Rialtas na hÉireann
Government of Ireland

Spending Review 2023

Estimating the Potential Cost of Compliance with 2030 Climate & Energy Targets

Department of the Environment, Climate & Communications

EU Climate Policy

Economic & Evaluation Unit

Department of Public Expenditure & Reform

Climate Research, Evaluation & Oversight

FEBRUARY 2023

This paper has been prepared as part of the 2022 Spending Review Series. The views presented in this paper do not represent the official views of the Ministers.

IGEES

Irish Government Economic and Evaluation Service

Paper Summary

- This paper represents a first step at estimating the cost of compliance with EU climate targets.
- Currently it is not feasible to provide reliable estimates for the price of credits under the EU's Effort Sharing Regulation or the cost of statistical transfer mechanisms under the Renewable Energy Directive II. Therefore, the potential cost estimates provided in this paper are subject to considerable uncertainty and will likely evolve over time. It is the intention of the authors to continually monitor and update this analysis as new data and information is sourced.
- The stated objective of government policy is to comply with its EU targets through direct emissions reductions and, if necessary, to avail of the flexibility options that are available under the relevant EU legislation.
- The paper outlines the proposed approach to estimating the potential costs of compliance on an annual basis out to 2030, in order to present potential implications if Ireland fails to make sufficient progress towards the legally binding EU climate and energy targets and in implementing the new Climate Action Plan 2023.
- Future data requirements in order to accurately estimate, assess and monitor compliance and the existing data limitations are discussed.

Key Findings

1. The revised emissions reduction targets for Ireland under the proposed revision to the Effort Sharing Regulation, as part of the EU Fit for 55 Package, will require further measures beyond the Climate Action Plan 2021 in order to bridge a compliance gap to the new targets.
2. Failure to implement additional measures, as presented in the Climate Action Plan 2023, will very likely result in compliance costs for the State.
3. The cost of compliance will be a function of the volume of this gap and the price at which a "carbon credit" or "statistical transfer" can be purchased to close the gap as required under the Effort Sharing Regulation (ESR) and the Renewable Energy Directive II (RED II).
4. However, for the ESR the price of an ETS allowance may offer a best available alternative proxy. The price of allowances in the EU Emissions Trading System is anticipated to grow over the course of this decade:
    - Between 2005 and 2019 prices ranged between €0.01 and €30, with an average of €20.
    - Since 2020, that average price increased to €51 with peak prices of €98 reached in August 2022.
    - Future contracts currently price December 2030 at €112.

Policy Implications

1. **Climate Action Policy**

- The Climate Action Plan 2023 sets out the policies and measures that Ireland must take to meet our revised emissions reductions targets and avoid any costs arising from failing to comply with these targets.
- If Ireland's Government, economy and society do not take the necessary, timely climate actions and measures to meet our binding annual targets from 2021 to 2030, significant monies that would otherwise have been invested into our economy could be required to ensure compliance with the emissions targets set in the Effort Sharing Regulation.
- These expenditure estimates, coupled with the environmental science, accentuate the importance of implementation of the new Climate Action Plan 2023.
- It should not be assumed that credits will be available to Ireland to make up for a shortfall to targets. Depending on Member States' performance against their respective targets, there could be a situation where there is insufficient supply of surplus credits available to meet the needs of Member States who have underperformed. Failure to comply brings the risk of infringement procedures.
- Government Departments should continue to prioritise climate action, ensuring the annually updated climate action plans detail the necessary actions and measures for meeting sectoral targets.

2. **Public Expenditure Management**

- Prudent expenditure management requires policymakers to align estimated expenditures with available resources. Policymakers will have to consider the potential risk to the Exchequer that a failure to achieve emissions reductions would give rise to.
- This paper represents a first step in the consideration of how best to approach this issue. DECC and DPER will continue to work closely together to evolve the modelling approach as data becomes available and to provide options for consideration on how best to predict and allocate any compliance costs that may emerge

Authors:

Evan Walker, Aoife-Parker Hedderman, Samuel McArdle, James Coade
Department of Environment, Climate & Communications

Laura Kevany, James Reddy:
Department of Public Expenditure & Reform

1 Introduction and Paper Objectives

On 10 March 2022, the Committee Secretariat of the Committee of Public Accounts (PAC) wrote to the Department of the Environment, Climate and Communications (DECC) requesting further information on the Departments projections of the potential costs of meeting compliance with EU climate and energy targets in the coming years.

In addition to the reply given to the PAC, in March 2022 DECC Management Board requested that IGEES staff in DECC and DPER estimate the potential cost of carbon credit and statistical transfers for the period 2021-2030, as part of this year's Spending Review series.

The objective of that Spending Review proposal is as follows:

"Estimate the potential cost of carbon credit and statistical transfers for the period 2021-2030"

The paper below presents and proposes the continued development of an open-source working model, to form the basis of those projections at given moments in time based on the available data, to inform the Government and the PAC of the potential cost of compliance.

