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Agri-food Emissions Trading Scheme and Mandatory Climate Standard

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Abstract: Comparison of downstream market-based policies to reduce agricultural emissions

This report evaluates three downstream market-based instruments currently under consideration by the European Commission for cutting greenhouse-gas (GHG) emissions in the EU agri-food sector: (i) a Mandatory Climate Standard (MCS) applied to meat and dairy processors, (ii) an MCS applied to food retailers, and (iii) an Agricultural Emissions Trading Scheme (AgETS) applied to processors. All three mechanisms oblige regulated entities to reduce farm-level agricultural GHG emissions embedded in the products they handle or sell. To comply, regulated entities have different options including adapting their product portfolios and purchasing certified farm-level mitigation credits (CRCF certificates). The study begins by drawing on technical papers and stakeholder workshops led by the European Commission to compare the options across key design dimensions including scope, point of obligation, approach to monitoring, reporting, and verification (MRV), and degree of trading. We then briefly assess the proposed policy options against key criteria, including their incentivised mitigation actions, emission leakage risk, potential gains from trade, and administrative and compliance costs. The results show several trade-offs between the different options. While the retailer-level MCS option captures the widest range of emissions, it suffers from high MRV complexity that poses practical challenges and administrative costs—creating significant barriers to efficiency and effectiveness. The processor-level AgETS might offer superior cost-efficiency through allowance trading, while the processor-level MCS is simpler to administer but lacks trading flexibility. Carbon leakage could pose a potential problem under all options, albeit through different channels. The magnitude of this risk is difficult to predict, and current options for mitigating these risks are limited. We conclude the study by suggesting how policy options could evolve or be sequenced over time. In the short term, the processor-based MCS option seems more feasible due to its narrower product scope and more straightforward MRV requirements, enabling faster implementation and institutional learning. Over time, increasing policy ambition and expanded MRV capacity, may motivate a shift toward more comprehensive frameworks, such as an AgETS, that can deliver higher efficiency.

Kurzbeschreibung: Vergleich nachgelagerter marktbasierter Klimaschutzinstrumente zur Reduktion landwirtschaftlicher Emissionen

Dieser Bericht bewertet drei marktbasierte Instrumente, die auf nachgelagerte Unternehmen in der Wertschöpfungskette abzielen und derzeit von der Europäischen Kommission zur Reduktion von Treibhausgasemissionen (THG) im EU-Agrar- und Lebensmittelsektor geprüft werden: (i) einen verpflichtenden Klimastandard (Mandatory Climate Standard, MCS) für Fleisch- und Milchverarbeitungsbetriebe, (ii) einen MCS für Lebensmitteleinzelhändler und (iii) ein Emissionshandelssystem für die Landwirtschaft (AgETS), angewandt auf Verarbeitungsbetriebe. Alle drei Mechanismen verpflichten regulierte Unternehmen und Organisationen, die in ihren verarbeiteten oder verkauften Produkten enthaltenen landwirtschaftlichen THG-Emissionen auf Betriebsebene zu reduzieren. Zur Einhaltung stehen sie verschiedene Optionen zur Verfügung, darunter die Anpassung ihres Produktportfolios sowie der Erwerb zertifizierter Emissionsminderungszertifikate auf Betriebsebene (CRCF-Zertifikate). Die Studie stützt sich zunächst auf technische Papiere und Stakeholder-Workshops unter der Leitung von Europäischen Kommission, um die Optionen anhand zentraler Gestaltungsdimensionen zu vergleichen: Anwendungsbereich, Regulierungsansatz, Ansätze für Monitoring, Berichterstattung und Verifizierung (MRV) sowie das Ausmaß der Handelbarkeit. Anschließend werden die vorgeschlagenen Politikoptionen kurz anhand zentraler Kriterien bewertet, darunter die gesetzten Anreize zur Emissionsminderung, das Risiko von Carbon Leakage, potenzielle Handelsgewinne sowie Verwaltungs- und Compliance-Kosten. Die Ergebnisse zeigen mehrere Zielkonflikte zwischen den verschiedenen Optionen. Während ein MCS auf Ebene der Lebensmitteleinzelhandel den größten Anteil an Emissionen erfasst, geht diese Option mit einer hohen MRV-Komplexität einher, die praktische Herausforderungen und Verwaltungskosten verursacht und damit erhebliche Hürden für Effizienz und Wirksamkeit schafft. Ein AgETS auf Ebene der Verarbeitungsbetriebe könnte durch den Handel mit Zertifikaten eine höhere Kosteneffizienz bieten, während ein MCS auf derselben Ebene einfacher umzusetzen wäre, jedoch weniger Flexibilität beim Handel bietet. Carbon Leakage könnte bei allen Optionen ein potenzielles Problem darstellen, wenn auch über unterschiedliche Kanäle. Das Ausmaß dieses Risikos ist schwer vorherzusagen und die derzeitigen Möglichkeiten zu seiner Minderung sind begrenzt. Abschließend zeigt die Studie auf, wie sich die Politikoptionen im Zeitverlauf weiterentwickeln oder sinnvoll aufeinander aufbauen könnten. Kurzfristig erscheint die auf Verarbeitungsbetriebe ausgerichtete MCS-Option aufgrund ihres engeren Produktumfangs und der einfacheren MRV-Anforderungen besser umsetzbar, da sie eine schnellere Implementierung und institutionelles Lernen ermöglicht. Langfristig könnten ein steigendes Ambitionsniveau und ausgeweitete MRV-Kapazitäten einen Übergang zu umfassenderen Politikinstrumenten wie einem AgETS ermöglichen, die eine höhere Effizienz bieten.

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List of abbreviations

Abbreviation	Explanation
AgETS	Agricultural Emissions Trading System
CAP	Common Agricultural Policy
CH_4	Methane
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivelant
CRCF	Union Certification Framework for Carbon Removals, Carbon Farming, and Carbon Storage in Products
CSRD	Corporate Sustainability Reporting Directive
CSDDD	Corporate Sustainability Due Diligence Directive
DG CLIMA	Directorate-General for Climate Action (European Commission)
EEA	European Environment Agency
ESABCC	European Scientific Advisory Board on Climate Change
ESR	Effort Sharing Regulation
EU ETS	EU Emissions Trading System
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Land Use, Land-Use Change and Forestry
MCS	Mandatory Climate Standard
MRV	Monitoring, Reporting, and Verification
N_20	Nitrous oxide
nEHS	German national ETS
tCO_2-e	Tonnes of carbon dioxide equivalent

Summary

Context and objective

The EU's agricultural sector has made only limited progress in reducing greenhouse gas (GHG) emissions. Between 2005 and 2023, emissions from the EU agri-food system fell by 19%, while agricultural non-CO_2 GHG emissions declined by just 7%, considerably less than the rest of the EU economy (ESABCC, 2026). The European Scientific Advisory Board on Climate Change (ESABCC) argues that much steeper reductions will be needed for agriculture to make a significant contribution to the EU climate neutrality target by 2050, estimating in an earlier report that agricultural non-CO2 GHG emissions would need to fall by at least 17% by 2030 and 26% by 2040 (ESABCC, 2024). However, **existing policies remain fragmented and have been deemed insufficient to achieve this**.

In this context, the European Commission's Directorate-General for Climate Action (DG CLIMA) has increasingly focused on the potential of **market-based approaches to incentivise agricultural GHG emissions reductions**, including through an ongoing series of commissioned studies. These efforts explore, among other options, the possibility of establishing a **cap-and-trade system for the agri-food sector** at different points along the agri-food value chain. In its latest report, the ESABCC likewise advocates carbon pricing in agriculture, alongside incentives for carbon dioxide removal in agriculture and land use. It outlines the possibility of a modular policy architecture covering different emission sources and suggests that such a framework could be implemented through a cap-and-trade system at different possible points along the agri-food value chain (ESABCC, 2026).

This report evaluates three key policy options currently under consideration by the European Commission for cutting agricultural GHG emissions along the EU agri-food value chain:

(i) a Mandatory Climate Standard (MCS) applied to meat and dairy processors,

(ii) an MCS applied to food retailers, and

(iii) an Agricultural Emissions Trading Scheme (AgETS) applied to processors.

All three proposed policy options place the point of obligation downstream: either on **processors** (i.e. first-stage processors of meat and dairy, e.g. pasteurisation units and slaughterhouses) or **retailers** (i.e., food retailers, including caterers), both of which are down the value chain from the main source of agri-food emissions, the farm. All three mechanisms oblige regulated entities to reduce agricultural GHG emissions embedded in the products they handle, such as methane emissions due to enteric fermentation. To do so, the compliance entities can shift their product portfolio, purchase certified farm-level mitigation credits (CRCF certificates[1]), or in the AgETS case, surrender sufficient allowances to cover their verified emissions.

The overarching research question driving this report is: how are the proposed downstream market-based policies likely to perform, and how could they best be implemented over time? To answer this question, we describe the proposed downstream AgETS and the MCS policy options, drawing on the policy options as suggested in input papers for recent DG CLIMA workshops (Trinomics et al., 2025). We then assess these policies to

[1] In this study we limit our assessment to carbon farming CRCF certificates from the reduction of emissions in livestock and feed production; such certificates are proposed in the European Commission agri-food policy discussions, though their inclusion in the CRCF is not yet confirmed or certification methodologies developed. We exclude consideration of temporary CRCF units (e.g. based upon afforestation, agroforestry, or soil carbon) to reduce complexity. See McDonald et al. (2025) for a detailed discussion of the challenges and risks posed by temporary CRCF units.

understand their strengths and weaknesses considering a set of performance criteria, including their incentivised mitigation actions, emission leakage risk, potential gains from trade, and administrative and compliance costs. This informs our discussion of their likely effectiveness and efficiency at meeting agricultural mitigation objectives and consideration of how policy options can be sequenced over time.

Proposed downstream policy options

We draw on input papers and workshops from DG CLIMA's consultants to describe the three proposed downstream policy options (Trinomics et al., 2025):

- **Mandatory Climate Standard (MCS)**: Downstream agri-food actors (e.g. food processors or retailers) are obliged to reduce the agricultural emissions associated with the products they sell. They must meet increasingly strict targets over time, calculated at the point of obligation in terms of tCO_2-e per unit of product, based upon industry-wide emissions factors and individual output. Targets will be set in line with the EU's climate neutrality ambitions. Downstream actors can meet their targets either by changing their product portfolio (inputs and outputs) to reduce emissions[2] or by purchasing CRCF certificates. Two MCS policy options are considered: **MCS Processor,** with a point of obligation for meat and dairy processors, i.e. **downstream**; or **MCS Retailer,** with the point of obligation for retailers, i.e. **downstream**.
- **Agri-Food ETS - Processor:** An emissions trading system would set a cap on the total amount of emissions that are permitted from the sector, which are translated into tradable allowances, each equivalent to one tCO_2-e. Processors covered by the ETS must return sufficient allowances - which they buy on the market or receive for free under a free allocation system - to cover their emissions and are thus incentivised to reduce emissions and/or trade allowances to meet their obligations. Obligated entities can also purchase CRCF-certificates to meet their compliance obligations. The point of obligation is on meat and dairy **processors,** i.e. **downstream**.

The main distinction between the policy options lies in the **point of obligation**: while both the AgETS and MCS Processor options cover only meat and dairy processed within the EU, the MCS Retailer option covers a broader product scope — including imported food. This could imply a higher total amount of emissions, though its exclusion of exported meat and dairy, unlike the processor-level options, makes this uncertain. The broader scope of the MCS Retailer model significantly increases the **complexity of monitoring, reporting, and verification (MRV)**, as it implies MRV must be developed for a wide range of food products; this poses significant practical challenges. In contrast, the processor-level options apply MRV only to meat and dairy. The **AgETS Processor** option provides greater flexibility for obligated entities by allowing **allowance trading** between downstream actors, unlike the MCS options.

Policy option assessment

We qualitatively assess the ability of proposed policy options to meet their overall objective of **reducing farm-level agricultural GHG emissions by incentivising emission reductions along the EU agri-food value chain**. To understand the options' effectiveness and efficiency, we consider four evaluation criteria:

[2] For example, a retailer could increase sale of vegetarian products relative to high-emissions products such as meat; processors could shift to process lower emissions animals (e.g., faster growing animals); both processors and retailers could also reduce output. These options are discussed in more detail in section 2.

Incentivised mitigation actions: Downstream policy options vary in their ability to incentivise mitigation, depending on how comprehensively they cover different segments of the value chain and the extent of mitigation actions that are captured by their MRV approach, with implications for effectiveness and efficiency. The MCS Processor and ETS-Processor options focus only on EU-produced meat and dairy (including exports), the retailer model includes imports but excludes exports. This means that the MCS Retailer policy likely has somewhat broader coverage. However, the ability to translate this wide emission scope into incentives for mitigation depends on robust MRV, which as already mentioned is challenging for retailer-level policies.

Emissions leakage risk: Policy-induced leakage occurs when emissions increase (in other countries or regions) as a result of a domestic climate policy. We identify two types of leakage risk associated with the analysed climate policies: competitiveness-related leakage, where EU products become less competitive due to increased production costs, leading to imports of cheaper alternatives; and demand-driven export leakage, where reduced domestic demand for emission-intensive products leads to increased exports, offsetting emissions reductions. These two types of leakage risk may impact the policies analysed in this study in different ways. Competitiveness-related leakage is particularly relevant for processor-level policies, as these could increase the cost of EU products relative to imports. In contrast, the risk of increased net exports could arise under all policy options. It is especially pertinent under the MCS Retailer policy, since this policy explicitly excludes exported products from its scope (as discussed in the previous section). But it could also apply to processor-level policy options, for example if they lead farmers to increase net exports of emissions-intensive agricultural products. There are different ways to reduce the risk of carbon leakage for processor-level options, e.g., mirror requirements for importers or free allocation of allowances.

