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Sustainable Finance: A Review of Mitigation and Adaptation Finance Options in Ireland

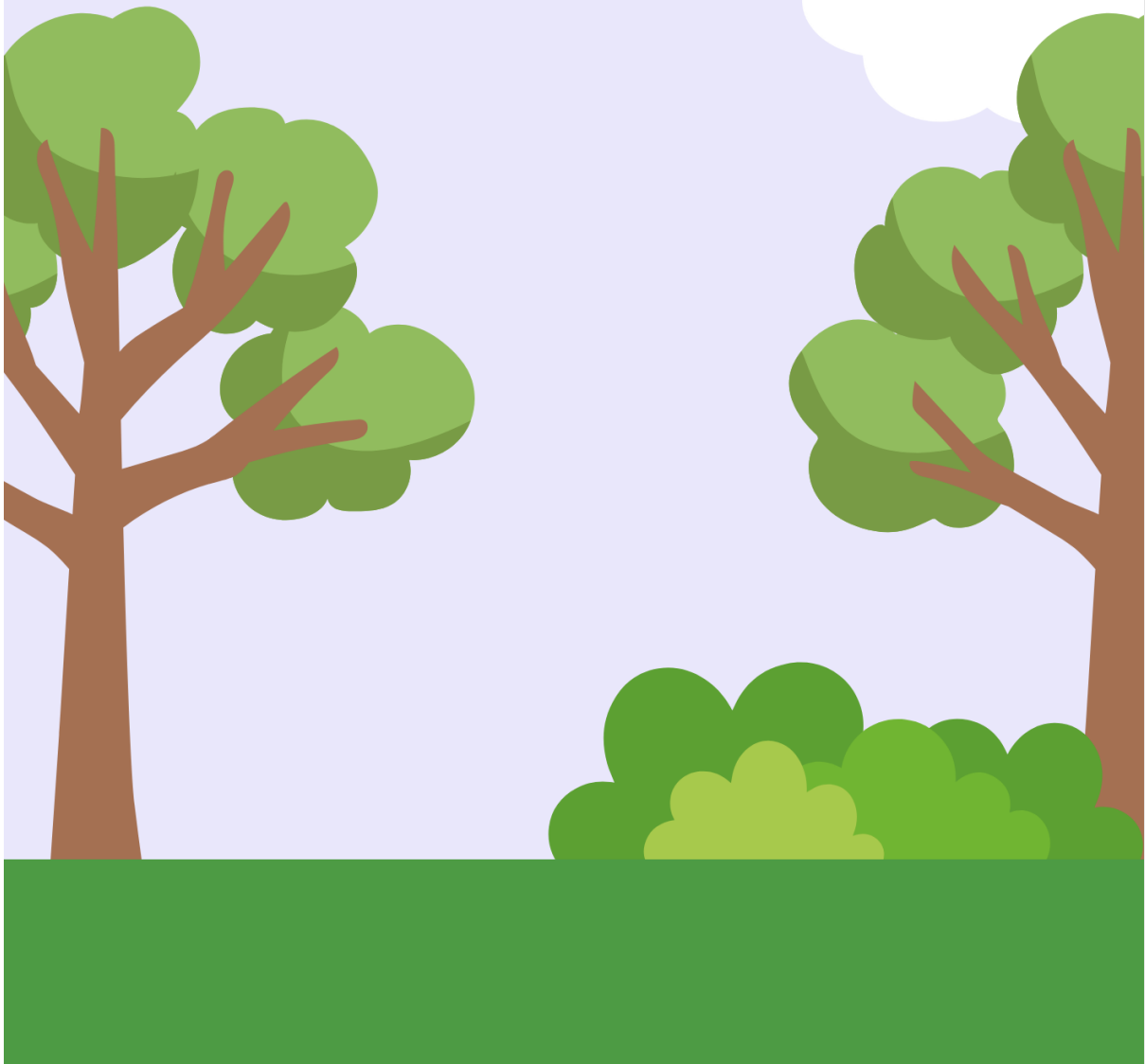
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Executive Summary

The scale of financing required to transition to a low carbon economy in Ireland is estimated to be in excess of €125bn to 2030, so both mobilizing public and private finance is essential. Sustainable finance is where environmental, social, and governance factors are incorporated into the decision-making process and is essential for channeling funds to projects, initiatives, and companies that have a sustainable *and* productive use for them. The EU estimates that climate-related investments must at least quadruple each year to 2030¹, and to meet that target both public and private sector funding is essential. The Climate Action Fund (CAF), will provide at least €500m up to 2027 to fund projects and initiatives that will help achieve climate and energy targets.

Often, directing private finance to both mitigation and adaptation efforts requires policy intervention, particularly when a strong economic argument for investment is absent. Carbon pricing, in the form of the EU-ETS and carbon taxes, are the main policy tools used in Ireland. The introduction of the Carbon Border Adjustment Mechanism (CBAM) aims to ensure a fair price is applied to carbon emissions caused by carbon intensive goods entering the EU and is aimed at preventing carbon leakage.

Ireland has progressed in terms of policy support for mitigation with the introduction of the Renewable Energy Support Scheme (RESS). RESS has been successful in encouraging a more diverse mix of renewables, particularly utility scale solar and wind. Under the RESS scheme, €2 per MW/h will be contributed to a community benefit fund scheme for a twenty-year period. In the longer term, Ireland specifies a target of 2GW from offshore wind towards renewable hydrogen by 2030 (National Hydrogen Strategy²). Power to hydrogen is still in its very early stages of development in Ireland. Seen as an ideal energy carrier that can provide a key solution to providing both decarbonization and energy security, there is a research gap in identifying a route to market in Ireland. One area in particular that may be worth testing is Sustainable Aviation Fuel (SAF) due to the importance of aviation, a hard to abate industry, to Ireland's economy. Irish corporates are also making increasing use of Corporate Power Purchase Agreements (CPPA) to mitigate their climate impact. The appeal of CPPAs to corporates arises from both the reduction in carbon footprint and the lack of exposure to electricity price volatility over the life of the agreement.

Public Private Partnerships (PPPs) have the potential to channel funds towards sustainable projects and have been found to be more cost efficient than public subsidies if the bargaining power between the partners is well-balanced (Buso and Stenger, 2018).

¹ Towards EU climate neutrality: Progress, policy gaps and opportunities. Available at <https://climate-advisory-board.europa.eu/reports-and-publications/towards-eu-climate-neutrality-progress-policy-gaps-and-opportunities>

² National Hydrogen Strategy, last updated on 31 July 2023. <https://www.gov.ie/en/publication/624ab-national-hydrogen-strategy/#>

The parameters for successful PPPs are well defined in the literature but the role of such partnerships in climate-related projects has been limited (Buchner et al., 2019). A notable exception in Ireland is the Dublin Waste to Energy Facility, a PPP between Dublin City Council and three private entities. Due to their significant potential to act as a financing mechanism for Ireland's transition, further research specific to Ireland is warranted in this area.

Attracting private finance to adaptation efforts is much more challenging because of the difficulties in identifying a clear pathway to generating the revenue necessary private return (Gouett et al., 2023). While Public-Private Partnerships for climate adaptation are one possible solution, private investors seem more predisposed to mitigation projects to date than adaptation initiatives (Bisaro and Hinkel, 2018). A new asset class, resilience credits, is being explored (Al-Mashat et al., 2024). The successful development of this financial instrument will have particular relevance to Ireland's agricultural sector, another hard to abate industry. One strategy to consider is combining revenue generating projects along with adaptation projects (Gouett et al., 2023). Another is using the sustainable debt market to finance both mitigation and adaptation projects simultaneously.

Sustainable debt instruments such as Green, Social, and Sustainability (GSS) bonds are used to finance projects that have dedicated environmental or social benefits. The Irish state has diversified its funding base to include Irish Sovereign Green Bonds (ISGB), underpinned by the Irish Sovereign Green Bond Framework, the proceeds of which are allocated to fund eligible green projects. A small proportion of the green bond issue has been allocated to fund initiatives addressing social goals, including a portion assigned to improve social housing. Allied Irish Bank (AIB) and Bank of Ireland (BOI) lead the way in the GSS market for Irish financial institutions, having issued a number of green bond offerings used to finance dedicated green initiatives including green buildings, clean transportation, and renewable energy. AIB has also issued a social bond, allocating the funds to projects that will lead to positive societal change. For non-financial institutions, ESB leads the way in using sustainable finance to fund its activities, being the first corporate green bond issuer in 2019, as well as utilizing sustainability linked loans. A small number of other Irish corporates have issued green bonds, but it remains a financing avenue that is under-utilised.