This paper is structured as follows:

- Section 1 outlines the objectives and rationale for the analysis.
- Section 2 outlines the background relevant policy directives.
- Section 3 proposes a methodology for estimation.
- Section 4 describes the underlying data used and the limitations.
- Section 5 explains the rationale of the proposed working model.
- Section 6 provides clarity on the expected updates that will impact the current estimate.
- Section 7 discusses the policy implications of the analysis.

2 Background and Policy Context

Ireland has several climate and energy targets under EU law. The 2020 climate and energy package consisted of a package of legislative measures designed to ensure that the EU met its climate and energy targets for the year 2020. Of particular importance to this package, the Effort Sharing Decision (ESD) and Renewable Energy Directive placed targets for greenhouse gas emissions reduction and renewable energy increases on Member States, up to 2020. Given the lag between targets and the final results from Member States on progress towards these targets, compliance with the 2020 climate and energy package remains ongoing, as set out in the following section.

The 2030 climate and energy framework includes EU-wide targets and policy objectives for the period from 2021 to 2030. Although these targets have been fixed, extensive work is ongoing at EU level to revise and strength these targets in line with the ambition outlined in the EU's European Green Deal. The purpose of this process is to align targets and instruments with the achievement of a 55% reduction in greenhouse gas emissions across the EU by 2030 (relative to 1990 levels). This conclusion of this process will see more stringent climate and energy targets imposed on all Member States. The achievement of the Green Deal will put Europe on the path towards a climate neutral economy.

2.1 Cost of Compliance with 2020 Climate and Energy Targets

In order for Ireland to comply with its 2020 target under the EU Effort Sharing Decision, after direct emissions reductions, Ireland will need to use carbon credits purchased on the international market and credits purchased from other Member States to meet the shortfall. Similarly, Ireland did not meet our 2020 target under the Renewable Energy Directive and had to purchase statistical transfers from other Member States to reach compliance.

2.1.1 Compliance with the Effort Sharing Decision

The EU Effort Sharing Decision (ESD) set annual binding emissions reduction targets for EU Member States for the period 2013 to 2020 for the non-ETS sector. The legislative framework of the ESD provides for a number of compliance options including domestic emissions reductions, using banked excess allowances (known as Annual Emission Allocations or "AEAs") from earlier years, purchasing ESD-eligible international carbon credits, and trading excess AEAs between Member States.[1]

Ireland is fully compliant with its obligations covered by the ESD to date. To date, Ireland has availed of all but the option to trade excess AEAs between Member States in order to demonstrate compliance

[1] Under the ESD, targets are expressed as levels of allowed emissions, or "allocations". The allowed emissions are divided into "Annual Emission Allocations" or AEAs. One AEA is equivalent to one tonne of Carbon Dioxide equivalent.

against our targets. Ireland was compliant up to end of 2018 from direct emissions reductions and the ability to carry forward allowances from overachieving in the earlier years (2013-2015). For 2019, Ireland used 5.3m ESD-eligible international credits towards compliance.

The total cost of purchasing credits up to 2021 was €91.7m. This consisted of €89.6m spent on 5.3m credits (€16.9 per credit) bought in 2008/2009 and brought forward from the first period of the Kyoto Protocol, and €2.1m spent on 2.9m credits (€0.7 per credit) between 2019-2021.

For 2020, after direct emissions reductions, Ireland exceeded the 2020 target by 7.07 Mt CO2eq[2]. As Ireland only holds 2.9 million ESD-eligible international credits at present, a further 4.15 million international credits or AEAs need to be purchased for 2020. Ireland intends to avail of the option to trade excess AEAs between Member States to meet our 2020 target on the basis of cost efficiency and securing the best possible value for the Irish taxpayer. Ireland will not be the first country to purchase AEAs in order to comply with its ESD obligations. Malta has been purchasing AEAs from Bulgaria throughout the 2013 to 2020 period. Overall, the EU has outperformed its 2020 target.

On 12 July 2022, the Government decided (S180/20/10/1210E) that formal negotiations could commence with other EU Member States to purchase the 4.15 million AEAs. The negotiations and any subsequent transaction are to be concluded by the compliance deadline of 17 February 2023. Thus, exact costs to the Exchequer of purchasing compliance is yet to be determined, but it is not expected to exceed the €8m funding provided to DECC.

2.1.2 Compliance with the Renewable Energy Directive

In order to meet Ireland's obligations for 2020 under the Renewable Energy Directive, there are mechanisms under the EU Framework that allow Member States to purchase 'statistical transfers' from other Member States to comply with their 2020 obligations. Engagement with a number of Member States took place during 2020. This led to the successful conclusion of negotiations and terms being agreed with two Member States (Denmark and Estonia) which provide for the purchase by Ireland of specified quantities of renewable energy by virtue of statistical transfers.

The total cost of statistical transfers in 2020 was €50 million consisting of:

- the purchase of statistical transfer of 1,000 GWh from Denmark costing €12.5 million; and

[2] The unit "CO2eq" represents an amount of a GHG whose atmospheric impact has been standardized to that of one unit mass of carbon dioxide (CO2), based on the global warming potential (GWP) of the gas. One metric ton of carbon dioxide equivalent or (MTCO2e) is a million tonnes.