Gains from trading emissions reductions: This criterion evaluates the potential for trading and gains from trade under various policy options. In principle, the AgETS has greater economic efficiency, as it allows the obligated entity (i.e. the processor) greater flexibility in how to meet their target: both AgETS and MCS policies permit processors and retailers to meet their targets/comply with the policy by reducing their own emissions (e.g. changing their product portfolio or reducing quantity sold/processed) or by purchasing CRCF credits. Additionally, the AgETS also allows processors with high marginal emissions reduction costs to purchase allowances from other obligated entities with low marginal emissions reduction costs. The relative efficiency advantage of the AgETS Processor depends on the cost and availability of CRCF certificates. If certificates are abundant and cheaper than other mitigation options, all policies would rely primarily on them—reducing the mitigation incentives from AgETS allowance trading. The links between emission reductions activities by covered downstream entities and on-farm emission reduction actions by farmers in the context of the CRCF are complex and make predicting effects of the policy challenging.

Administrative and transaction costs: These costs vary across the downstream policy options and impact economic efficiency. The MCS Retailer option entails the highest costs due to its broad product scope and the complexity of developing accurate emissions factors across a wide range of food products, which poses a significant practical barrier. In contrast, processor-based options are more straightforward to implement, as they cover fewer products and can leverage existing MRV systems. While farmers face CRCF-related certification costs under all options, additional transaction burdens may arise if processors require more granular supply chain data. Overall, the simpler MRV structures and fewer obligated entities make processor-based options more administratively feasible and cost-effective.

Conclusions

Policy design will need to adapt over time to effectively and efficiently meet the long-term goal of reducing agri-food emissions. As ambition and opportunity may increase (e.g. with increasing pressure posed as Europe approaches more ambitious interim targets on the way to 2050 EU net zero), and as constraints recede (e.g. as MRV develops), policy stringency and ambition can be gradually increased. Many aspects of the policy design can be adapted over time, such as ambition, participant scope, MRV, allowance allocation, and degree of trading. Some aspects, such as point of obligation are more challenging to adapt due to loss of learning that would result (e.g. related to MRV, participant upskilling).

Based on our assessment of strengths and weaknesses, our study suggests that a processor-based policy option could offer a feasible starting point for short-term policy development. In the short term, processor-based options are more feasible due to their narrower product scope and more straightforward MRV requirements, enabling faster implementation and institutional learning. Over time, increasing policy ambition and expanded MRV capacity may motivate a shift toward more comprehensive frameworks, such as an AgETS, that can deliver higher efficiency.

As this policy area remains in an early stage of development, several important questions remain open. These include the comparative performance of downstream policy options versus other measures such as an on-farm ETS or public procurement, a need for more detailed MRV specifications to support more detailed assessments, questions regarding the type of CRCF certificate that can be utilised and their environmental integrity, and consideration of additional criteria such as socio-economic impacts and legal and trade barriers.

Zusammenfassung

Kontext und Einführung

Der Agrarsektor der EU hat bei der Verringerung der Treibhausgasemissionen (THG) nur begrenzte Fortschritte erzielt. Zwischen 2005 und 2023 sanken die Emissionen des EU-Agrar- und Lebensmittelsystems insgesamt um 19 %, während die landwirtschaftlichen Nicht-CO2-THG-Emissionen lediglich um 7 % zurückgingen, deutlich weniger als in der übrigen EU-Wirtschaft (ESABCC, 2026). Zugleich argumentiert der European Scientific Advisory Board on Climate Change (ESABCC), dass deutlich stärkere Emissionsminderungen erforderlich sein werden, damit die Landwirtschaft einen substanziellen Beitrag zum EU-Klimaneutralitätsziel bis 2050 leisten kann. In einem früheren Bericht schätzte der Beirat, dass die landwirtschaftlichen Nicht-CO2-THG-Emissionen bis 2030 um mindestens 17 % und bis 2040 um 26 % sinken müssten (ESABCC, 2024). **Die bestehenden Politiken bleiben jedoch fragmentiert und wurden als unzureichend bewertet, um dieses Ziel zu erreichen**.

In diesem Zusammenhang hat die Europäische Kommission, insbesondere DG CLIMA, ihren Fokus zunehmend auf das Potenzial marktbasierter Instrumente zur **Reduzierung von THG in der Landwirtschaft** gelegt, unter anderem durch eine fortlaufende Reihe beauftragter Studien. Diese prüfen unter anderem die Möglichkeit, ein Emissionshandelssystem (ETS) für den Agrar- und Lebensmittelsektor an verschiedenen Stellen entlang der Wertschöpfungskette einzuführen. In ihrem jüngsten Bericht spricht sich das ESABCC ebenfalls für eine CO_2-Bepreisung in der Landwirtschaft aus und empfiehlt ergänzend Anreize für die Entfernung von Kohlendioxid in Landwirtschaft und Landnutzung. Darüber hinaus skizziert es die Option einer modularen Politikarchitektur, die unterschiedliche Emissionsquellen abdeckt, und schlägt vor, dass ein solcher Rahmen über ein ETS an verschiedenen möglichen Stellen entlang der agrar- und lebensmittelwirtschaftlichen Wertschöpfungskette umgesetzt werden könnte (ESABCC, 2026).

Der vorliegende Bericht bewertet drei Politikoptionen, die derzeit von der Europäischen Kommission zur Reduktion von Treibhausgasemissionen im EU-Agrar- und Lebensmittelsektor geprüft werden:

(i) einen verpflichtenden Klimastandard (Mandatory Climate Standard, MCS) für Fleisch- und Milchverarbeitungsbetriebe;

(ii) einen MCS für Lebensmitteleinzelhändler; sowie

(iii) ein ETS für die Landwirtschaft (Agricultural Emissions Trading Scheme, AgETS), angewandt auf Verarbeitungsbetriebe.

Alle drei bewerteten Optionen setzen an nachgelagerten Regulierungspunkt (point of obligation) in der Wertschöpfungskette an – entweder bei Verarbeitungsbetrieben (z. B. Schlachthöfen oder Molkereien) oder bei Einzelhändlern (einschließlich Gastronomiebetrieben). Somit liegen sie weit von den Hauptquellen der landwirtschaftlichen Emissionen – den landwirtschaftlichen Betrieben – entfernt. Alle drei Mechanismen verpflichten die regulierten Unternehmen, die in den Produkten enthaltenen landwirtschaftlichen Treibhausgasemissionen zu reduzieren, etwa die Methanemissionen aus der enterischen Fermentation. Zur Erfüllung ihrer Verpflichtungen können sie ihr Produktportfolio anpassen, Kohlenstoffzertifikate auf Betriebsebene (CRCF-Zertifikate[3]) erwerben oder – im Falle des AgETS – eine ausreichende Anzahl von Emissionsberechtigungen zur Abdeckung ihrer verifizierten Emissionen abgeben.

[3] In dieser Studie beschränken wir unsere Bewertung auf CRCF-Zertifikate aus dem Bereich des Carbon Farming, die auf Emissionsminderungen in der Tierhaltung sowie in der Futtermittelproduktion beruhen. Solche Zertifikate werden zwar in den agrar- und ernährungspolitischen Diskussionen der EU-Kommission vorgeschlagen, ihre Einbeziehung in den CRCF ist jedoch bislang

Die übergeordnete Forschungsfrage lautet: Wie effektiv und effizient sind die vorgeschlagenen nachgelagerten marktbasierten Politikinstrumente und wie könnten sie im Zeitverlauf am besten implementiert werden? Zur Beantwortung dieser Frage beschreibt der Bericht zunächst die Ausgestaltung der drei Instrumente auf Grundlage der Diskussionspapiere und Workshops von DG CLIMA (Trinomics et al., 2025). Anschließend werden sie qualitativ bewertet – insbesondere hinsichtlich der angeregten Minderungsmaßnahmen, des Risikos von Emissionsverlagerungen (Carbon Leakage), des Potenzials für Effizienzgewinne durch Handel sowie der Kosten für Verwaltungs- und Compliance. Die Ergebnisse fließen in eine Bewertung der zu erwartenden Effektivität und Effizienz ein und bieten Anhaltspunkte für eine mögliche zeitliche Sequenzierung der Optionen.

Vorgeschlagene nachgelagerte Politikoptionen

Die Analyse stützt sich auf Unterlagen und Workshops von DG CLIMA und ihren Auftragnehmern, um die drei vorgeschlagenen nachgelagerten Politikoptionen zu beschreiben (Trinomics et al., 2025):

- **Mandatory Climate Standard (MCS):** Nachgelagerte Unternehmen der Agrar- und Lebensmittelwertschöpfungskette (z. B. Weiterverarbeitende Betriebe oder Einzelhändler) sind verpflichtet, die mit den von ihnen verkauften Produkten verbundenen landwirtschaftlichen Emissionen zu senken. Sie müssen im Zeitverlauf zunehmend strengere Ziele einhalten, die am jeweiligen Regulierungspunkt in Tonnen CO_2-Äquivalent pro Produkteinheit (tCO_2-e) festgelegt werden – auf Basis branchenspezifischer Emissionsfaktoren und individueller Produktionsmengen. Die Ziele werden im Einklang mit den EU-Klimaneutralitätszielen definiert. Verpflichtete Unternehmen können ihre Zielvorgaben erfüllen, indem sie ihr Produktportfolio ändern[4] oder CRCF-Zertifikate erwerben. Zwei Varianten werden betrachtet: **MCS Processor** (Regulierungspunkt: Fleisch- und Milchverarbeitungsbetriebe); **MCS Retailer** (Regulierungspunkt: Lebensmitteleinzelhändler).

- **Agricultural Emissions Trading Scheme (AgETS) – Processor:** Ein ETS legt eine Obergrenze (Cap) für die zulässigen Emissionen im Sektor fest, die in handelbare Emissionsberechtigungen umgewandelt wird. Verarbeitungsbetriebe müssen genügend Emissionsberechtigungen erwerben oder kostenlos zugeteilt bekommen, um ihre Emissionen abzudecken. Sie sind somit angehalten, Emissionen zu mindern oder Emissionsberechtigungen zu handeln, um ihre Verpflichtungen zu erfüllen. Verpflichtete Unternehmen können auch ihre Zielvorgaben erfüllen, indem sie CRCF-Zertifikate erwerben. Der Regulierungspunkt liegt bei den nachgelagerten Fleisch- und Milchverarbeitungsbetrieben.

Der Hauptunterschied zwischen den Optionen liegt im Regulierungsansatz und der Reichweite. Während AgETS und MCS Processor nur EU-produzierte Fleisch- und Milchprodukte erfassen, deckt der MCS Retailer auch importierte Lebensmittel ab. Damit könnten zwar insgesamt mehr Emissionen erfasst werden, gleichzeitig werden jedoch exportierte Produkte nicht erfasst, was die genaue Quantifizierung der erfassten Emissionen erschwert. Die breitere Abdeckung des MCS Retailer führt jedoch zu deutlich höheren

nicht bestätigt, und entsprechende Zertifizierungsmethoden liegen noch nicht vor. Zur Reduktion der Komplexität werden temporäre CRCF-Einheiten (z. B. auf Basis von Aufforstungsmaßnahmen) nicht berücksichtigt. Eine ausführliche Diskussion der mit temporären CRCF-Einheiten verbundenen Herausforderungen und Risiken findet sich bei McDonald et al. (2025).

[4] So könnten Einzelhändler beispielsweise den Absatz vegetarischer Produkte gegenüber emissionsintensiven Produkten wie Fleisch erhöhen; Weiterverarbeitende Betriebe könnten verstärkt Tiere mit geringeren Emissionen verarbeiten (z. B. schneller wachsende Tiere); sowohl Weiterverarbeitende Betriebe als auch Einzelhändler könnten zudem ihre Produktions- bzw. Absatzmengen reduzieren. Diese Optionen werden in Abschnitt 2 näher erläutert.

Anforderungen an das MRV, da Emissionsfaktoren für eine Vielzahl von Produkten entwickelt werden müssen, was eine erhebliche praktische Herausforderung darstellt. Die Optionen AgETS und MCS Processor sind in dieser Hinsicht deutlich einfacher. Ein AgETS bietet den verpflichteten Akteuren zudem größere Flexibilität, da Emissionsberechtigungen gehandelt werden können, was ein Vorteil gegenüber den MCS-Ansätzen darstellt.

Bewertung der Politikoptionen

Die Fähigkeit der vorgeschlagenen Instrumente, Emissionen entlang der Agrar- und Lebensmittelwertschöpfungskette zu senken, wird qualitativ anhand von vier Bewertungskriterien analysiert:

Angeregte Minderungsmaßnahmen: Die Wirksamkeit hängt davon ab, wie umfassend die jeweiligen Instrumente verschiedene Segmente der Wertschöpfungskette abdecken und inwieweit ihr MRV-Ansatz Minderungsaktivitäten erfasst. MCS- und ETS-Varianten auf Ebene der Verarbeitungsindustrie beziehen sich ausschließlich auf EU-produzierte Fleisch- und Milchprodukte (einschließlich Exporte), während der MCS Retailer auch Importe einschließt, jedoch Exporte ausschließt. Damit deckt der MCS Retailer tendenziell mehr Emissionen ab. Allerdings hängt die tatsächliche Wirksamkeit von der Robustheit des MRV-Systems ab, die bei der Vielzahl an Produktarten auf Einzelhandelsebene erhebliche Datenanforderungen und Hürden mit sich bringt.

Risiko von Emissionsverlagerungen (Carbon Leakage): Politikinduzierte Emissionsverlagerungen treten auf, wenn infolge einer nationalen oder regionalen Klimapolitik Emissionen in anderen Ländern oder Regionen zunehmen. In dieser Studie werden zwei Arten von Emissionsverlagerungsrisiken im Zusammenhang mit den analysierten klimapolitischen Instrumenten betrachtet: erstens wettbewerbsbedingte Emissionsverlagerungen, bei denen EU-Produkte aufgrund steigender Produktionskosten an Wettbewerbsfähigkeit verlieren und dadurch Importe kostengünstiger Alternativen zunehmen; und zweitens nachfragegetriebene exportbedingte Emissionsverlagerungen, bei denen eine sinkende inländische Nachfrage nach emissionsintensiven Produkten zu steigenden Exporten führt und damit erzielte Emissionsminderungen teilweise kompensiert werden. Diese beiden Formen von Emissionsverlagerungen können die in dieser Studie untersuchten Politikoptionen auf unterschiedliche Weise beeinflussen. Wettbewerbsbedingte Emissionsverlagerungen sind insbesondere für Politiken auf Ebene der Verarbeitungsbetriebe relevant, da diese die Kosten für in der EU hergestellte Produkte im Vergleich zu Importen erhöhen können. Demgegenüber kann das Risiko steigender Nettoexporte grundsätzlich bei allen Politikoptionen auftreten. Es ist jedoch besonders ausgeprägt beim MCS-Retailer-Ansatz, da dieser, exportierte Produkte explizit von seinem Geltungsbereich ausnimmt (wie im vorherigen Abschnitt dargestellt). Entsprechende Effekte können jedoch auch bei Optionen auf Ebene der Verarbeitungsindustrie auftreten, etwa wenn diese dazu führen, dass landwirtschaftliche Betriebe ihre Nettoexporte emissionsintensiver Agrarprodukte ausweiten. Für die Optionen auf Ebene der Verarbeitungsindustrie bestehen verschiedene Möglichkeiten, das Risiko von Verlagerungseffekten zu verringern.

