Official-Sensitive

Annex B - Compliant Report: list of quantified and unquantified policies and proposals

[NB text which is dependent on the timing of upcoming publications / is subject to agreement is included in square brackets and yellow highlight.]

TABLE 1: DEFRA'S QUANTIFIED LIST OF NET ZERO MEASURES & SAVINGS

FOR REFERENCE ONLY	PUBLIC FACING – SECTION 14 COMPLIANT REPORT					NOT PUBLIC FACING – SECTION 13 ADVICE TO DESNZ SOS	
Measure: Code	**Measure: Public Facing Name**	**Measure: Public Facing Description**	**CB4 savings p.a. (England only)**	**CB5 / NDC savings p.a. (England only)**	**CB6 savings p.a. (England only)**	**Additional commentary on delivery risk & next steps**	**Is this measure already in the public domain already?**
AGRICULTURE[1]							
A1.1	Increase feed analysis and use of precision feeding to not exceed animal requirements.	This measure involves the assessment of animal feed to ensure the composition and volume of feed meets, but does not exceed animal requirements. This can reduce methane emissions and nitrous oxide emissions associated with animal waste. Increasing industry adoption is expected as part of a market-led take up of precision feeding that is already occurring. The AIC (Agricultural Industries Confederation) maintains a register of accredited feed nutritionists to facilitate this. In addition, precision mixing machinery is available for the preparation of mixed rations. The role of Government is in supporting and accelerating this. This measure is being developed under the Farming Innovation Programme and the funding will enable the development of technology to enable precision feeding, including nutritional advice, to ensure feed is provided effectively to livestock.	0.00	0.01	0.03	**Delivery confidence RAG: Amber/Red** • All measures would need sufficient R&D investment through FIP or other means. • Savings will remain uncertain until innovation / R&D is complete. Innovation will need to provide evidence that increases confidence in technical feasibility. • Delivery levers will need to be identified to ensure necessary levels of uptake. Requires more research, specifically on impact on other environmental targets. • We need to confirm if these measures are covered at all by ELM.	Yes – industry are aware and generally adopting.
A1.6	Use of methane suppressing feed products (e.g. 3NOP, nitrate additives) to reduce methane emissions from livestock.	This measure involves utilising methane-suppressing feed products (for example 3NOP, nitrate additives) within feed rations to reduce the amount of methane produced by ruminant livestock (e.g. cattle). Food Standard Agency (FSA) and Food Standards Scotland (FSS) are responsible for the authorisation process of feed additives in Great Britain. We will continue to work with the FSA and FSS, industry and the sector to explore suitable policy options to encourage rapid and extensive uptake of methane suppressing feed products with proven safety and efficacy, including exploring mandating methane suppressing feed products in compound feed for cattle in England. We have already published research on these products and recently ran a call for evidence on methane suppressing feed products to better understand the opportunities and challenges associated with their use.	0.94	1.57	1.57	**Delivery confidence RAG: Amber/red** • Call for evidence closed in November 2022. Defra officials are currently analysing responses and reviewing options to deliver this policy, including through voluntary industry led schemes, incentives, and regulatory intervention. Next steps will include improving knowledge on existing take up and being clear on the role of industry and Government. Barriers to overcome: • Product availability: FSA approval of 3NOP (Bovaer) anticipated by the end of 2023. Defra officials engaging with manufacturer to better understand cost and availability. Exploring opportunities to encourage further market maturity. • Integration on farm: Concerns remain over applicability across some farm systems (e.g. pasture-based or organic) and outstanding issues of farmer perceptions. To be further explored through analysis of CfE responses and wider policy development throughout 2023. • Legislation: Mandatory introduction will require legislation. Defra officials are developing policy options to deliver these following recommendations of CfE,	Yes, but not mandating element (EIP).

						research projects and industry engagement. • Costs: Initial estimates for 3NOP indicate a cost for effective dosing of around £80 per head pa.	
A4.1.1	Analyse manure prior to application to match crop requirements.	This measure is about improving nutrient management. Analysing the nitrogen content of slurry, prior to application on crops and grassland, can ensure the nitrogen applied matches crop requirements and minimises emissions of nitrous oxide (N2O). Increasing industry adoption is expected as part of a market-led take up of precision farming that is already occurring. Government will support this through the design and delivery of wider farming reforms. We expect the Sustainable Farming Incentive (nutrient management standard) to contribute indirectly to this outcome.	0.000	0.000	0.001	**Delivery confidence RAG: Red** • To identify whether the actions we are encouraging under the SFI (particularly advisor visits) will partly contribute to this outcome.	Yes - Sector generally aware and adopting and in ELM SFI
A4.1.2	Biological fixation of nitrogen on grassland using grass-legume mixtures.	This measure relates to the inclusion of clover into pasture areas and also increasing the proportion of clover in the mixed grassland to at least 20%. This allows nitrogen gas from the atmosphere to be incorporated into the tissues of plants. Doing so reduces the rate of fertiliser application and associated nitrous oxide (N2O) emissions. We are already seeing farmer led movement to more biological and on farm solutions to nutrients. Government will accelerate wider adoption through the design and delivery of wider farming reforms. For instance, we will fund these actions through the Sustainable Farming Incentive (soils standards for SFI 2022 nutrients standard for SFI 2023) and Countryside Stewardship (GS4 Legume and herb-rich swards).	0.02	0.12	0.30	**Delivery confidence RAG: Amber/Green** • This will be delivered by Countryside Stewardship and ELM: CS GS4 – Legume and herb-rich swards; SFI23 nutrients standard. • Next steps are to review the role of ELM and wider levers necessary to achieve desired levels of uptake (e.g. regulation). We will continue to develop options to consider how to maximise uptake/ carbon savings. This will involve reviewing Defra land use surveys, census and farm practice surveys to establish the baseline and working with British Grassland Society to understand what is realistic.	Yes - Sector generally aware and adopting and in ELM SFI
A4.1.3	Covering slurry tanks with a retrofitted, permeable cover.	Retrofitting slurry tanks with a permeable cover will reduce both methane and ammonia emissions. We plan to introduce new regulatory requirements to cover slurry stores, as committed to in the 2019 Clean Air Strategy. Defra plans to consult on this later this year. In the short term, focus is on improving compliance and supporting take up through e.g., Countryside Stewardship slurry grants.	0.0000	0.0002	0.0004	**Delivery confidence RAG: Amber/Green** • A small retrofitting offer is currently available under the Countryside Stewardship Capital Grants. Next steps are to confirm whether this will be included in FIF. Expected to be fully covered in future years when rollout is expanded. Uptake is not required to start until 2027. • Projected uptake for the scheme (heavily caveated that this requires quality assurance and as such is subject to change) suggests in excess of 50% of specialised pig and dairy holdings in England (based off 2021 farming stats data) having upgraded slurry storage and covers by 2029. Next steps are to track uptake.	Yes - CS grants cover this
A4.1.4	Covering slurry tanks with a retrofitted, impermeable cover.	Retrofitting slurry tanks with an impermeable cover to reduce both methane and ammonia emissions. We plan to introduce new regulatory requirements to cover slurry stores, as committed to in the 2019 Clean Air Strategy. Defra plans to consult on this later this year. In the short term, focus is on improving compliance and supporting take up through e.g. grants provided through Farming Investment Fund Slurry Infrastructure Grant and Countryside Stewardship slurry grants. We will keep those regulations under review and track uptake to project the savings.	0.01	0.06	0.15	**Delivery confidence RAG: Green** • Projected uptake for the scheme (heavily caveated that this requires quality assurance and as such is subject to change) suggests in excess of 50% of specialised pig and dairy holdings in England (based off 2021 farming stats data) having upgraded slurry storage and covers by 2029. Next steps are to track uptake.	Yes - CS and FIF slurry infrastructure grants cover this
A4.2.1	Reseeding temporary pasture/forage crops with high sugar grass varieties.	Reseeding temporary pasture/forage crops with high sugar grass varieties. . High sugar grasses have the potential to increase livestock's nitrogen usage efficiency. This reduces nitrogen lost though livestock urine and	0.00	0.02	0.05	**Delivery confidence RAG: Amber/Red** • While it is not possible to monitor/verify whether these are being used (they do not look different from other varieties), it is possible that we could pay towards	No

