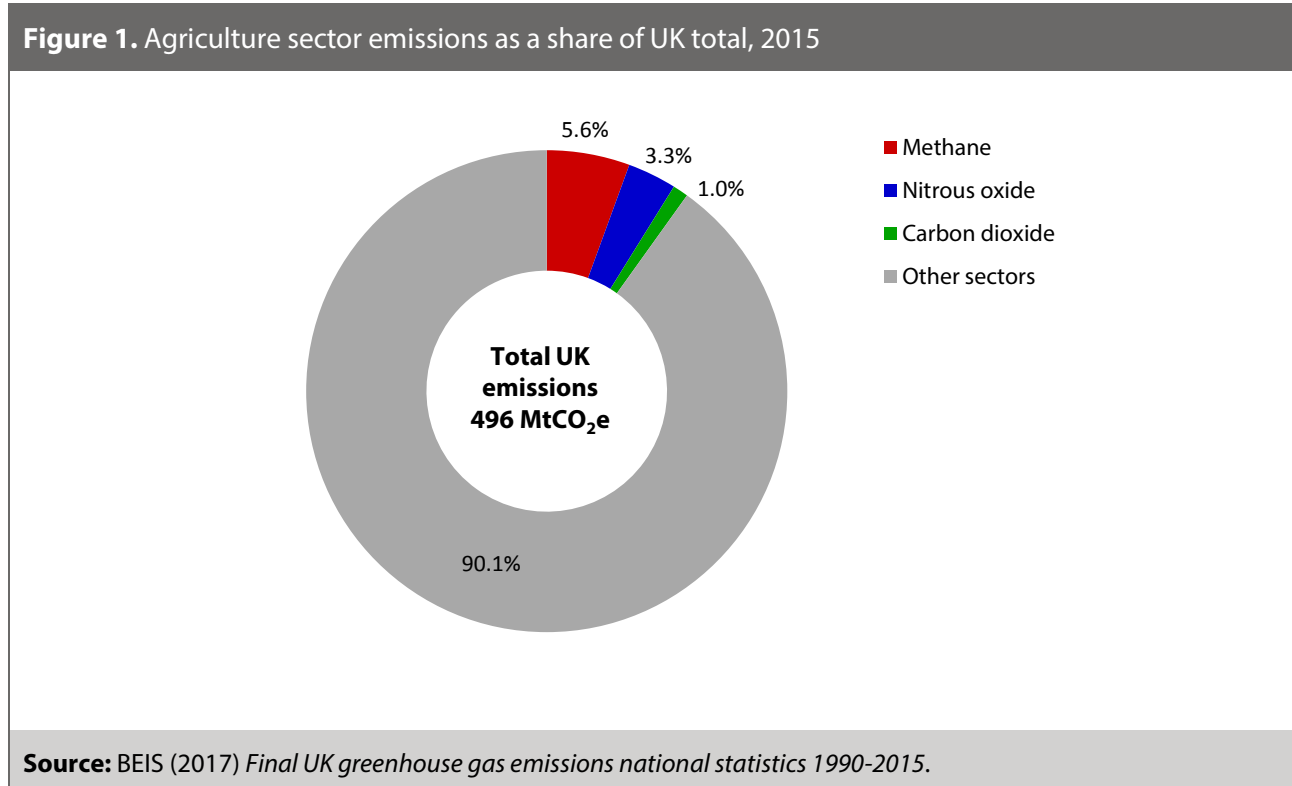
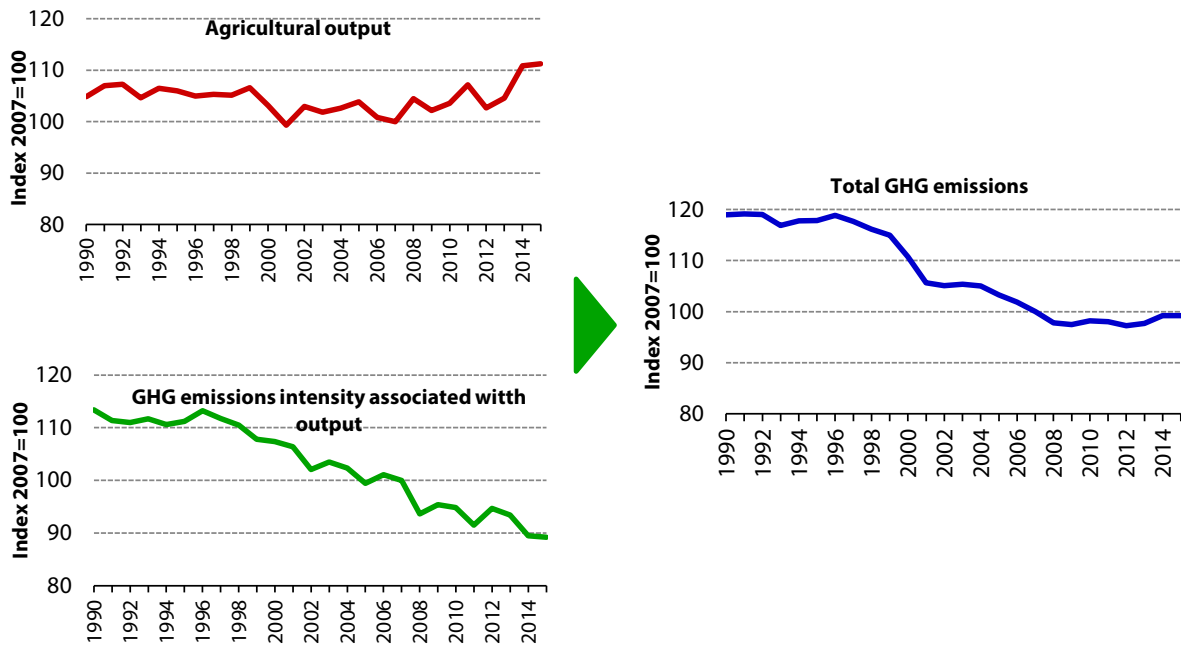


Figure 2. Historic emissions (1990-2015)



Source: BEIS (2017) *Final UK greenhouse gas emissions national statistics 1990-2015*; Defra (2016) *Agriculture in the UK*; CCC calculations.