Potenzial für Effizienzgewinne durch den Handel von Emissionsberechtigungszertifikaten: Dieses Kriterium bewertet das Potenzial für den Handel von Emissionsberechtigungszertifikaten und den daraus resultierenden Effizienzgewinnen unter den verschiedenen Politikoptionen. Ein AgETS auf Ebene der Verarbeitungsindustrie ist tendenziell am effizientesten, da es durch den Handel von Emissionsberechtigungszertifikaten mehr Flexibilität bietet. Sowohl MCS- als auch AgETS-Ansätze erlauben die Zielerreichung durch eigene Emissionsreduktionen oder den Erwerb von CRCF-Zertifikaten. Im Unterschied dazu

ermöglicht ein AgETS zusätzlich den Handel zwischen Akteuren mit unterschiedlichen Emissionsreduktionskosten. Der Effizienzvorteil hängt jedoch von der Verfügbarkeit und dem Preis der CRCF-Zertifikate ab. Sind diese in ausreichender Menge verfügbar und kostengünstiger als alternative Reduktionsoptionen, würden alle Akteure vorrangig auf deren Nutzung zurückgreifen, wodurch die Effizienzgewinne aus dem Handel mit Emissionsberechtigungen im Rahmen des AgETS weitgehend entfallen würden. Die Wechselwirkungen zwischen Emissionsminderungsaktivitäten der verpflichteten nachgelagerten Akteure und Emissionsminderungen durch landwirtschaftliche Betriebe im Kontext des CRCF sind komplex und erschweren eine verlässliche Abschätzung der Wirkungen.

Verwaltungs- und Transaktionskosten: Die Kosten für Verwaltung und Compliance unterscheiden sich erheblich zwischen den Optionen. Der MCS Retailer weist die höchsten Kosten auf, da er eine große Produktvielfalt umfasst und komplexe MRV-Systeme erfordert. Die Optionen auf Ebene der Verarbeitungsindustrie sind administrativ einfacher, da diese sich auf eine begrenzte Produktpalette fokussieren und auf bestehende MRV-Strukturen zurückgreifen können. Auf Betriebsebene entstehen unter allen Optionen Kosten für CRCF-Zertifikate; zusätzliche Datenanforderungen können die Transaktionskosten erhöhen. Insgesamt erscheinen die Politikoptionen auf Ebene der Verarbeitungsindustrie administrativ am ehesten umsetzbar.

Schlussfolgerungen

Eine wirksame Politikgestaltung muss sich im Zeitverlauf weiterentwickeln, um die langfristigen Emissionsziele zu erreichen. Mit wachsendem Ambitionsniveau (z. B. angesichts schärferer Zwischenziele bis 2050) und zunehmender MRV-Kapazität kann die Regelungsintensität schrittweise erhöht werden. Elemente wie Ambitionsniveau, Anwendungsbereich, MRV-Systeme, Zuteilungsmechanismen und Handelsregeln lassen sich anpassen, während andere Elemente, insbesondere der Regulierungspunkt, schwieriger zu ändern sind, da sonst institutionelles Wissen verloren geht.

Die Bewertung im Rahmen dieses Berichts legt nahe, dass ein stufenweises Vorgehen, beginnend mit einer Option auf Ebene der Verarbeitungsindustrie, aufgrund des engeren Geltungsbereichs und der einfacheren MRV-Struktur kurzfristig am ehesten umsetzbar erscheint und Lernprozesse ermöglichen kann. Mit zunehmender politischer Ambition und verbesserter MRV-Infrastruktur könnte ein Übergang zu umfassenderen Systemen wie einem voll funktionsfähigen AgETS sinnvoll sein, um Effizienzgewinne zu realisieren.

Da sich dieses Politikfeld noch in einem frühen Entwicklungsstadium befindet, bleiben zahlreiche Fragen offen, wie etwa der Vergleich von nachgelagerten Politikoptionen mit alternativen Ansätzen (z. B. einem betriebsbezogenen ETS oder dem öffentlichen Ankauf von Emissionsreduktionszertifikaten), die Ausgestaltung von MRV-Spezifikationen, die Qualität und Integrität von CRCF-Zertifikaten sowie mögliche sozioökonomische, rechtliche und handelspolitische Auswirkungen.

1 Introduction

Despite its strong mitigation potential, non-CO2 GHG emissions from EU agriculture have remained stubbornly high, declining by only 7% from 2005 to 2023 (ESABCC, 2026). Livestock is the dominant source of emissions, primarily through enteric fermentation, followed by emissions from fertiliser use and manure management. These emissions are stagnating and represent a growing share of EU emissions — currently at 17% (ESABCC, 2026). This report focuses on reducing on-farm emissions, which are predominantly non-CO2.

EU agricultural emissions must fall faster to make a significant contribution to the EU's climate neutrality target. The scenarios that formed the basis for the ESABCC's recommendation of a 90–95% climate target by 2040 proposed reducing agricultural emissions by 17% by 2030 and 26% by 2040, relative to 2005 levels (ESABCC, 2024). Note however, that these scenarios indicate that a reduction of 23–57% could be possible by 2040, depending on the effective implementation of demand-side measures, such as transitioning to sustainable and healthy diets. A weak reduction in agricultural emissions would need to be offset by greater reductions in other sectors and carbon removals, which would increase overall costs and risks (ESABCC, 2026).

Both current and previous designs of key EU agri-food policies have been criticised as insufficient at addressing climate change and driving agri-food mitigation on farms, within the agri-food value chain or by consumers (EU Court of Auditors, 2024). Even though there are national targets under the Effort Sharing Regulation (ESR) and efforts through the Common Agricultural Policy (CAP) to promote more climate friendly farming practices, there are few binding requirements and incentives for farmers and landowners to reduce or remove GHG emissions. Moreover, the ESABCC concluded in its assessment report that climate change mitigation in EU agriculture is insufficient because of a lack of ambition, policy gaps, and implementation challenges (ESABCC, 2024). There is a clear need for stronger policy incentives to drive emissions reductions and removals in the EU agri-food system to meet the EU's climate targets.

By 2028, the EU's flagship climate policy, the EU Emissions Trading System (EU ETS), is expected to cover (through two separate sub-systems) effectively all sectors apart from agriculture and land use, land-use change, and forestry (LULUCF). The EU ETS 1 already covers power and industry, as well as aviation and maritime transport, and could possibly be extended to cover waste incineration. The EU ETS 2, scheduled to apply from 2028, is expected to cover emissions from fuel combustion in buildings, road transport and small industry not covered by EU ETS 1; following the example set by the German national ETS (nEHS), the EU ETS 2 could also cover fuel emissions from the agricultural sector in the future.

Perhaps unsurprisingly**, there is increased interest in the potential for pricing agricultural GHG emissions in the EU** (Isermeyer et al., 2019; Lünenbürger et al., 2013). Moreover, the ESABCC has called for extending emissions pricing to the agriculture and land-use sectors to drive emissions reductions and promote carbon removals across the agri-food value chain (ESABCC, 2024). In doing so, they highlight key considerations for policy design, such as the technical complexity of MRV of agricultural GHG emissions, varying levels of permanence, and the importance of redistributive measures to address social equity and support a just transition. Furthermore, the agricultural sector presents particular challenges for emissions trading, given the large number of farms in the EU, diversity of farm types, activities, and complexity of value chains, all of which complicate effective monitoring and administration. The Strategic Dialogue on the Future of EU Agriculture (European Commission, 2024a) called for further investigation into an emissions trading scheme for agriculture and the challenges posed by the sector.

In its latest report, the ESABCC explicitly recommends that the EU develop a dedicated framework for pricing GHG emissions in agriculture and rewarding carbon dioxide removals in agriculture and land use (ESABCC, 2026). **The ESABCC suggests a modular approach with separate pricing schemes for (i) energy-related emissions**, which could be directly included in the existing EU ETS, **(ii) agricultural non-CO_2 emissions**, especially from livestock and nitrogen-fertilised soils, and **(iii) land-based agricultural CO_2 emissions and removals**, initially focused on agricultural land. At the same time, the report leaves open whether the eventual system should be designed upstream, downstream or at farm level, while emphasising phased implementation, testing and improving MRV, and increasing coverage of mitigation opportunities across the value chain.

The European Commission's DG CLIMA has focused attention to the potential for extending emissions trading to agriculture through a series of studies. In 2023, the European Commission published a study that outlined and evaluated different policy designs for an agricultural ETS (AgETS) as a policy tool to reduce emissions and encourage carbon removals within the agri-food sector (Bognar et al., 2023). Following its publication, a number of reports have continued to explore this policy (e.g. Agora Agriculture, 2024; European Commission, 2024; Flatz et al., 2024). In an ongoing study and workshop series, the European Commission and its consultants have extended their initial study to further investigate policies to price agricultural emissions within the agri-food sector(EC, 2025). In addition to deepening the assessment of different AgETS policy designs, the ongoing study also introduces additional policy options for generating financial incentives for reducing agricultural emissions, such as so-called MCS and public procurement of carbon farming units; we describe these options in chapter 2.

Alongside these discussions, a key enabling policy is taking shape in the form of the Regulation establishing a Union certification framework for permanent carbon removals, carbon farming and carbon storage in products (CRCF)[5]. This policy aims to support the upscaling of permanent carbon removals and mitigation activities of farmers and foresters ("carbon farming") by certifying mitigation activities according to several quality criteria, summarised under the acronym "QU.A.L.ITY", covering aspects of quantification, additionality, long-term storage (i.e., permanence), and sustainability (CRCF, 2024). In the context of the agri-food sector, the CRCF covers activities that generate removals—including agriculture and agroforestry on mineral soils, as well as afforestation – as well as emissions reduction activities—including peatland rewetting and the reduction of nitrous oxide emissions from managed soils (EC, 2025). Further, the CRCF is developing an additional draft methodology for livestock emissions reduction activities, specifically linked to enteric fermentation and manure management.[6] The use case for CRCF certificates has not yet been defined, though potential use cases include voluntary offset or contribution claims (depending in part on conclusions of Green Claims Directive and Science-based Targets Initiative discussions), corporate reporting (e.g. linked to Corporate Sustainability Reporting Directive (CSRD) or Corporate Sustainability Due Diligence Directive (CSDDD)), as well as potential inclusion in any future AgETS or related policy options.

A key design decision for any market-based agricultural emissions reduction policy is the point of obligation, that is, at what point in agri-food value chain emissions are regulated. This decision establishes which actors are responsible for reporting emissions and meeting regulatory requirements (e.g. returning sufficient AgETS units to meet obligations). The point of

[5] Regulation - EU - 2024/3012 - EN - EUR-Lex

[6] The European Commission is mandated to review the coverage of the livestock sector (subcategories 3A and 3B of the agricultural sector) by 2026. See Art. 18(3) of the CRCF regulation (CRCF, 2024).

obligation can be placed at the farm level, but also upstream (e.g. fertiliser or feed producers), or downstream (e.g. meat/dairy processors, retailers). Different points of obligation offer different advantages and disadvantages, and will be more or less appropriate for different contexts, with important criteria including the following (Partnership for Market Readiness & International Carbon Action Partnership, 2021): accuracy and costs of MRV of agricultural GHG emissions; emission reduction incentives along the value chain; carbon leakage (i.e. relocation of emissions to non-EU countries).

In this report, we focus on downstream policy designs and their possible interactions with the CRCF certificates. Specifically, following the selected policy options of the ongoing DG CLIMA study, we consider two downstream policies, AgETS and MCS, with the point of obligation on **processors** (i.e. first-stage processors of meat and dairy, e.g. pasteurisation units and slaughterhouses), and on **retailers** (i.e., food retailers, including caterers). Retailers and processors are referred to as "downstream" points of obligation as they are down the value chain from the main source of emissions (the farm) (Partnership for Market Readiness & International Carbon Action Partnership, 2021).

Through these policies, the downstream actors are made responsible for the scope 3 emissions associated with the products they process or sell, that is their indirect emissions. In principle, scope 3 emissions can include a broad range of emissions, including upstream sources such as purchased goods and services (the largest source of emissions in the context of downstream actors in agriculture, i.e. those associated with production) as well as downstream, e.g. emissions associated with consumption.[7] Due to the objective of reducing agricultural emissions, the policies have a focus on scope 3 emissions but only considering agricultural emissions. The policies do not cover scope 1 (the actor's direct emissions) or scope 2 (energy and heating) emissions, as these emissions are commonly covered by other policies (e.g. EU ETS) (Greenhouse Gas Protocol, 2011) and are not classified as agricultural GHG emissions.

The overarching research question driving this report is: how are the proposed downstream market-based policies likely to perform, and how could they best be implemented over time? We consider a set of performance criteria, including their incentivised mitigation actions, emission leakage risk, potential gains from trade, and administrative and compliance costs. These assessment criteria inform our discussion of their likely effectiveness and efficiency. Our results complement the studies and proposals by DG CLIMA and ESABCC, providing additional information to inform subsequent discussions and policy decisions.

Our study is structured as follows: we describe the main differences between the proposed downstream AgETS and the MCS policy options along with the CRCF trading system (**Chapter 2**), drawing on the policy options as suggested in input papers for recent DG CLIMA workshops. We then state the policy objectives and criteria used for assessing the policy options (**Chapter 3**). Based on this, we assess these policy options and provide an overview of their strengths and weaknesses in being able to effectively and efficiently meet agricultural mitigation objectives (**Chapter 4**). Finally, we explore how policies can be implemented and developed over time, considering potential sequencing and practical issues (**Chapter 5**).