		subsequent emissions to the environment.				the cost of seed and that advice provided under SFI may encourage farmers to take up this measure. • Next steps are to explore options for paying for higher sugar grasses and establish what we would/could pay for.	
A4.2.2	Use of conventional breeding practices (not genomics or gene editing) to breed cattle that have reduced emissions.	Reducing emissions intensity in cattle, without compromising welfare or fertility, by using conventional production focused breeding metrics such as Estimated Breeding Value (EBV) (not genomics, gene editing or genetic modification). This process allows the identification of desirable genetic effects in individuals and enables cattle to be bred with lower rates of intestinal methane production. Continuing market-led uptake from farmers is expected. Measures such as funded annual animal health and welfare visits are expected to support that uptake.	0.01	0.04	0.14	**Delivery confidence RAG: Red** • Competitions in FIP are developing this technology and equipment. The measure is ready for further rollout. A subsequent delivery vehicle is to be identified in discussion with industry.	Yes - Some market-led uptake already
A4.2.4	Increased milking frequency (using robotic milking systems not hormones).	Increasing the rate of milk production, without the use of hormones, by moving from milking twice a day to three times a day. This may require robotic milking parlours and changes to stock management (e.g., keeping cattle closer to the milking parlour). We are currently seeing market-led changes to support this. The role of Government's role is to support adoption and remove any barriers. Currently grants for relevant technology and equipment to facilitate this are being offered under Farming Investment Fund (e.g a grant for improving farm productivity using robotic or autonomous equipment), and future rounds of funding are being considered.	0.01	0.03	0.07	**Delivery confidence RAG: Amber/Red** • Further evidence required (could be explored in FIF). Farmers are currently able to apply for grants through the Improving Farm productivity theme of the farming transformation fund (e.g., Improve farm productivity using robotic or autonomous equipment & systems to aid crop and livestock production).	Yes - Grants available under FIF
A4.2.5	Multi-purpose breeds or multi-use of cows - (milk, calves and meat).	This could be accomplished either by switching from specialised dairy and beef to multipurpose breeds, or by increasing the proportion of beef derived from the dairy supply chain. Research suggests that a more integrated approach can reduce the emissions from milk and meat production. The reason is that specialised, pure beef production systems show higher Greenhouse Gas emission intensities when compared to beef produced in dairy systems. We are seeing market-led response to support this, and we will monitor this and work with industry and the sector to consider the role that may be required of Government if emissions savings are not realised.	0.06	0.24	0.64	**Delivery confidence RAG: Amber/Red** • R&D needs to be completed. Following this, an approach to incentivising the measure will need to be identified, unless market forces are sufficient to drive action at the scale required. • A proportion of the sector is willing to make these changes. There are two main streams of work: (1) engage with the dairy and beef sectors and breeding societies to gauge appetite and technical suitability of breeds and (2) assess the role of markets (Industry has started to trial this). Farming Science team in AFC are looking to commission a research project to better define this action. We will consider policy solutions, working with sector policy teams to understand the role of the market and supply chain commitments in influencing uptake of this measure, and to be better informed by the conclusions of the research.	Yes - Some awareness in sector
A4.3.1	Cultivating common crop varieties that have better nutrient uptake.	Supporting and accelerating the adoption of the cultivation of varieties of already common crops in the UK which use nitrogen more efficiently, reducing Nitrous oxide (N2O) emissions. Competitions in Farming Innovation Programme (FIP) are developing this technology and equipment. In addition, Defra's Genetic Improvement Networks (GINs) aim to improve the main UK crops by identifying genetic traits to improve their productivity, sustainability and resilience. Ongoing work in the Wheat GIN, including annual nitrogen diversity trials, is exploring nitrogen use	0.0000	0.0001	0.0004	**Delivery confidence RAG: Green** • A longer lead in time (10-15 years) is assumed for this measure to allow for R&D of improved crop varieties through a crop breeding programme. We are exploring it in FIP, which is industry led, so we don't have control over what technologies are explored explicitly. We have worked with the FIP team to ensure that we have opportunities to feed in, for example in the 'Sustainable Proteins' theme. • In particular, the focus is on improving the efficiency of crops to utilise the N fertiliser. This would mitigate emissions as well as reduce the economic loss of unrecovered nitrogen.	Yes - FIF

		efficiencies in different wheat varieties.				• We will look to utilise FIF or ELM to support the wider roll out of these improved crop varieties, and the associated procedures, once they have been successfully developed and safely demonstrated.	
A4.3.2	Growing cover crops within a rotation to maintain soil cover during fallow periods.	Crops, grown within a rotation to maintain soil cover during fallow periods (where soil is ploughed and left bare), captures carbon below ground through increased productivity and maintaining input of organic matter (which allow the soil to retain nutrients and not release them as emissions) throughout the rotation. We are seeing market-led uptake of this from farmers. The role of Government is to support and accelerate adoption and ensure co-benefits (e.g. for nature and water quality) are realised. This is included in Sustainable Farming Incentive arable and horticultural soils standard for SFI 2022 and through Countryside Stewardship (SW6 Winter cover crops).	0.01	0.06	0.15	**Delivery confidence RAG: Green** • This measure is already being taken up (based on SFI pilot data). • Track uptake to confirm whether we have sufficient numbers to achieve savings.	Yes - EIP
A4.3.3	Maintain a soil pH that is optimum for crop or grass growth (e.g., liming).	This measure involves carrying out soil analysis for pH and carrying out soil liming (application of magnesium or calcium rich materials to soils) on arable grassland. The application of lime improves the soil pH on land which is below the optimal pH for crop or grass growth. This allows more carbon to be captured below ground through improved productivity and efficient use of nutrients from the soil. We are seeing market-led uptake of this from farmers. The role of Government is to support and accelerate adoption. This is included in SFI soils standards for 2022, moorland standard for 2022, and nutrients standard for 2023.	0.02	0.12	0.32	**Delivery confidence RAG: Amber/ Green** • There are several relevant actions in ELM (e.g., nutrients advice and soil assessments) although we are not directly paying people to keep soil at optimum pH level as this would be hard to track. Under the Farming Rules for Water, farmers are required to plan their nutrient applications according to crop need, and one step in this process is checking the soil pH. We also expect discussion around checking soil pH levels and checks on soil analysis to take place as part of the SFI funded FACTS annual adviser visit. • We are investigating the impact of this on this measure's emission saving.	Yes - Sector generally aware and adopting and in ELM SFI
A4.3.4	Precision Farming (arable/grassland) using machine guidance and other technologies to control and adjust fertiliser application.	The use of machine guidance (MG) and variable rate nitrogen application technologies (VRNT) in arable and temporary grassland field operations can help farmers reduce overlaps/avoids gaps and adjust the application rate of fertiliser to match need better in that precise location within the field. This can reduce Nitrous oxide (N_2O) emissions. Increasing industry adoption is expected as part of the market-led take up of precision farming that is already occurring. The role of Government is to support adoption, demonstrate potential and promote further innovation, funding is available for technology and equipment to facilitate this measure through the Farming Investment Fund and new innovations are being supported through the Farming Innovation Programme.	0.01	0.02	0.06	**Delivery confidence RAG: Amber/ Green** • Under consideration for inclusion in ELM as a revenue offer to complement capital offers for related technologies that already exist. • We need to confirm whether we intend to offer precision farming revenue payments through ELM. (We expect to make a provisional decision on this in the next month).	Yes - Sector generally aware and adopting and in ELM SFI
A4.3.5	Improving/renovating land drainage on mineral soils (where drainage is poor).	Improving and renovating current land drainage (where drainage is poor) to improve crop yield and reduce Nitrous oxide (N_2O) emissions. The role of Government includes working with industry to ensure clear guidance for the best way to drain soils (balancing flood, water quality, agricultural and net-zero).	0.00	0.00	0.01	**Delivery confidence RAG: Red** • Need to confirm the extent to which we expect small savings total of this measure to be covered by other ELM actions helping with soil drainage. Explore how industry/market may encourage this.	No - But likely to be awareness of this practice
A.4.3.6	Reversing, reducing and preventing surface and subsoil soil compaction.	Compaction of soil acts as a barrier and restricts the movement of air, water and nutrients within the soil which can reduce crop yields and increase emissions e.g Nitrous oxide and carbon dioxide (CO_2). Improved root penetration may increase organic inputs. This measure	0.02	0.10	0.19	**Delivery confidence RAG: Amber** • No incentives could mean cost may become limiting, and farmers may not see as necessary or feasible. SFI actions and soil health measures in the EIP may make some contribution, we need to explore the possible savings impacts	Yes - Sector generally aware of this practice and some elements covered by SFI