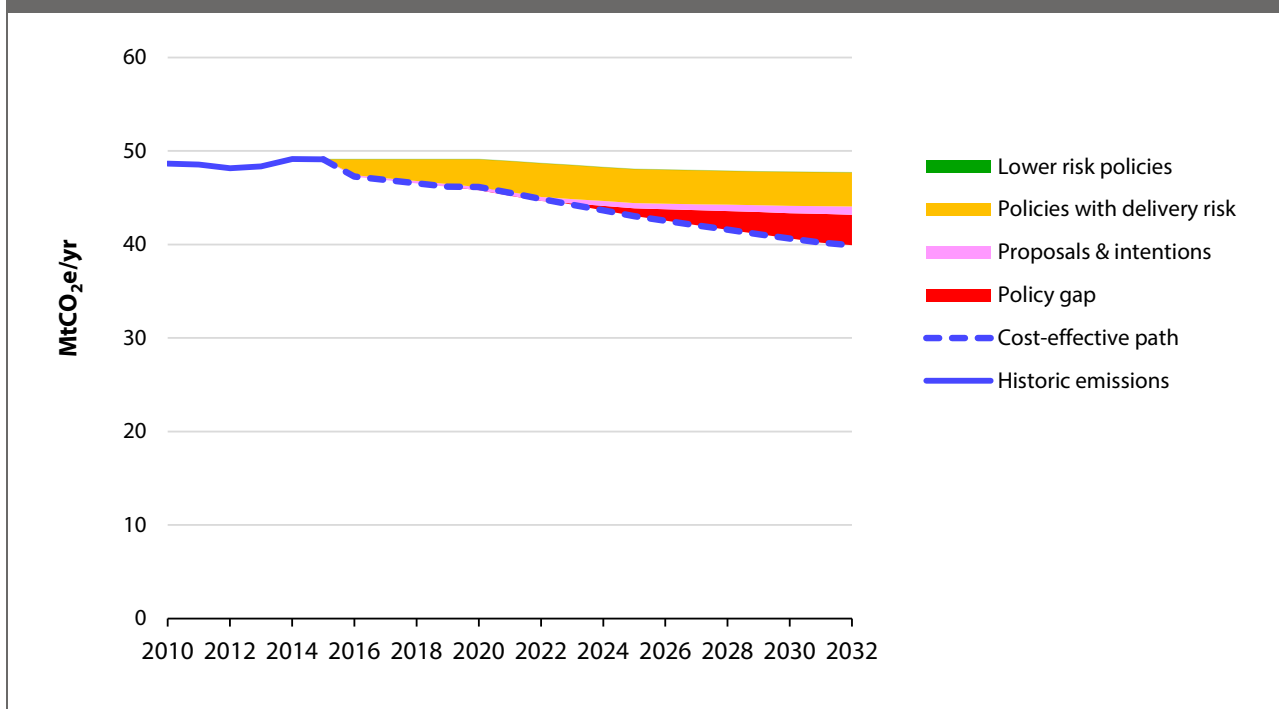
ii) Ambition in the Clean Growth Strategy

Table 1. Ambition in key low-carbon technologies and behaviours in agriculture

Key technology / behaviour	CCC scenario	Clean Growth Strategy ambition	What we have assumed for quantification
Crops and soils measures	Emissions from crops and soils reduce by 14% by 2030 through: <ul style="list-style-type: none"> • Precision farming - crops • Autumn to spring manure application • Manure planning • Grass clover crops • Controlled released fertilisers • Loosen soil compaction • Crops with enhanced nutrition use efficiency • Triticale 	Development of low-emissions fertiliser	Delivers a tenth of CCC savings from crops and soils measures by 2030
Livestock measures	Emissions from livestock reduce by 6% by 2030 through: <ul style="list-style-type: none"> • Livestock breeding • Livestock diets • Livestock health 	Tackling endemic diseases in cattle herds	Delivers 35% of CCC savings from livestock measures by 2030

Source: CCC analysis.

Figure 3. Agriculture emissions and impact of Clean Growth Strategy (2010-2032)



Source: BEIS (2017) *Updated Energy and Emission Projections 2016*, BEIS (2017) *2016 UK Greenhouse Gas Emissions, provisional figures, CCC analysis*.

Notes: Chart is for actual (i.e. gross) emissions and is on the basis of Government emission projections used in the Clean Growth Strategy. Emission reductions from existing policies that we judge to have significant delivery risks (e.g. GHG Action Plan) are coloured amber. We have assessed emission reductions from proposals and intentions that were included in the Clean Growth Strategy. These are coloured pink. The remaining gap to the cost-effective path is coloured red.

iii) Policy development required to deliver ambition in the Clean Growth Strategy

Table 2. Progress against the Committee’s recommendations in 2017 Progress Report

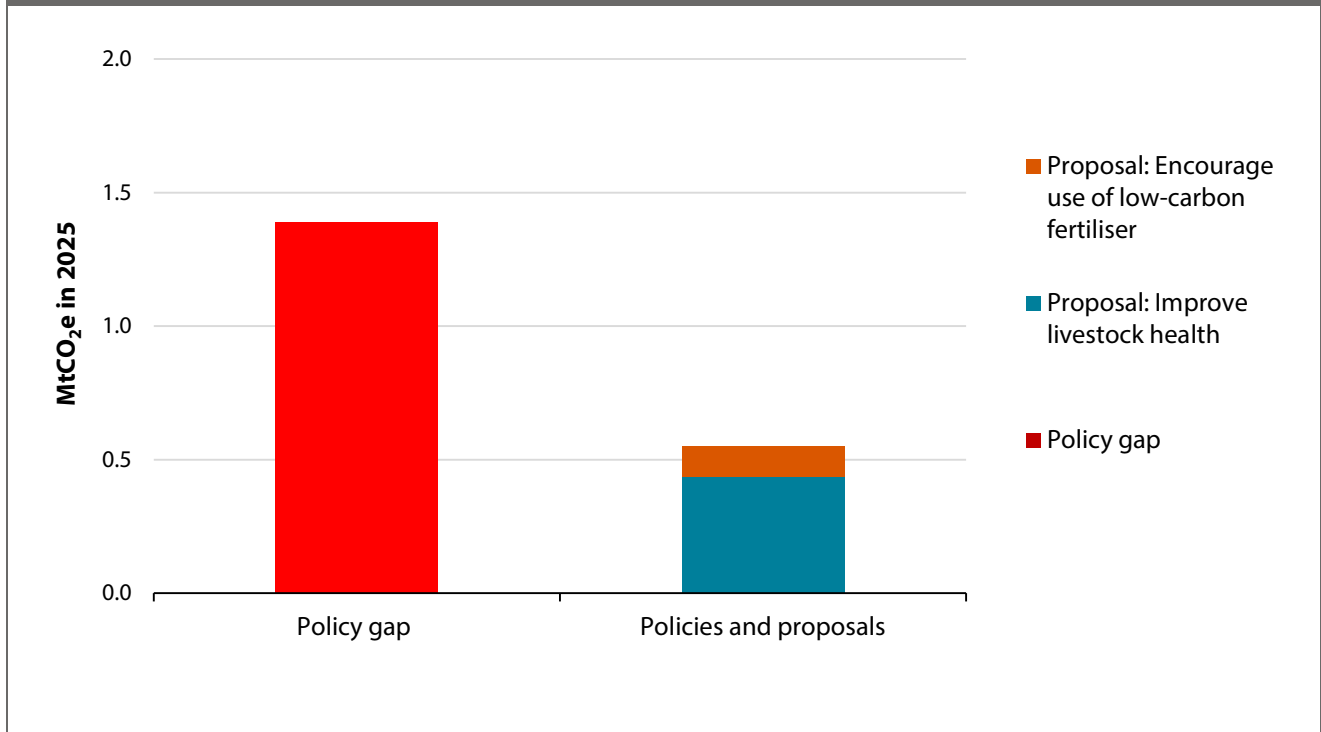
Recommendation in 2017 Progress Report	Clean Growth Strategy proposal	Assessment	Commentary
A stronger policy framework for agriculture emissions reduction across all nations to 2022 , as current progress is not on track.	No comment	Not met	Introduce policies to take effect from 2019