This report deliberately excludes several additional policy options, criteria, and sectors. Our objective is to support ongoing policy discussions at the EU-level. For this reason, we do not consider additional policy options that are excluded from the ongoing CLIMA study (e.g. AgETS

[7] The extent of scope 3 emissions to be covered by a policy depends on scope and MRV and policy design more generally, with a balance to be set balancing coverage and costs.

at the retailer level[8]). We leave out the inclusion of the LULUCF sector to avoid adding further complexity to this analysis and due to the relatively limited role current DG CLIMA proposed policy options foresee for including LULUCF removals.[9] We exclude potential linkages with the EU ETS 1 and EU ETS 2 due to added challenges and risks. While a connected system could generate efficiency gains, the diversity of the sectors covered by each system makes the possible linkage a complex, still unexplored issue.[10] Moreover, maintaining separation from these systems preserves greater design flexibility for any future AgETS or MCS. We also exclude additional options such as upstream and on-farm AgETS options. We focus on downstream options due to their increasing prominence in policy debates, their relatively higher administrative and political feasibility, and their potential to influence emissions across the entire agri-food value chain. By focusing on these underexplored instruments, this report seeks to fill an important gap and offer insights into how agriculture can be more effectively integrated into market-based climate policy frameworks.

[8] The strengths and weaknesses of an AgETS at the retailer level could be broadly extrapolated from our assessment of AgETS Processor and the MCS Retailer policy options, with the MRV approach (and its significant challenges) the same as the MCS Retailer option, and the strengths and weaknesses of the AgETS model the same as the AgETS Processor option.

[9] While including the LULUCF sector in an AgETS could potentially support implementation, by offering farmers a net income stream and flexibility for compliance entities to meet their emissions targets, it raises several concerns including mitigation deterrence, permanence and environmental integrity risks, potential double counting, and increased administrative complexity. The options for LULUCF inclusion in an AgETS and strengths and weaknesses are presented in Bognar et al. (2023). See McDonald et al. (2025) for a detailed discussion of integrating temporary CRCF units from carbon farming into the proposed agri-food policies.

[10] In part due to the lack of equivalence between agricultural emissions (mostly methane) and fossil fuel emissions (mostly carbon dioxide)— the latter having significantly longer GHG atmospheric lifetimes.

2 Downstream market-based policy options

2.1 Brief overview of the policy options currently under discussion

The European Commission's DG CLIMA is considering a set of market-based climate change mitigation policy options in the agri-food sector that use incentives to promote individual action. An initial study, "Pricing agricultural emissions and rewarding climate action in the agri-food value chain" (Bognar et al., 2023) identified and assessed five agricultural ETS (AgETS) policy options that place prices on agricultural emissions. Aligned with the call from the Strategic Dialogue for the Future of EU Agriculture (European Commission, 2024a) and the ESABCC's (2024) promotion of pricing agricultural emissions, DG CLIMA have commissioned a follow up study to "improve the understanding of climate change mitigation policy options across the agri-food value chain for the post-2030 framework." This study has featured a series of stakeholder and technical expert workshops, which have sought to deepen understanding of the strengths and weaknesses of a set of policy options for pricing food in the agri-food value chain. An initial set of 12 policy options was narrowed to a shortlist of five policy options, which have been set out in a series of background papers and presented at the workshops (Forestier & Dekker-Hufler, 2025).[11]

In this chapter, we provide detailed descriptions of the following proposed policy options: downstream AgETS (processor level) and the MCS policy (processor and retailer level) options along with the CRCF trading system. We do so while teasing out the key differences between the proposed policies and identifying open questions. To ease this process, it is useful to rely on a set of key design elements (or dimensions), which are summarised in Table 1. All information comes from DG CLIMA consultant input papers, particularly the most recent document that describes the policy documents (Forestier & Dekker-Hufler, 2025).[12]

Table 1 Downstream policy design elements

Design element	Definition and importance
Scope	The scope defines the range of agricultural emissions addressed by the policy. It determines which (sub-)sectors, emission sources, activities or products, geographic areas, types of actors (e.g. types of retailers), greenhouse gases, and mitigation actions are included under its coverage. Scope is important and is closely related to the other design elements, as it defines which agricultural emissions are covered by the policy and are therefore incentivised to decrease. Broader scopes can increase cost-effectiveness due to a broader range of abatement options and the cost of these. However, broader scopes can result in higher administrative and transaction costs, among other considerations.
Point of obligation	The entity (e.g. company or plant or individual) who is obliged to report data and is directly responsible for meeting emissions obligations/targets.
Compliance threshold	Thresholds can be used to exclude small sources of emissions, reducing the number of entities covered to reduce administrative, transaction, and political costs, without significantly reducing the total scope of the policy.

[11] See https://climate.ec.europa.eu/eu-action/carbon-removals-and-carbon-farming_en. Where policy descriptions differ in different input papers, we rely on the most-up-to-date paper (April 2025), assuming this reflects updates following discussions and further research.

[12] All workshop documentation can be found online at: https://climate.ec.europa.eu/eu-action/carbon-removals-and-carbon-farming_en#carbon-farming-in-the-agri-food-value-chain

Design element	Definition and importance
Monitoring, reporting, and verification (MRV)	MRV is the process through which emissions (and emissions reductions) are quantified, and compliance is ensured. Different approaches can be used to target different entities. In the context of downstream policy options, a common approach is to use emissions factors per unit of auditable inputs and/or outputs multiplied by obligated entity's output to quantify emissions. MRV is closely related to the point of obligation, and effectively establishes the scope of the policy, as the incentive to mitigate emissions only applies to those emissions and actions whose impact can be adequately captured by MRV. Trade-offs exist between MRV accuracy and transaction costs, with more sophisticated MRV covering more emissions activities, providing more accurate emission reduction incentives, and reducing uncertainty but requiring greater data and effort.

2.1.1 Mandatory Climate Standard – Processor and Retailer level

Functioning and targets

The Mandatory Climate Standard policy options set targets for reducing emissions from agricultural production (i.e. scope 3 emissions) , which must be met at the point of obligation (either Processor or Retailer, depending on policy option). Absolute targets[13] set in tonnes of emissions will be set based upon industry baselines per product (e.g. average tCO2-e/kg meat). The processor/ retailer's target trajectory will decline over time, in line with EU targets to achieve climate neutrality by 2050. The European Commission's 2040 Impact Assessment offers an idea of indicative reductions for the agriculture sector, estimating these at 26% by 2040 compared to 2015 (European Commission, 2024b).

The obligated entity (processor or retailer) can meet the target in two ways: 1) by changing their product portfolio (e.g., processing or selling fewer products, e.g. products with high emissions intensity such as beef); 2) by purchasing eligible CRCF emissions reduction credits. These CRCF emissions reduction credits are generated by farmers voluntarily implementing eligible mitigation actions on farm and then having these certified (Box 1 discusses eligible credits).

Point of obligation

- **MCS Processor:** First stage processors of meat and dairy (e.g., pasteurisation units and slaughterhouses). **Thresholds** could be used to exclude smaller processors, who process products associated with a relatively small amount of EU emissions. Bognar et al. (2023) report that excluding processors who employ fewer than 50 employees would result in approximately 1600 participating processors, who are responsible for approximately 82-91% of revenues in the food processing sector, with presumed corollaries to meat and dairy emissions arising from EU production.
- **MCS Retailer:** Food retailers (e.g. supermarkets, catering firms). **Thresholds** could also be used to exclude smaller retailers; a threshold including only retailers employing greater than 50 employees would still capture retailers earning 82% of revenues in the non-specialised retail industry sector,[14] with presumed corollaries to associated product emissions.

[13] An alternative would be to set emissions intensity targets are set per unit of output (or another performance metric, e.g. per EUR revenue); we presume absolute targets would be implemented in the case of any agricultural emissions mitigation policy, as they provide greater certainty (in terms of emissions outcomes) and simplicity, and are more straightforward to implement alongside CRCF certificates, which are also an absolute measure (i.e. 1 t CO2-e)

[14] Source: EUROSTAT, share of enterprises reporting under NACE 47.2 and their share of total turnover of the NACE code for the EU in 2020, by company size

Scope

- **MCS Processor**: The MCS Processor option covers GHG emissions associated with **on-farm production of meat and dairy products processed by EU processors**. This includes all emissions arising from their production, including emissions from livestock and feed production[15], emissions from grasslands and soils, and fertiliser use, all of which would be attributed to the processed products, covering all gases (CH_4, N_2O, and CO_2 emissions generated through agri-food production, but excluding CO_2 removed or emitted in the LULUCF sector). The coverage includes all production of processors, i.e., it includes meat and dairy that is processed in the EU and then exported; it does not include imported meat and dairy; it also does not cover meat or dairy produced in the EU but not processed.[16]
- **MCS Retailer**: The MCS Retailer option covers GHG emissions associated with the **on-farm production of all food products that are sold by the retailer**. The proposed policy option states that all food products – not just those with a significant amount of meat or dairy – is covered, a significantly broader scope compared to the previous option.[17] This includes all emissions arising from their production, from livestock and feed production, emissions from grasslands and soils, and fertiliser use, all of which would be attributed to the processed products, covering all gases (CH_4, N_2O, and CO_2 emissions generated through agri-food production, but excluding CO_2 removed or emitted in the LULUCF sector).[18] The coverage includes imports into the EU sold by retailers; it does not include agri-food produced in the EU but exported; it also does not cover agri-food goods produced in the EU but not sold via a retailer.

Monitoring, reporting, and verification (MRV)

- **MCS Processor:** The processor would quantify their emissions (and progress towards their targets) based upon default EU and industry-wide emissions factors (tCO2-e/kg milk or meat) and the amount of product they process (i.e. kg of meat or milk). The specificity of emissions factors is not determined in the policy options; it could range from general (e.g. kg beef) to specific (e.g. kg of beef from 2-year-old animals raised under specific contexts), with the more specific measurement approach offering greater opportunities for emissions reduction as processors would then have a wider range of products that they could substitute between to alter their portfolio. Existing Intergovernmental Panel on Climate Change (IPCC) inventory approaches and emissions factors could be used as the basis for processor MRV.

[15] Whether this applies to only on-farm feed production or also bought-in feed is not specified. Given the quite approximate MRV approach proposed, it would be possible to set emissions factors on average emissions associated with production considering all types of feed. The MRV developer would need to assess data and uncertainties.

[16] It could be feasible to also include meat /dairy importers as points of obligation, to reduce risk of direct like-for-like leakage (e.g., import of raw milk or minimally processed meat) but this is not suggested in current policy proposals. Generally, the scope could be adapted based on different policy decisions, with additional or fewer activities or actors covered.

[17] Even if the scope were limited to products that contain significant amounts of meat or dairy, the number of products covered would be high: it would include all the products covered by the Processor MRV (e.g. types of milk and meat) plus all processed products with significant meat and dairy components (e.g. cheese, cakes, frozen pizzas).

[18] The CLIMA consultant paper is not clear on whether the same emissions scope applies in both MCS Processor and MCS Retailer; we assume that it is the same.

- **MCS Retailer**: The retailer would quantify their emissions (and progress towards their targets) based upon default industry-wide emissions factors (t/CO2-e per product) and the amount of product they sell[19]. The specificity of emissions factors is not discussed in the policy option. The **MCS Retailer option would presumably pose significant challenges for MRV, involving significant administrative costs** and greater uncertainty than processor-level MRV given the greater distance between the point source of emissions on farm and the product receiving an emissions factor and the wide range of products sold by retailers, including both EU-produced and imported products.[20]

The policy options also propose that obliged entities could apply for individual unique emissions factors based upon their specific context; e.g. frontrunner processors or retailers who have lower-than-industry-average emissions per unit of output could have this certified and would then be able to more easily meet their targets, creating incentives to shift towards processing lower emissions meat.[21] Both policy options would also allow processors/retailers to purchase CRCF certificates from farmers to reach their targets; these would be quantified using the CRCF certification methodologies.

2.1.2 Agricultural Emissions Trading Scheme – Processor level

Functioning and targets

Under the AgETS Processor policy, the regulator sets a cap (limit) on the total amount of emissions permitted. This cap is divided into allowances, each representing 1t CO2-e. Processors must surrender sufficient allowances to cover their verified emissions. The cap will decline over time, in line with EU targets. For the assessment that follows, we assume that the AgETS Processor policy would set equivalent targets for processors as the MCS Processor option.[22]

The processor can ensure they can surrender sufficient allowances to cover their emissions in three ways: 1) by changing their product portfolio (e.g., processing or selling fewer products, e.g. products with high emissions intensity such as beef); 2) by purchasing eligible CRCF emissions reduction credits; 3) trading of allowances with other participants, receiving them through free allocation or by purchasing them at auctions. Purchased CRCF certificates are generated by farmers voluntarily implementing eligible mitigation actions on farm, which are then certified (see box 1 for discussion of eligible credits).

The policy proposes some free allocation in early years though the design and volume of free allocation are not specified. Options include free allocation initially based upon historical GHG emissions and output levels. Over time, as sufficient data is gathered, this could match the EU ETS and transition to performance benchmarks, e.g. based upon the emissions intensity of the top 10% of processors or retailers, and reduce overtime. Free allocation could be targeted to manage transitional costs and to reduce costs for consumers and agri-food actors, which could reduce carbon leakage, among other motivations (World Bank, 2021).

Point of Obligation: *Same as MCS Processor*.

[19] The MCS Retailer MRV could alternatively be based upon products purchased. However, analogous to a value added tax, basing obligations on products sold seems advantageous due to as basis on products sold seems advantageous, as it reduces upfront costs for retailers.

[20] For example, emissions factors would be needed at least on a per product basis (e.g. per pizza, per kg of butter, per kg of cheese).

[21] There could be a risk of double-counting of emissions reductions, if the actions resulting in a lower individual emissions factor are also rewarded through CRCF certificates; the policy would need to manage this.

[22] Note this is not specified in the consultant reports (Springer, 2025), which instead discusses different options for the cap, including options to transition through slowly declining caps. Such a transition is not discussed in the MCS policy options, though equivalent approaches could be applied there in the form of slowly declining targets.