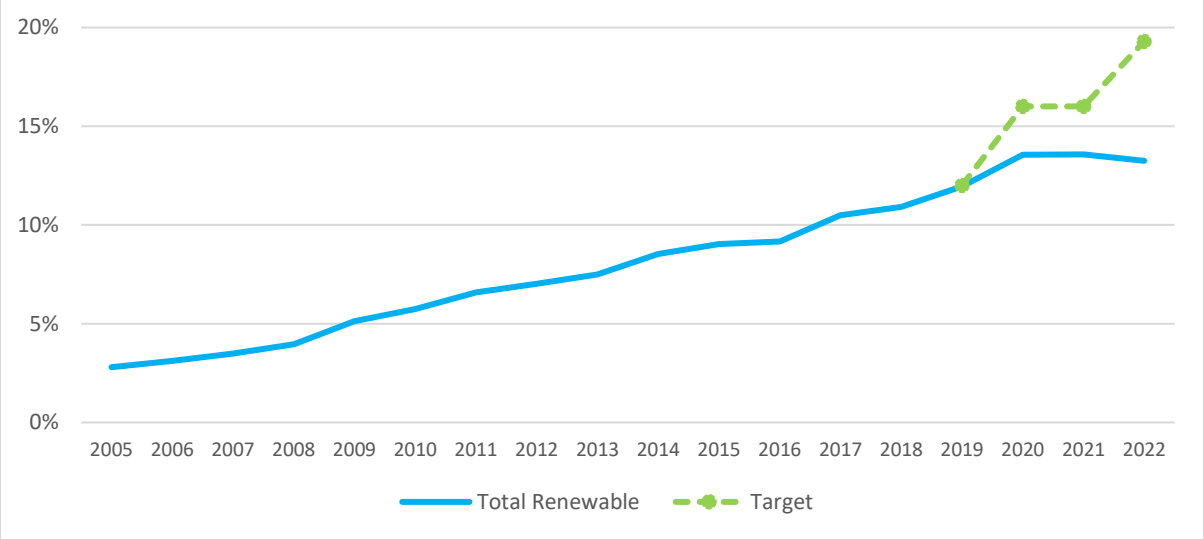
- the purchase of statistical transfer of 2,500 GWh from Estonia costing €37.5 million.

Fund transfers of €50 million for the above were paid and completed by the end of 2020.

Figure 1 below shows the gap between our renewable targets and the level of renewable electricity achieved, as per mandatory compliance reporting by SEAI to the European Commission.

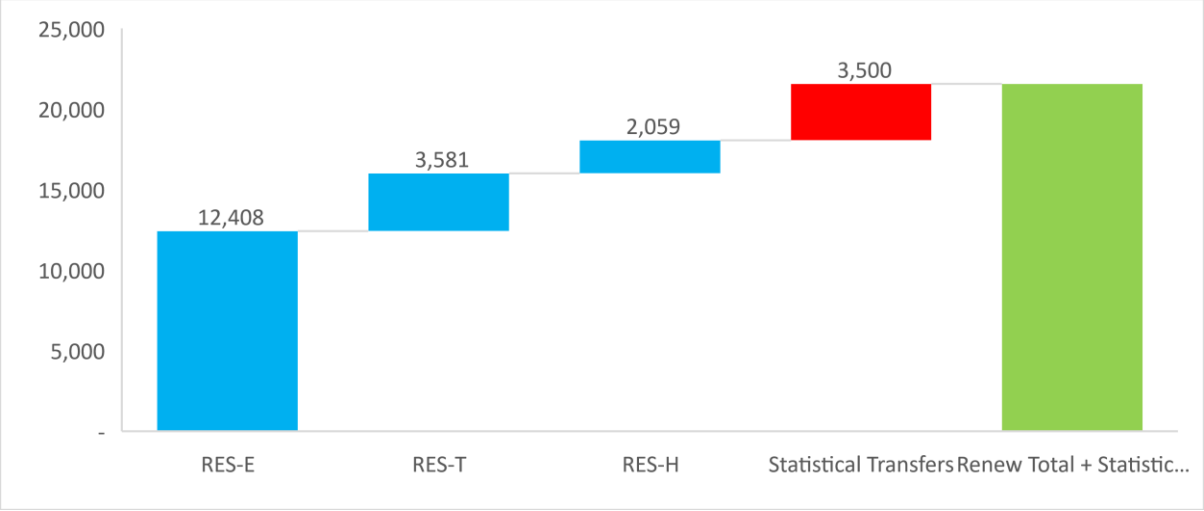
Figure 2 below shows how compliance with the 2020 renewable target was achieved, by renewable electricity share (RES-E), renewable transport share (RES-T) and renewable heat share (RES-H), and by statistical transfer from other EU Member States.