Table 2. Progress against the Committee’s recommendations in 2017 Progress Report

Recommendation in 2017 Progress Report	Clean Growth Strategy proposal	Assessment	Commentary
<p>The new ‘Smart’ inventory for agriculture to be introduced in 2018, to enable better monitoring of progress in reducing emissions including assessment of mitigation options.</p>	<p>In response to CCC 2017 Progress report, government ‘expect’ to meet this in 2018</p>	<p>Partially met</p>	<p>Ensure Smart Inventory is introduced in 2018</p>
<p>New policies and measures required to deliver emissions reductions in agriculture and afforestation to 2030 that moves beyond the current voluntary approach, and with CAP replaced, from 2020, by a policy that links support more closely to the reduction and removal of emissions in agriculture, forestry and other land use sectors.</p>	<ul style="list-style-type: none"> • 25 Year Environment Plan to set out approach to reduce emissions. • Intend to design a ‘new system’ post CAP. • CGS sets out opportunities to develop technological innovation aimed at reducing emissions e.g. low-emissions fertiliser, crops and livestock genetics 	<p>Partially met</p>	<p>Publish a strategy in 2018 with policies which includes emissions reductions and sequestration in agriculture, forestry and other land use sectors</p> <p>Set out policies by 2020 that will take effect from 2022</p>
<p>Addressing financial and non-financial barriers to increase afforestation rates and on-farm tree planting schemes to deliver the level of abatement in the fifth carbon budget.</p>	<ul style="list-style-type: none"> • Set up ‘investment zones’ to unlock private investment (no details) • Will design incentives to plant trees on farms (no details) • Will fund large-scale woodland and forest creation 	<p>Partially met</p>	<p>Ensure policies are developed by 2020 to deliver afforestation</p>

Source: CCC analysis.

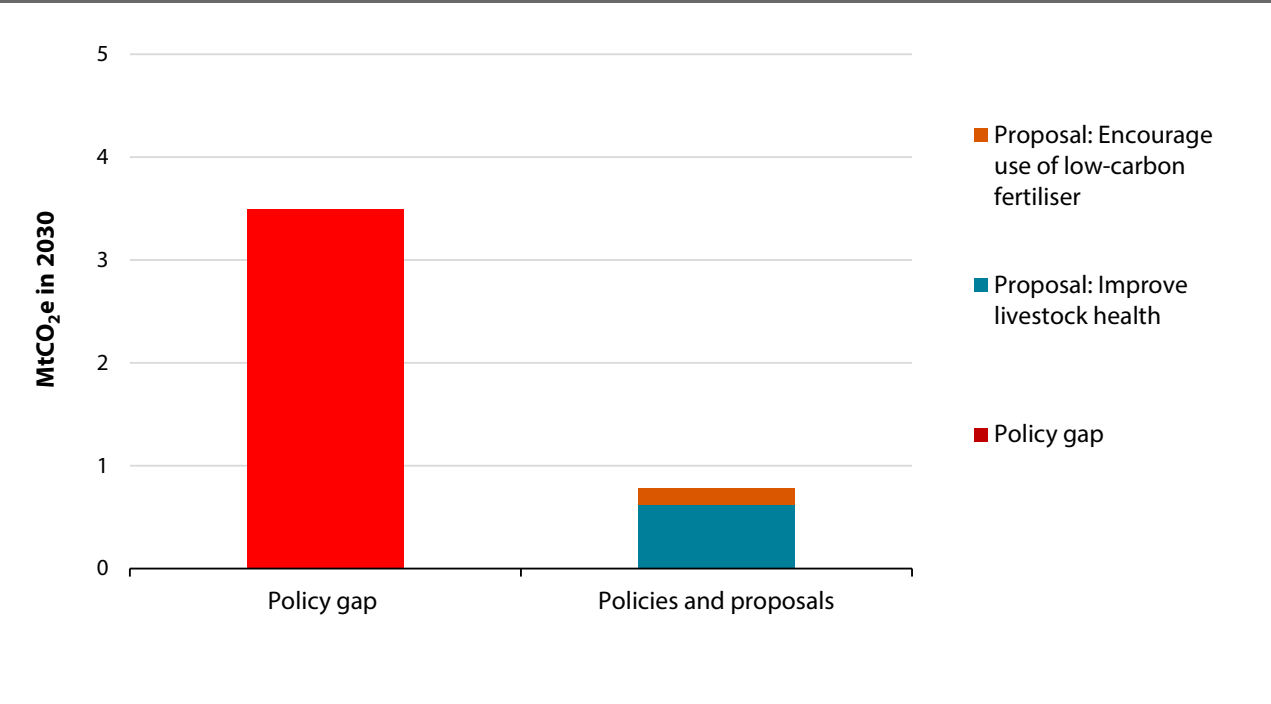
Figure 4. How policies and proposals in the Clean Growth Strategy could close the 2025 agriculture policy gap



Source: CCC analysis.

Notes: Policy gap assessment in our 2017 Progress Report to Parliament; represents the gap to the cost-effective path, rather than to carbon budgets.