Scope: *Same as MCS Processor.*

MRV: *Same as MCS Processor*.

2.1.3 CRCF certificate trading system

All policy options include a flexible approach that allows obligated entities to purchase CRCF certificates to offset their emissions and meet their reduction targets. Box 1 describes eligible CRCF certificates.[23] In this study we focus on the case of carbon farming certificates from the reduction of emissions in livestock and feed production; such certificates are proposed in the European Commission agri-food policy discussions, though their inclusion in the CRCF is not yet confirmed and their methodology is yet to be developed; considerable uncertainties regarding their form remains (see Box 1). We exclude consideration of other types of CRCF certificates (e.g. based upon afforestation) due to the primary role the EU agri-food policies see for CRCF certificates from reduction of emissions and feed production (see Box 1) and to reduce complexity.

The flexible approach can be implemented in different ways, with the possibility to limit who can buy and sell CRCF certificates. Options for facilitating the trade of CRCF certificates include:

- **Centralised pool**: Downstream actors would be able to purchase CRCF certificates from a centralised pool. The ability to purchase from this pool would be limited to obligated entities under the policy.[24] This centralised pool would be publicly managed, and could take a variety of forms, from a simple marketplace linking buyers (processors/retailers) and farmers, to a more sophisticated publicly administered intermediary. An intermediary could support the supply of CRCF certificates from farmers through forward contracts or blended finance purchase models, as well as advisory and MRV support. It would then offer a simple purchase option for buyers (i.e. processors/retailers), reducing their transaction costs. With more administrative effort, such an intermediary could also play additional roles, such as auctioning allowances within the AgETS and managing AgETS allowance availability.
- **Direct purchases with rules[25]:** Downstream actors could purchase CRCF certificates from farmers **within its supply chain** to meet its targets. The DG CLIMA workshop series has considered whether this should be implemented through separate contracts for CRCF certificates and food products or combined contracts; separate contracts would seem simplest, similarly to how individual producers can close many individual contracts for different products (e.g., beef meat, sheep meat, wool) with different or the same buyers. Alternatively, obligated entities could be permitted to purchase CRCF certificates from farmers **beyond their value chain** to meet its targets, e.g. from other farmers/landowners.

Note that if downstream actors were permitted to purchase CRCF certificates from activities beyond the scope of the policy (e.g. in the case of AgETS Processor or MCS Processor models, if CRCF certificates could be generated by actors beyond meat and dairy food producers), if the cap were not adjusted this would effectively expand the cap by increasing the number of allowances available to actors covered by the cap (i.e. the original cap amount plus the additional external

[23] We consider the use of CRCF certificates within the agri-food policies, as proposed in the CLIMA workshop series. The use cases for CRCF certificates have not been determined but could alternatively include other uses such as contribution claims.

[24] While not proposed, it could make sense to widen access to purchasing from the centralised pool to also permit processors/retailers from the same sector who fall below compliance thresholds to voluntarily purchase from the pool, providing additional private demand and funding.

[25] In the draft policy proposals, only the MCS policy designs permitting direct purchases. However, practically, this would also be implementable under the AgETS design.

credits), reducing stringency of the targets.[26] This could pose an environmental integrity risk if the CRCF certificates represent double-counting (i.e. the same emissions reductions are captured elsewhere in EU climate policy accounting)[27] or if the accompanying emissions reductions are not equivalent to the obligated entities emissions reductions (e.g., if the certificates pose a reversal risk – see Box 1).

Box 1 CRCF: Eligibility of CRCF certificates

The policy options propose the use of CRCF certificates as a way for downstream obligated entities (processors or retailers) to meet their targets or cover their emissions under the cap. CRCF certificates eligible for use in agri-food policies are generated by farmers voluntarily implementing eligible mitigation actions on farm and then having these certified.

The following activities are currently considered "carbon farming" under the CRCF (EC, 2025):

- Carbon removals and soil emission reductions resulting from the **management of agricultural soils and agroforestry:** This includes agroforestry and agricultural practices that increase carbon removals in soils or reduce emissions of carbon from soils, and those that reduce direct and indirect N_2O emissions from managed agricultural soils
- Carbon removals and soil emission reductions resulting from the **planting of trees**
- Carbon removals and soil emission reductions from **peatland rewetting and restoration**

In addition, the European Commission is reviewing the inclusion of some agricultural emissions reduction activities, including **the reduction of emissions in livestock and feed production**.

Eligibility of CRCF certificates in proposed agri-food climate policies:

The most recent policy draft states that for all policy options, the following activities can be used: "CRCF certificates that can be used for compliance would be related to emission reductions in livestock and feed production or (within certain limits in terms of scope and volume) other carbon farming activities, while avoiding double-counting." (Forestier & Dekker-Hufler, 2025)

Hence, **the type of CRCF certificates permitted to be used in the scheme is roughly the same across the downstream policies** and should primarily be emissions reductions CRCF certificates generated through reductions in livestock emissions and feed production. As this methodology is still being drafted and has not yet been officially accepted, there are still considerable open questions, including about exactly what measures this will cover.

As stated in the introduction, in this study we do not consider the integration of temporary CRCF certificates into the downstream market-based policies (e.g. those arising from carbon farming activities that pose non-permanence risks), in order to reduce complexity of the study. These temporary CRCF certificates pose several risks – including most pressingly reversal risks – and these risks should be considered when deciding whether and which credits to accept in a compliance system (McDonald et al., 2025). It will be important to ensure that the system avoids double counting by including a strict traceability requirement for CRCF certificates to ensure these emissions reductions are not already quantified by compliance systems elsewhere.

[26] An alternative, the cap could be adjusted such that for each beyond-scope CRCF certificates that is used within the policy, the cap is tightened accordingly (e.g. a "one-in-one-out" approach).

[27] For example, if the certificate is purchased from a small farm that falls below the compliance threshold, but whose emissions reductions will also be captured under the ESR targets.

In this study, our assessment assumes the use of CRCF certificates based on reduction of emissions in livestock and feed production. We do not consider the use of other carbon farming CRCF certificates in this assessment; McDonald et al. (2025) discuss temporary CRCF certificates in detail.

2.2 Policy option overview and key differences

Table 2 provides an overview of the proposed downstream policy options currently considered by DG CLIMA and their consultants, illustrating similarities and differences. There are three key differences between the proposed policy options, which otherwise have many overlaps: the point of obligation; MRV for downstream actors; and emissions reduction options incentivised.

Table 2 Overview of proposed downstream policy options and key differences (based upon Trinomics et al. 2025, own compilation)

Feature	MCS Retailer	MCS Processor	AgETS Processor
Scope	GHG emissions related to the on-farm production of **all food products that are sold in the EU.**	GHG emissions related to the on-farm production of **meat and dairy products**, including emissions embedded in the feed, **that are processed in EU**.	
GHG covered	Emissions from livestock, from soils and grasslands, and from fertiliser use		
Point of obligation	Food **retailers** (including caterers)	First-stage **processors** of meat and dairy (e.g., pasteurisation units, slaughterhouses)	
Legal nature	**Downstream points of obligation** (processors/retailors): mandatory. Farms: Voluntary, e.g., providing CRCF certificates used by obligated entities to prove emission reductions.		
MRV approach: downstream points of obligation	Default emission factors used to calculate emissions associated with **all food products sold in EU** (possibility to use individual factors).	Default emission factors used to calculate emissions associated with **meat and dairy products processed in the EU** (possibility to use individual factors).	
MRV for CRCF certificates: Farms	On-farm emissions reductions demonstrated through CRCF certification methodologies.		
Emissions reduction options	Downstream point of obligation (processor or retailer) must **meet targets by (1) altering their product portfolio** (to lower emissions intensity products and/or reducing quantity), **and/or (2) by purchasing CRCF certificates**		Processors must surrender AgETS allowances to cover their GHG emissions. Processors **meet their obligation by (1) altering their product portfolio** (to lower emissions intensity products and/or reducing quantity), **(2) purchasing CRCF certificates**, or **(3) trading allowances, free allocation and/or purchasing allowances**.

Feature	MCS Retailer	MCS Processor	AgETS Processor
Degree of trading	**No trading between points of obligation** (i.e. no processor-processor or retailer-retailer trading). CRCF certificates can be purchased by downstream actors.		**Trading permitted: AgETS processors can trade allowances between themselves**. CRCF certificates can be purchased by downstream actors.

3 Policy objective and assessment criteria

The primary objective of the downstream policy options presented above is to **reduce farm-level agricultural GHG emissions by incentivising emission reductions along the EU agri-food value chain**. Although the point of obligation under each policy option lies downstream (at the processor or retailer level), mitigation actions will take place **across multiple stages of the agri-food value chain**—including on farms, at processing facilities, and by consumers. This includes incentivising farming practice change, shifts to lower emissions product portfolio, and consumption changes.

Farm-level agricultural GHG emissions mitigation will be incentivised in two main ways. First, through **the purchase of CRCF certificates** by compliance entities (under MCS or AgETS), which directly reward farmers for implementing certified mitigation practices. Second, indirectly, as downstream actors respond to the emissions price or regulation by shifting demand toward lower-emission agricultural products. **Demand shifts by downstream actors can take different forms.** At the point of obligation, processors and retailers may reduce their emissions by changing sourcing strategies, investing in lower-emission supply chains, or reformulating products to reduce the carbon intensity of their offerings. These actors face a direct compliance cost and will seek cost-effective ways to reduce their emissions exposure. Further downstream, consumers are likely to respond to higher prices on emissions-intensive products. For example, under a processor-level policy, the embedded emissions cost in beef or full-fat dairy would lead to higher retail prices for those products. This, in turn, could drive consumers to shift toward lower-emission—and lower-cost—alternatives.

These different mitigation actions—occurring at various stages of the value chain—highlight that the impact of each policy option depends not only on the scope and point of regulation of the emission mitigation policy, but also on how incentives and behavioural responses are transmitted across actors. To understand how effectively and efficiently each policy option can drive these responses and deliver on its objective of reducing agri-food emissions, we begin by assessing them using four key policy evaluation criteria:

- **Incentivised mitigation actions**

  This criterion examines the type and scope of emission reduction actions promoted by each policy option.[28] Downstream policy options vary in their ability to incentivise mitigation, depending on how comprehensively they cover different segments of the value chain and the extent of mitigation actions that are captured by their MRV approach.

- **Emission leakage risk**

  Policies that reduce emissions within the EU must also manage the risk of emissions leakage—that is, a shift in production and increase in emissions outside the EU due to EU climate policy. We discuss:

  - Potential leakage risks under each policy option,
  - The extent to which the policy includes mechanisms (e.g. border adjustments, alignment with trade partners) to mitigate this risk.

[28] This has implications for economic efficiency, as a greater range of mitigation actions can increase potential gains from trade available under some policy options.

Leakage undermines the environmental integrity of EU-based mitigation and must therefore be a central consideration in the policy design and implementation.

- **Gains from trade**

  That is, what degree of trading and gains from trade are likely under each policy option. An efficient policy ensures that mitigation occurs where it is most cost-effective. We assess the degree to which each policy option:

  - Enables market-based mechanisms or flexibility (e.g. trading across sectors or actors),
  - Facilitates gains from trade in emission reductions (e.g. allowing entities with lower abatement costs to sell allowances or credits).

  Policies that restrict trading or apply uniform requirements irrespective of marginal abatement costs may achieve emissions reductions at higher economic cost.

- **Administrative and compliance costs**

  The practicality and cost of implementation are critical to the success of any policy. We briefly examine:

  - Administrative burdens for regulators (e.g. MRV system setup, enforcement),
  - Compliance obligations for entities covered by the policy (e.g. data reporting, audits, penalties),
  - Overall transaction costs along the agri-food value chain.

  Policies with lower administrative complexity and clearer compliance pathways are more likely to be accepted by stakeholders and effectively enforced.

After evaluating the performance of the policy options against these four key criteria, we proceed to a focused assessment of their impacts on the **potential for emissions reduction**, as well as their overall **effectiveness** in achieving environmental goals and their **efficiency** in balancing costs and benefits. Economic efficiency implies that outputs are achieved with lowest inputs. Assuming all policy options have the same output (i.e. equivalent targets), economic efficiency considers the extent that the costs of achieving emissions reduction goals are minimised. To achieve this, the downstream policies must ensure that they reduce emissions where it is cheaper to do so, and that these mitigation options are effectively incentivised.

Modelling work by Perez-Dominguez et al. (2016) find that the most cost-effective emissions reduction measures in EU agriculture differ across different contexts. In particular, they find that the set of most efficient measures differs across different Member States, meaning that there is no one-size-fits-all set of emissions reduction measures that is optimal across all EU contexts. Perez-Dominguez et al. (2020) concludes that meeting emissions reduction targets at lowest cost will require a mix of technological mitigation options (to reduce the emissions intensity, i.e. tCO2-e/unit of production) and changes in production portfolio (i.e. transition away from emissions intensive products), finding that a 20% reduction in emissions would be achieved at lowest cost through a mix of technological mitigation measures (68.5% of reductions) and production mix (32.5%). This could be accompanied by changes on the consumption side, with Stepanyan et al. (2023) modelling suggesting that a €100/tCO2-e carbon tax on beef would decrease EU beef consumption by 4.5%.

We assess policy options by examining their effectiveness, efficiency and emission-reduction potential to reveal trade-offs and show which measures deliver the most climate benefit with the least economic or administrative burden, providing practical insights for decision-makers. The evaluation highlights each option's main strengths and weaknesses against key criteria to inform policy sequencing (chapter 5) but does not rank or recommend policies. Other important factors — socio-economic and environmental impacts, coherence, trade effects, and legal/political feasibility — are not covered here, so results are indicative and not a substitute for a full, comprehensive assessment before decisions are made.

4 Policy option assessment

4.1 Incentivised mitigation actions

The broader the scope of a policy, the greater the share of total agri-food sector emissions it covers, and the greater its ability to incentivise emissions reductions. The policy options considered in this study have similar scopes in some respects, for example, we assume that all the policies cover the same greenhouse gases (i.e. CH_4, N_2O, and CO_2 emissions generated through agri-food production; excluding CO_2 removed or emitted in the LULUCF sector). **However, there are significant differences in scope between the policy options due to the point of obligation (processor vs. retailer),** which results in different sets of products being covered under each policy, and (slightly) different MRV approaches of associated emissions and emissions reductions. These scope differences have important implications for the expected mitigation potential of each option.