Sustainable investing combines traditional investment strategies with ESG values in order to achieve financial returns while promoting long-term environmental and social value. As a leader in the global funds industry, Ireland has the potential to establish itself as a leader in ESG finance with approximately 31% (€1.2 trillion) assets under management in 2023. As part of the EU's Financing Sustainable Growth Action Plan³, The

³ https://finance.ec.europa.eu/publications/renewed-sustainable-finance-strategy-and-implementation-action-plan-financing-sustainable-growth_en

Sustainable Finance Disclosures Regulation (SFDR) established mandatory disclosure regulations. Funds are classified as an article 6, 8, or 9 fund; with ESG investment funds classified as article 8 or 9. In 2023, the proportion of Irish domiciled funds categorised as articles 8 or 9 were significantly lower than the EU average. However, in 2023, over 50% of funds authorised in Ireland were classified as article 8 and 9. Irish domiciled Exchange Traded Funds (ETF) account for approximately 70% of the total European ETF market. With increasing demand for sustainable ETFs, Ireland has an excellent opportunity to leverage its supportive regulatory environment and well-established reputation to attract further Irish domiciled sustainable ETFs.

Ireland was one of the first countries to divest public money from fossil fuels in 2018, EuroNext Dublin was designated as a hub for sustainable and green bond listings in 2019, the Sustainable Finance Roadmap was introduced in 2021, and The International Sustainable Finance Centre for Excellence (ISFCOE) was launched in 2022. While an excellent environment for institutional investors has been established, Irish retail investors are not incentivised to invest sustainably, largely due to tax disadvantages. To direct private capital from individual investors, tax incentives could be considered, particularly in relation to GSS bonds and sustainable ETFs.

Central to both the EU Taxonomy and Ireland's Climate Action Plan (2023) is that the transition to a low carbon society must be a just one. The concept of a just transition recognizes that whatever actions are undertaken to mitigate and adapt to combat climate change must also identify and address any negative impacts these actions may have on individual members or particular groups within society. Ireland's commitment to a just transition under the Climate Action Plan has progressed. Co-funded by the EU and the government, the total available over the lifetime of the fund is to €169m. The Just Transition fund applies to the wider Midlands region due to the significant adverse impact the closure of peat-reliant power has on the region. In June 2024, 22 projects were approved for €22.71m funding as part of the Regenerative Tourism and Placemaking Scheme 2023-2026. Some projects funded under the CAF are clearly aligned with the principle of a just transition, as is much of the funding allocated from the sovereign green bond proceeds.

1. Introduction

The European Union has committed to reducing its greenhouse gas emissions to net zero by 2050, significantly strengthening its climate policies to achieve this goal. Large investment gaps have been identified in the area of climate mitigation and adaptation (Burger et al., 2018; McCollum et al., 2018; European Commission, 2020; Kapeller et al., 2023). Ireland's investing landscape is transforming in order to allocate the scale of funding required to close the investment gap yet despite efforts to date, Ireland has consistently missed its climate targets (Environmental Protection Agency, 2024). The

financial system must evolve to channel funds to projects, activities, and firms that have both a productive *and* sustainable use for them. Five of the top ten global risks over the next ten years are categorised as environmental, while two are categorised as societal⁴. Each country, and the actors within it, are mandated with developing solutions to address the negative impact of climate change. In December 2017, UN Secretary General António Guterres remarked that “*Finance is the key to successful climate action. We need more ambition – climate change is moving faster than we are and this is a war we cannot afford to lose.*” (United Nations, 2017).⁵

The European Union has been integral in driving the sustainable finance agenda and has enacted legislation⁶ whose primary objective is to steer private financial flows to economic activities that mitigate the adverse effects of climate change. The EU estimates that climate-related investments must at least quadruple each year to 2030⁷, with both public and private funding necessary to meet this target. Inconsistent and non-standardised ESG data and reporting makes it more difficult for socially conscious investors to separate the good risks from the bad (Clements, 2022, Musciano, 2022). The introduction of the Corporate Sustainability Reporting Directive (CSRD), written into law in January 2023 will lead to a significant wave of new ESG reporting requirements, designed to bring together ESG reporting in a more cohesive and coherent manner⁸.

To establish itself as a leading sustainable finance centre by 2025, Ireland published the Sustainable Finance Roadmap in 2021 which sets out five pillars designed to achieve its goal: developing talent, driving industry readiness, leveraging digital technology, ensuring an enabling environment, and promotion and communication (isfcoe, 2021). Central to both the EU Taxonomy and the Climate Action Plan (2023)⁹ is the concept of a “just transition”, recognising that the transition to a low carbon economy disproportionately burdens certain groups of society. It is the intention of the Irish State that “no community, no sector and no person get left behind” (CAP 2023). The implication is that any climate adaptation and mitigation efforts undertaken must also consider and address any

⁴ World Economic Forum Global Risks Perception Survey 2023-2024 available at https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2024.pdf

⁵ <https://x.com/UN/status/940608086011674624>

⁶ Commission Delegated Regulation (EU) 2022/1288 of 6 April 2022 supplementing Regulation (EU) 2019/2088 of the European Parliament and of the Council with regard to regulatory technical standards specifying the details of the content and presentation of the information in relation to the principle of ‘do no significant harm’, specifying the content, methodologies and presentation of information in relation to sustainability indicators and adverse sustainability impacts, and the content and presentation of the information in relation to the promotion of environmental or social characteristics and sustainable investment objectives in pre-contractual documents, on websites and in periodic reports (Text with EEA relevance) C/2022/1931

⁷ Towards EU climate neutrality: Progress, policy gaps and opportunities. Available at <https://climate-advisory-board.europa.eu/reports-and-publications/towards-eu-climate-neutrality-progress-policy-gaps-and-opportunities>

⁸ Directive 2022/2464 of the European Parliament and of the Council of 14 December 2022

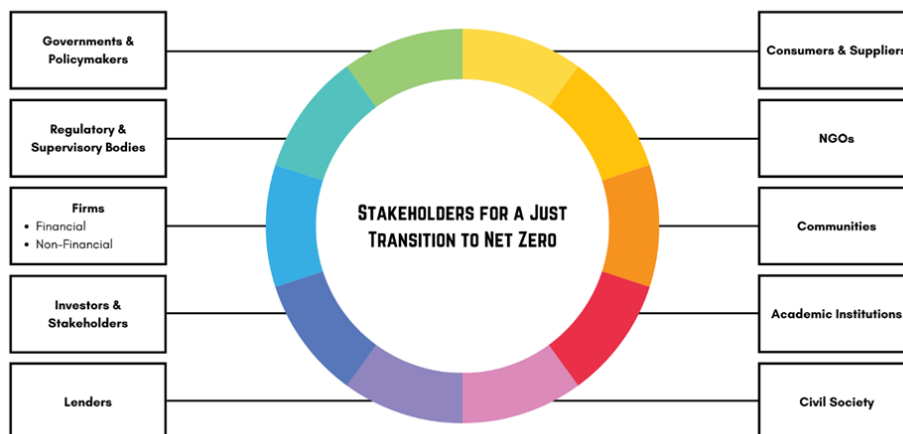
⁹ Climate Action Plan 2023: <https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/>

negative impacts such actions may unintentionally have on individual members or particular groups within society.

The financial implications of transitioning to a decarbonized energy system are significant, affecting every aspect of the transition. It is estimated that in excess of €125 billion in public and private investment will be needed on the island of Ireland this decade alone¹⁰. This figure can be decomposed into estimated requirements of €43 billion in the electricity and transport sectors, €23 billion in residential buildings, and €13 billion in commercial buildings. Additionally, €4.3 billion and €3 billion will be required in agriculture and industry respectively (McNamara et al., 2024).

All stakeholders play a key role in channelling funds to projects, initiatives, and companies that have a sustainable *and* productive use for those funds. Private finance must be accessed in order to achieve the levels of investment required. The key stakeholders for a just transition are illustrated in Figure 1.

Figure 1: Stakeholders for a Just Transition



The Irish government has taken a number of policy actions designed to channel funding towards sustainability, but it is anticipated that even with all of these policies and measures implemented, Ireland will miss its 2030 climate targets by a considerable distance (EPA, 2024)¹¹. This suggests that current policies and actions are not attracting sufficient investment towards sustainable activities. The European Union defines sustainable finance as follows: “Sustainable finance refers to the process of taking environmental, social and governance (ESG) considerations into account when making investment decisions in the financial sector, leading to more long-term

¹⁰ Shared Energy Futures Report: available at <https://www.ibec.ie/influencing-for-business/ibec-campaigns/shared-energy-futures>

¹¹ <https://www.epa.ie/news-releases/news-releases-2024/ireland-is-projected-to-exceed-its-national-and-eu-climate-targets.php>

investments in sustainable economic activities and projects”.¹² The environmental component of ESG incorporates activities that have an impact on the environment including carbon emissions, deforestation practices, waste management, water pollution, and energy efficiency. The social component incorporates policies and practices in relation to business ethics, diversity and inclusion, supply chain management, human rights, and the wider social impacts that arise as a result of operations and activities. The World Economic Forum (2022) notes that corporate governance underpins the realisation of both environmental and social goals of ESG and issued a list of factors that should be included in the governance component of ESG including the composition of the board, resource allocation, transparency, corporate leadership, anti-corruption and integrity, tax strategy, stakeholder engagement, and supply chain management.