Figure 1: Total Renewable as % of Total Final Electricity Consumption



Source: SEAI

Figure 2: Total Renewable and Statistical Transfer GW Composition 2020



Source: DECC

2.2 Effort Sharing Regulation (ESR) and Fit for 55

The ESR sets out Ireland's national greenhouse gas emissions reduction target for 2030 (non-ETS target). As part of the 'Fit for 55' package, the proposed revision of the ESR will see a strengthening of ambition and increased greenhouse gas emission reduction targets assigned to Member States which would result in total EU non-ETS emissions reducing by 40% by 2030, compared to 2005. The revised regulation proposes a non-ETS greenhouse gas emissions reduction target of 42% (compared to 2005 levels) for Ireland, with annual limits for every year over the period 2021-2030. Ireland's provisional 2021 non-ETS greenhouse gas emissions were 46.13 Mt CO_2eq. To comply with proposed EU targets, these emissions would need to reduce to circa 27.66 million tonnes in 2030.[3]

Separate to the ESR, the EU Emissions Trading System (ETS) is a cornerstone of EU policy on climate change mitigation promoting cost-effective emissions reduction in heavy industry and power-generation. It is the first and largest carbon market and works on the 'cap and trade' principle. A cap is set on the total amount of greenhouse gases that can be emitted by installations covered by the system. The cap is reduced over time so that total emissions fall. Within the cap, companies receive (for free) or buy emission allowances that they can trade with one another as needed. The limit on the total number of allowances available ensures that they have a value. After each year a company must surrender enough allowances to cover all its emissions, otherwise heavy fines are imposed. If a company reduces its emissions, it can keep any spare allowances to cover its future needs or else sell these to another company that is short of allowances. Trading brings flexibility that ensures emissions are cut where it costs least to do so. A robust carbon price also promotes investment in clean, low-carbon technologies.

2.3 Renewable Energy Directive II

The renewable energy target is calculated as the proportion of energy consumed in the economy over the course of a year that comes from renewable sources. For the period 2021-2030, Ireland must retain a baseline share of renewable energy of at least 16% (which was the 2020 target) and meet trajectory points in 2022, 2025 and 2027 on the pathway to a 34.1% target in 2030[4]. This trajectory points are on an indicative basis but may become legally binding at national level in a scenario where the trajectory point has not been met at a European level. This target was set by Ireland under the

[3] See page 29 EPA-Ireland's-GHG-Projections-Report-2021-2040v4.pdf

[4] Each Member State is required to achieve certain compliance milestones in 2022, 2025 & 2027: 18% – 43% and 65% respectively (of the proposed increase).

National Energy & Climate Plan 2020. Ireland did not meet the 16% baseline in 2021 and is unlikely to meet the trajectory point in 2022.

It should be noted that the Fit for 55 proposals include proposed revisions to the Renewable Energy Directive that could result in an increase in the EU wide renewable energy target from 32% to 45%. As RED III and RepowerEU are still under negotiation, the issue of whether the renewable energy target will rise to 40% or 45% is still a live issue.

On finalisation of the fit for 55 package, a revised and strengthened National Energy and Climate Plan will be required reflecting the expected agreement at EU level of higher 2030 targets.

2.4 Compliance Mechanisms

Subject to availability, Member States can meet the EU targets by purchasing carbon credits, in the case of the emissions reduction target, and statistical transfers from other EU Member States in the case of the renewable energy target.

1. Under RED I – Member States who fell short of their 2020 targets, were required to purchase compliance in the form of statistical transfers from other countries who had achieved or exceeded their targets.
2. Under RED II - additional options are available to Member States who do not meet their targets, as outlined below:
    a. Take part in a joint project: Two or more EU countries can co-fund a renewable energy project in electricity or heating and cooling and share the resulting renewable energy for the purpose of meeting their targets.
    b. Joint support schemes: Two or more EU countries can co-fund a joint support scheme to spur renewable energy production in one or both of their territories. EU countries may also enter joint projects with non-EU countries. The resultant energy will count towards national targets if the project involves electricity generation or the physical flows of energy into the EU.
    c. Take additional measures and wait to measure their impact.
    d. Purchase statistical transfers (as per RED I).

In addition, if any Member State slips below their baseline proportion of renewable energy for any of the compliance milestones, they will be required to implement additional measures within one year to cover this gap. This may mean additional investment in domestic renewable energy or a contribution to an EU fund that will fund renewable energy in EU Member States.

Explainer: WEM vs WAM:

The WEM (With Existing Measures) scenario is a projection of future emissions based on the measures currently implemented and actions committed to by Government. To become part of the WEM scenario a policy or measure must be in place by the end of the latest inventory year (which for 2022 is the year 2020) and the projected emissions reduction is commensurate with the resources or legislation already in place or committed to Government Departments or Agencies.

The WAM (With Additional Measures) scenario is the projection of future emissions based on the measures outlined in the latest Government plans at the time Projections are compiled. This includes all policies and measures included in the WEM scenario, plus those included in government plans but not yet implemented. For example, the WAM scenario includes the target of 944,600 Electric Vehicles on the road by 2030 in the Climate Action Plan 2021. The full amount of this ambition is not currently in the existing measures scenario as actions remain to be taken that would deliver it.