As illustrated in Table 3, the processor and retailer policy options cover emissions associated with a different range of products, with two key distinctions:

- Exported/imported meat and dairy: Processor options include emissions associated with exported meat and dairy but exclude those associated with imported meat and dairy; the opposite is true for MCS Retailer, which includes emissions from imported meat and dairy and excludes exported meat and dairy. The EU is a net exporter of meat and dairy, e.g. in 2024 dairy product exports amounted to 19.7 billion EUR and imports of 2.2 billion Euros (DG AGRI, 2025).[29] This suggests that coverage of exports could considerably increase the policy's scope relative to only including emissions embodied in imports, even though the agri-food policy would likely increase imports of meat and dairy products. However, it is important to note that traded production might be small relative to total production; for example, in 2024, 145 million tons of raw milk were produced within the EU, with 5.9 million tons exported[30]. An additional argument for including exports arises from the policy's objective of reducing agri-food emissions within the EU (and therefore within the EU's inventory reporting and climate targets).
- Other foodstuffs: The MCS Retailer policy options include emissions associated with foodstuffs beyond meat and dairy, e.g. associated with crops; MCS and AgETS Processor are limited to meat and dairy only. This inclusion of additional products increases the coverage of the MCS retailer policy option relative to the processor options, provided that MRV can adequately capture emissions associated with products in the retailer option, as discussed below.

[29] The EU has trade surpluses for all meat and dairy food categories (dairy, pigmeat, beef and veal) except for a small trade deficit for sheep and goat meat (0.5 billion EUR) (DG AGRI, 2025) .

[30] Sources: DG AGRI Dairy production data and Dairy trade; accessed 16.02.2026

Table 3: Scope of emissions covered under different policy options

Emissions associated with (including feed):	MCS and AgETS Processor	MCS Retailer
EU-processed meat and dairy, sold in EU	Yes	Yes
EU-processed meat and dairy, exported	Yes	No
Imported meat and dairy	No	Yes
Other food (either produced in EU or imported)	No	Yes

MRV influences the scope of the policy, as it determines which emissions and emission reductions can be reliably measured, reported, and verified. Where robust MRV is not feasible, certain sources or activities may be excluded from policy coverage, thereby narrowing its scope. Where MRV is not precise, some mitigation actions might not be incentivised, as their impact on emissions would not be captured**.** In this setting, two MRV aspects are crucial:

- **MRV of emission reductions for CRCF certificates:** All policy options allow either the retailer or processor to meet their targets using CRCF certificates. The MRV approach for CRCF certificates is the same for all policies. As discussed in Box 1, the use of CRCF certificates enables the quantification and incentivisation of mitigation actions on individual farms that are covered by the eligible CRCF methodologies, including any future actions captured by the proposed method for reduction in livestock emissions and feed production. Since these methodologies are still being developed and are yet to be approved, it is not yet possible to say what emissions reductions they will cover but the scope will be equivalent for all policies. **The broader the coverage of eligible CRCF methodologies, the greater potential for on-farm emissions reductions**; however, it is crucial to ensure high quality such that each CRCF certificate is backed by real emissions reductions and that there is no double counting of emissions already reduced in the agriculture sector because of the policy.
- **MRV of emissions for processors/retailers:** The MRV at the point of obligation differs slightly between the policy options, with implications for the range of emissions reductions incentivised and efficiency. This is important for setting and monitoring progress towards targets (in MCS options) and determining the level of the cap, allocation and surrender of allowances under the AgETS option. All policy options propose MRV based upon emissions factors (i.e. tCO2-e/unit of meat or milk, or tCO2-e/product) multiplied by products processed or sold. The more specific the emissions factors are, i.e. the narrower the categories, the more mitigation options the processor/retailer will have – and the more accurate they should be. For example, in the case of a processor, the emissions factors could be set at a high level of abstraction (e.g. beef) or be more specific (e.g., beef coming from a two-year-old animal raised with no imported feed in a particular region). With highly specific emissions factors, the processor can shift from relatively high emissions source animals (e.g. older, smaller animals) to lower emissions animals (e.g., fast-growing, large animals) to reduce their emissions. **MRV based upon high-level categories (e.g. beef produced in Germany) offers processors/retailers fewer options to reduce their emissions—they would be limited to reorienting their portfolio away from high emission products such as beef towards lower emissions meats such as pork, and/or reducing quantity**. The ability to set specific emissions factors depends on data quality. Retailers, being further downstream and with many more substitutes available to them are likely to have greater flexibility to reorient their portfolio than processors, e.g. they may be able to reformulate pizza recipes to have more vegetable toppings and less meat, or to

reduce promotion of cheese products in favor of vegetables (if these changes were reflected by different emissions factors for the different products). However, as discussed in 2.1.1, this is questionable, given the significant approximations likely necessary to be made to establish emissions factors for all (or a sufficiently high number of) food products sold by retailers.[31]

- **The policy options also open the door to allowing for the points of obligation to calculate individualised emissions factors, where rather than using default emissions factors, they calculate the emissions associated with their own supply chain.** If this were permitted, processors and retailers would be willing to pay more for low-emissions products (to process or sell), as they would result in lower emissions factors and emissions obligations. This would create additional incentives for emissions reductions on farm (in the case of processor options) and on suppliers (in retailer option).

4.2 Emissions leakage risk

Emissions leakage is seen as one the major barriers for the introduction of emissions pricing in EU agriculture (Spiegel et al., 2024; Van Hoof, 2023). Policy-induced leakage occurs when emissions increase (in other countries or regions) as a result of a domestic climate policy (e.g., MCS or AgETS in this study). Leakage undermines the effectiveness of climate mitigation policies by shifting emissions (abroad) rather than reducing them. If foreign production is more carbon-intensive, total emissions may even rise. Additionally, EU producers might lose market shares and thus revenues, although many other factors such as input prices and demand for set product also play a role.

Potential impacts can be gleaned from carbon leakage modelling studies for the EU agri-food sector. Studies simulating EU climate policies in agriculture have projected a wide range of carbon leakage rates, spanning from -5% to as high as 153% (Fournier Gabela et al., 2024; Matthews, 2022). At the lower end, Perez Dominguez et al., (2016) estimate leakage rates of 23–35% under mandatory GHG reduction targets of 15–25%. Similarly, Himics et al., (2018) project leakage between 21–50% in response to a €50 carbon tax on non-CO_2 agricultural emissions. At the upper end, Nordin et al., (2024) estimate a leakage rate of 91% resulting from a €120 carbon tax on EU agri-food products. Matthews (2022) expects that leakage rates will differ across sectors and depend on many factors but are likely to be relatively high compared to other sectors due to the characteristics of the agri-food sector. **Based on this literature, there appears to be a significant but highly uncertain level of carbon leakage risk in EU agriculture.** To the best of our knowledge, no studies compare leakage rates across different points of obligation. Moreover, existing studies have not considered downstream policy options or examined the specific effects of an AgETS or an MCS, as considered in this paper.

In theory, **different policy options pose different leakage risks. For the policies analysed in this study, we identify two relevant types of leakage risk:**

- **Competitiveness-related leakage**: Climate policies can increase the production costs of meat and dairy in the EU, potentially raising prices and making EU products less competitive. As a result, imports of cheaper alternatives from countries without a (strong) pricing instrument could reduce the market share of EU producers. These imports may come from countries with higher emissions intensities, potentially reversing the intended climate benefits.

[31] An additional challenge for retailer MRV is posed by imports. To allow for effective substitution towards low-emissions production, imported foods would need emission factors that reflect their emissions. This would multiply the number of emission factors required.

- **Demand-driven export leakage**: Leakage can also occur when successful domestic climate policies reduce EU demand for emission-intensive products but simultaneously lead to a rise in net exports of those same products. This shift can reduce total mitigation, as the environmental gains from lower domestic consumption are offset by increased consumption abroad. Note, however, that this effect could also lead to reduced emissions in foreign countries if less emission-intensive exports crowd out more emission-intensive production abroad, decreasing global emissions. This phenomenon has been examined in the context of GHG taxes applied to food products (Zech & Schneider, 2019).

These two types of leakage risk may impact the policies analysed in this study in different ways. Competitiveness-related leakage is particularly relevant for processor-level policies, as these could increase the cost of European products relative to imports. In contrast, the risk of increased net exports could arise under all policy options. It is especially pertinent under the MCS Retailer policy, since this policy explicitly excludes exported products from its scope (as discussed in the previous section). But it could also apply to processor-level policy options, for example if they lead farmers to increase net exports of emissions-intensive agricultural products.

There are a range of strategies and measures to manage carbon leakage. Matthews (2022) provides a good overview of these including information on possible implementation hurdles. Carbon leakage risk for processor-level options could, for example, be most directly reduced by submitting importers to border measures that mirror the EU's agri-food policy. Alternatively, importers of raw milk/unprocessed meat could be required to also participate as points of obligation in the MCS or AgETS policies. For the AgETS processor option, a mirror approach could encompass an extension of the Carbon Border Adjust Mechanism (CBAM) to agricultural products (Fournier Gabela et al., 2024).[32] Alternatively, free allocation of allowances based on output could also be utilised to reduce leakage risk. For the MCS Processor option, there is not a clear policy to introduce at the border that mirrors the MCS design.[33] However, there could be a requirement that the emissions intensity of products imported are below a certain level. This could be implemented via performance-based mandatory import standards, limiting the quantity of GHG emissions per ton of produce. In the case of emissions leakage generated by increased net exports, reducing it would likely be more challenging. To our knowledge, no studies have analysed anti-leakage measures that address this specific channel.

4.3 Gains from trading emissions reductions and CRCF certificates

The different policy options presented have different possible degrees of trading, with implications for economic efficiency. As explained in Chapter 2, all proposed policy options give the obligated downstream actors (i.e. processors or retailers) the option to purchase CRCF certificates for compliance. In contrast, only under the AgETS Processor can emissions permits be traded between downstream actors. These design decisions impact the expected gains from trade under each policy option.

The different CRCF certificate trading systems introduced in section 2.1.3 offer differing access to CRCF certificates, with implications for the likely costs and volume of CRCF certificates purchased, and posing different risks. Less restrictive trading options (e.g. a centralised pool or permitting actors to directly purchase CRCF certificates from suppliers

[32] The CBAM imposes a carbon price on imported goods equivalent to that faced by domestic producers, thereby levelling the playing field and reducing incentives to shift production abroad.

[33] So-called "mirror clauses", which make trade policy more restrictive for trading partners lacking equivalently ambitious environmental standards, could be considered (Gohin & Matthews, 2024).

beyond their value chain) would provide downstream actors with a wider range of CRCF certificates, increasing the potential gains from trade. Allowing only within value chain trading could significantly limit access to CRCF certificates and would reduce the likely range of CRCF certificate costs and volume traded; conversely, it offers potential benefits in terms of strengthening value chain relationships related to climate mitigation.

All else equal, the AgETS has greater economic efficiency than an MCS, as it allows the obligated entity (i.e. the processor) greater flexibility in how to meet their target, i.e., comply with the cap by returning sufficient emissions allowances to cover their emissions. **This is because it enables obligated entities with high marginal emissions reduction costs to purchase allowances from other obligated entities with low marginal emissions reduction costs**. If we assume the range in emissions reduction costs and measures across Member States suggested by Dominguez et al. (2016; 2020) is matched by different emissions reduction costs across different processors, this flexibility could be expected to deliver significant gains from trade and efficiency gains.

Interactions between policy options and CRCF trading system

The extent of CRCF certificate purchases will depend on the relative prices of CRCF certificates and the marginal emissions reduction costs of points of obligation. If CRCF certificates are in plentiful and cheap supply at costs below the downstream actors' marginal cost of reducing emissions, then we would expect downstream actors to meet their targets exclusively by purchasing CRCF certificates.[34] If CRCF certificates were limited in supply and more expensive for downstream actors than their marginal cost of reducing emissions, we would expect no certificates to be purchased and all mitigation to be achieved through emissions reductions by the downstream actors (and their supply chain). Given the likely diversity of marginal emissions reduction costs for downstream actors and of CRCF certificates, the likely result falls somewhere between these extreme cases: those downstream actors with high marginal mitigation costs will meet some of their target by purchasing CRCF certificates that cost less than their marginal mitigation costs, while those downstream actors with low marginal costs of emissions reductions would meet most or all of their targets through their own emissions reductions. In the case of more restrictive mechanisms for facilitating the trade in CRCF certificates, i.e. if trade were limited to within the downstream actor's value chain, we would expect to see fewer CRCF certificates purchased and more emissions reductions and/or allowance trading between downstream actors.

The relative efficiency ranking of the proposed downstream policy options depends on the availability and costs of CRCF certificates. One exception to the conclusion that the AgETS will be most efficient is the case when CRCF certificates are plentiful and available at costs lower than all obligated entities own marginal abatement costs. In this situation, in all policies, the lowest cost way to meet targets would be for all obligated entities to purchase CRCF certificates, and therefore there would be no (effective) advantage associated with the additional flexibility offered by the AgETS policy. Such an outcome would also depend on unlimited access to CRCF certificates and would probably not occur if the trading of CRCF certificates were limited to within the downstream actor's own value chain. In any case, we would not expect this outcome of sufficient cheap CRCF certificates, given the Dominguez et al. (2016) modelling results that suggest a mix of technological and production changes would be necessary, with CRCF certificates likely to only reward technological mitigation.

[34] Under the AgETS policy option, this situation would imply that that the AgETS allowance price would have to be equivalent to or lower than the CRCF certificate price for there to be any trading within the AgETS.

The links between emission reductions activities by covered downstream entities and on-farm emission reduction actions by farmers in the context of the CRCF are complex and make predicting effects challenging. Emission reduction activities by downstream entities will have an effect at the farm level, probably affecting CRCF certificate generation, and vice-versa. For example, if downstream actors seek to reduce their own emissions by requiring their supply farmers to incentivise specific farm mitigation practices (e.g., improved feed efficiency), farmers may implement them not voluntarily but as a "quasi-compliance" requirement or to retain market access. This could reduce CRCF supply, if the farmer can no longer claim these mitigation actions as *additional* under the CRCF. Generally, we could expect CRCF supply to be reduced the more that downstream entities demand their value chain reduce emissions. These effects could also influence the CRCF certificate and AgETS allowance price. The precise implications following from these interactions remain, to the best of our knowledge, a research gap.