		focuses on reducing and remediating surface and subsoil compaction. The policy also considers prevention of compaction of vulnerable soils, such as through controlled traffic farming. Actions under the Sustainable Farming Initiative SFI and soil health measures in the Environmental Improvement Plan could make a contribution to this measure, alongside impacts from regulations such Farming Rules for Water.				from these measures and from Farming Rules for Water.	
A6.1	Reducing emissions from cattle by improving animal health, delivered through tackling endemic disease.	This measure is part of Defra's Animal Health and Welfare Pathway and will be delivered through the in-development disease eradication programme focusing on Bovine Viral Diarrhoea (BVD) in England. Testing for BVD is also part of the recently launched Sustainable Farming Incentive Annual Health and Welfare Review which is the first step on the Pathway to improving the health of cattle herds across England.	0.03	0.12	0.28	**Delivery confidence RAG: Amber** • The AHW team are undertaking further evidence review of improving animal health to understand if and how much further we could potentially go in terms of carbon savings under different policy scenarios. • Same for all ELM actions - we have uptake forecasting and environmental impact modelling prior to release, and through our monitoring and evaluation programme can track who is doing the action and where, which we can combine with our environmental impact modelling to track live trajectories.	Yes - Herd Health is mentioned in the EIP
A6.2	Reducing emissions from sheep by improving animal health, delivered through tackling endemic diseases.	This measure is part of Defra's Animal Health and Welfare Pathway and will be delivered through the in-development disease reduction programme focusing on a range of diseases and conditions in sheep in England. The recently launched Sustainable Farming Incentive Annual Health and Welfare Review will also improve sheep health by providing funding to test the effectiveness of worming treatments.	0.01	0.02	0.06	**Delivery confidence RAG: Amber** • The AHW team are undertaking further evidence review of improving animal health to understand if and how much further we could potentially go in terms of carbon savings under different policy scenarios. • Same for all ELM actions - we have uptake forecasting and environmental impact modelling prior to release and through our monitoring and evaluation programme can track who is doing the action and where which we can combine with our environmental impact modelling to track live trajectories.	Yes - Herd Health is mentioned in the EIP
A7.1	Use of plant biostimulants to promote growth and reduce emissions.	Use of plant biostimulants to promote growth and reduce emissions. Plant biostimulants contain substances (microbial and non-microbial) that stimulate natural plant processes. Biostimulants may offer productivity and resilience gains by enhancing nutrient uptake, nutrient efficiency, tolerance to environmental stress and crop quality. Regulation is in development to set consistent products standards. The evidence on the efficacy of Biostimulants is mixed, and so further research is required to allow for it to be integrated into the Sustainable Farming Incentive. Defra's Farming Innovation Programme (FIP) and agri-food evidence programme are developing evidence on novel fertilising products.	0.000	0.000	0.002	**Delivery confidence RAG: Amber** • We need to understand more on the impact on soil biology. There is a Call for Evidence this year. FFCP to follow up later. It would require farm specific advice. • Fertiliser regulatory reform from 2023 will also include scope to include more novel products such as biostimulants - but from later in 2020s. • Due to the need for further research and development of biostimulants it is assumed they would not see uptake until 2030 (10 year lead in time from 2020). This further development is needed as there is limited evidence on their effects, and this drives the lack of uptake. Team have commissioned evidence to look at inhibitors/biostimulants as we currently lack evidence on impacts to soil. Call for evidence being launched this year.	Yes - Sector aware of practice and FIF is developing the measure
A7.2	Use of nitrification Inhibitors (chemical additives to fertilisers) to reduce nitrous oxide emissions.	Nitrificatiion inhibitors are chemical additives that-inhibit or delay biochemical processes that give rise to Greenhouse Gas emissions from fertiliser breakdown. Evidence is not yet robust enough on the case for direct Government intervention. Defra's Farming Innovation Programme (FIP) and agri-food evidence programme are developing evidence on novel fertilising products.	0.01	0.03	0.08	**Delivery confidence RAG: Amber/ Green** • We are planning to commission a research project to develop the evidence base.	Yes - FIF is developing the measure
A8.1	Using genetic testing (genomic tools) to develop improved livestock breeding goals and deliver permanent low emissions	The measure involves improving breeding, using genetic testing (genomic tools), to ensure that breeding goals involve some low carbon traits. The measure involves farmers collecting performance information on the	0.000	0.001	0.003	**Delivery confidence RAG: Amber/ Green** • Further evidence and policy development required but being explored in FIP - Gene editing/modern breeding techniques are in scope of all competitions in the FIP. Not projected to make a significant contribution by CB6. Potentially	Yes - FIP developing this

	traits.	individual animals and genetic testing and feeding back this information to help with breeding goal development (the goals include lower methane emissions). Competitions in Defra's Farming Innovation Programme (FIP) are developing this measure ahead of further refinement of policy measures.				sensitive - will require a shift away from economic breeding indices.	
A10.1	Integrating grass/herbal leys in rotation in arable systems.	Leys are temporary grasslands made up of legume, grass and herb species that have the benefits of increasing soil organic matter and adding nitrogen to the soil and improving the soil structure. This measure promotes diversification of vegetation in arable cropping systems with the introduction of grass leys to reduce use of artificial nitrogen fertiliser. Positive impacts include reduced Greenhouse Gas emissions from synthetic fertilisers and reduced energy use and leaching of nitrogen from the soil. This is included in the Sustainable Farming Incentive SFI (soils standards for SFI 2022).	0.00	0.01	0.05	**Delivery confidence RAG: Green** • Track uptake to confirm whether we have sufficient numbers to achieve savings.	Yes - In ELM SFI
A10.2	Avoiding use of Nitrogen in excess through the development of an agronomist led nutrient management plan.	We are already seeing the use of nutrient management plans and manure management plans across the farming sector. Government's role is to support that adoption (and where appropriate ensure such plans support decarbonisation) and more consistent use of Nutrient Management Plans at farm level to optimise the use of nitrogen and avoid excess application. Positive impacts include reduced Greenhouse Gas emissions from synthetic fertilisers and reduced energy use and leaching of nitrogen from the soil. This action may be covered or partially covered by ELM, or by the Farming Rules for Water and Nitrate Vulnerable Zones regulation. This is included in the Sustainable Farming Incentive SFI (soils standards for SFI 2022, nutrients standard for 2023, and low/no input grassland standard for 2023) and is also partially covered by the Farming Rules for Water and Nitrate Vulnerable Zones regulations.	0.00	0.01	0.02	**Delivery confidence RAG: Amber/ Green** • SFI 23 could partially help minimise the risk of excess nitrogen application through greater awareness and education via the annual FACTS qualified adviser visit. We are also looking at rewarding grassland farmers to use more natural nitrogen fixing crops to reduce the demand for nitrogen fertiliser inputs. We have commissioned a project to develop a new online, free to user, nutrient management planning tool (to be launched 2025) which also aims to improve uptake of nutrient management planning. • Market forces (i.e. current price of nitrogen fertiliser) will impact applications of N fertilizers and potentially drive increased efficient use of nitrogen.	Yes - nutrient management plans referred to as a measure in EIP
A11	Improved crop health through improved pest and disease control practices.	Improving crop health should increase yields and the efficiency of nutrient use. The measure assumes improved pest and disease control practices, which can be a combination of management actions targeting the relevant problems on the farm. We expect continuing market-led uptake from farmers, so the role of government is in improving these practices. The Sustainable Farming Incentive SFI Integrated Pest Management actions are expected to contribute to this. New pest management techniques are also being supported through the Farming Innovation Programme.	0.000	0.001	0.004	**Delivery confidence RAG: Amber/ Green** We need to confirm the extent to which we expect the savings total to be covered by SFI Integrated Pest Management actions.	
A12	**[NB: This measure will not be included in the public facing compliant report, as it has moved to the baseline. Is included here as it will be included in the advice to DESNZ SoS].** **Economic projection for the agriculture sector** (based on changes to farming incentives).	n/a	0.00	0.00	0.00	**Delivery confidence RAG: Amber/ Green**	No
A15	Improved farm fuel and energy efficiency.	This measure refers to reductions in farm non-traded carbon dioxide (CO_2) emissions from motive power, pumps and drives. This may include options like the	0.10	0.30	0.57	**Delivery confidence RAG: Amber/ Red** • Future work to consider existing roll out of technologies and the steps required	Yes - Sector aware and adopting