While there are a number of sustainable financial instruments available that are designed to channel funding towards sustainable activities, the green investment gap remains. Reasons for this include policy uncertainty, information gaps, high transactions costs, lack of experience, and technology risks associated with green energy infrastructure (Irena, 2016; OECD, 2016, Jones, 2015). With the sustainable finance market expected to grow significantly over the next ten years (Bloomberg, 2024)¹³, there are both risks and opportunities for investors, businesses, and individuals. Investor appetite for sustainable investments is increasing, with almost 80% of individual investors seeking investment opportunities that receive both a fair market-rate financial return and positive environmental or social impact (Morgan Stanley, 2024)¹⁴. Institutional investors such as banks, hedge funds, insurance companies, and pension funds are by far the largest participants in the markets and therefore exert considerable influence. Retail investors have also demonstrated a marked increase in demand for sustainable investment products (Financial Times, 2024)¹⁵.

Greenwashing, defined as behaviour or activities that make people believe that a company is doing more to protect the environment than it really is¹⁶, is a major concern in the attempts to mobilize the financial system towards sustainability. Gatti et al. (2021) find that greenwashing negatively influences on the intention to invest. A lack of clear and unambiguous regulatory and policy frameworks, and inconsistent sustainable reporting practices provide opportunities for greenwashing. As long as there is room for manoeuvre or interpretation within the regulatory framework, there is space for greenwashing

¹² https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en

¹³ <https://sponsored.bloomberg.com/article/mubadala/the-future-of-esg-Investing>

¹⁴ <https://www.morganstanley.com/content/dam/msdotcom/en/assets/pdfs/MSInstituteForSustainableInvesting-SustainableSignals-Individuals-2024.pdf>

¹⁵ <https://www.ft.com/partnercontent/london-stock-exchange-group/the-rise-and-rise-of-sustainable-investment.html>

¹⁶ <https://dictionary.cambridge.org/dictionary/english/greenwashing>

practices to thrive. Professor Andreas Hoepner, co-lead of the Greenwatch team at University College Dublin classifies greenwashing according to five different mechanisms and argues that it is “paramount for regulators to establish a small set of mandatory anti-greenwashing disclosures”, and that these disclosures should be unconditional.¹⁷ In May 2024, the EU adopted the “Empowering Consumers Directive” (Directive (EU) - 2024/825)¹⁸ and includes greenwashing behaviours in the list of misleading practices outlined in the Unfair Commercial Practices Directive (UCPD) — Directive 2005/29/EC.¹⁹ The EU aims to provide further transparency on greenwashing claims with the introduction of the Green Claims Directive (GCD) in this legislative term.²⁰

The Irish government and public sector play a pivotal role in encouraging private sector investment by reducing risk and facilitating large-scale sustainability projects and initiatives. They are instrumental in attracting investment to renewable energy projects, characterised by high upfront costs and technological and policy uncertainty. These uncertainties have been reduced by the introduction of a wide variety of mechanisms, including policy support via the Renewable Electricity Support Scheme (RESS) and investment in energy grid infrastructure. The State also partners with private firms for climate adaptation and infrastructure, such as financing and managing large-scale flood protection schemes like the Limerick City Flood Relief Scheme, the River Shannon Drainage Scheme, and the Dublin Docklands Flood Protection Scheme. Through institutions such as the National Treasury Management Agency (NTMA), the Irish government has issued green bonds, providing an avenue for private investors seeking to fund sustainable projects and initiatives. State-backed bond issues reduce the financial uncertainty for investors and send a signal related to the stability of the investment. The Irish government also provides funding for research and development in climate-related activities, via bodies such as Science Foundation Ireland (SFI) and Enterprise Ireland. These measures are essential for achieving Ireland’s climate goals, while also creating jobs in the green economy.

Key role of standards and regulations in directing private finance

¹⁷ “Too good to be true: the greenwashers’ box of tricks”, The Financial Times, May 16th, 2024. Available at <https://www.ft.com/content/78b3c741-1ab8-48f5-92a8-4e98dfa230ab>

¹⁸ Directive (EU) 2024/825 of the European Parliament and of the Council of 28 February 2024 amending Directives 2005/29/EC and 2011/83/EU as regards empowering consumers for the green transition through better protection against unfair practices and through better information available at <http://data.europa.eu/eli/dir/2024/825/oj>

¹⁹ Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council (‘Unfair Commercial Practices Directive’) available at <http://data.europa.eu/eli/dir/2005/29/oj>

²⁰ Green Claims Directive (GCD) which aims to establish specific requirements for substantiating environmental claims, providing clarity on the conditions under which businesses can make such claims.

Effective standards and regulations are crucial in channelling private finance towards sustainability. Clear, predictable, enforceable rules create a favourable environment to align the market and public policy goals. Each of the regulations such as green taxonomies, carbon pricing, environmental standards, and disclosures has a different effect on private finance. Introduced in 2020, The EU's Taxonomy Regulation sets out which economic activities can be considered environmentally sustainable. It establishes technical screening criteria for various sectors, including energy, agriculture, and transport, to help investors assess the environmental impact of their investments. The taxonomy clarifies which activities are aligned with the EU's climate and environmental goals, while providing companies with a way to demonstrate their commitment to sustainability.

Carbon pricing is designed to increase the price of high-carbon activities so that low and zero-carbon alternatives become more attractive to investors. The EU-Emission Trading Scheme (EU-ETS) is designed to drive corporate climate innovation and by establishing a carbon price plays a crucial role in shaping climate policy. However, ETS alone is unlikely to meet the EU's 2050 climate goals (Rogge et al., 2011) so a mixed policy approach is required.

Environmental regulations often set mandatory thresholds for industries, influencing which projects are financially viable. These standards encourage private investment in technologies and activities that comply with the regulatory framework, particularly in energy, construction, and manufacturing. Many countries use feed-in-tariffs and renewable energy standards to incentivize investment in clean energy. Feed-in-tariffs for example, guarantee fixed payments for the generation of renewable energy, providing long-term, stable revenue streams for investors. The economic support provided by the Renewable Energy Support Scheme (RESS) and previously by a Feed-in Tariff (FIT) facilitated the ongoing expansion of renewable power in Ireland. However, significant administrative barriers and inadequate grid deployment hindered stronger growth (Shivakumar et al., 2019). Prior to the introduction of policy support utility scale solar deployment in Ireland was not feasible (Assereto and Byrne, 2021) but was subsequently successfully deployed following the introduction of RESS. The first utility scale solar to be deployed under RESS-1 was the Millvale site in 2022, generating enough energy to power 3,600 homes annually and avoiding 4,800 tonnes in CO₂ emissions.

The revised EU Energy Performance of Buildings Directive (EPBD)²¹, which sets out requirements for energy efficiency in buildings, has driven investment in energy-efficient building technologies and sustainable construction practices. The directive mandates energy efficiency standards, leading to the creation of a market for green construction,

²¹ <http://data.europa.eu/eli/dir/2024/1275/oj>

energy-efficient appliances, and retrofit projects. In order to meet the requirements for energy efficiency, public and private finance has been directed towards these areas.

The National Residential Retrofit Plan outlines how Ireland aims to reduce CO₂ emissions by 3.5 million tonnes by 2030 in the residential sector. This will be achieved by upgrading 500,000 homes to a BER B2 rating and installing 400,000 heat pumps. The plan is also backed by substantial funding and provides excellent business opportunities in the retrofit building industry (Byrne, 2022). The Home Energy Upgrade Loan Scheme offered by the Strategic Banking Corporation of Ireland (SBCI) in partnership with the European Investment Fund (EIF) and European Investment Bank (EIB) is a mechanism to channel funds towards achieving the requirements set out in the EPBD directive.

The remainder of the report will proceed as follows. Section 2 will outline the current sustainable finance landscape. Section 3 will explore policy and the financing barriers and opportunities for climate mitigation, climate adaptation will be discussed in section 4, and Ireland's progress towards a just transition will be the focus of section 5. Concluding remarks are presented in section 6.

2. The Sustainable Finance Landscape

The debt and equity markets both play an instrumental role in the allocation of capital, with an increasing number of sustainable financial instruments available in both markets designed to channel funding towards achieving sustainability. Each of the sustainable financial instruments available has specific features and characteristics that result in different risk/return profiles. Sustainable financial instruments are issued by governments, public entities, and corporations to finance operations. The required yield investors have for any financial instrument is primarily driven by how risky the asset is perceived to be, with financial instruments that are deemed to be riskier commanding a higher expected yield (Sharpe, 1964, Lintner, 1965, Fama and French, 2004).