3 Methodology

3.1 The Cost Function

The cost function is a simple Volume X Unit Cost estimate.

1. The Volume is the "gap" between actual and projected emissions and the targets
2. The unit cost is of carbon credits and/or statistical transfers, which are a function of:
    a. The volume of carbon credits available on the market, driven by:
        i. Other member states progress in emissions reduction.
        ii. Other member states willingness to trade.
    b. As per section 2.4 above there are additional alternative options available to member states in order to comply with RED II.

$$Actual\ and\ Projected\ Emissions - Emissions\ Targets$$

$$X\ Unit\ €\ of\ Carbon\ Credits\ Purchase$$

$$\boldsymbol{and/or}\ Statistical\ Transfer$$

$$\boldsymbol{and\ or}\ alternative\ options\ available\ under\ RED\ II$$

4 Data Availability and Limitations

As per the cost function above the following data is required:

Volume

a. Projected emissions to 2030 (with existing/additional measures scenarios): These are available from the EPA. Under the Regulation on the Governance of the Energy Union and Climate Action Member States must submit their projections data by 15 March (every 2 years), however some Member States (including Ireland) update their projections every year. 2023 is a mandatory reporting year.
b. Actual renewable energy share of total energy consumption: Available from SEAI.
c. Projected renewable energy share of total energy consumption to 2030: Not available at time of publication, updated data will be published with the next NECP.

Potential Cost

d. Proposed revision to the Effort Sharing Regulation as part of the EU Fit for 55 package: Accurate prices of non-ETS carbon credits and statistical transfers are not available yet as there is no established market for trading AEAs. Further information on AEAs may become available this year as Member States are encouraged to begin reporting.
e. Renewable Energy Directive: As of December 2022, the costs of options 1-4 under RED II above are not available.

4.1 Best Available Data

Volume

a. Effort Sharing Regulation

The EPA provide projections of non-ETS emissions out to 2030, under two scenarios, with existing measures and with additional measures. These are used relative to the emission targets set for Ireland under the Effort Sharing Regulation (EU 2018/842) adopted in 2018 and the revised targets for Ireland under the proposed revision to the ESR as part of the EU Fit for 55 Package.

In terms of other Member States' projected progress towards ESR targets, this is presented in the EU Trends and Projections report, published annually in Q4.

b. Renewable Energy Directive II

For the Renewable Energy Targets the SEAI provided for an estimate of the 2022 position, upon special request from DECC for this Spending Review. Given the SEAI do not publish a similar comparable

estimate of overall energy renewable shares out to 2030, the potential gap and therefore cost of compliance with the Renewable Target is limited to 2022.

Potential Cost

c. Effort Sharing Regulation

To work around the data limitations of providing an estimated compliance cost under the ESR, the unit cost of Emission Trading Scheme (ETS) carbon credits (European Union Allowance) in €/CO2t[5], is used as an alternative to arbitrary unit cost inputs. The yearly futures contracts are taken for December out to 2030 and used as the input for forecasted unit costs. It should be borne in mind that there is no indication that Member States will use ETS prices as a reference for ESR transactions. To date activity in the Emissions Trading Sector has progressed much more rapidly than in the non-ETS and therefore, as discussed in the limitations section, non-ETS price data is unavailable and therefore the ETS price is used for purposes of estimation.

The actual price we would pay to purchase compliance would likely be based on the price agreed with Member States who have over-achieved, if any. The increase in ambition at EU level is likely to result in challenging targets for all Member States. It seems highly unlikely that there will be a large surplus of credits available for purchase. Any Member States that do manage to overachieve on their annual targets will also have the option to bank any surplus and carry it forward for their own compliance in future years. It is therefore possible that the price of carbon credits will increase significantly over the decade.

d. Renewable Energy Directive II

As per section 2.4 above, under RED II additional mechanisms to purchase compliance will be available. However, at the time of publication, the specifics of those mechanisms are under development by the European Commission. As such, there is currently no appropriate proxy available for costing the compliance options available to Member States under RED II and therefore this paper does not provide an overall cost estimate. It is the intention of the authors to continually monitor and update this analysis as new data and information is sourced.

[5] EU Allowances (EUA) are the emissions allowances as defined by the EU Emissions Trading System (EU ETS). As no potential prices are currently available for potential AEAs, the future price of an EUA, expressed as a price per tonne (i.e., one EUA), is used as a benchmark for the potential unit cost that could pertain, as a best alternative to arbitrary unit cost inputs.

5 The Proposed Approach to Cost Estimation and Monitoring

The authors propose that a working model be developed to inform government of the potential costs based on current data availability. It is important to note the term "working" i.e., the estimate is at a particular moment in time based on the available data at that moment in time. As the required data for more accurate costings become available, these can be incorporated into the model to update the estimate. As negotiations may not conclude until 2027 for the first compliance period (2021-2025), it is considered prudent to establish a cost per tonne of CO_2 for the 2021 compliance year and update this costing annually based on updated information on costs, as reported to the Commission by Member States.