		electrification of tractors and utility vehicles, use of small robots in place of heavy human operated machines, low energy motors etc. There is a strong market-led response due to current high energy prices. We anticipate this continuing but will support adoption where needed. Currently competitions in the Farming Innovation Programme (FIP) are developing this technology and equipment and the Farming Investment Fund (FIF) is providing grants towards the purchase of relevant equipment.				to deliver additional savings in this area. Competitions in FIP are developing this technology and equipment. Next steps will involve monitoring what is coming out of FIP, and what is being paid for under FIF, and also to build a more detailed picture with a view to developing a list of specific measures (e.g., efficiency in fuel use and farm buildings energy efficiency, energy saving technologies), and consider future delivery vehicles. • A BEIS led call for evidence on Non-Road Mobile Machinery (NRMM) is currently planned for 2023. This would aim to identify possible savings opportunities for agricultural machinery for through fuel switching and technological improvement.	
FORESTRY, AGROFORESTRY & HEDGEROWS							
Af1-E	Increase tree canopy and woodland cover to 16.5% of total land area in England by 2050.	Through the England Trees Action Plan, supported by the Nature for Climate Fund (NCF), we have launched new grants and initiatives to support increased tree planting in England. These include the England Woodland Creation Offer, the Community Forests Trees for Climate Programme and the establishment of Woodland Creation Partnerships in Cornwall and Northumberland. Tree planting and woodland creation was increased in England to c.2,700 hectares in 2021/22. The new environmental land management (ELM) schemes will deliver a large proportion of tree planting funding from 2025, when the NCF is due to end. Future woodland creation grants in ELM will mirror the EWCO. Landscape Recovery will support major landscape-scale afforestation projects where these deliver a wide range of environmental outcomes.	-0.01	0.05	0.26	**Delivery confidence RAG: Amber/Red** • We have recently adjusted our tree target to increase delivery confidence. There are delivery risks with tree planting because our measures are ambitious and demand-led, but we are making good progress. For example, in 2021/22 2,300 ha of woodland creation took place in England, representing a 10% increase in woodland creation compared to the previous year and an additional 400 ha of tree planting outside of woodland. Interim (non-binding) target to increase tree and canopy cover by 0.26% of land area in England by 31st January 2028, requiring an in increase in tree and woodland cover of 34,000 ha. Initial delivery pathway set out in 2023 Environmental Improvement Plan.	Yes
A2	**Agroforestry.** A combination of levers aiming to increase silvo-arable agroforestry to 10% of all arable land by 2050.	Agroforestry will be delivered through environmental land management schemes. Indicative launch date for agroforestry standard in Sustainable Farming Incentive is 2024, although this will not be confirmed until nearer the date.	0.00	0.02	0.09	**Delivery confidence RAG: Red** • Review regulatory status of agroforestry to classify as agriculture, rather than forestry, to remove regulatory barriers. • Provide financial support to farmers to assist in covering costs for investment in technology and equipment; and grants to support costs of transforming land from agriculture to agroforestry (tree planting, tree covers, etc). • Fund a national advice and guidance service to support uptake of agroforestry with network of regional advisers. • Fund reverse auctions to scale uptake of agroforestry. • Review farm tenancy arrangements to enable appropriate diversification into agroforestry and forestry and provide industry led guidance (best practice and case studies of how landlords and tenants can work together). Review the tax treatment of woodlands (and if necessary, amend to ensure there is no disadvantage to farmers from changing their use of land to forestry).	Yes

A2.2	Hedgerows.	Support farmers to create at least 30,000 miles of managed hedgerows by 2037, increasing to a total of at least 45,000 miles of additional managed hedgerows by 2050. We will also support them to additionally restore degraded hedges across the country. We have announced the inclusion of a hedgerow standard in the Sustainable Farming Incentive, expected to roll out in 2023.	0.02	0.05	0.09	**Delivery confidence RAG: Amber/ Red** • Defra will encourage and support increased hedgerows through our environmental land management schemes. We are working with Sustainable Farming Incentive pilot participants to gather learning from the pilots and are incorporating this feedback into the development of the live version of the Hedgerow Standard and its supporting capital items, which are due to be rolled out into the scheme in 2023.SFI is unlikely to deliver the savings alone but together with CS options it is likely to (for example BN11: planting new hedge, BN5: Hedgerow laying, BN7: hedgerow gapping up), but there are risks around certainly in delivery until those offers, and their timings are confirmed. .	Yes
BIOMASS							
Nrg3	**Domestic planting of Perennial Energy crops (PECs) and Short Rotations Forestry.** Increase planting of PECs (miscanthus and Short Rotation Coppice) and Short Rotation Forestry (SRF).	Increase land planted with perennial energy crops and short rotation forestry, ensuring above- and below-ground carbon sequestered by fast-growing species. Further consideration will be provided in the Biomass Strategy. We will also be further exploring how this will be driven by market demand and whether other support might be needed from government to enable this planting.	0.01	0.35	1.00	**Delivery confidence RAG: Red** • Underpinning this measure is confidence in the end market for these products and need to maximise proportion of feedstock destined for technologies with CCUS. To increase delivery confidence, we need to: 1. Get ministerial agreement to the specific elements within the scaled back pathway, including integration with wider land use requirements, species mix, cultivation standards 2. Continue working closely with BEIS and key stakeholders to understand the viable and sustainable end market for biomass crops, modelling and maximising the proportion destined for technologies with CCUS. 3. Alongside this end market economic modelling, rapid work to understand what further delivery mechanisms may be needed to incentivise growers.	Yes
PEAT							
Peat 1	**[NB: This measure will not be included in the public facing compliant report, as it has moved to the baseline. Is included here as it will be included in the advice to DESNZ SoS].** Peat Restoration (Nature for Climate Fund - 2020-2025).	Restoring 35,000 ha of peatland by 2025.	0.00	0.00	0.00	**Delivery confidence RAG: Amber/ Red** • We are working with the LR team and wider ELM teams to ensure join up in delivery rounds to provide longer term confidence in the future delivery of peatland restoration. This should help landowners have more confidence to put their land into restoration but reaching the 35,000 ha target may still be challenging. • We have funded discovery projects and have a pipeline of approximately 50,000 ha, however reaching the 35,000 ha may go beyond 2024/25 due to the sector capacity constraints. Increased, long term demand for restoration projects should build restoration sector confidence to expand to meet our challenging delivery targets to CB6 and 2050. We are also exploring other options to encourage sector capacity growth such as skills and training, and new entrants' schemes. We are in the process of commissioning an R&D project to understand the sector size and the growth required, as well as what skills gap currently exists. This will be funded by a mixture of public and private finance.	Yes
Peat 2	Peat Restoration (Blended Finance - 2022-2050).	Overarching target to restore approximately 280,000 ha of peatland by 2050 (inclusive of the Nature for Climate	0.16	0.82	1.37	**Delivery confidence RAG: Amber/ Red**	Yes