2.1 Sustainable Debt

The emerging field of green, blue, and sustainable fixed income securities are a primary way to channel large scale private financing to projects and activities that have both a productive and sustainable use. "Green" and "sustainable" financial instruments are increasingly used to finance and hedge corporate activities, as well as to encourage a shift to low carbon investment. From an issuer's perspective, the motivation to issue bonds with a green label is to help attract new investors while creating corporate goodwill by highlighting their sustainability credentials. For investors, an additional source of diversification is provided, investments are aligned with investor value, and in some cases, there are tax incentives provided to encourage sustainable investing. Tax incentives can be made available to either the investor or the issuer in a number of ways. The first method is via tax credit bonds where issuers provide tax credits to the investors instead of interest payments (Klein, 2009). The second mechanism, tax-exempt bonds,

where investors are exempt from paying tax on the returns from sustainable bonds (Calabrese and Ely, 2016), are appealing to both investors via a reduction in their tax liability and issuers as they can issue the bond at lower rates. Finally, direct subsidy bonds (Ang et al., 2010), mainly confined to US states and municipalities, see issuers receiving cash rebates from the federal government to reduce their net interest obligations. Green bonds issued for the purpose of financing wind projects in Brazil are tax-exempt, while the US Inflation Reduction Act (IRA)²² enacted in the United States in 2022 introduced new tax credits for emerging asset classes including hydrogen and sustainable aviation fuel (SAF). It is important to note that the introduction of the global 15% minimum effective tax rate may complicate tax incentives on sustainable financing for corporates (Angus, 2023). Given Ireland's already low corporate tax rate, tax incentives to corporations like the ones described above may be extremely complex, or even unfeasible.

Perceived as a positive step towards reaching the UN Sustainable Development Goals, funds raised through Green, Social, and Sustainability (GSS) bonds support the financing of projects relating to climate change or the environment. The most common type of GSS bond is use of proceeds, where the bond is used to finance specific projects with dedicated environmental or social benefits. Less common are sustainability-linked bonds where capital raised is used to finance the ongoing concerns of an issuer and not tied to a specific project. Rather, the issuer of a sustainability-linked bond determines how the funds will be used, and the bond is structurally linked to the issuer's achievement on climate or wider sustainable development goals. Financial instruments that fall under the GSS category include green bonds, blue bonds, sustainable bonds, social bonds, and sustainability-linked bonds. To date, the green bond category dominates all GSS bond issues.

GSS bonds aligned with the Climate Bonds database methodologies reached US\$4.4 trillion globally by the end of December 2023²³. While demand is rising, it is estimated that GSS bonds accounted for just 5 per cent of the global bond market in 2022. New sustainable bond issues in 2023 exceeded US\$939 billion, with green bond issues leading the way accounting for over 61% of total GSS issues²⁴. The breakdown of new GSS bond issues by category is illustrated in Figure 2. Of the euro area green bond issuance

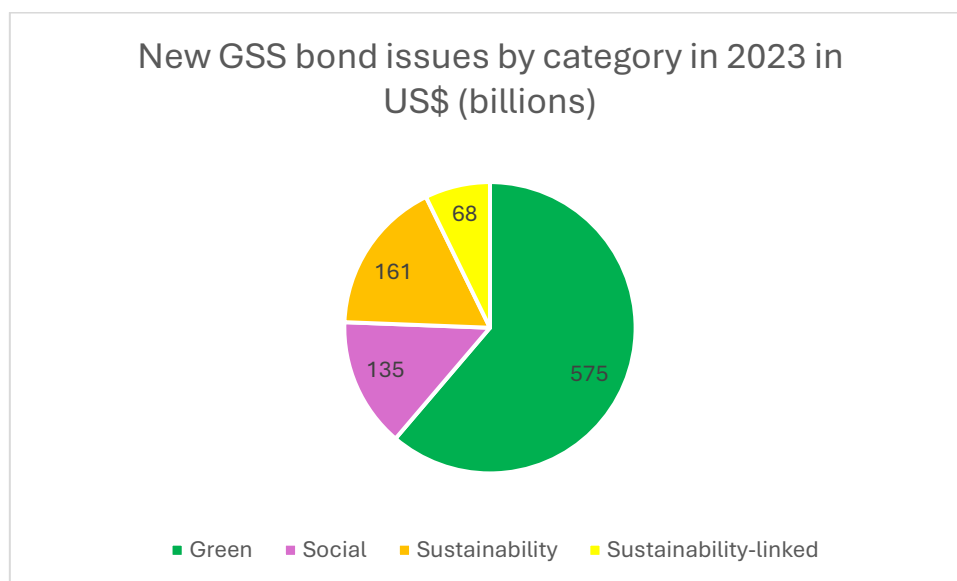
²² [Inflation Reduction Act of 2022 \(P.L. 117-169\)](#)

²³ Climate Bonds Initiative: Global State of the Market Report 2023. Available at <https://www.climatebonds.net/resources/reports/global-state-market-report-2023>

²⁴ "Green bonds reached new heights in 2023". Available at <https://www.bloomberg.com/professional/insights/trading/green-bonds-reached-new-heights-in-2023/>

outstanding, Irish green bond issuers accounted for 2.7% at the end of 2020 (Central Bank of Ireland, 2021)²⁵.

Figure 2: New GSS bond issues by category, 2023



The International Capital Market Association (ICMA) defines green bonds as “any type of bond instrument where the proceeds will be exclusively applied to finance or re-finance projects with clear environmental benefits, and which are aligned with the four core components of the GBP (ICMA). Eligible Green projects include renewable energy, energy efficiency, pollution prevention and control, eco-efficient and/or circular economy adapted products, production technologies and processes, green buildings, terrestrial and aquatic biodiversity conservation, clean transportation etc”²⁶. At present, there are no restrictions to ensure the green credentials of a bond designated as green. The development of market and regulatory frameworks such as the Climate Bond Initiative (CBI)²⁷, the Green Bond Principles²⁸, and the EU Taxonomy are an important step to maintain market integrity and transparency. The EU Council adopted regulation to create a European green bond standard in October 2023 with the goal that all proceeds raised are invested in projects and activities that are aligned with the EU taxonomy for sustainable activities²⁹. The voluntary standard uses the criteria contained within the EU taxonomy to define green economic activities and is designed to create consistency and

²⁵ <https://www.centralbank.ie/statistics/statistical-publications/behind-the-data/green-bonds-a-snapshot-of-global-issuance-and-irish-securities-holdings#:~:text=The%20tree%20below%20provides%20a,amount%20outstanding%20at%20end%2D2020.>

²⁶ <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Guidance-Handbook-March-2020-120320.pdf>

²⁷ <https://www.climatebonds.net/standard/governance/scientific-framework>

²⁸ <https://www.ifc.org/content/dam/ifc/doclink/2022/the-green-bond-principles-202206.pdf>

²⁹ [Regulation \(EU\) 2023/2631 on European green bonds and optional disclosures for bonds marketed as environmentally sustainable and for sustainability-linked bonds](https://eur-lex.europa.eu/eli/reg/2023/2631/oj)

clarity from investors. The voluntary nature of the bond is in line with other standards as a move to make the EU GBS mandatory for green or sustainable issuers would lead to “*an unsustainable level of additional cost and liability for Issuers*”, (ICMA, 2022)³⁰. The regulation entered into force on 30th November 2023 and will start applying on 30th November 2024. The intention of the European Commission is that the EU GBS becomes a “gold standard” for green bonds. As all regulatory frameworks with respect to GSS markets are voluntary, greenwashing concerns persist.

Social bonds are designed to finance or re-finance projects that will lead to positive social outcomes and defined as “any type of bond instrument where the proceeds will exclusively be applied to finance or re-finance in part or in full new and/or existing eligible social projects and which are aligned to the four core components of the Social Bond Principles”³¹. Social bonds are an important source of financing for a just transition but, unlike the green bond market, the market for social bonds has stagnated somewhat (Bloomberg, 2023a).

More controversial than the types of bonds discussed above, transition bonds are debt instruments that are issued to finance projects that, while not necessarily green, should yield lower overall emissions from polluting sectors within an economy. Most commonly, transition bonds are issued where entities are engaged in activities that do not qualify for green bonds such as high-carbon emitting industries like aviation and shipping, and oil and gas. Transition bonds were designed to provide an avenue for funding to be channelled to companies in the fossil sector and other hard-to-abate industries. Accounting for just 0.4% of the sustainable debt market at the beginning of 2024, Japan has taken a leading role in the market, issuing \$5.3 billion transition bonds in February 2024 with plans to issue \$140bn over the next 10 years. Airlines that utilise alternative fuels are among the activities the proceeds are expected to fund (Reuters, 2024³², ICMA³³, 2024). Persistent fears around greenwashing and a lack of consensus about acceptable and credible technologies and trajectories raises difficulties for companies in the fossil fuel sector and the hard-to-abate industries to raise transition finance. This is illustrated by the modest amounts raised by issuers from these sectors which are equivalent to an estimated 3.6% of green, sustainability and sustainability-linked bond issuance to date.