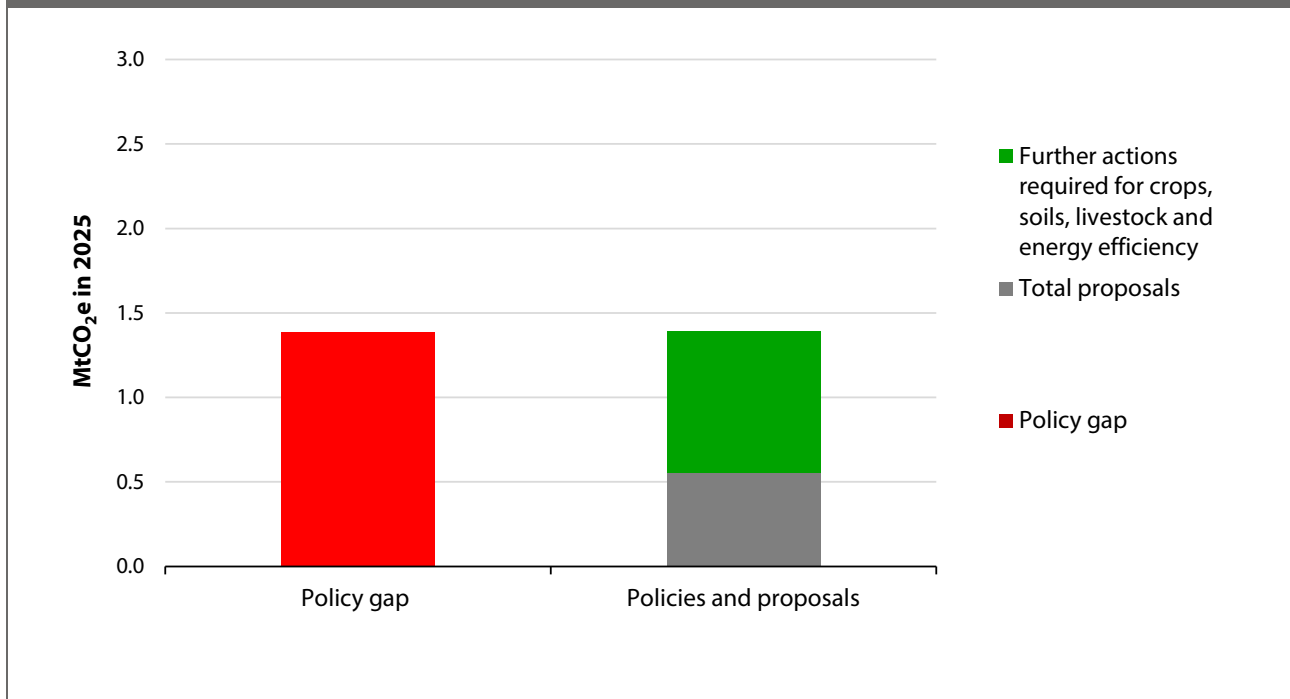
Figure 5. How policies and proposals in the Clean Growth Strategy could close the 2030 agriculture policy gap



Source: CCC analysis.

Notes: Policy gap assessment in our 2017 Progress Report to Parliament; represents the gap to the cost-effective path, rather than to carbon budgets.

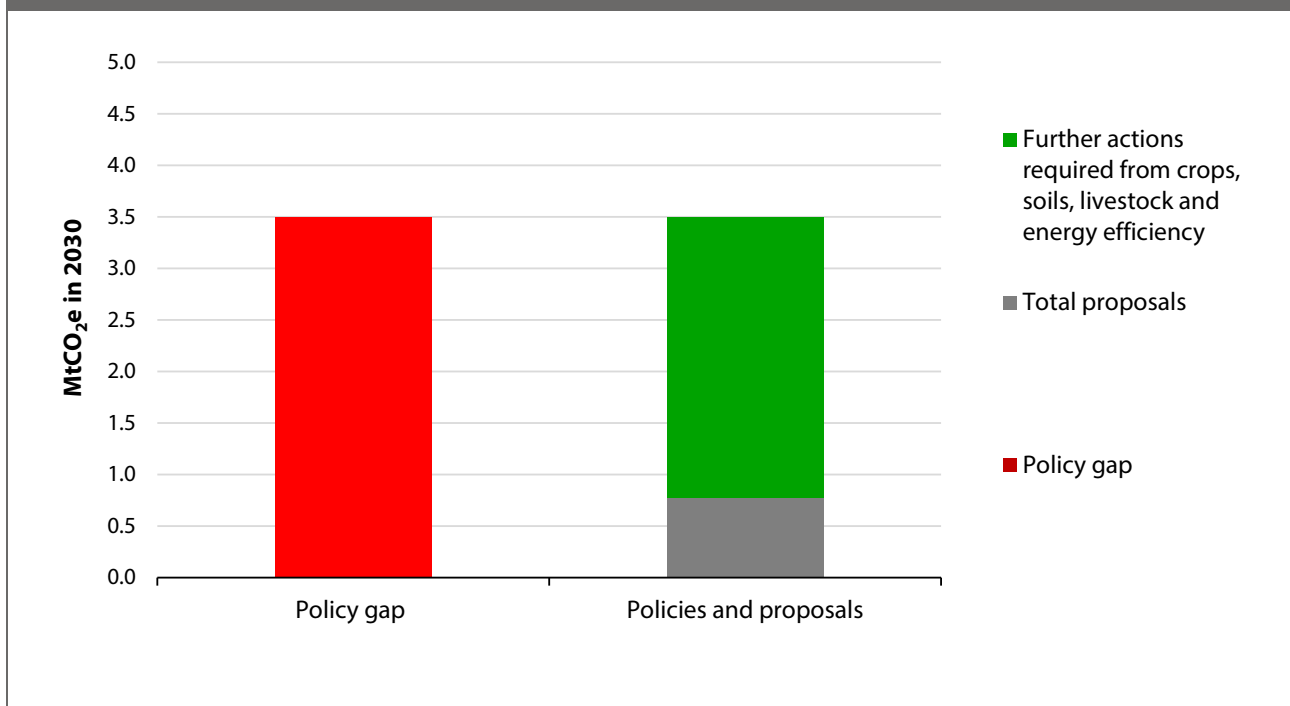
Figure 6. Additional actions required to close the 2025 policy gap in agriculture



Source: CCC analysis.

Notes: Policy gap assessment in our 2017 Progress Report to Parliament; represents the gap to the cost-effective path, rather than to carbon budgets.

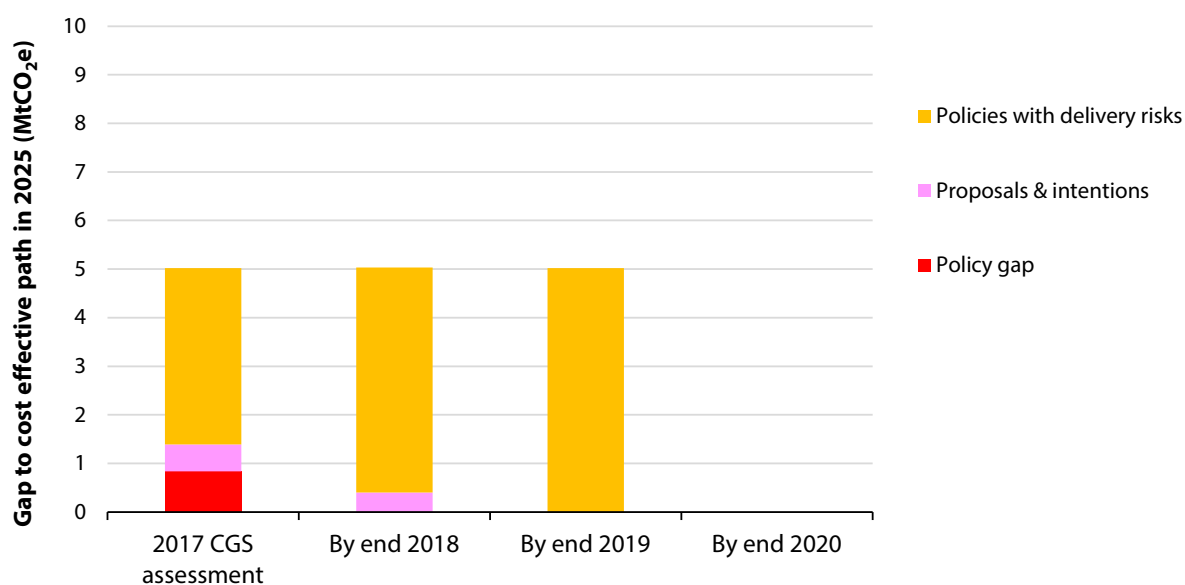
Figure 7. Additional actions required to close the 2030 policy gap in agriculture



Source: CCC analysis.