		Fund (NCF) funded restoration). The NCF is providing over £33 million to restore 20,000 hectares of peatlands, with a further bidding round in 2023. Beyond 2025, the main delivery vehicles will be incentives through the new environmental land management (ELM) schemes: Countryside Stewardship will provide a key funding stream for wetter modes of farming; Landscape Recovery will provide long-term funding to support large-scale peatland restoration projects; and the Farming Innovation Programme supports applications for research and development in paludiculture. Private investment will be mobilised by developing the Peatland Code further, including by expanding the Code to cover lowland peat and exploring further carbon pricing opportunities for the sector. Informed by data from the England Peat Map and findings of the Lowland Agricultural Peat Task Force, a Peatland Restoration Roadmap will be developed to set out a detailed trajectory for restoration to 2050.				• We are exploring different options for private finance, including the peatland carbon code and inclusion of peat in the Emissions Trading Scheme. • We will develop understanding of the feasibility of changes to landscape-scale water level management, which will enable more expansive lowland restoration, through a large-scale R&D programme rolling out of water landscape infrastructure (water storage and water level management) awaiting procurement. • The sector capacity and skills work mentioned in the cell above will also be important for long term delivery, as well as the development and publication of our Peatland Restoration Roadmap (2024).	
Peat 3	Increasing responsible management of lowland agricultural peatlands .	More responsible agricultural management of peatlands, through raising water tables and wetter modes of farming (e.g. Paludiculture).	0.04	0.18	0.24	**Delivery confidence RAG: Red** • The updated Peat Map (2024) and other R&D projects will develop a clearer picture of the technical feasibility of restoration and sustainable management activities.	No
Peat 4	Ending the sale of peat in horticulture.	Ending the sale of peat in horticultural growing media, in the amateur sector by 2024 and in the professional sector by 2030.	0.00	0.01	0.04	**Delivery confidence RAG: Amber/Green** • Positive progress with the outcome of the public consultation being published announcing the ban in amateur sector. Need to identify appropriate legislative Bill. • Need to continue to progress with pursuing a ban in the profession sector.	Yes
Peat 5	Update the greenhouse gas inventory, including applying new wasted peat cropland emissions.	Determination of new emissions factors for various peatland categories, including particularly cropland on wasted peat (peat formerly mapped as having a depth of at least 40cm), and their inclusion in the 1990-2021 LULUCF inventory published in 2023.	1.92	1.92	1.92	**Delivery confidence RAG: Green** • This is a GHG inventory adjustment to account for updates to emissions factors across the inventory, including for those of cropland on wasted peat. These changes have been made in the inventory published on 7 February resulting in emissions from peat being reduced but are not yet included in the EEP baseline.	No
WASTE AND WASTE-WATER							
W1A	Near elimination of biodegradable municipal waste to landfill - Confirmed collection and packaging reforms policies.	Collection and packaging reforms to reduce biodegradable waste municipal waste to landfill. Primarily consistency in collection of household recycling (food waste, garden waste and paper and cardboard).	0.43	1.96	2.95	• **Delivery confidence RAG: Amber/Red** • Maintain £295m capital funding and £60mil of resource transition funding for weekly household separate food waste collections, and wider waste budgets for collection, packaging, and recycling reforms. (*To note we need to secure funding for ongoing costs at the next spending review).* Work with local authorities and the non-household municipal sector to ensure that we achieve compliance by the implementation dates as agreed with Defra Secretary of State. These dates will be included within legislation.	Yes
W1B	Near elimination of biodegradable municipal waste from landfill - additional policies towards near elimination of this waste to landfill from 2028.	This is an early-stage proposal which will consist of further measures to divert biodegradable municipal waste from landfill from 2028.	0.42	0.49	0.71	• **Delivery confidence RAG: Red** • Enhanced waste composition data will allow us to both model potential savings and take a targeted approach to deliver on the near elimination of biodegradable waste to landfill. We aim to begin addressing this through launching a call for evidence to explore options to achieve the near elimination of biodegradable municipal waste to landfill. Ministers will also soon be deciding next steps for textiles.	Yes

W2A	**[NB: This measure will not be included in the public facing compliant report, as it has moved to the baseline. Is included here as it will be included in the advice to DESNZ SoS].** Data improvement for industrial wastewater treatment.	Emissions savings associated with respect to data improvement have been factored into the new EEP baseline.	0.00	0.00	0.00	• **Delivery confidence RAG: Green** • The emissions savings associated with W2A have now been factored into the new Energy and Emissions Projections (EEP) baseline (EEP 2021-40). Therefore, we need to remove them from our emissions savings projections.	No
W4A	Monitoring emissions from wastewater treatment and subsequent optimisation of existing operations to minimise process and other emissions.	Detection of emissions from a full range of sites, treatment stages and environmental conditions using new sensors will give a better understanding of processes. This will allow optimisation of current processes to reduce greenhouse gas leakage and minimise production.	0.02	0.13	0.25	• **Delivery confidence RAG: Amber/Red** • We need to be in a position where water companies are able to understand the emissions from different treatment processes and how they vary with environmental conditions/load/location. This will allow modification of the treatment process to minimise emissions of GHG. • To do this we need further research and the development of techniques to monitor GHG emissions. The Water Industry holds responsibility to drive this through existing industry tools and processes such the WINEP, UKWIR and opportunities from regulator driven funding mechanisms such as the Ofwat Innovation Fund.	Yes
W5A	High proportion of conventionally digested sludge from wastewater treatment is upgraded to Advanced Anaerobic Digestion (AAD).	By treating a higher proportion of sewage sludge via advanced anaerobic digestion, process emissions could be reduced.	0.01	0.05	0.08	• **Delivery confidence RAG: Amber/Red** • This is dependent the water industry investing in the processes. It is market driven as there are no legislative requirements driving this. This could be achieved through the Ofwat Open Access Fund in development for Spring 2023.	Yes
W6A	Alternative treatment processes for wastewater - e.g., anaerobic treatment/Membrane Aerated Biofilm Reactor (MABR)/alternative ammonia removal processes.	Development and adoption of new wastewater treatment processes will improve the efficiency of wastewater treatment and reduce greenhouse gas production.	0.00	0.03	0.08	• **Delivery confidence RAG: Red** • This is dependent on the water industry investing in the processes. It is market driven as there are no legislative requirements driving this. BEIS have set up a Regulators Pioneer Fund (closed September 2022) for projects starting and finishing between January 2023- March 2025.	Yes
W2B	Data improvement for industrial wastewater treatment.	Further improvements in modelling and data collection should improve reporting and reduce uncertainty.	0.07	0.07	0.07	• **Delivery confidence RAG: Amber/Green**	Yes
F-GASES							
Fg1	Metered-dose inhalers (MDIs) F-gas Phasedown.	Measures implemented by the NHS to reduce MDI F-gas emissions.	0.02	0.19	0.45	• **Delivery confidence RAG: Amber/ Green** • The NHS would need to prioritise training for clinicians on how to use and prescribe alternatives, and patients would need to be supported to switch. • Need MHRA to approve MDIs using alternative propellants. Slight risk relating to MHRA backlog as there is no unmet clinical need to prioritise it over other approvals work.	Yes
Fg2	Additional HFC phasedown step(s) to secure 85% cut.	Implementation of additional phasedown step(s) to meet the Kigali Amendment requirement to reduce HFC consumption by 85% by 2036	0.00	0.00	0.05	• **Delivery confidence RAG: Amber/ Green** • A primary legislative vehicle would need to be securedAdditionally, in order to undertake their review, the F-Gas team will need to prioritise net zero action in addition to their ongoing work on the REUL Bill and NIP Bill.	Yes

Fg3	Raise ambition through a review of F-gas policy in 2023.	Conduct a review of F-gas policy in 2023 to identify further policy measures.	0.17	0.50	0.63	• **Delivery confidence RAG: Amber/ Green** • A primary legislative vehicle would need to be secured Additionally, in order to undertake their review, the F-Gas team will need to prioritise net zero action in addition to their ongoing work on the REUL Bill and NIP Bill.	Yes

TABLE 2: DEFRA'S UNQUANTIFIED LIST OF NET ZERO MEASURES WHICH MAY HELP CLOSE THE GAP / PROVIDE ADDITONAL SAVINGS IN THE FUTURE