In addition to new data becoming available, the model will be sensitive to movements in actual vs projected emissions domestically and of other Member States, and changes in government and EU policy between now and 2030. A broader description of further considerations is presented in section 6 below.

Therefore, we recommend that the estimates are reported on an annual basis to monitor these potential movements and update accordingly.

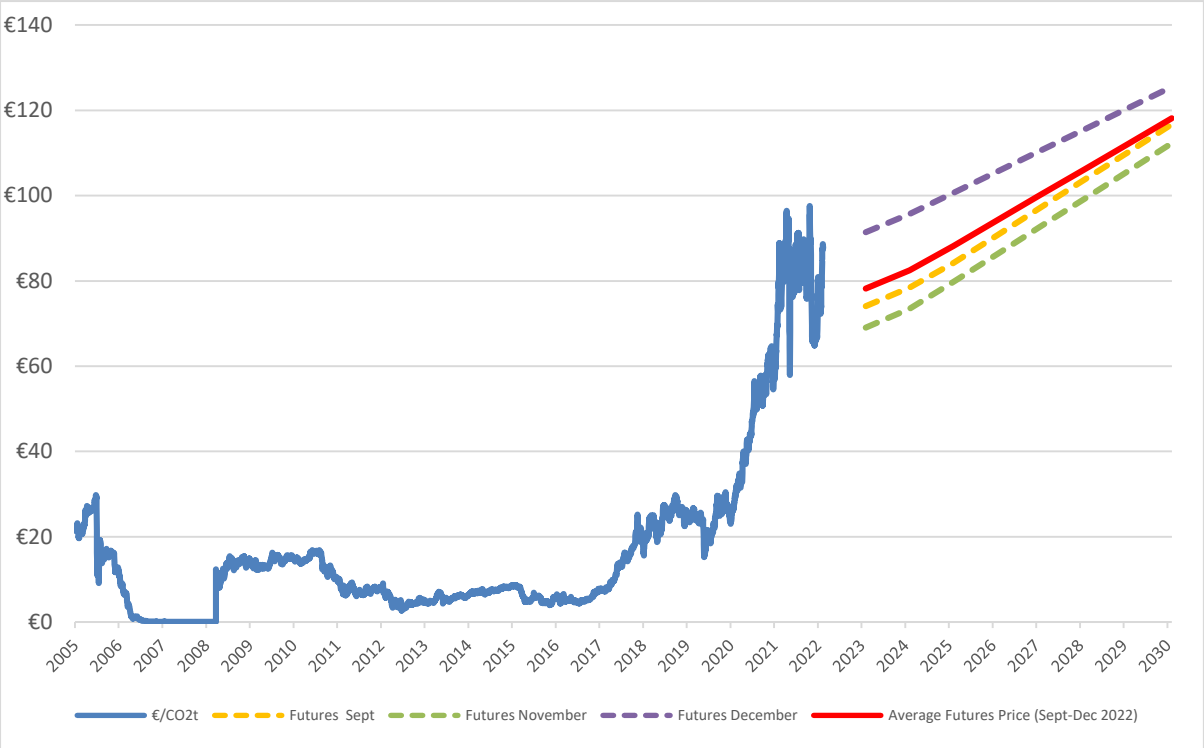
5.1 Working Model

5.1.1 Model Inputs (as of January 2023)

As outlined in the data limitations section, in the absence of an open market for AEAs or any known transactions under the ESR it is not possible to determine, in advance, the price (or price range) of AEAs with any level of certainty. As such, to provide for an estimate we have used the ETS prices as an alternative for illustrative purposes.

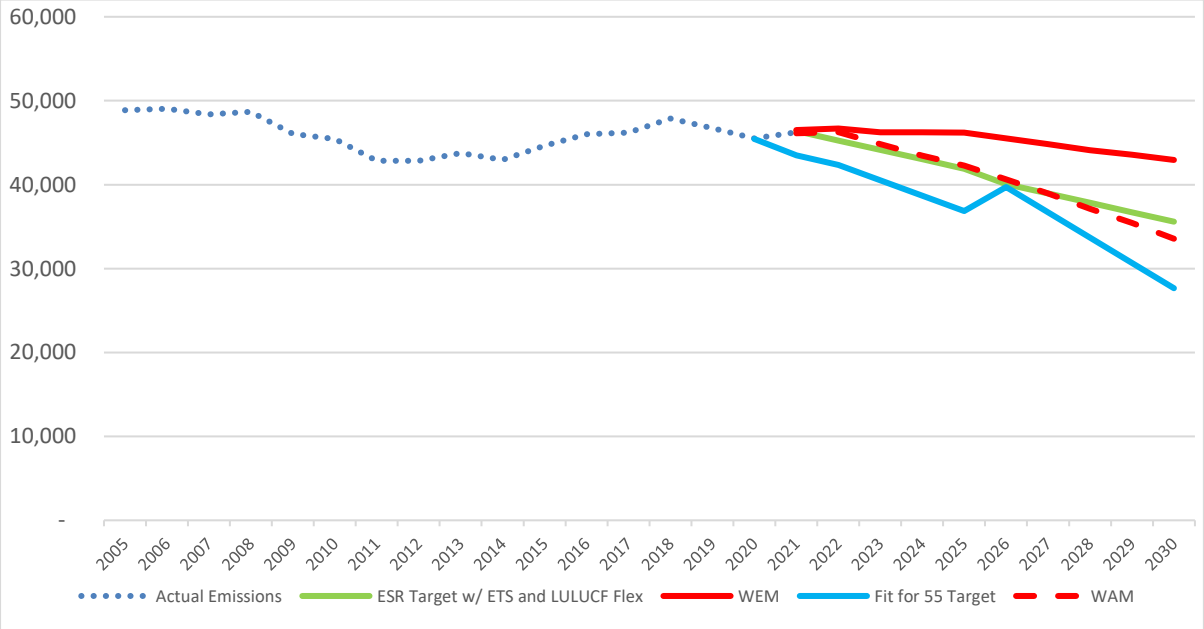
Figure 3 below shows the level shift of ETS prices over time, using past prices and futures contracts, traded on the European Energy Exchange. Between 2005 and 2019 prices ranged between €0.01 and €30, with an average of €20. Since 2020, that average price increased to €51 with peak prices of €98 reached in August 2022. Future contracts currently price December 2030 at €112.