Unlike the use of proceeds bonds described above, which are used to finance specific projects, sustainability-linked bonds finance the general functioning of the issuer who must have explicit sustainability targets that are linked to the financing conditions of the bond. The interest rate on the bond is conditional on whether the issuer meets

³⁰ <https://www.icmagroup.org/assets/icma-update-to-its-analysis-of-the-eugb-regulation-05012022.pdf>

³¹ <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/social-bond-principles-sbp/>

³² <https://www.reuters.com/sustainability/climate-energy/tokyo-worlds-first-sovereign-transition-bonds-make-their-debut-2024-02-14/>

³³ <https://www.icmagroup.org/assets/Transition-Finance-in-the-Debt-Capital-Market-paper-ICMA-14022024.pdf>

predetermined key performance indicators. The ICMA provide a KPI Registry, providing sector guidance for selecting KPIs.³⁴ Sustainability-linked bonds were developed in the private sector and introduced in 2019. Guidelines relating to these issues are provided in the Sustainability-Linked Bond Principles issued by the ICMA (ICMA, 2024³⁵). Credibility concerns surrounding sustainability-linked bonds along with criticism from environmentalists led to a sharp fall in issues in 2024 compared to the previous year. As funds raised from these bond issues are used to finance the general activities of the issuer and not tied to a specific environmental or social project, the issuer can be penalised through higher interest payments if environmental or sustainable KPIs are not reached. Issuers can weaken the link between financial outcomes and sustainability via structural loopholes such as late target dates or embedding a call option, making sustainability linked bonds less effective (Ul Haq and Doumbia, 2022) and many issuers choose weak or easily affordable penalties, providing an incentive to pay the penalty rather than meeting the KPIs (Kolbel and Lambillion, 2022). The use of sustainability-linked bonds are often beneficial to the issuing company without achieving true sustainable progress due to weaknesses of the KPIs (Bloomberg, 2022). Despite criticisms, sustainability-linked bonds leave issuers with more control over their decision-making process and are therefore an appealing option to firms seeking to finance their transition to net zero. Further guidance from the European Union on when penalties are activated and transparency on KPIs should encourage more demand in the market. Commonly issued sustainable bond types and their permitted use are summarised in Figure 3.

To finance the transition to a sustainable economy and meet its climate commitments, Ireland has diversified its funding base to include Irish Sovereign Green Bonds (ISGB). ISGB issues are underpinned by the Irish Sovereign Green Bond Framework³⁶, developed to align with the ICMA's Green Bond Principles³⁷. Projects eligible for funding are outlined within the framework, as is the selection, allocation, management, and external review process. The first ISGB was issued in 2018 and successfully raised €3 billion for the financing or refinancing of sustainable projects. The most recent ISGB issue raised €3.5 billion in January 2023, priced to yield 3.106%. The bond issue was heavily oversubscribed, ESG investors accounted for approximately 70% of final allocations with 4% of the issue allocated to domestic investors and 97% remaining within Europe.

³⁴ <https://www.icmagroup.org/assets/documents/Sustainable-finance/2024-updates/Sustainability-Linked-Bond-Principles-June-2024.pdf>

³⁵ <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp/>

³⁶ Irish Sovereign Green Bond Framework. Available at <https://www.ntma.ie/uploads/general/Irish-Sovereign-Green-Bond-Framework.pdf>

³⁷ ICMA Green Bond Principles: <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/>

Figure 3: Sustainable Bond Types and permissible use of funds

SUSTAINABLE DEBT INSTRUMENTS		
Type	Permissible Use of Funds	Debt Instruments
Use of Proceeds	Must be used to finance or re-finance specific projects that address specific environmental or social issues.	Green bonds Blue bonds Social bonds Transition bonds
Sustainability-Linked	General functioning of the issuer. Yield linked to specified KPIs.	Sustainability-linked bonds

In compliance with the Irish Sovereign Green Bond Framework, a series of allocation reports are issued detailing how the capital raised from the sovereign green bond issue has been utilised. The Irish Green Bond Allocation Report 2022³⁸ documents the allocations made across eligible green categories; Built Environment/Energy Efficiency, Clean Transportation, Climate Change Adaptation, Environmentally Sustainable Management of Living Natural Resources and Land Use, Renewable Energy, and Sustainable Water and Wastewater Management. The two categories securing the largest funding allocation are clean transportation and sustainable water and wastewater management. A Green Bond Working Group with representatives from the Department of Finance, the National Treasury Management Agency, the Department of Communications, Climate, Action and Environment, and the Department of Public Expenditure and Reform oversee both the implementation of the GB Framework and the project evaluation and selection process. The GB Framework further provides that all submitted projects and proposals meet “all of the relevant appraisal processes and value-for-money tests required under the Public Spending Code...” and that “all capital-investment projects and programmes with an estimated cost in excess of €100 million are subject to a further level of scrutiny, requiring specific Government approval before final contracts are agreed.”³⁹ Capital raised through the sovereign green bond issue has been allocated to social housing improvement, increased energy efficiency, enhanced public transport and public transport infrastructure, and electrification of the transport

³⁸ <https://www.ntma.ie/uploads/publication-articles/NTMA-ISGB-Allocation-Report-2022-Final.pdf>

³⁹ <https://www.ntma.ie/uploads/general/Irish-Sovereign-Green-Bond-Framework.pdf>. Section 3.2

system. Aligned to the commitment of a just transition, funding has also been allocated to the improvement of water services in rural Ireland and the restoration and management of peatlands. Funding from the green bond issue was used for the Athlone Town Bus Service Electrification and allocated to the SEAI to finance initiatives for both business and individual citizens. Business initiatives include the support of 2,500 businesses in the energy transition, the provision of energy efficiency training to business, a new solar PV grant for businesses, the Support Scheme for Renewable Heat amounting to 90GWh of renewable heat each year, and scaled up support to public sector bodies in readiness for the climate transition. In supporting the community and citizens, the SEAI funded 24 community energy projects in 2022, achieving 235GWh of energy savings, while its SEAI Pathfinder Programme supporting the education, health sector, and OPW decarbonisation endeavours led to 65GWh and 18 ktCO₂ direct savings. The SEAI also contributed to electrifying transport through EV grants supporting almost 11,000 electric vehicle purchases and 16,000 EV home chargers. Further, it also used proceeds to fund several research initiatives that will contribute to the understanding of transitioning to a net zero economy (NTMA ISGB Allocation Report, 2022).

Green bonds in Ireland are not confined to sovereign issues, with a handful of Irish corporations choosing to raise capital via a green bond issue. Ireland's first corporate green bond issue was by ESB in 2019, raising €500m with an interest rate of 1.125% (ESB). Institutional investors in Europe demonstrate a strong appetite for green bonds, leading to many green bond issues, including this one, being oversubscribed (Climate Bonds Initiative, 2017)⁴⁰. Institutional investors buy green bonds due to competitive pricing and their strong green credentials, while the main impediment is poor reporting (Sangiorigi and Schopohl, 2021). Green bonds issued by non-financial institutions in the utilities, industrial and automotive industries along with sovereign issues were found to be the preferred option of European Institutional investors (ibid).

By the end of 2023, green bond financing accounted for 22% of the ESB Group's overall debt (ESB, 2024)⁴¹. Capital raised by ESB from green bond issues are allocated across a series of projects addressing renewable energy, electricity networks, and energy efficiency. Crucially, the use of proceeds aligns with the "do no significant harm" (DNSH) criteria outlined in the EU Taxonomy which aims to ensure a just transition. A key aspect of both the EU Taxonomy Regulation⁴² and the Sustainable Finance Disclosure Regulation⁴³, the "do no significant harm" means not supporting or carrying out economic

⁴⁰ <https://www.climatebonds.net/resources/reports/green-bond-highlights-2017>

⁴¹ <https://esb.ie/investors/green-financing>

⁴² Regulation (EU) 2020/852. Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32020R0852>

⁴³ Article 2(17) SFDR

activities that do significant harm to any environmental objective, where relevant, within the meaning of Article 17 of Regulation (EU) 2020/852”⁴⁴, (European Commission).

Details of how the funds from one ESB bond have been allocated is presented in Figure 4.

Figure 4: Allocation of Green Bond Funding and Impacts⁴⁵

Green Bond XS2009861480					
Project	Allocated (€millions)	Status	Generation Capacity (MW)	Qualifying Generation Capacity	Non-windfarm Project Impact Metrics
Neart na Gaoithe Wind Farm (Offshore)	232.20	In construction	224	89	
Galloper Wind Farm (Offshore)	130.90	Operational	44	44	
Grousemount Wind Farm	154.70	Operational	123	85	
Cappawhite Wind Farm 1	16.20	Operational	57	11	
Castlepook Wind Farm	56.00	Operational	35	30	
Smart Meter Roll-Out	50.00	Ongoing			More than 620,000 total new smart meters were installed on overall project to end December 2021. This was partially funded by ESB’s Green Bond Issuances.
Project Fitzwilliam – ESB’s Head Office Redevelopment	60.80	In construction			Designed and under construction in line with “BREEAM Excellent” Certified Building Standards
EV	6.20	Ongoing			138 Fast Chargers 118 AC Charges Installed over period of spend
Total	698.00		483		

Source: ESB Green Bond Report 2022

The first Irish bank to raise capital through a green bond issue was Allied Irish Bank with a €1bn offering in 2020. Further subsequent offerings have led to the total capital raised by the bank through green bond issues of €4.65bn to date (AIB, 2024). The capital raised has been allocated to green buildings (54.8%), clean transportation (0.7%), and

⁴⁴ https://knowledge4policy.ec.europa.eu/glossary-item/do-no-significant-harm_en

⁴⁵ The information in this table is taken directly from the ESB Green Bond Report, 2022. Available at https://cdn.esb.ie/media/docs/default-source/investor-relations-documents/esb-green-bond-report-2022.pdf?sfvrsn=57f38933_1

renewable energy (44.5%) and includes the funding of utility scale solar and offshore wind projects (ibid). The Bank of Ireland are also active participants in the green bond market, raising a total of €4.75 billion since first entering the market in 2021 (Bank of Ireland Sustainable Finance Framework). Capital from BOI green bond issues has been allocated to residential green buildings, commercial green buildings, renewable energy, and transportation⁴⁶. Corporate green bonds have also been issued by other Irish entities including Permanent TSB (for green residential buildings and green mortgages)⁴⁷, and Smurfit Kappa (96% of green bond funding was allocated to projects contributing to SDG 12 via circular economy adapted products, production technologies and processes and eco-efficient products; and 4% was allocated to projects contributing to SDG 15 Environmentally sustainable management of living natural resources and land use)⁴⁸.