FOR REFERNCE ONLY	**PUBLIC FACING – SECTION 14 REPORT**		**NOT PUBLIC FACING – SECTION 13 ADVICE TO BEIS SOS**	
Measure: Code	**Measure: Public Facing Name**	**Measure: Public Facing Description**	**Additional commentary on delivery risk & next steps**	**Is the measure in the public domain already?**
AGRICULTURE				
	Better health through disease reduction in pigs	Endemic production-limiting disease is a major constraint on efficient livestock production and will have an impact on the carbon footprint of livestock farming. Improving health status would be expected to lead to reductions in emissions intensity. The Animal Health and Welfare Pathway aims to improve farm animal health and welfare across our national herds and flocks, including an in-development Porcine Reproductive and Respiratory Syndrome virus control programme for pigs. We are currently undertaking research to quantify the emissions savings associated with improved pig health.	We await the results of R&D to fully understand the technical and practical potential. Early-stage potential policy, next steps not yet determined.	Yes – not formally but sector will generally be aware
	Development of more sustainable protein sources for human diets.	Alternative proteins, encompassing plant-based products, cellular agriculture and insects may offer environmental benefits. However, the sector is diverse and at different stages of readiness and investment, and so further research is needed to overcome technological barriers, increase consumer acceptance and accomplish an optimal regulatory alignment that meets the needs of the sector.	Alternative protein technologies are at different stages of development and face very different technical (& scalability), economic, regulatory, and public acceptance barriers, that will determine market growth and associated potential to contribute GHGs emissions abatement. Early-stage potential policy, the next stage would be further analysis.	Yes – not formally but sector will generally be aware
	Developing the evidence base on controlled environment agriculture (CEA) systems/Vertical agriculture	These systems make it possible to consistently and reliably control and/or manipulate the growing environment. This effectively controls crop nutrition and growth along with potential pathogens (pests and diseases) on the crop, and increases the potential to reduce transport/import emissions and improve yields. These systems are likely to increase greenhouse gas emissions until renewable energy sources become more widely available. We continue to undertake research and monitor the evidence base in this area.	Defra's R&D programme is developing evidence on the relative gains, costs, feasibility and scalability of current and future energy generation technologies available for CEA. The potential for reduced energy consumption by incorporating energy efficiency practices is also being explored. Additional research on current and future technologies available for CEA is being undertaken, which will consider barriers and opportunities for growth and decarbonisation in the sector. UK Research and Innovation (UKRI) made a pre-announcement on new funding for innovation focussed research for protected and controlled environment (PACE) horticulture; CEA is also within the scope of our farming innovation programme, including a recent call which focuses on automation and robotics, [lines on FIP CEA] which will contribute to develop the evidence base. It hasn't been possible to ascertain deliver risk for this policy at this stage. Early-stage measure, no further next steps identified.	Yes – not formally but sector will generally be aware
	Methanisation, methane capture and combustion.	Additional mitigation intervention whereby the methane generated during storage of liquid manure is collected and burnt, converting it to carbon dioxide, a less potent GHG. There may also be potential to utilise heat or energy produced on combustion within the farm business. Although initial quantification has been attempted, significant uncertainty remains and further work is needed. We continue to monitor research and development in this area.	There is technical potential but there is a need to assess the deployability of this measure. This includes understanding the practical barriers to uptake (e.g., safety and risk) and behavioural changes required, as well as the views and opinions of farmers who would undertake this measure. Early-stage measure, no next steps identified. The likely next step would be further R&D.	(Yes) – some of the sector may be aware

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Measure: Code	**Measure: Public Facing Name**	**Measure: Public Facing Description**	**Additional commentary on delivery risk & next steps**	**Is the measure in the public domain already?**
	Biorefinery as nutrient recovery.	Additional mitigation intervention in which nutrients are extracted from biomaterials for use in livestock feeding or replacing synthetic fertilisers. Although initial quantification has been attempted, significant uncertainty remains, and further work is needed. We continue to support research and development in this area such as through the Farming Innovation Programme. The Programme funds industry-led research and development to drive innovation that will enhance the productivity and profitability of England's farming sectors, whilst enhancing the environment and reducing greenhouse gas emissions. It has already supported a range of projects, including ones which focus on biorefinery as nutrient recovery. For instance, the 'Bringing H2OPE to Agriculture' project looks at on-site transformation of dairy cow slurry into valuable byproducts including fertiliser and growth substrate.	It hasn't been possible to ascertain deliver risk for this policy at this stage. Early-stage measure, no next steps identified.	Yes (research supported through FIP)
	Using insect protein as animal feed.	Feeding insect protein to animals has the potential to reduce overall global emissions from feed production (in comparison to conventional protein production e.g. soya grown overseas) and support a circular economy (e.g. if insects are raised on waste). There is ongoing research to determine the potential of these measures and the sector is at an early stage of development. This measure is unlikely to have significant UK GHG or land use impacts. It could, however, reduce supply chain emissions from feed supply occurring outside the scope of UK carbon budgets.	Further R&D is required to better understand risks around disease outbreaks, air quality, animal productivity/welfare and contamination, as well as to fully understand the total emissions from insect protein production. Early-stage measure. Defra is working with devolved administrations and Food Standards Agency on review of the Transmissible Spongiform Encephalopathy (TSE)-related livestock feed controls, which includes considering allowing the use of processed insect protein in pig and poultry feed. Defra and FSA are currently completing an assessment of the animal and public health risks of the changes considered.	(Yes) – some of the sector may be aware
FORESTRY				
	Forestry and woodlands: safe use of timber in construction.	Increasing the safe use of timber in construction was a commitment in the England Trees Action Plan and the Net Zero Strategy, as it can support storing carbon safely, for example through using timber to build houses. This work will be taken forward in particular through the cross-government and industry timber in construction working group, which will design a policy roadmap identifying key actions for government and industry to safely increase timber use in construction.	Resolving the barriers cuts across DLUHC/BEIS and Defra policy areas - Key barriers that need to be addressed are: 1) Resolving outstanding building safety questions around some uses of timber in building regulations and in guidance provided to insurers/lenders etc. 2) Ensuring a secure supply of domestic timber of right quality/type etc. 3) Ensuring we have the skills in the supply chain to use timber. There are also cultural barriers to use of TiC and we need to look across government at how we can stimulate demand, for example through public procurement or through the wider work on embodied carbon limits. Defra is currently working with BEIS, DLUHC and stakeholders to create a timber in construction policy roadmap outlining how we will achieve this. The work is going to be highly interlinked with the wider work in BEIS on the Industrial Decarbonisation Pathway and requires cross collaboration across government. To be able to delivery this policy we need agreement of which government department owns the carbon savings/actions and how government can work together to unlock these savings.	Yes
BIOMASS				
	Biomass: increase ambition for planting perennial energy crops and short rotation forestry.	Increasing ambition for carbon savings through biomass by either: increasing land planted, or relaxing expected standards about stocking density or use of exotic species.	Detailed work is needed to understand the land use implications of this measure, including impact on Environment Act targets, of planting biomass in such a way as to maximise carbon but that does not sufficiently mitigate the adverse impacts on ecosystem services. It is critical that any further increase is linked to confidence in the end market for these crops, maximising use in conjunction with CCUS. Defra will test ministerial appetite for scenarios including increased biomass ambition.	Yes
PEAT				