Notes: Policy gap assessment in our 2017 Progress Report to Parliament; represents the gap to the cost-effective path, rather than to carbon budgets.

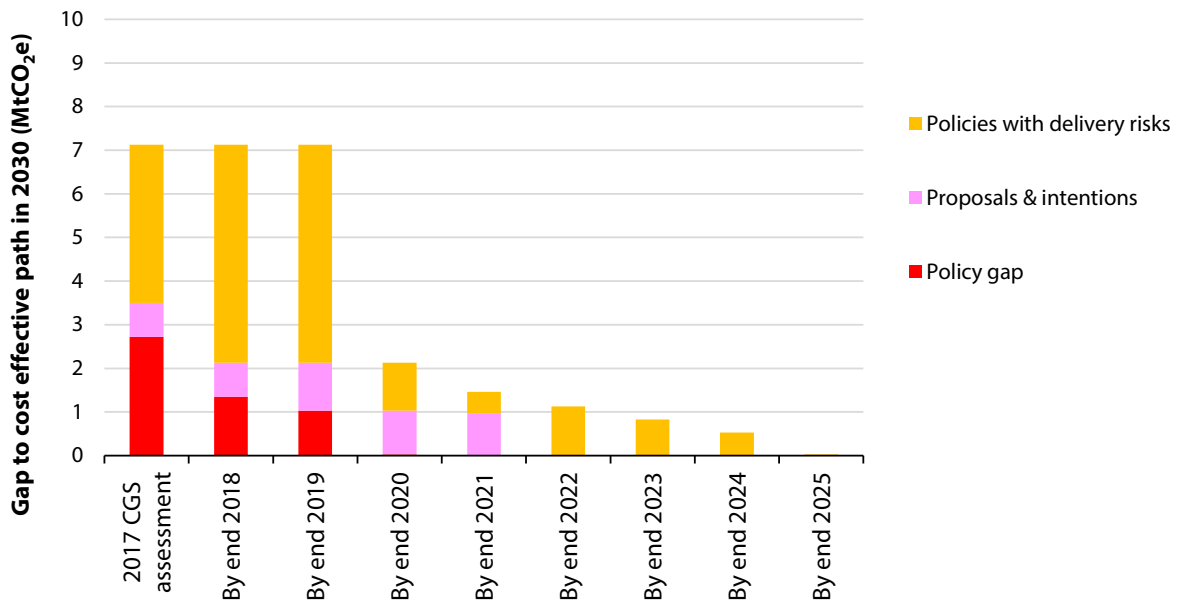
Figure 8. Fourth carbon budget: The agriculture policy gap in 2025 and how Government policies should develop over time to close this gap



Source: BEIS (2017) *Updated Energy and Emission Projections 2016*, CCC analysis.

Notes: This chart reflects the Committee's detailed assessment of how the remaining gap to the cost-effective path can be closed and how current policies, proposals and intentions are firmed up so that delivery risks are largely eliminated. This is based on an assessment of the current status of policies, proposals and intentions, and the potential to strengthen policy by 2020. The chart focuses on annual emissions in 2025, the middle year of the fourth carbon budget period, and the gap to meeting the cost-effective path. This assessment is based on the government emission projections used in the Clean Growth Strategy. New projections were published in January 2018. These increased the level of projected future emissions in 2025, and therefore imply a larger policy gap to be closed.

Figure 9. Fifth carbon budget: The agriculture policy gap in 2030 and how Government policies should develop over time to close this gap