4.4 Practical challenges and administrative and other transaction costs

Administrative and compliance costs associated with the policy options are borne by involved parties, e.g. administrators, obligated entities, farmers providing CRCF certificates, reducing the net benefit of the policies. In the following section, we identify different types of administrative and other transaction costs faced by different actors and describe how they differ across the policy options.

4.4.1 Administrator costs and practicality

Administrators face costs establishing schemes and managing their ongoing operation. A key focus will be the development of MRV systems to quantify emissions (and emissions reductions) and ensure ongoing compliance. **These costs are likely to be higher for the MCS retailer option than the AgETS and MCS processors options**. This is due to the wider range of types of products covered by the retailer policy option, which covers all food products sold in the EU, compared to the processor options, which cover only meat and milk processed in the EU. Calculating and defending emissions factors for the wide range of food products envisioned under the MCS retailer option would be highly complex. Even if the scope of food products covered was limited, e.g. to products with a significant level of animal components, this would be challenging, with the number of emissions factors very high, even with this restriction. At the same time, the development of more specific emissions factors seems impractical, given the sheer number of products sold by retailers. In contrast, the MRV processor policy, which, given it occurs closer to the main source of emissions on farm, could more practically capture context (e.g. age and size of animal processed), and also pass prices along in such a way that retailer product prices reflect associated emissions (e.g., the price of a pizza with twice as much cheese would be higher than a pizza with less cheese, due to the input price of cheese reflecting its emissions).

The complexity of generating accurate and sufficiently differentiated emissions factors raises questions about the practicality of a retailer policy option in (at least) the short-term. In contrast, the processor-level policy options could draw on existing emissions factors in national UNFCCC inventory reporting, as a first basis. The accuracy of even blunt emissions factors at the processor level has been demonstrated in other regions. For example, the New Zealand Interim Climate Change Committee found that estimating emissions based upon number

of animals and milk yield correlated strongly with more sophisticated, farm-audit tool approaches using tens of data points (New Zealand Interim Climate Change Committee, 2019).[35]

Ongoing administrator costs depend primarily on the number of obligated entities and complexity. The number of obligated entities can be managed using thresholds to exclude small companies responsible for small total amounts of emissions. Bognar et al. (2023) estimate that a processor-based policy would involve a total of approximately 1600 large processors[36]. Data on the number and size of likely obligated entities under a retailer policy are more challenging, but work by DG CLIMA consultants suggests that the number of obligated entities may not differ significantly, with 1260 entities belonging to the category "Retail sale in non-specialised stores" responsible for 70% of turnover (with likely correlation to emissions)(Trinomics et al., 2025). **However, given the greater complexity of the retailer policy MRV, with many more products, it is likely that this would entail greater ongoing monitoring costs for administrators.**

4.4.2 Compliance and transaction costs for obligated entities and farmers

Regulated downstream actors: The most significant costs for obligated entities will be the costs of reducing emissions or purchasing certificates or allowances to meet their targets or AgETS obligations, as well as the transaction costs implied by the different system. These costs will **differ across policy options. The greater complexity of the MCS retailer mechanism means it will generate higher compliance costs**, due to the greater number of products covered and the complexity of MRV.

Farmers: It is also important to consider the (transaction) costs borne by farmers, which may differ across downstream policy options, despite farmers not being direct participants in the policies. Most directly, farmers will face participation costs through the CRCF system; this might, for example, involve MRV costs to receive certification of mitigation. While farmer CRCF participation is voluntary, and therefore they are only likely to participate if the benefits outweigh the implementation and transaction costs, these transaction costs reduce their benefits of selling CRCF certificates. **An open question is the extent to which other transaction costs for farmers could result from the policies**; for example, should downstream regulated actors demand additional data from farmers in order to quantify their own emissions at greater granularity, this could be associated with higher farmer transaction costs.

4.5 Impacts on potential emission reduction, efficiency and effectiveness

The performance of the policy options under the criteria analysed above could have important implications for the emission reduction potential of the policies, their effectiveness, and their efficiency:

- Emission reduction potential: We identified two main factors affecting the emission reduction potential: the scope of the policy and the MRV system. In the first case, the MCS Retailer option has greater potential because it covers a larger share of products — and therefore a broader range of agricultural emission sources at the farm level. It includes all food products sold within the EU. The different treatment of exported goods reduces the

[35] They found a R^2 correlation coefficient of 0.86 within the specific context of the New Zealand dairy industry; further work would be needed to understand whether this also applied within the more diverse EU context.

[36] Based on a threshold of 50 employees. Assuming that revenues are a reasonable approximation for emissions, these 1600 meat and dairy processors would "cover approximately 82% of emissions associated with meat production and 91% of emissions linked to dairy production" (Bognar et al. 2023).

difference in coverage between the two options, with the proposed processor-level options covering EU exports, unlike the MCS Retailer option. However, this potential may be limited by constraints related to MRV of emissions, with the MCS Retailer option posing greater implementation challenges. Emission reduction potential hinges on the range and scale of emissions reductions actions that are incentivised. This will be supported by ensuring a wide range of robust emissions reductions methods are covered by CRCF methodologies, and that the emissions factors used for quantifying processor and retailer emissions are based on highly differentiated categories, allowing them to have portfolio reallocation be reflected by reduced emissions. As noted in our evaluation, significant challenges are likely to limit the development of sufficiently accurate and specialised emissions factors for the MCS Retail option.

- Effectiveness: Emissions leakage reduces a policy's ability to effectively reduce greenhouse gas emissions, as emissions reductions by actors covered by the policy are offset by emissions increases by other actors. In this paper, we have identified at least two types of emissions leakage that could happen under the proposed policy options. All of these policies carry a potential risk of carbon leakage, the magnitude of which, however, cannot currently be predicted or compared. This risk of carbon leakage can nonetheless be addressed through various anti-leakage measures. However, the effectiveness of these mechanisms in reducing carbon leakage also remains a research gap. Note that policies' effectiveness will also depend on the quality of the MRV approach, including the quality of the CRCF certificates that are accepted in the system.
- Efficiency: The extent to which the downstream agri-food policies can ensure lowest cost mitigation is achieved depends principally on these three aspects: (1) their ability to cover all emissions reduction measures (i.e. the scope of the policies); (2) their ability to incentivise emissions reductions where it is cheapest; and (3) administrative and compliance costs. As explained above, the MCS Retailer option has a broader scope than the processor-level options and therefore includes many potentially cheaper emission reduction opportunities. However, this advantage is offset by the challenge of implementing an accurate MRV system, which could result in many reduction options being overlooked or unaccounted for. The MCS Retailer policy would also likely face higher administrative and compliance (transaction) costs compared to the other options. The AgETS Processor option provides more opportunities for trading allowances however it is important to note that the gains from trading emission allowances under this option depend on its interactions with the CRCF certificate trading system. In addition to the high administrative and transaction costs associated with retailer-based MRV, it is important to note that administrative and compliance costs can further reduce the efficiency of downstream policies, by reducing the amount of trading that occurs within policies (e.g. between obligated entities in an AgETS, or between farmers with CRCF certificates and obligated entities seeking CRCF certificates).

Table 4 presents a summary of the results derived in this study.

Table 4: Summary of the analysis of downstream policy options

Criteria	MCS Processor	AgETS Processor	MCS Retailers
Covered emissions	Moderate – EU meat & dairy, including exports	Moderate – EU meat & dairy, including exports	Wide – meat, dairy and other foodstuffs sold in EU, but excludes exports

Criteria	MCS Processor	AgETS Processor	MCS Retailers
Incentivised mitigation actions	Moderate - EU meat & dairy, including exports	Moderate - EU meat & dairy, including exports	Moderate/uncertain - Potentially greater due to broader scope (EU produced and imported meat and dairy, plus other products) but MRV challenges may limit actions.
MRV complexity (for emissions)	Moderate – narrower product range; more feasible to apply granular emission factors	Moderate – narrower product range; more feasible to apply granular emission factors	High – broad product scope increases difficulty in assigning accurate emission factors
Emissions leakage risk	Potentially high, with some ability to address through policy design (e.g. extend scope, import standards).	Potentially high, with some ability to address through policy design (e.g. AgCBAM, free allocation).	Potentially high, though somewhat lower than other policies due to inclusion of importers within scope.
Gains from trade of emissions reductions	Moderate – permits trade of CRCF certificates only.	High – permits trading between downstream actors, as well as CRCF certificates.	Moderate – permits trade of CRCF certificates only.
Admin & compliance costs	Moderate – administrative and transaction costs for downstream actors and farmers.	Moderate – administrative and transaction costs for downstream actors and farmers.	High – retailer MRV highly complex, posing practical barriers and high set up and ongoing costs

Note: Assessment is based on expert judgement by the authors of this report.

5 Developing policies over time

In this section, we consider how agri-food downstream policies could evolve over time, drawing on considerations of shifting objectives and capacities over time. Given the novelty of the proposed policy options in the agriculture sector, and significant short-term challenges including the need to develop and test (cost-)effective MRV, it will be important to consider sequencing over time. To develop potential sequencing strategies, we also draw on existing policy examples, including the policy evolution of the EU ETS (Box 2).

5.1 Policy objectives and considerations over time

In section 3 we identified that the overarching objective of the downstream policy options is to reduce farm-level agricultural GHG emissions by incentivising emission reductions along the EU agri-food value chain. Reflecting shifts in ambition and capacities, policy design for the short-term and long-term should consider differentiated objectives and constraints:

- Short-term: Policy priorities should include maximising learning, developing effective policy infrastructures and gaining broad acceptance by relevant stakeholders. Relatively simple, swiftly implementable policies that can quickly have impact should be a priority; to this end, accepting some uncertainty (e.g. in MRV) or inefficiencies (e.g. narrower scope) should be acceptable in return. This could include a time limited "pilot phase", similar to the EU ETS (Box 2). A key short-term constraint is MRV, which must be developed and tested, and the need to upskill and familiarise participants with the policy. To improve political buy-in and social acceptance, initial policies should carefully include strategies to overcome barriers that have prevented the adoption of market-based emission reduction mechanisms in the agriculture sector in the past (see e.g. Grosjean et al. (2016)). These include the adequate management of distributional impacts including broader societal impacts as well as robust strategies to prevent carbon leakage.[37] To this end, the implemented policy could begin with relatively low-ambition targets and/or generous free allocation of allowances.
- Long-term: Effectiveness and economic efficiency are more crucial for longer term policy. Later phases of the downstream agri-food emissions reduction policies should focus on achieving more ambitious emissions reduction targets. Policies with a broad scope should be favoured, to improve economic efficiency and effectiveness by extending coverage of obligated entities and mitigation actions and thus incentivising more emissions reductions and ensuring lowest cost options are realised. In this phase, due to higher ambition and emission prices, should leakage risks increase, cost-effective anti-leakage instruments may need to be implemented. The broader scope could justify greater complexity, with MRV sensitivity developed over time.

Box 2: Case study in policy evolution - the EU ETS

The evolution of climate policy over time is illustrated by the EU Emissions Trading Scheme (EU ETS). Initially proposed in 2000 and first adopted in 2003, the EU ETS has since been through four distinct phases (Meadows et al., 2019; DG CLIMA, 2025):

- Phase 1 (2005-2007) was a pilot phase that focussed on the development of infrastructure and learning and with limited emissions reduction ambition. It limited coverage to only CO_2 and featured free allocation of allowances based on estimated emissions.

[37] Klenert et al. (2018) emphasise the crucial need to use carbon pricing revenues to increase political acceptability of carbon pricing, e.g. by using revenues to subsidise low-income households.

- Phase 2 (2008-2012) built on the initial phase, with slightly greater ambition and accuracy (i.e. a lower cap and a optional introduction of auctions up to 10%, based on data gathered in phase 1) and extension of scope to include additional countries and gases (N_2O).
- Phase 3 (2013-2020) saw the scope of the policy extended further, to include the aviation sector (from 2012) and additional gases. It also set one EU-wide cap, replacing national caps and simplifying cross-border trading. Auctioning of allowances was promoted alongside reduced and more closely regulated free allocation rules, as well as implementation of a quantity management instrument, to drive down surpluses.
- Phase 4 (2020-2030) further increased ambition to meet the 2030 target and extended the scope to maritime transport, with stricter limits on free allocation and a transition towards a carbon border adjustment mechanism (CBAM) to manage leakage risks. Moreover, emissions trading in the EU will be extended to the buildings and transport sectors through the establishment of the EU ETS 2, scheduled for full operation from 2028.

Lessons can be learned from the development of the EU ETS for the development of any downstream agri-food policy, including the importance of a pilot phase to develop data, test MRV and build market infrastructure; free allocation and policies to address leakage and support political buy-in; and the ability to adapt to unforeseen challenges over time.

5.2 Policy sequencing options

The adaptability of most aspects of policy design and the changing policy objectives and capacities over time suggest that policy makers could consider sequencing of policy options. This also means that the proposed downstream policy options that we have considered in this paper are not just alternative options but could be sequential policy options (e.g. transition between MCS Processor and AgETS Processor would be feasible; transitioning between the Retailer policy option and either of the MCS Processor policy options would be challenging). Below, we present a potential sequential development of the processor-based policy options over time:

- **Phase 1: MCS Processor (pilot phase)** – An initial, time-limited pilot phase could be mandatory only for large processors of meat and dairy (i.e. >50 employees), with smaller participants able to participate voluntarily. Targets would be set based on estimated high-level industry-wide emissions factors and individual historical production data, and would be generous, e.g. set at 95% of current emissions, with low penalties for failure to comply. The focus would be on establishing policy infrastructure (e.g. compliance and administrative approaches), familiarising participants with the policy requirements, gathering data, and providing some demand incentives for CRCF emissions reductions.
- **Phase 2: MCS Processor** – The policy could evolve by increasing ambition by setting tighter targets. MRV could be improved by increasing the accuracy and specificity of emissions factors (drawing on data from phase 1). To increase processor emissions reduction incentives (and reward early movers), processors could apply for a unique emissions factor based upon the specifics of their supply chain. Penalties for non-compliance would increase. The focus would be on ratcheting up ambition and increasing emissions reduction options for participants, as well as learning from experience to adapt and improve the policy. Accompanying policies to support farmers and consumers could be established, e.g., subsidising rising food costs for low-income households and farmer training support.