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Measure: Code	**Measure: Public Facing Name**	**Measure: Public Facing Description**	**Additional commentary on delivery risk & next steps**	**Is the measure in the public domain already?**
	Paradigm shift in water management on lowland peatlands	Major investment in water storage and water level management infrastructure would transform how we manage water in lowland peatlands. It would enable us to raise water levels safely and sustainably to an appropriate depth that could lower GHG emissions	Some of this is already part of our pathway, but what we have provided is a conservative estimate, given uncertainties. Note: it is not currently possible to determine the area of peat for which raising the water table can be deployed as a mitigation tool. Areas of uncertainty include the impact of topography and water availability. It is also unclear whether raising the water table is the solution for peat soils shallower than 40cm, which accounts for 72% of cropland and 50% of grassland on peat. We are shortly starting: Research project on understanding 1) the water requirements and impact of topography on raising the water table, 2) other measures that could reduce emissions, e.g. surface irrigation. Pilot studies on water management infrastructure. In the longer-term, we would need significant funding via an SR bid and private investment for the infrastructure.	No
	Regulatory approaches to activities on lowland peat soils	Provided the necessary water management infrastructure is in place, it would be possible to explore regulatory options around activities on lowland peat soils (e.g., requiring a minimum water table depth).	Defra's Secretary of State has shown interest in interventionist approaches, which could be an effective tool if voluntary approaches (e.g., ELM options) prove insufficient.	No
	Paludiculture	Full implementation of the Paludiculture Road Map, as developed by the Lowland Agricultural Peat Task Force. This includes delivery of the Paludiculture Exploration Fund (2022-2025), which comprises a community engagement project and a competitive grant scheme.	The Paludiculture Exploration Fund has already been launched and is receiving good publicity. Paludiculture has not already been quantified as it is a very early stage method and emission factors for the various practices don't yet exist.	Road Map – No. PEF – Yes.
	R&D: Improving peat emissions data	Ongoing Research & Development will improve the quantification of emissions and removals.	This line refers to the England Peat Map, which is due to report in 2024. We are expecting to have lost some of our peat soils since they were last mapped, which will lead to a lower emissions figure.	Yes
WASTE & WASTEWATER				
	R&D to refine emissions estimates and explore further methane gas capture from landfill.	Landfill gas is collected and used to generate electricity. Whilst current practices are relatively successful at capturing landfill gas, there is room for improvement. Previous research has indicated that most methane is lost at operational sites through uncapped waste and around infrastructure, such as gas wells. Industry practise could reduce this leakage. There are also other smaller opportunities for improvements at closed but permitted sites.	Do not yet have a robust evidence base and adequate measurement of these emissions. Need to ensure human resource availability and funding allocation going forwards. Need to work with BEIS and ensure right incentives (such as ROC) are in place to promote landfill gas capture. The EA and Defra will run a programme to develop better measurement techniques, supported by a robust evidence base. In advance of those research results, we are also working with industry to encourage operational practise improvements based on industry lead best practise. We are exploring potential solutions. For example, whether microgeneration technologies could support extended lift of landfill gas capture and conversion to energy. We are exploring options for planting woodland on historic landfill.	No
F-GASES				
FG3	Raising ambition through additional actions identified by the review of F-gas legislation	We are undertaking a review of F-gas policy in 2023 and believe this will identify policy action to deliver additional emissions savings.	Do not yet have a robust evidence base. This measure will be dependent on external factors, e.g. securing primary powers to our intended timeframe. The main next step will be securing primary powers.	Yes
EMERGING AREAS				
	Saltmarsh restoration and creation.	Exploring the potential for carbon sequestration through the restoration and creation of saltmarsh habitats around the UK.	Restoring saltmarsh habitats provides considerable wide ranging climate adaptation, fisheries, biodiversity, tourism, water quality and flood prevention benefits. The majority of the UK's saltmarsh habitats are already in Marine Protected Areas, our focus is now on ensuring these are effectively managed. Saltmarsh restoration is already being delivered, due to its benefits for climate adaptation and resilience, as well as biodiversity. The Environment Agency lead the 'Restoring Meadows, Marsh and Reef Initiative', working with partners across government, the eNGO sector,	Yes

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Measure: Code	**Measure: Public Facing Name**	**Measure: Public Facing Description**	**Additional commentary on delivery risk & next steps**	**Is the measure in the public domain already?**
			academia and industry to facilitate the accelerated restoration of estuarine and coastal habitats, with saltmarshes being one of their three initial focus habitats. The carbon sequestration potential from saltmarsh is still uncertain and further research is required to understand the potential savings and their permanence. Work to take direct GHG measurements from saltmarsh and to propose saltmarsh definitions for inventory purposes is already underway. The UK Blue Carbon Evidence Partnership, consisting of Defra, BEIS and Devolved Administrations, is working to progress the evidence base on blue carbon, including by looking to fill the evidence gaps which hinder the inclusion of saltmarsh in the UKGHGI.	
	Seagrass restoration and creation.	Exploring the potential for carbon sequestration through the restoration and creation of seagrass habitats around the UK.	Restoring seagrass habitats provides considerable wide ranging climate adaptation, biodiversity, fisheries and flood prevention benefits. The majority of the UK's seagrass habitats are already in Marine Protected Areas, our focus is now on ensuring these are effectively managed. Seagrass restoration is already being delivered, due to its climate adaptation and resilience, as well as biodiversity benefits. Natural England is leading a project which aims to restore seagrass and maerl habitat in five Special Areas of Conservation. The carbon sequestration potential from seagrass is still uncertain and further research is required to understand the potential savings and their permanence. Seagrass habitats are less of a priority than saltmarsh habitats due to their smaller extent and the more limited availability of data needed by the UK GHGI. The UK Blue Carbon Evidence Partnership, consisting of Defra, BEIS and Devolved Administrations, is working to progress the evidence base on blue carbon, including by looking to fill the evidence gaps which hinder the inclusion of seagrass in the UKGHGI.	Yes
	Enhanced weathering through applying ground silicate rocks to land.	Exploring the potential for carbon dioxide removal through the application of ground silicate rocks to land.	This policy is still at an early stage, and further research and development is required to understand the risks and benefits, particularly when deployed at scale. It is not clear where savings from this policy would accrue in the UKGHGI. Early-stage policy yet to be adopted there is still significant R&D and engagement, to do to develop robust MRV and a system, ahead of policy implementation. This policy is not yet owned by a Defra team and would need to be resourced if adopted.	No
	Applying biochar to land for carbon dioxide removals	Exploring the potential to deploy biochar for carbon sequestration through application to land.	Further research and development is required to understand the risks and benefits, particularly when deployed at scale. It is not clear where savings from this policy would accrue in the UKGHGI. Early-stage policy yet to be adopted there is still significant R&D and engagement, to do to develop robust MRV and a system, ahead of policy implementation. This policy is not yet owned by a Defra team and would need to be resourced if adopted.	No
	Microalgae cultivation	Exploring the potential to cultivate microalgae to fix carbon dioxide into biomass.	It is not clear where savings from this policy would accrue in the UKGHGI. Further research and development is required to understand the potential savings and their permeance.	No

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Measure: Code	**Measure: Public Facing Name**	**Measure: Public Facing Description**	**Additional commentary on delivery risk & next steps**	**Is the measure in the public domain already?**
	Macroalgae cultivation	Exploring the potential to cultivate macroalgae (such as seaweed or kelp) to fix carbon dioxide into biomass.	Further research and development is required to understand. It is not clear where savings from this policy would accrue in the UKGHGI. Further research and development is required to understand the potential savings and their permeance.	No

TABLE 3: DEFRA'S LIST OF ENABLER NET ZERO MEASURES (NO ADDITIONAL CARBON SAVINGS POSSIBLE, BUT KEY TO SUPPORT MEASURES ABOVE)

FOR REFERNCE ONLY	PUBLIC FACING – SECTION 14 REPORT		NOT PUBLIC FACING – SECTION 13 ADVICE TO BEIS SOS	
Measure: Code	**Measure: Public Facing Name**	**Measure: Public Facing Description**	**Additional commentary on which measure the enabler supports, it's importance for the net zero system & next steps**	**Is the measure in the public domain already?**
	Agriculture, Forestry and Other Land Use (AFOLU): Nature for Climate Fund.	**AFOLU:** We will boost the existing £640 million Nature for Climate Fund with a further £124 million of new money, ensuring total spend of more than £750 million by 2025 on peat restoration, woodland creation and management.	NCF supports delivery for both forestry and peat restoration (Afn1e and Peat 1&2). It is the main source of public funding for both until 2025. The next steps are to ensure a smooth transition to other funding post 2025, which is expected to come mainly from the future farming schemes.	Yes
	AFOLU: Rewetting lowland peat.	**Peat:** Rewetting lowland peat necessitates investment in (i) water storage capacity (e.g., reservoirs), and (ii) water level management capabilities (e.g., telemetry, mechanised pumps, Archimedes screws). This infrastructure would facilitate rewetting and address drought and flood risks. Design and cost of interventions will be context-specific, and will require close working with the EA and IDBs, e.g. around regulatory challenges. We are developing pilots to facilitate a better understanding of the costs, barriers, and emissions impact of this work.	This supports the delivery of Peat 3. One of the key delivery challenges for this measure is achieving optimal water depth. Significantly slowing the rate of degradation requires the raising and careful management of water levels, so that they are just below the surface. This rewetting would limit peat loss, and under optimal conditions may support the formation of new peat deposits. The next steps are to move forward with the pilots and R&D in this area.	No
	Waste water: Research and Investment.	**Resources and waste:** Water company research and investment into reducing process emissions from wastewater treatment plants, e.g. anaerobic treatment, membrane activated biofilm reactors, alternative ammonia removal processes and nature-based solutions.	This supports the delivery of W6A: the development and adoption of new wastewater treatment processes.	No
5vi.24	Product Labelling.	We are exploring the use of product labelling to show the durability, repairability and recyclability of products, as well as their environmental footprint, with a view to stimulating demand for better quality items. We have committed to developing a mandatory methodology for the eco-labelling of food and drink products. This will be for participating companies to consistently follow, providing a common standard where eco-information is voluntarily used should they choose to include such information on their products	Joint BEIS/Defra work which Defra support but is dependent on SR outcomes. We have announced our intention to require recyclability labelling on packaging and will introduce this as part of new regulations on packaging and packaging waste. This labelling will help consumers to recycle and dispose of packaging correctly.	Yes