Unlike a number of EU countries, Ireland has not issued sovereign social bonds. Instead, a portion of the proceeds from Ireland's green bond issues have been allocated to fund social issues like social housing and estate regeneration⁴⁹ (NTMA, 2022). The first, and to date, the only Irish bank to have issued a social bond is Allied Irish Bank (AIB) with its' inaugural €1 billion issue in March 2022⁵⁰. The capital raised by the bank will be allocated for lending to projects that will lead to positive societal change including the provision of funds for affordable and social housing and widening access to education. A 2.25% fixed interest rate is attached to the bond issue, which was oversubscribed, and was purchased by 97 investors spanning twenty-one countries.

Irish corporations have not played a significant role in the sustainability-linked bond market to date, with the Kerry Group 2021 issue of a 10-year €750 million bond priced to yield 0.875% a notable exception (Kerry Group). The types of sustainable bond instruments utilised by Irish entities is shown in figure 5. Irish financial and non-financial institutions are also availing of and offering an increasing number of sustainable loans. Many Irish banks have set out targets for green lending providing financing for climate-related initiatives such as lending for renewable energy, green mortgages, and energy-reduction activities (Banking & Payments Federation Ireland, 2022)⁵¹. As part of their green financing, ESB have taken out a five-year €1.4bn sustainability linked loan. The loan "contains specific KPIs directly linked to ESB's Brighter Future Strategy⁵² and its

⁴⁶ <https://aib.ie/content/dam/frontdoor/investorrelations/docs/debt-investors/green-bonds/AIB-Green-Bond-Report-2023.pdf>

⁴⁷ <https://www.permanenttsbgroup.ie/~media/Files/P/Ptsb-CORP/documents/debt-investors/green-bond/ptsb-green-bond-allocation-report-ye2023#:~:text=The%20total%20amount%20of%20Eligible,Eligible%20assets%20refinanced%20through%20this>

⁴⁸ <https://www.smurfitkappa.com/ie/-/m/files/documents---global/investor/smurfit-kappa-green-bond-report-2023.pdf?rev=-1&hash=56A8879454C058536ACEB61C38657325>

⁴⁹ <https://www.ntma.ie/uploads/publication-articles/NTMA-ISGB-Allocation-Report-2022-Final.pdf>

⁵⁰ <https://aib.ie/content/dam/frontdoor/investorrelations/docs/debt-investors/social-bond/social-bond-allocation-report-ye2022.pdf>

⁵¹ <https://bpfi.ie/wp-content/uploads/2022/11/218940-BPFI-Sustainable-Finance-Paper-Final.pdf>

⁵² <https://www.esbnetworks.ie/docs/default-source/publications/esb-networks-innovation-strategy.pdf>

commitment to leading the transition to a reliable, affordable, low-carbon energy future” (ESB, 2020) and involves the refinancing of its existing credit facility.

Figure 5: Sustainable bond instruments utilised by Irish entities

SUSTAINABLE DEBT INSTRUMENTS UTILISED BY IRISH ENTITIES			
	Government	Financial Institutions	Non-Financial Corporations
Green Bonds	✓	✓	✓
Blue Bonds	X	X	X
Social Bonds	X	✓	X
Transition Bonds	X	X	X
Sustainability-Linked	X	X	✓

2.2 Sustainable Investing

Sustainable investing combines traditional investment strategies with environmental, social, and governance values in order to achieve financial returns while also promoting long-term environmental and social value. There is increasing pressure on the financial industry to move towards sustainable investing models, with the number of sustainable assets under management (AUM) predicted to grow considerably (Bloomberg 2024). ESG assets under management are projected to account for one third of total global assets, reaching approximately US\$50 trillion by 2025.⁵³

A strong financial services sector, existing regulatory frameworks, proximity to global markets, and commitment to sustainable goals puts Ireland in the position of becoming a leader in sustainable finance. The presence of global financial institutions, investment funds, and insurance companies operating in Dublin means that the country has the expertise and capital necessary to drive sustainable investment. As a member of the European Union, Ireland has direct access to European green finance initiatives,

⁵³ Bloomberg, “ESG Assets Rising to \$50 Trillion Will Reshape \$140.5 Trillion of Global AUM by 2025, Finds Bloomberg Intelligence”. Bloomberg. Available at <https://bloomberg.com/article/mubadala/the-future-of-esg-Investing>

including the EU Taxonomy for sustainable activities, and the European Green Deal. This creates a favourable environment for sustainable bonds and sustainable investment funds. While the regulatory environment in Ireland is transparent and supportive of financial innovation, its sustainable finance profile could be improved by strengthening its green finance regulation and promoting ESG disclosures to ensure private finance flows towards sustainable projects and initiatives. Towards achieving this goal, Ireland is part of the EU Action Plan on Sustainable Finance.

As the largest actors in the financial markets, the financial services sector is central to shifting funds towards activities that are beneficial to the environment. The Central Bank of Ireland (CBI) has designated climate change as a strategic priority and applies a Sustainable Investment Charter for its assets (Central Bank of Ireland, Our Strategy 2022-2026)⁵⁴. The CBI is also working to assess the capability of Ireland's financial services sector in relation to sustainable finance and established their Sustainable Investment Charter in 2022 (CBI, 2022). In 2023, the Central Bank (Individual Accountability Framework) Act 2023⁵⁵ was signed into law. The commitment set out in the sustainability strategies of two of Ireland's leading banks, Allied Irish Bank (AIB Sustainability Report, 2023) and Bank of Ireland (Bank of Ireland Sustainability Report, 2023), illustrates a growing commitment of the Irish financial sector to sustainability.⁵⁶

With 17 of the top 20 global financial institutions with operations in Ireland, 6% of the world's investment fund assets are Irish domiciled making it the third largest global centre. Ireland is positioned as a leader in the global funds industry and is establishing itself as a leader in ESG finance with approximately 31% (€1.2 trillion) assets under management in 2023 (Irish Funds, 2024).

As part of the EU's Financing Sustainable Growth Action Plan, Sustainable Finance Disclosures Regulation (SFDR)⁵⁷ established mandatory ESG disclosure regulations that asset managers must comply with. According to the regulation, a fund will be classified as an article 6, 8, or 9 fund. The classification is made depending on the fund's characteristics and level of sustainability. Investments that are promoted as being ESG investments must be classified as either article 8 or 9 funds, with ESG requirements higher to be classified in the latter category. In 2023, 25% of the 6,673 Irish domiciled funds are classified as article 8 funds compared to an EU average of 45%⁵⁸. The proportion of article 9 classified Irish domiciled funds in 2023 was 2%, in line with the EU average (Central Bank of Ireland, 2023). The Irish financial services sector is evolving to reflect the increased appetite for sustainable investing. Notably of the 183 funds authorised in the year ending September 2023, over half were classified as ESG funds