Figure 3: EUA ETS Spot and Future Prices (€/EUA $MtCO_2$)



Source: Refinitiv DataStream & authors calculations

Figure 4: Irelands Non-ETS Emission Trajectories and Emission Targets



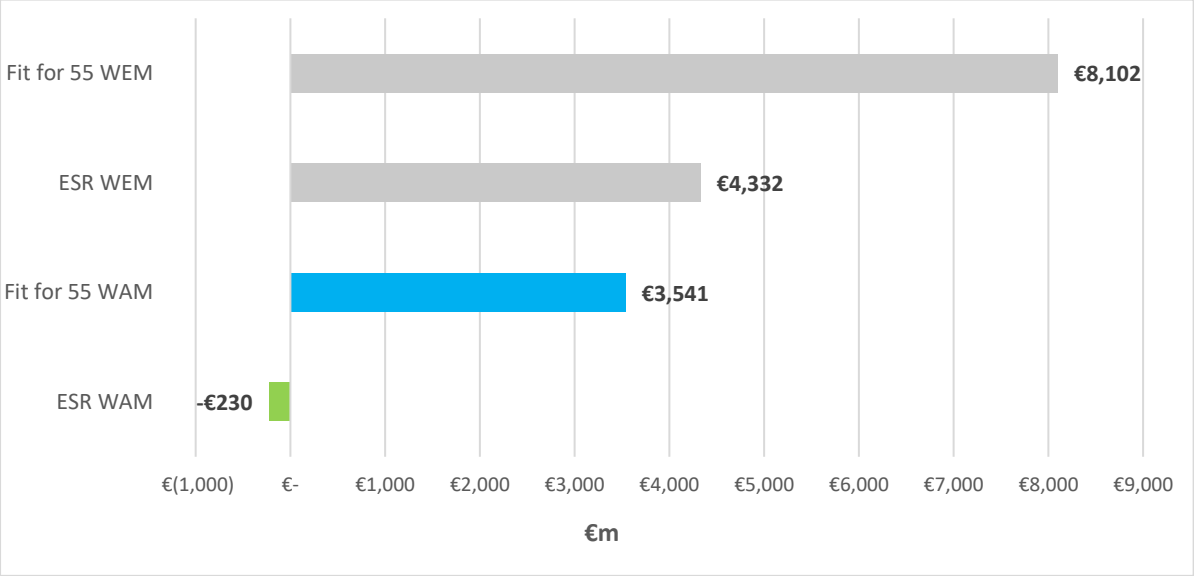
Source: EPA, European Commission & authors calculations

5.1.2 Model Outputs (as of January 2023)

When dealing with very high levels of uncertainty, it is technically appropriate to model with a focus on the range of possible outcomes rather than on the precision of the final number. As such, a range

of estimates is presented, to allow for a scenario and sensitivity analysis, as advised by section 4.9.2 of the Public Spending Code (PSC, 2019). Therefore, the projections set out in this document should be seen more as a scenario analysis rather than a forecast per se.

*Figure 5: Cumulative Compliance Cost under CAP 21: **(€m)***



Source: EPA, European Commission & authors' calculations – **based on ETS prices**

*Figure 6: Annual Compliance Cost under CAP21: With Additional Measures **vs** ESR and Fit for 55*

Source: EPA, European Commission & authors' calculations – **based on ETS prices**

6 Further Considerations

6.1 Compliance Regime

Under the ESR, the compliance cycles for years 2021 – 2025 will take place following a review process and compliance check to take place in 2027. Likewise, the compliance cycles for the years 2026 – 2030 will commence following a review in 2032. Further details on compliance for the 2021 to 2030 period will become known following the agreement of the ESR proposal under the Fit for 55 Package. This may influence the timing of purchases and volumes required.