5i.06	Green Jobs and Skills: New professional body for the farming industry.	Between 2021 and 2027, Defra will gradually reduce and then stop untargeted Direct Payments. Farmers will instead, receive public money for improving the environment, improving animal health and welfare and reducing carbon emissions. To achieve this, farmers will need new skillsets. The Government is contributing towards the establishment of a new professional body for the farming industry; The Institute for Agriculture and Horticulture (TIAH). TIAH is aimed at removing the fragmentation that exists within current learning and skills landscape for farming businesses. TIAH will drive improvements in industry capability – which will cover the skillsets required to deliver future Environmental Land Management objectives; including water and air quality, soil husbandry, woodland restoration and management, agroforestry and biodiversity. Alongside TIAH's work, we are also looking at the new skills and knowledge advisers may need to support farmers and land managers towards these goals. Action is already being taken by the sector. For example, the Chartered Institute for Ecology and Environmental Management (CIEEM) has developed a competency framework and BASIS has recently launched an environmental adviser training module and register.	This is an industry initiative to, in part, support the Agricultural Transition by supporting farmers to upskill. TIAH are meeting all the deliverables of their grant agreement and are projected to launch later this year as part of their 2023/24 funding agreement - Defra's grant manager is working closely with the TIAH team.	Yes
	Green Jobs and Skills: Forestry Training Fund.	To meet afforestation targets, the Forestry Training Fund launched in. February 2023 to provide practical training courses for new entrants and upskilling the existing workforce. With Forestry England, we are increasing the number of available apprenticeships including the launch of the Level 6 Professional Forester.	Government continues to work with the sector, employers and educators on the new Forestry Skills Action Plan for England, driving outreach, awareness, new entrants; and engagement by industry.	Yes
5iv.18	Environmental principles policy statement: impact on net zero (DEFRA).	The Environment Act 2021 makes sure that environmental considerations are at the heart of government policy making, by creating a legal duty on Ministers of the Crown to have due regard to the environmental principles policy statement when making policy. The five internationally recognised principles are: integration, prevention, rectification at source, polluter pays, and the precautionary principle. The policy statement is designed to set out how the principles should be interpreted and proportionately applied. The final environmental principles policy statement was published on 31 Jan 2023. Following an implementation period, the duty will come into force on 01 Nov 2023.	Environmental effects will be different for each policy. These will need to be assessed on a case-by-case basis relative to the likelihood and or significance of the potential effect on the environment The Environment Act 2021 places a duty on Ministers of the Crown to have due regard to the environmental principles policy statement when making new or revised policy. Policymakers will need to consider a range of environmental effects that can include emissions and their contribution to climate change. The environmental principles may inform and influence the design of the policy, to prevent or mitigate environmental effects, or require polluters to pay. Application of the principles could help deliver net zero by reducing carbon emissions and/or promoting the use of nature-based solutions and ecosystem services that act as carbon sinks.	Yes
	Agriculture: Consider the role of emissions targets to drive decarbonisation.	To assess the role and efficacy of introducing agriculture specific emissions targets, such as targets split between individual greenhouse gases to drive decarbonisation across the agriculture and land use sectors.	Following the approach of New Zealand and California, we could look to implement a specific target on agricultural emissions, either as a sector or proxy via limits on the primary greenhouse gases from the sector, e.g. methane. If appropriate, these targets could be aligned with broader international commitments (e.g. The Global Methane Pledge). Although not currently being considered, bringing agriculture into the UK ETS could also create an emissions cap on the sector, but with the potential to trade and benefit from GGR opportunities on farm and farmland. For both of these, robust MRV would be a prerequisite. This is an area we are looking to improve our understanding on (see measure below) however is some way from being realised consistently across the sector. We are undertaking research to examine existing carbon audit tools across a range of agricultural systems. A policy approach which could be considered is the introduction of regulatory methane emissions under the National Emissions Ceiling Directive (NECD). This could provide stronger regulatory footing to deliver emissions savings. This could be regulated by the Environment Agency. It has not yet been possible to ascertain delivery risk for this.	No
	Agriculture: Developing the evidence on agroecological farming systems.	Although regenerative measures are considered within the pathway, further work on the potential of regenerative systems is required. We are seeing farmers undertake such practices and are monitoring efficacy working across farming and evidence teams. Defra's evidence programme encompasses R&D on the productivity, sustainability and wider trade-offs of agroecological farming systems including extensive livestock systems, which will inform future development. Many of the pathway measures delivered through the Environmental Land Management schemes align with agroecological practices, for example introducing cover crops.	Evidence suggests the net impacts of livestock extensification would be to increase overall levels of emissions. However, focussing on developing evidence on the role of regenerative agriculture could help deliver broader environmental goals. As such, Defra's evidence programme encompasses R&D on the productivity, sustainability and wider trade-offs of agroecological farming systems, including land-use.	Yes – some of the sector will be aware

	Increase the use of robust Monitoring, Reporting and Verification of GHG emissions (MRV).	We will explore policies to increase the use of MRV across farm businesses as a mechanism to support improved understanding and behaviour change for decarbonisation. This will build on the recent UK-ETS consultation's call for evidence chapter which explored the use and application of MRV for the agriculture sector and looking at opportunities to better harmonise and improve the robustness of emission reporting across farm, food and drink businesses.	Deployment of robust and standardised monitoring, reporting and verification at farm-level could improve the application of net zero agriculture measures to deliver emissions reduction through improved understanding of the source and scale of emissions on farms. Next steps include the completion of Defra's 'Harmonisation of Carbon Accounting Tools for Agriculture' research project in Summer 2023 which aims to target the development of improved methodological guidance to improve consistency of carbon audits tools on farms as a first step to agreeing a standardised methodology on the calculation of carbon.	Yes
	Explore the role of carbon pricing strategies and trading markets as a mechanism to drive decarbonisation.	We will continue to review potential carbon pricing strategies for the agriculture and land use and waste sectors, including the potential role for voluntary or compliance carbon markets to support cost effective decarbonisation in these sectors.	This could support a range of net zero measures within the Defra's net zero pathway including the waste and agriculture and land use sectors. Application of a carbon price to a sector (such as through inclusion in the UK Emissions Trading Scheme) will encourage the uptake of measures that are most cost-effective for participants according to their specific context. The development of a robust and standardised monitoring, reporting and verification regime of emissions is a pre-requisite to any future carbon pricing strategy for any sector. Further consideration of the wider, social, environmental, and economic impacts carbon pricing would have on the sector is required.	Yes – referenced in NZ strategy and EIP
	Further incentives to encourage nutrient use efficiency.	Continue to monitor the effectiveness of current nutrient efficiency measures and market forces and consider development of policy levers to further enhance or strengthen delivery if needed e.g., through regulation.	The fertiliser intervention is the only measure to have been removed in full from the quantified list (0.07MT). The rationale is lack of ministerial appetite for a tax. We plan to reframe the measures as an enabler (as it would help us achieve savings associated with existing nutrient efficiency measures. Whilst fertiliser prices are high, causing reduced use, we need to monitor whether farmers will revert to over application again if prices begin to fall. In this scenario, we may need to intervene. We will consider how much of the carbon savings associated with this measure could potentially be achieved, without any interventions and if any softer levers could be required to make up any shortfall.	No
	Minimum or no-till.	Minimum till is cultivating agricultural land using mechanical methods other than ploughing to reduce disturbance to the soil. No-till does not use cultivation machinery, instead using direct drilling methods. Such methods tend to significantly reduce draught power (working animal) requirements and can reduce emissions from agricultural fuel use. Although initial quantification has been attempted, further work is needed. This measure can also deliver wider environmental, soil health, and resilience benefits.	Next steps could involve investigating whether min/no-till systems could be included in SFI. However, these are barriers to inclusion. Early-stage measure, no next steps identified.	Yes sector aware and in EIP