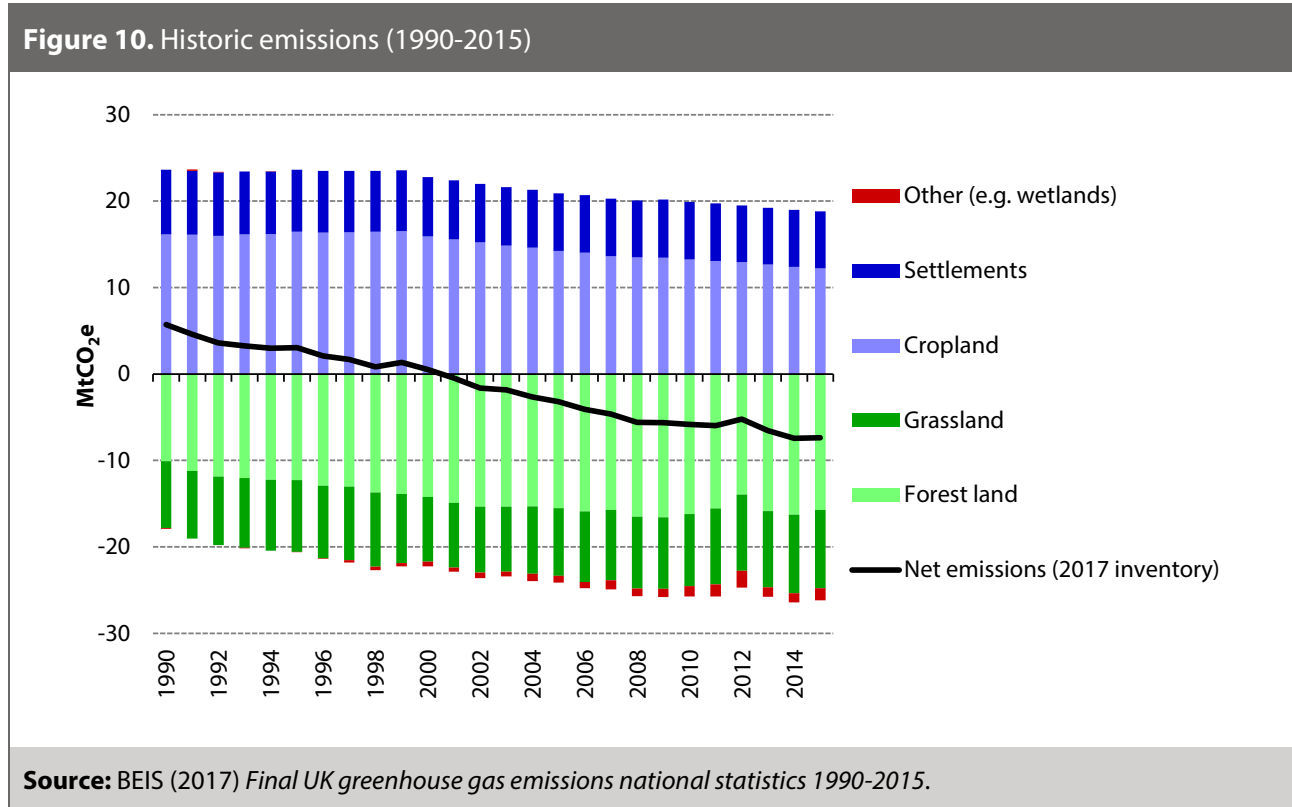


Source: BEIS (2017) *Updated Energy and Emission Projections 2016*, CCC analysis.

Notes: This chart reflects the Committee's detailed assessment of how the remaining gap to the cost-effective path can be closed and how current policies, proposals and intentions are firmed up so that delivery risks are largely eliminated. This is based on an assessment of the current status of policies, proposals and intentions, and the potential to strengthen policy by 2025. The chart focuses on annual emissions in 2030, the middle year of the fifth carbon budget period, and the gap to meeting the cost-effective path. This assessment is based on the government emission projections used in the Clean Growth Strategy. New projections were published in January 2018. These increased the level of projected future emissions in 2030, and therefore imply a larger policy gap to be closed.

Land-use and forestry

i) Emissions from the LULUCF sector today

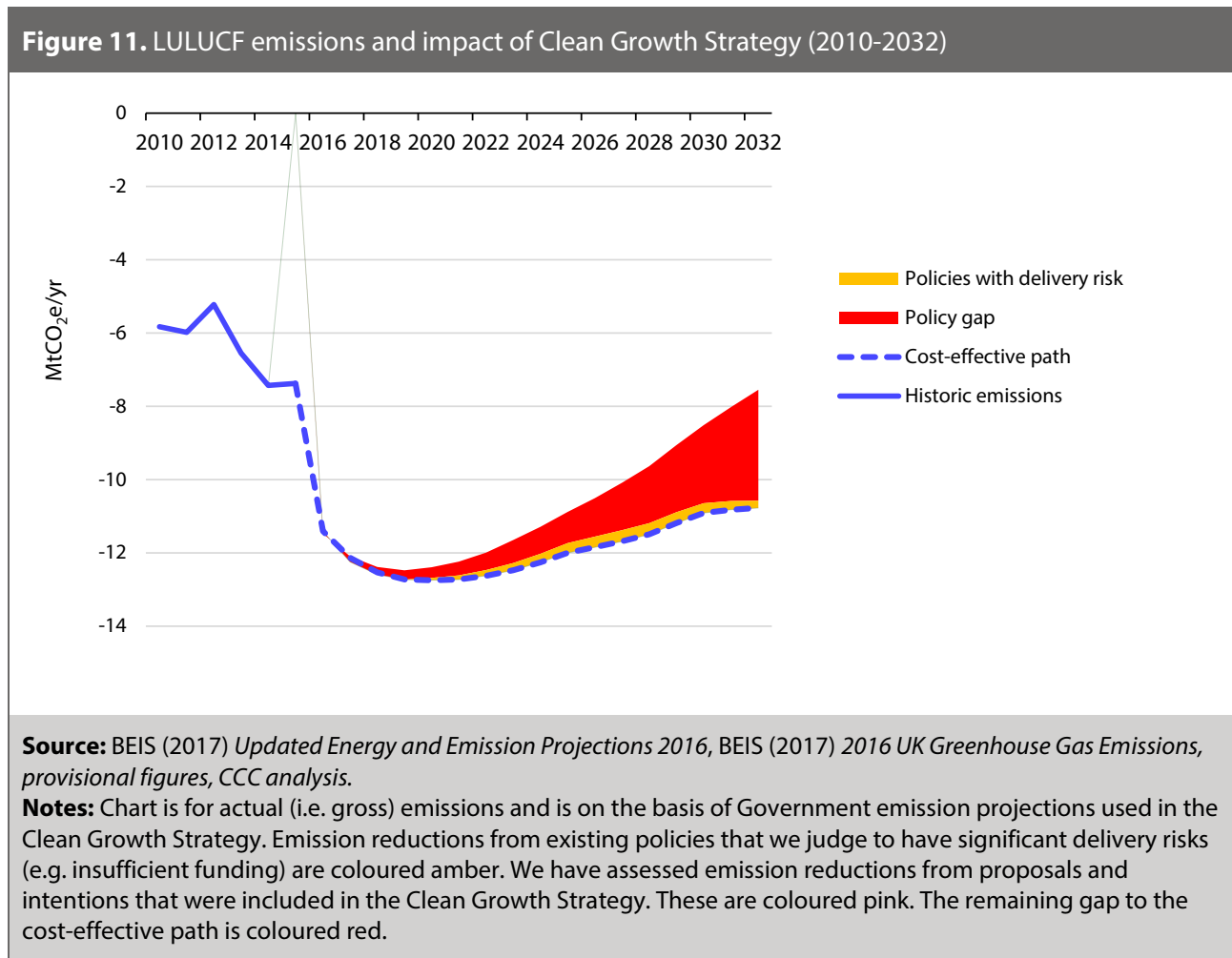


ii) Ambition in the Clean Growth Strategy

Table 3. Ambition in key low-carbon technologies and behaviours in the LULUCF sector