⁵⁴ <https://www.centralbank.ie/publication/corporate-reports/strategic-plan>

⁵⁵ <https://www.irishstatutebook.ie/eli/2023/act/5/enacted/en/html>

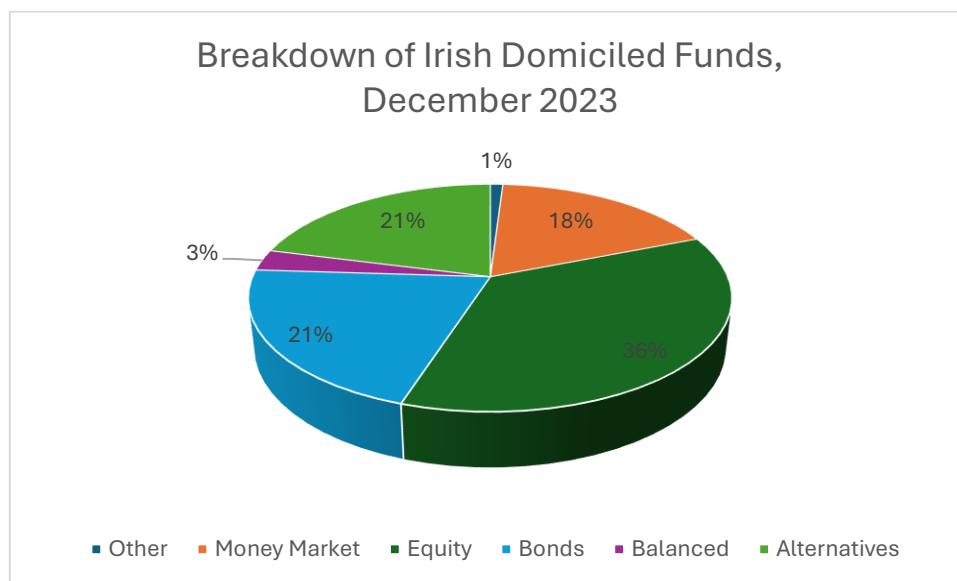
⁵⁶ Regulation (EU) 2019/2088 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R2088>

⁵⁷ Regulation (EU) 2019/2088 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R2088>

⁵⁸ <https://cdn.irishfunds.ie/x/2c22094717/7263-irish-funds-annual-review-2023-web.pdf>

with almost 43% classified as article 8 and 7.5% as article 9 (ibid). The breakdown of Irish domiciled funds by category is illustrated in figure 6.

Figure 6: Irish domiciled funds by category



Source: Central Bank of Ireland

Ireland is also well placed to lead in sustainable Exchange Traded Funds (ETFs). ETFs are funds containing a group of stocks, bonds and/or other securities that trade on exchanges and usually track a specific index. ETFs are used by investors to obtain a group of diversified assets that generally help to lower risk. They are widely considered by investors, including retail investors, to be an affordable and efficient way to access a wide range of asset classes. Irish domiciled ETFs account for approximately 70% of the total European ETF market (Irish Funds, 2024)⁵⁹.

Sustainable ETFs are funds containing a group of assets that prioritise companies that adhere to specific ESG criteria. ESG funds use different mechanisms to integrate ESG, using anything from positive screening, negative screening, ESG scores provided by external ratings providers, or impact focus (TrackInsight, 2021). There are many different types of sustainable ETFs available, ranging from broad market ETFs that include a wide range of companies with strong ESG performance, thematic sustainable ETFs comprised of companies that focus on a specific theme such as clean energy, gender equality, or water resources, and best in class sustainable ETFs consisting of companies with the highest ESG ratings within their specific industries.

Sustainable ETFs can be classed as actively or passively managed funds. Passively managed sustainable funds are funds invested in portfolios that track an index comprising of companies that meet specific ESG criteria. Once the fund is established, the composition of the fund tends not to change. In contrast, actively managed funds

⁵⁹ <https://www.irishfunds.ie/news-knowledge/news/now-available-why-ireland-2024-publication/>

involve the regular purchase and sale of stocks based on the current ESG performance of the companies. Passively managed sustainable ETFs have an advantage over their actively managed counterparts in terms of enhanced diversification benefits and lower costs and fees. While actively managed funds can be more costly and associated with higher risk, they do offer potentially higher returns and allow fund managers the opportunity to actively engage with, and attempt to influence, corporate ESG practices.

Sustainable ETFs, particularly passively managed funds, have been subject to greenwashing accusations (Rompolis, 2023; Abouarab et al, 2024). Many passively managed sustainable funds managed by some of the world's largest asset managers were found to be not actually sustainable (Cuvelier et al., 2024). Of the 430 sustainable passive funds assessed, 70 percent were found to have exposure to companies developing new fossil fuel projects (ibid). Some of these sustainable funds contained stakes in oil and coal companies.

While primarily designed with institutional investors in mind, ETFs are also popular with individual investors due to low fees, diversification properties, and high liquidity. Funds classed as sustainable do attract more capital, but they do not outperform “low sustainability” funds (Hartzmark and Sussman, 2019) and a large sample of ESG labelled mutual funds were found to hold portfolios with inferior records of both environmental and labour laws compared to those of non-ESG portfolios (Raghunandan and Raigopal, 2022).

2.3 Public-Private Partnerships: a blended approach to climate finance

The Irish government defines Public-Private Partnerships (PPPs) as “a different method of procuring public services and infrastructure by combining the best of the public and private sectors with an emphasis on value for money and delivering quality public services”.⁶⁰ PPPs are characterised by shared responsibilities and rewards (Hodge and Greve, 2007). Channelling private funding towards high-risk climate projects without sufficient financial returns can be difficult (Engel et al., 2014). Public-Private Partnerships for sustainable solutions can help to address this challenge. Ensuring the fair distribution of risks between the public and private partners is essential so effective risk management strategies and clear contractual arrangements are required (Yescombe, 2011). PPPs have been found to be more cost efficient than public subsidies (Buso and Stenger, 2018) but there must be well balanced bargaining power between the two parties for optimal outcomes (ibid). However, the role of PPPs in climate-orientated projects to date has been limited (Buchner et al., 2019). When new technologies are involved, additional risks and complexities can arise, and government caution is warranted (Kennedy and Corfee-Morlot, 2012). Factors such as profitability, risk mitigation, and favourable policy

⁶⁰ <https://www.gov.ie/en/campaigns/96ba2-public-private-partnership/>

frameworks are the main motivators for private participation in climate PPPs (Casady et al., 2024).

Subsidies tend to be designed to reduce the initial cost of a project to investors through the provision of financial supports such as grants, low interest rates, and tax incentives but they do not always reduce the inherent risks investors face. Subsidies are more straightforward to design and can create immediate impacts on adoption rates for green technologies and climate mitigation strategies (Sterner, 2012). However, subsidies can also create long-term fiscal challenges and impede a government's ability to fund other crucial areas of policy (Coady et al., 2015). Subsidies are also sensitive to political changes which can lead to a reluctance by investors to commit to long-term sustainable projects if they believe there is a risk that subsidies can be reduced or eliminated due to a change in government or government priorities. Further, subsidies can be limited in terms of available funding so can be insufficient to attract the scale of investment required, whereas PPPs can scale up sustainable capital investment without as much of a burden on public finances.

In some cases, PPPs can offer a more efficient, scalable and sustainable method for attracting private investment than subsidies. PPPs have been found to outperform subsidies with respect to welfare, effort, and investment (Buso and Stenger, 2018). As PPPs share the risks and benefits of a project, this financing model may attract capital from private sources that may not have invested under subsidies due to their exposure to risk. Public Private Partnerships can provide an important channel to direct private finance towards sustainable infrastructure and innovation. The private sector often has more flexibility, technical expertise, and ability to innovate, which can be critical in addressing the dynamic challenges posed by climate change. PPPs combine the strengths of private sector expertise, efficiency, and capital with the strengths of public policy such as planning and regulatory frameworks. The profit motivation of private investment in PPPs can help to ensure projects are completed on time, within budget, and efficiently managed (Hart, 2003). However, the complexity of negotiating and designing PPPs can result in delays and transactions costs and reduce their overall effectiveness (Bovens, 2012).

PPPs in Ireland that focus on climate action to date are rare. A notable exception is the Dublin Waste to Energy Facility which is a PPP between Dublin City Council and three private entities; Encyclis, DIF Capital Partners, and MEAG. There are far reaching environmental benefits including the reduction of landfill, generation of renewable energy, and increased recycling. A community gain fund generating approximately €600,000 per year and overseen by the community gain fund committee (Dublin City Council) is to be used to fund local community enhancing initiatives. The Nature Trust, established to attract finance for biodiversity restoration, is another example of a blended finance model funded by public funding and corporate partners. Taighde Éireann

(previously Science Foundation Ireland (SFI)) fund a number of state of the art research centres and programmes working towards climate and sustainable solutions to achieve net zero Ireland (for example SFI Research Centres the Co-Centre for Climate + Biodiversity + Water, iCrag, Marei and BiOrbic; strategic partnership programme NexSys). Many of the initiatives funded are matched by industry funding.

2.4 Leveraging EU Funding

As an EU member state, Ireland has access to several EU funds and initiatives that can be leveraged to transition to a low carbon economy. The LIFE Programme is the EU's funding programme for projects aimed at nature conservation, environmental protection, and mitigation and adaptation. Through this programme, Ireland has financed a number of climate initiatives including the Cornrake LIFE project, the Living Bog, and the Wild Atlantic Nature Project. The EU Just Transition Fund (JTF) has allocated funding to Ireland which will be used to regenerate the communities in the midlands whose communities depended on peat extraction.

The Strategic Banking Corporation of Ireland (SCBI) have partnered with the European Investment Bank (EIB) to introduce a low-cost retrofit scheme allowing homeowners to borrow between €5000 and €75000 at significantly reduced interest rates in order to make their homes more energy efficient.