6.2 Flexibilities

There are compliance options/flexibilities that Ireland may be able to use towards our emissions reduction targets, which would have an impact on the volume of credits required, if any. The structure and extent of these flexibilities is subject to change as part of the Fit for 55 Package.

For the first period, the ESR allows member states certain flexibilities to achieve their targets including, the borrowing and banking of AEAs across years, and the transfer of AEAs between Member States. The ESR sets a limit on the percentage of a Member States' excess allowances it may transfer for a given year (ex-ante), to the final review and compliance check (in 2027 or 2032), and on the percentage of AEAs which a Member State may carry forward each year. Any strategy for compliance, beyond direct emissions abatement, must be carried out within this framework.

In December 2022, the revised ESR was provisionally agreed by the EU institutions (the Council, Commission and Parliament). As the new rules underpinning the flexibilities in the ESR (banking, borrowing, trading of allowances etc.) are yet to be formally adopted, it is difficult to propose a purchasing strategy until Member States have certainty on the various rules under the regulation. Further consideration will be given once the new rules are agreed.

The regulation provides for certain Member States to offset a percentage of their obligations under the ESR through a limited cancellation of EU ETS allowances. For Ireland, this flexibility amounts to 4% of 2005 emissions per annum (1.91 $mtCO_2sq.$) over the entire ESR period. Further, the ESR allows for a limited offsetting of savings under the LULUCF regulation. However, the proposed architecture of the LULUCF is also under review as part of the Fit for 55 Package and as a result, the degree to which we could offset emissions, if at all, is uncertain.

6.3 Price of AEAs based on inter-MS trade and Annual Reporting

In the absence of an open market for AEAs or any known transactions under the ESR it is not possible to determine, in advance, the price (or price range) of AEAs with high levels of certainty. Annual reporting from 2023 will provide some information on emissions levels; transfers of AEAs between Member States; and Member States' intention to use flexibilities. Such information will inform this work going forward.

7 Policy Implications

7.1 Expenditure Management

Ireland will be required to report annual emissions to the Commission over the course of the ESR. This will provide insight on the difference between actual emissions reductions and our EU targets. It is important that Ireland has a strategy for meeting compliance that aims to ensure any cost to the Exchequer is minimised. This will mean timing any purchases that may be required in a manner likely to be most advantageous to Ireland. Once Member States have reported information on emissions, AEAs and flexibilities for the first year of the compliance period, Ireland will be in a better position to formulate a strategy for reaching compliance over the decade. While compliance for the period 2021 – 2025 will not take place until 2027, it may be necessary to engage with other Member States early to agree a potential trade of AEAs.

Failure to make direct emissions reductions will result in expenditure implications. Under the ESD and RED I, the DECC Vote met the entire cost of bridging the gap to compliance. In order to provide greater transparency and ensure costs are being borne by those responsible for any underachievement, the Department of Public Expenditure and Reform are currently preparing a consultation paper for Government Departments and Agencies to consider. This will examine the potential methodologies for apportioning any cost of compliance across Government Departments. The results of this process will form part of Ireland's compliance approach.

7.2 Climate Action Policy

A transformational level of change and development will be required across the economy if Ireland is to meet its climate targets for 2030 and establish a pathway towards climate neutrality by 2050. Far reaching policy changes will be required across all sectors. It will be necessary for Departments to develop and implement wide-ranging policies and measures and show considerable ambition and leadership to drive rapid decarbonisation in each of the

sectors. While this transition will undoubtedly be challenging the carbon budgets and sectoral emissions ceilings provide the necessary framework to support effective abatement across the sectors over the next decade.

In many instances, significant investments and policy change will need to be frontloaded in the short-run to support emissions reductions later in the decade and enable Ireland to meet its 2030 targets. Earlier investment in certain technologies may be necessary (in advance of them fully maturing or reaching cost parity with other higher emitting technologies) to allow Ireland to comply with the targets. For example, considerable investments will be required in the area of offshore wind generation in the coming years, but the benefits will only be realised in the later part of the decade as the infrastructure begins to generate electricity.

Government Departments should make the necessary policy decisions in a timely manner to ensure that Ireland's longer-term targets are met. Departments should ensure that each annually updated climate action plan includes the necessary actions and measures for meeting the sectoral emissions ceilings under the Carbon Budget Programme. This will require effective long-term planning and include taking ownership of difficult policy decisions required in the short run, to support necessary emissions reductions that will only be realised later in the period to 2030.

After use of ETS and/or LULUCF flexibilities, any failure to reach our binding EU emissions reduction targets will result in monies being diverted out of Ireland's economy (away from investment in national climate policy) for use towards compliance. Purchasing allowances, in addition to revenue being forgone for investment domestically, could be more costly.

Depending on Member States' performance against targets, there could be a situation where the supply of surplus credits in the market is insufficient to meet the needs of Member States who have underperformed. This leaves Ireland's compliance pathway subject to uncertainty and risks Ireland being subject to infringement proceedings at EU level. As such, it is vital that Departments recognise the importance of developing and implementing additional climate policies and measures to enable Ireland to comply with the targets, rather than depend on the performance of other Member States.