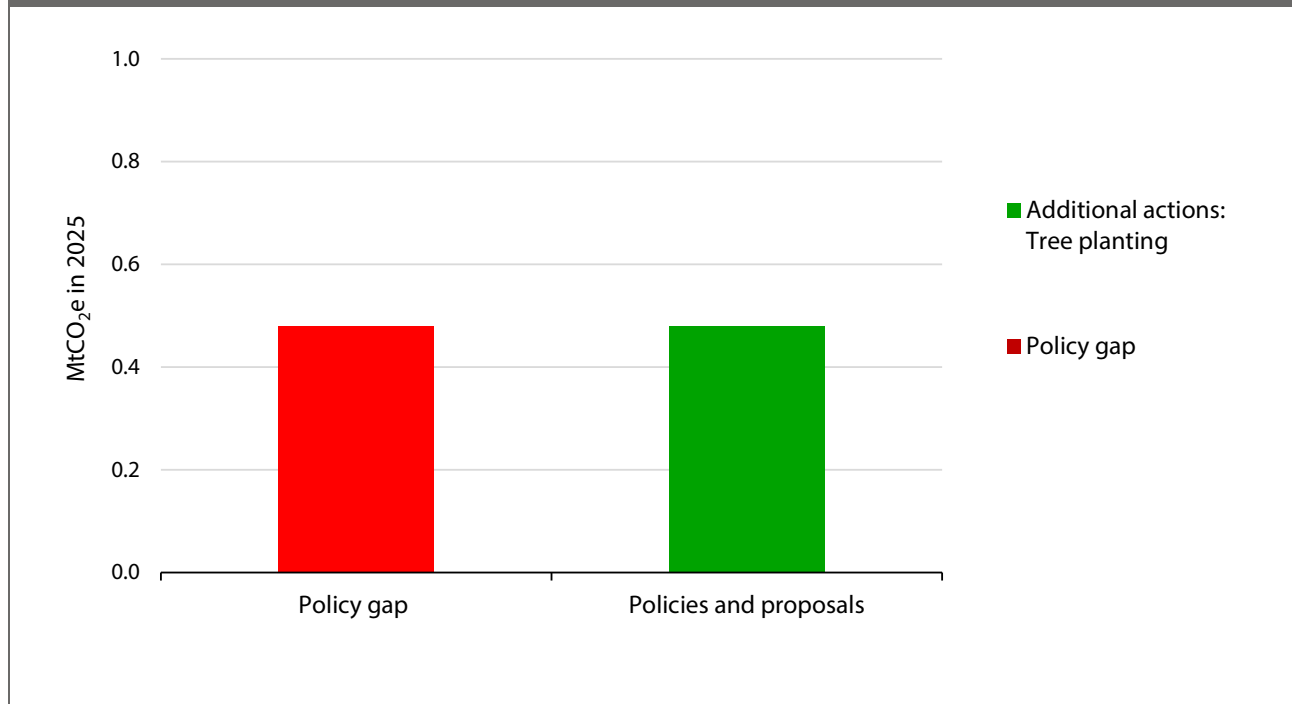
Key technology / behaviour	CCC scenario	Clean Growth Strategy ambition	What we have assumed for quantification
Afforestation	15,000 ha/year in the UK by 2030	130,000 hectares in England by 2032	Implies average annual rate of 8,700 hectares, around three-fifths of CCC scenario
Agroforestry	Trees and shrubs on 1.6% of UK agricultural land by 2030	Design incentives to plant trees on farm	1.6% land area can deliver 0.6 MtCO ₂ e by 2030

Source: CCC analysis.



iii) Policy development required to deliver ambition in the Clean Growth Strategy

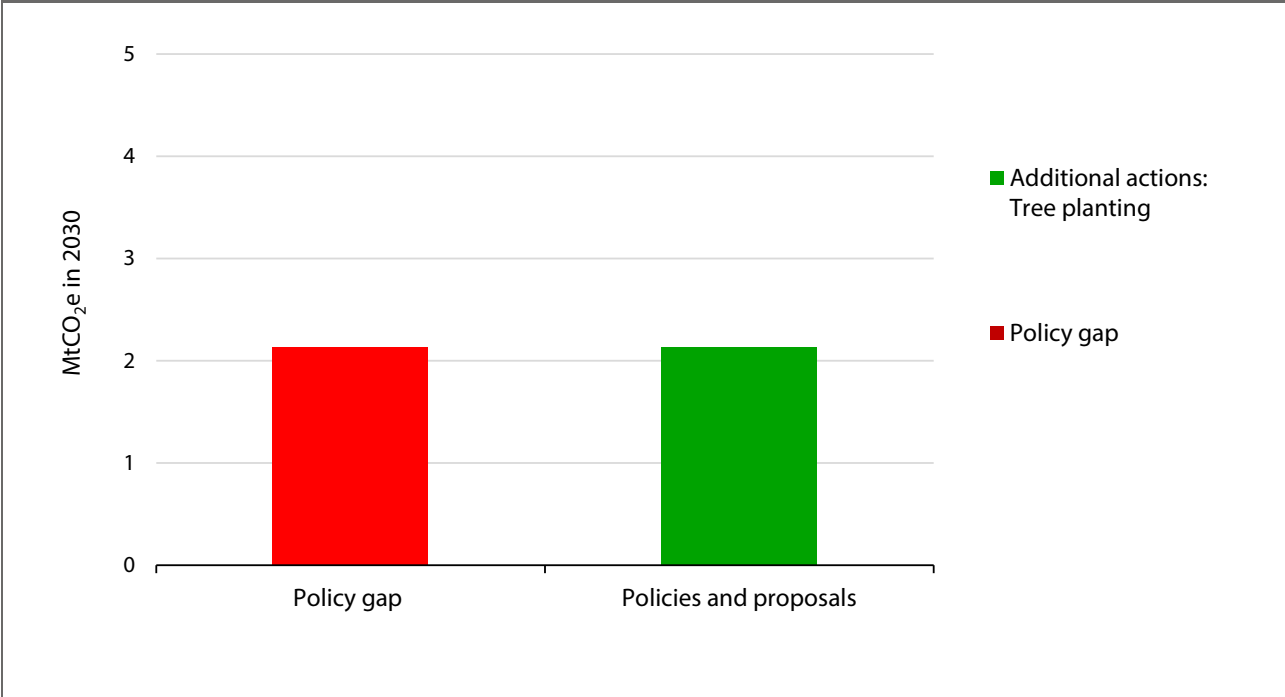
Figure 12. How policies and proposals in the Clean Growth Strategy could close the 2025 LULUCF policy gap



Source: CCC analysis.

Notes: Policy gap assessment in our 2017 Progress Report to Parliament; represents the gap to the cost-effective path, rather than to carbon budgets.