- **Phase 3: AgETS Processor** – The policy could shift to an AgETS by converting the sum total of individual targets into a cap and using individual targets as the basis for free allocation. This would allow processors to trade between themselves, to benefit from different marginal costs of abatement. A portion of free allocation could be replaced by auctioning, with proceeds used to fund an accompanying policy subsidising rising food costs for low-income households and to support farms in their transition. The focus would be on ratcheting ambition, improving efficiency, and protecting vulnerable communities from the impacts of the policy (and therefore increasing political support).

6 Conclusion

In this report, we have given an overview and assessed downstream market-based policy options to promote emissions reductions that have been proposed for the EU agri-food system. Specifically, we analysed three proposed policy designs: a Mandatory Climate Standard with the point of obligation at the processor level (MCS Processor) and the Retailer level (MCS Retailer), and an Agricultural Emissions Trading Scheme with a processor-level point of obligation (AgETS Processor). We characterised each proposed downstream policy option, describing key attributes including their scope, MRV, and the potential degree of trading. Our assessment focused on key factors that influence each policies' emission reduction potential, its effectiveness and efficiency. We also considered lessons from analogous policies, such as the EU ETS, and suggested how these policies could be sequentially developed over time.

Our qualitative policy assessment highlights the distinct trade-offs between effectiveness, economic efficiency, and administrative feasibility implied by the different policy options. The MCS Retailer option offers the broadest emissions coverage. However, this wide scope comes with high MRV complexity and significant establishment and ongoing administrative costs. The challenges inherent in a retailer-level MRV significantly decrease the potential efficiency gains that could arise from its wide scope. The AgETS Processor option could become more efficient than the MCS Processor option due to its allowance trading mechanism, enabling obligated entities to seek lowest-cost abatement opportunities across the sector by trading amongst themselves, though efficiency outcomes would depend on the interaction with CRCF certificate trading. All three options incentivise on-farm mitigation through CRCF certificates, while other incentives to reduce emissions depend on the granularity of MRV on obligated entities.

Based on our assessment of strengths and weaknesses, our study finds that a processor-based policy option could offer a feasible starting point for short-term policy development. Our analysis suggests that, in the short term, processor-based options could be simpler to implement due to their narrower product scope and more straightforward MRV requirements, enabling faster implementation and institutional learning. Over time, increasing policy ambition and expanded MRV capacity, may motivate a shift toward more comprehensive frameworks that can deliver higher efficiency. Building on lessons from the development of the EU ETS, the proposed processor-based policy options could be developed in phases, sequenced from a pilot MCS Processor phase to a MCS Processor option, and finally toward a fully operational AgETS Processor scheme.

Given the still early stage of policy development in this area, a number of open questions remain. Several areas require further exploration, including comparing the policy options analysed in this study to other policies considered in the DG CLIMA study, such as public procurement of CRCF certificates and an on-farm AgETS. Additionally, given the crucial role of MRV for creating effective incentives for emissions reductions, a full assessment of these policy options requires a more specific description of MRV implementation. Doing so would enable more detailed understanding of the emissions reductions actions that would be captured by MRV and therefore incentivised.

Further research is also needed to address several key uncertainties. Our assessment assumed the inclusion of CRCF certificates based upon emissions from livestock production and feed, following the proposals in the draft agri-food policy options. However, a CRCF methodology is yet to be finalised for livestock and feed; our assessment would need to be revised once a methodology has been developed, as the expected quality of these units could impact our assessment results. Further, our assessment excluded consideration of the use of

temporary CRCF carbon farming certificates with (high) reversal risks; it would be useful to assess how the permitting of temporary CRCF certificates affects our assessment of the downstream policy options. Next, the magnitude of emission leakage risks under each policy options and the effectiveness (and feasibility) of different anti-leakage measures to prevent it remain important questions for future research. Finally, our assessment has not considered other important criteria, such as broader socio-economic and environmental impacts, policy coherence, trade impacts, and legal and political feasibility, which will need to be taken into consideration in any final decision regarding selection of agri-food policy.

7 List of references

Agora Agriculture. (2024). Agriculture, forestry and food in a climate neutral EU. The land use sectors as part of a sustainable food system and bioeconomy. https://www.agora-agriculture.org/publications/agriculture-forestry-and-food-in-a-climate-neutral-eu

Bognar, J., Springer, K., McDonald, H., Tarpey, J., Görlach, B., Scheid, A., Lam, L., Finesso, A., Bolscher, H., Tremblay, L., Zakkour, P., & Heller, C. (2023). Applying the polluter-pays principle to agricultural emissions: Linking carbon removals in the land sector to an agricultural emissions trading system. Umweltbundesamt.

Bognar, J., Springer, K., Nesbit, M., Lam, L., Forestier, O., McDonald, H., Jakob, M., Görlach, B., & Scheid, A. (2023). Pricing agricultural emissions and rewarding climate action in the agri-food value chain. Publications Office. https://data.europa.eu/doi/10.2834/200

CRCF (Certification Framework for Permanent Carbon Removals, Carbon Farming, and Carbon Storage in Products): Regulation (EU) 2024/3012 of the European Parliament and of the Council of 27 November 2024 Establishing a Union Certification Framework for Permanent Carbon Removals, Carbon Farming and Carbon Storage in Products, 3012 OJ L (2024). http://data.europa.eu/eli/reg/2024/3012/oj

DG AGRI. (2025). Monitoring EU Agri-food Trade Developments in 2024. DG AGRI. https://agriculture.ec.europa.eu/document/download/8e6be7cf-e1d2-48fd-9114-90c448e09643_en?filename=monitoring-agri-food-trade_dec2024_en.pdf

DG CLIMA. (2025). Development of EU ETS (2005-2020). European Commission. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/development-eu-ets-2005-2020_en

EC. (2025). Carbon Removals and Carbon Farming. European Commission. https://climate.ec.europa.eu/eu-action/carbon-removals-and-carbon-farming_en

ESABCC. (2024). Towards EU climate neutrality Progress, policy gaps and opportunities. Publications Office of the European Union. https://climate-advisory-board.europa.eu/news/eu-climate-advisory-board-focus-on-immediate-implementation-and-continued-action-to-achieve-eu-climate-goals

ESABCC. (2026). Climate adaptation and mitigation in the agri-food system: Recommendations for coherent EU policies. Publications Office of the European Union. https://doi.org/10.2800/3706315

EU Court of Auditors. (2024). Special report 20/2024: Common Agricultural Policy Plans. European Court of Auditors. http://www.eca.europa.eu/en/publications/sr-2024-20

European Commission. (2024a). Strategic Dialogue on the Future of EU Agriculture: A shared prospect for farming and food in Europe. https://agriculture.ec.europa.eu/document/download/171329ff-0f50-4fa5-946f-aea11032172e_en?filename=strategic-dialogue-report-2024_en.pdf

European Commission. (2024b, February 6). Impact Assessment accompanying the document Securing our future: Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society—SWD (2024) 63 final. https://climate.ec.europa.eu/document/download/768bc81f-5f48-48e3-b4d4-e02ba09faca1_en?filename=2040%20Climate%20Target%20Impact%20Assessment_en_0.pdf

Flatz, J., Rasmussen, M. B., Bøttcher, J. G., & Højte, S. (2024). Climate action in a downstream agricultural emissions trading system [Report]. CONCITO. https://concito.dk/files/media/document/Climate%20action%20in%20a%20downstream%20agricultural%20emissions%20trading%20system.pdf

Forestier, O., & Dekker-Hufler, C. (2025). Incentives to climate change mitigation across the agri-food value chain. Explanatory document to the stakeholder survey.

Fournier Gabela, J. G., Spiegel, A., Stepanyan, D., Freund, F., Banse, M., Gocht, A., Söder, M., Heidecke, C., Osterburg, B., & Matthews, A. (2024). Carbon leakage in agriculture: When can a carbon border adjustment mechanism help? Climate Policy, 0(0), 1–16. https://doi.org/10.1080/14693062.2024.2387237

Gohin, A., & Matthews, A. (2024). Adding mirror clauses within the European Green Deal: Hype or hope? Applied Economic Perspectives and Policy, 46(3), 1103–1126. https://doi.org/10.1002/aepp.13434

Greenhouse Gas Protocol. (2011). Corporate Value Chain (Scope 3) Accounting and Reporting Standard. GHG Protocol.

Grosjean, G., Fuss, S., Koch, N., Bodirsky, B. L., De Cara, S., & Acworth, W. (2016). Options to overcome the barriers to pricing European agricultural emissions. Climate Policy, 18(2), 151–169. https://doi.org/10.1080/14693062.2016.1258630

Himics, M., Fellmann, T., Barreiro-Hurlé, J., Witzke, H.-P., Pérez Domínguez, I., Jansson, T., & Weiss, F. (2018). Does the current trade liberalization agenda contribute to greenhouse gas emission mitigation in agriculture? Food Policy, 76, 120–129. https://doi.org/10.1016/j.foodpol.2018.01.011

Isermeyer, F., Heidecke, C., & Osterburg, B. (2019). Integrating agriculture into carbon pricing. https://doi.org/10.3220/WP1606210060000

Klenert, D., Mattauch, L., Combet, E., Edenhofer, O., Hepburn, C., Rafaty, R., & Stern, N. (2018). Making carbon pricing work for citizens. Nature Climate Change, 8(8), 669–677. https://doi.org/10.1038/s41558-018-0201-2

Lünenbürger, B., Benndorf, A., Börner, M., Burger, A., Ginzky, H., Ohl, C., Osiek, D., Schulz, D., & Strogies, M. (2013). Klimaschutz und Emissionshandel in der Landwirtschaft [Climate protection and emissions trading in agriculture]. Umweltbundesamt (German Environment Agency). https://www.umweltbundesamt.de/publikationen/klimaschutz-emissionshandel-in-landwirtschaft

Matthews, A. (2022). Trade Policy Approaches to Avoid Carbon Leakage in the Agri-Food Sector. The Left in the European Parliament. https://left.eu/app/uploads/2023/02/GUE-Study-TRADE-Carbon-leakage.pdf

McDonald, H., Gardiner, J., Scheid, A., Siemons, A., Fallasch, F., Scheffler, M., & Wiegmann, K. (2025). Temporary Carbon Units from Carbon Farming and EU Agri-food Climate Policy (p. 63) [Report]. Ecologic Institute,Oeko-Institut e.V. Institute for Applied Ecology. https://www.ecologic.eu/20237

Meadows, D., Vis, P., & Zapfel, P. (2019). The EU Emissions Trading Scheme. In Towards a Climate Neutral Europe: Curbing the Trend. European Commission. https://cadmus.eui.eu/bitstream/handle/1814/65859/Towards_climate_neutral_europe_en-CLIMA%20version.pdf?sequence=7&isAllowed=y

New Zealand Interim Climate Change Committee. (2019). Action on agricultural emissions: Technical appendix 2: Calculating agricultural emissions. https://www.iccc.mfe.govt.nz/assets/PDF_Library/ad8206e92b/FINAL-ICCC-Technical-Appendix-2-Calculating-Emissions.pdf

Nordin, I., Wilhelmsson, F., Jansson, T., Fellmann, T., Barreiro-Hurle, J., & Himics, M. (2024). Border carbon adjustments in agri-food markets: Not as effective as one might think? Q Open, qoae015.

Partnership for Market Readiness & International Carbon Action Partnership. (2021). Emissions Trading in Practice, Second Edition. World Bank, Washington, DC. https://doi.org/10.1596/35413

Perez Dominguez, I., Fellmann, T., Witzke, H. P., Weiss, F., Hristov, J., Himics, M., Barreiro, H. J., Gomez, B. M., & Leip, A. (2016). Economic assessment of GHG mitigation policy options for EU agriculture. JRC Publications Repository. https://doi.org/10.2760/4668

Perez-Dominguez, I., Fellmann, T., Witzke, H. P., Weiss, F., Hristov, J., Himics, M., Barreiro, H. J., Gomez, B. M., & Leip, A. (2020). Economic assessment of GHG mitigation policy options for EU agriculture. JRC Publications Repository. https://doi.org/10.2760/4668

Spiegel, A., Heidecke, C., Fournier Gabela, J. G., Stepanyan, D., Söder, M., Freund, F., Gocht, A., Banse, M., & Osterburg, B. (2024). Climate Change Mitigation in Agriculture beyond 2030: Options for Carbon Pricing and Carbon Border Adjustment Mechanisms. EuroChoices, 23(1), 19–27. https://doi.org/10.1111/1746-692X.12425

Springer, K. (2025). Incentives for Climate Change Mitigation across the Agri-food Value Chain Input paper #1 – Policy options (DG CLIMA 2025 Carbon Farming Workshop Series Input Papers, p. 44).

Stepanyan, D., Heidecke, C., Osterburg, B., & Gocht, A. (2023). Impacts of national vs European carbon pricing on agriculture. Environmental Research Letters, 18(7), 074016. https://doi.org/10.1088/1748-9326/acdcac

Trinomics, IEEP, Ricardo, & Wageningen University. (2025). Incentives to climate change mitigation across the agri-food value chain. Five workshop input papers on policy design issues.

Van Hoof, S. (2023). Climate Change Mitigation in Agriculture: Barriers to the Adoption of Carbon Farming Policies in the EU. Sustainability, 15(13), Article 13. https://doi.org/10.3390/su151310452

World Bank. (2021). Emissions Trading in Practice, Second Edition: A Handbook on Design and Implementation. Partnership for Market Readiness. International Carbon Action Partnership. http://hdl.handle.net/10986/35413

Zech, K. M., & Schneider, U. A. (2019). Carbon leakage and limited efficiency of greenhouse gas taxes on food products. Journal of Cleaner Production, 213, 99–103. https://doi.org/10.1016/j.jclepro.2018.12.139