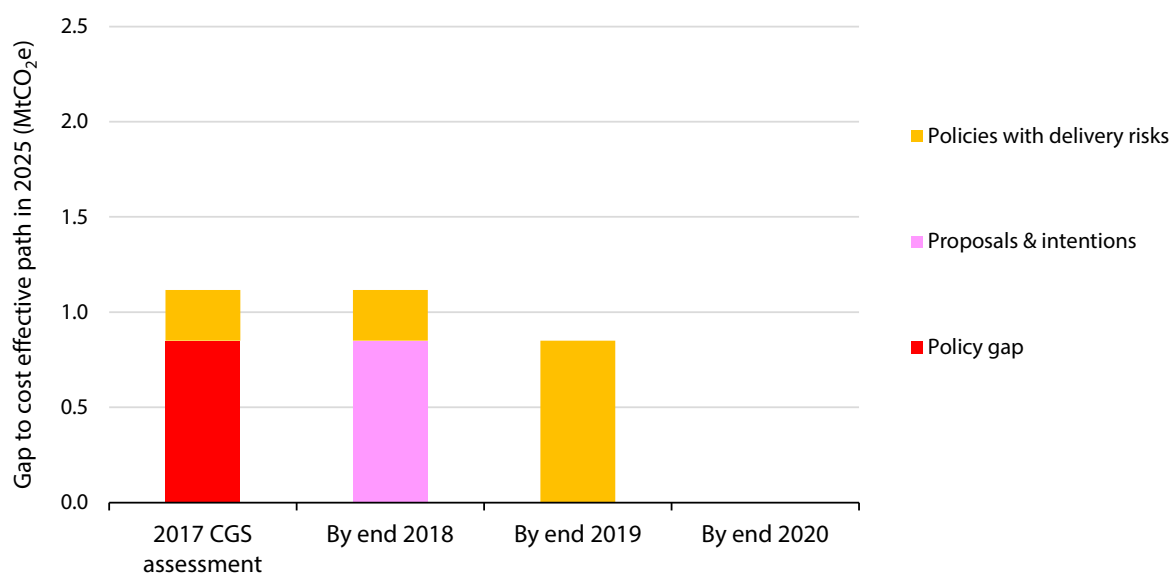
Figure 13. How policies and proposals in the Clean Growth Strategy could close the 2030 LULUCF policy gap



Source: CCC analysis.

Notes: Policy gap assessment in our 2017 Progress Report to Parliament; represents the gap to the cost-effective path, rather than to carbon budgets.

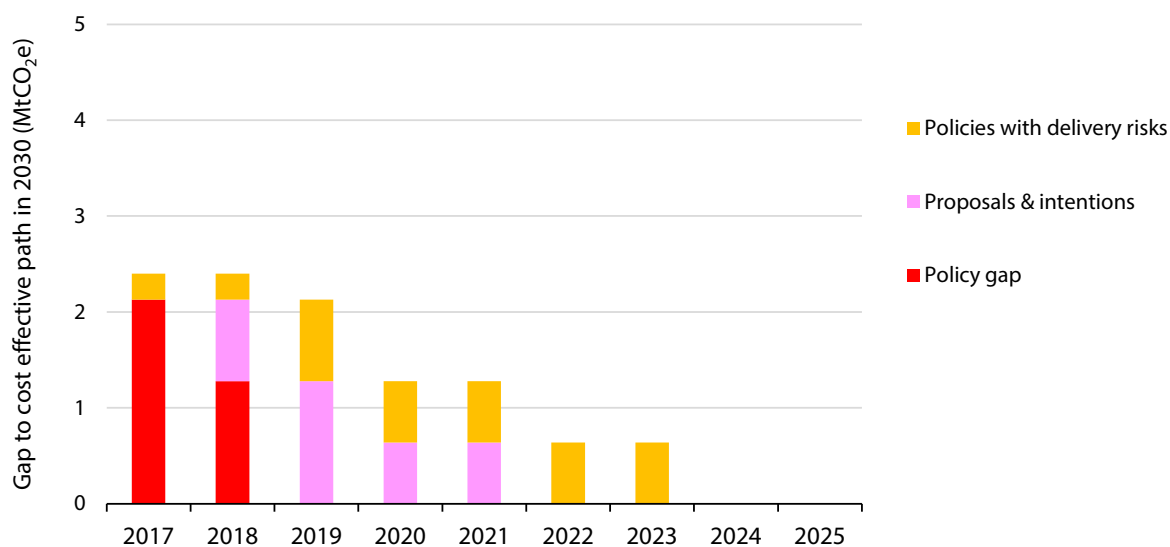
Figure 14. Fourth carbon budget: The LULUCF policy gap in 2025 and how Government policies should develop over time to close this gap



Source: BEIS (2017) *Updated Energy and Emission Projections 2016*, CCC analysis.

Notes: This chart reflects the Committee's detailed assessment of how the remaining gap to the cost-effective path can be closed and how current policies, proposals and intentions are firmed up so that delivery risks are largely eliminated. This is based on an assessment of the current status of policies, proposals and intentions, and the potential to strengthen policy by 2020. The chart focuses on annual emissions in 2025, the middle year of the fourth carbon budget period, and the gap to meeting the cost-effective path. This assessment is based on the government emission projections used in the Clean Growth Strategy. New projections were published in January 2018. These increased the level of projected future emissions in 2025, and therefore imply a larger policy gap to be closed.

Figure 15. How policies and proposals in the Clean Growth Strategy could close the 2030 LULUCF policy gap



Source: BEIS (2017) *Updated Energy and Emission Projections 2016*, CCC analysis.

Notes: This chart reflects the Committee's detailed assessment of how the remaining gap to the cost-effective path can be closed and how current policies, proposals and intentions are firmed up so that delivery risks are largely eliminated. This is based on an assessment of the current status of policies, proposals and intentions, and the potential to strengthen policy by 2025. The chart focuses on annual emissions in 2030, the middle year of the fifth carbon budget period, and the gap to meeting the cost-effective path. This assessment is based on the government emission projections used in the Clean Growth Strategy. New projections were published in January 2018. These increased the level of projected future emissions in 2030, and therefore imply a larger policy gap to be closed.

Table 5. Timetable for closing the agriculture and LULUCF policy gap

Policy	2018	2019	2020	2021	2022	2023	2024	2025	2026-32
Design a new system of future agricultural support post-CAP	Publish a strategy with policies which includes emissions reductions and sequestration in agriculture, forestry and other land use sectors	Set out policies to deliver emissions reductions through a range of measures to take effect from 2022: <ul style="list-style-type: none"> • Crops & soil management • Livestock diet, health & breeding • Waste & manure management • Energy efficiency 				Review policies and strengthen if required		Review policies and strengthen if required	
Tackle endemic diseases in dairy and beef herds	Finalise policies to deliver improved livestock health and reduced emissions					Review policies and strengthen if required		Review policies and strengthen if required	
Innovative low-carbon fertiliser products	Finalise policies to reduce fertiliser based emissions on-farm					Review policies and strengthen if required		Review policies and strengthen if required	
Establish a new network of forests in England	Ensure a coherent plan, including funding, to deliver the commitment to plant 11 million trees in England between 2017 and 2022 (equivalent to around 2,300 ha pa). Develop a strategy and finalise incentives and policies to deliver 8,700 hectares annually in England between 2017 and 2032 (equivalent to 130,000 hectares by 2032), to: <ul style="list-style-type: none"> • Plant trees on farms • Establish forestry investment zones to unlock private investment • Funding of larger-scale woodland & forest creation 					Review policies and strengthen if required		Review policies and strengthen if required	
	Ensure the rate of tree planting is accelerated in a timely manner in order to deliver 69,000 hectares of afforestation in England by 2025								

Legend: Green – Government commitment and timing in Clean Growth Strategy; Blue – Government commitment in Clean Growth Strategy with CCC timing and/or detail added; Orange – CCC recommendation