There are a number of other EU schemes that business in Ireland can access to accelerate the transition. Funded by the EU and managed by Enterprise Ireland, the Green Transition Fund is decomposed into the Climate Planning Fund for Business to support their efforts to decrease reliance on fossil fuels and the Enterprise Emissions Reduction Investment Fund providing up to €1m to businesses for investment in carbon neutral heating, energy monitoring, smart metering, and R&D. Funding from the EU Emissions Trading System (ETS) and Innovation Fund is also available. Businesses can apply to this fund to develop and scale up carbon abatement technologies and could use the funds to accelerate the development of green technologies. The European Regional Development Fund (ERDF) assigns a portion of the fund to sustainability including mitigation and adaptation. A significant recipient of this funding, Ireland could invest in climate initiatives such as improving sustainable transport infrastructure at the regional level and improving energy efficiency in buildings. The European Agricultural Fund for Rural Development (EAFED) can be used to fund initiatives such as sustainable land use and sustainable farming. Some of the monies from the NextGenerationEU recovery fund has also been allocated for climate-related projects and initiatives.

2.5 Financing for Small and Medium Enterprises (SME's) and Individuals

Small and Medium Enterprises (SMEs) face significant cost constraints in the transition to net zero. Government investment in SMEs focused on environmental sustainability and related disclosures can yield long-term returns in both capital and operational costs,

while also promoting more environmentally responsible business practices (O'Reilly et al., 2023). There are several credit mechanisms, public, private, and blended that SMEs can access to improve sustainability. The Green Enterprise Fund, managed by Enterprise Ireland, supports Irish businesses in developing innovative sustainable technologies and practices. The focus of the funding is to support R&D of green technologies, scaling of innovative solutions, and collaboration with research institutions. The Sustainable Energy Authority of Ireland (SEAI) offers a number of grants and incentives for SMEs designed to assist in implementing sustainability practices and to encourage them to integrate renewable energy solutions. Additionally, the SEAI partners with participating banks and financial institutions to allow SMEs to access credit via the Energy Efficiency Loan Scheme. Funding of up to €150,000 at discounted interest rates is available to finance energy-efficient or renewable energy projects through this scheme. The Accelerated Capital Allowance (ACA) scheme allows businesses to claim a 100% tax deduction on the cost of energy-efficient equipment, including LED lighting, heating systems, electric vehicles, and other energy-efficient technologies.

Figure 7 presents the opportunities available to individual consumers wishing to avail of grants and low-cost loans to help prepare for the transition to net zero. They are outlined below in Figure 7.

Figure 7: Funding available to individual households

Scheme	Use	Provider	Amount
Better Energy Homes Scheme	Insulation, solar panels, heating upgrades, window upgrades	Sustainable Energy Authority of Ireland (SEAI)	Attic insulation: up to €1200 External wall insulation: up to €6000 Heat pump system: up to €3500 Solar panels: up to €2100
Deep Retrofit Grant Scheme	Major retrofits	Sustainable Energy Authority of Ireland (SEAI)	Up to 50% of the cost of works
SEAI Solar Energy Grant	Installation of solar PV panels	Sustainable Energy Authority of Ireland (SEAI)	€2100
The Home Energy Saving Loan scheme	Energy efficiency upgrades	Sustainable Energy Authority of Ireland (SEAI) in partnership with participating banks	Normally €1500-€15000 loan up to 7 years

SEAI EV Home Charger Grant	Installation of electric vehicle charger in own home	Sustainable Energy Authority of Ireland (SEAI)	Up to €600
Electric Vehicle (EV) Incentives	Government EV Grant and VRT relief		EV grant: up to €3500 VRT relief: up to €5000
Green Mortgages	To finance the purchase of homes that meet certain energy efficiency requirements	Banks including Bank of Ireland, Allied Irish Bank, Ulster Bank	Preferential/discounted interest rates

3 Mitigation

The IPCC defines climate mitigation as “actions or activities that limit emissions of greenhouse gases (GHGs) from entering the atmosphere and/or reduce their levels in the atmosphere”⁶¹. An extensive study of the green finance gap examined the main barriers to investment using three different sources; academic literature, policy-based literature, and corporate interviews (Hafner et al, 2020). The results from the academic literature found lack of stable climate change policy frameworks and policy direction, technology risks associated with certain projects, lack of knowledge/technical advice on green infrastructure investment and constraints on decision making within investor companies to be the biggest barrier topics. From the policy-based literature limited projects with acceptable risk-return profiles; lack of liquidity in the markets, technology risks associated with certain projects, constraints on decision making within investor companies, lack of suitable financial vehicles/financial instruments, and high transactions costs were identified. The results from interviews identified lack of a stable climate change policy frameworks and policy direction, constraints on decision making within investor companies, lack of suitable financial vehicles/financial instruments, disclosure on climate related risks and integrating them into financial decision-making/lack of standardised ESG data, and perceptions that returns on renewable infrastructure investments are too low and require high upfront capital investment to be the main barriers.

Total investment in mitigation is the sum of public and private investment in activities that achieve emissions reductions. The degree to which capital will be channelled towards climate mitigating activities depends on the incentives for investment innovation. In the absence of a strong economic argument for private investment in mitigation, the government can implement policies that either enhance the incentives for low carbon

⁶¹ https://www.ipcc.ch/report/ar6/wg3/downloads/faqs/IPCC_AR6_WGIII_FAQ_Chapter_01.pdf

investment or address the barriers that restrict it. The aim of such policies is to internalise the negative externalities caused by carbon emitting actions. Unless the costs of these activities are borne by the emitter, natural resources are underpriced and the overuse of scarce resources will continue. As long as the benefits of activities causing carbon emissions outweigh the costs, there will be underinvestment in infrastructure and new technologies that rely on renewable resources. Stable and credible policy signals have been identified as a critical precondition for the mobilization of substantial financial flows towards climate mitigation efforts (Patashnik, 2018; Levin et al., 2012; Jordan and Matt, 2014; Meckling et al., 2015; Hafner et al., 2020).

3.1 Policy tools

The Irish government and the European Union have introduced a wide range of policy measures to encourage climate mitigation. However, Slevin and Barry (2024) find that the implementation of contradictory policies in Ireland, particularly regarding the approach to supply-side policy, have undermined climate action and contributed to its failure to meet emissions targets. They show that Ireland’s neoliberal orientation influences (and undermines) much of Ireland’s climate policy, and specifically highlight data centres and the State’s approach to Corrib Gas as examples. Further factors identified include Ireland’s reliance on gas for the transition to net zero and identifying it as a so-called “bridging fuel”, and susceptibility to lobbying from the agriculture industry leading to slow implementation and uptake of climate mitigating actions in the industry.

Carbon Pricing

The standard policy tool utilised to incentivise emissions reduction is carbon pricing. There are two main types of carbon pricing – carbon taxes and Emissions Trading Schemes (ETS). They differ in that with a carbon tax, the reduction in greenhouse gas emissions is not predetermined, whereas the carbon price is established in advance. The objective of a carbon tax is to incentivize industry, consumers, and other members of society to reduce their emissions to avoid paying the tax. The main criticism of carbon taxes is that they disproportionately disadvantage low-income sections of the population as they will spend more relative to those with higher incomes, and therefore are not aligned with the principle of a just transition.

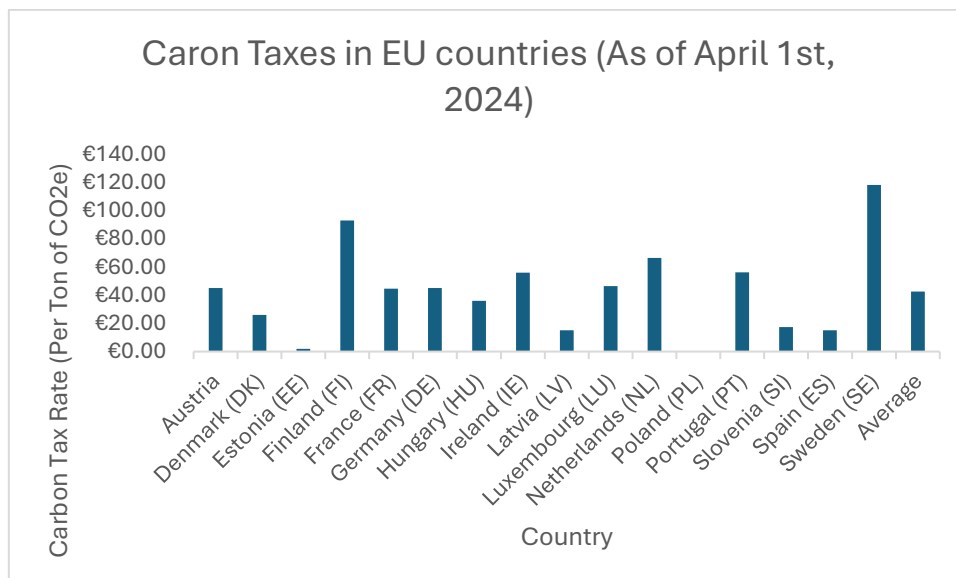
To incentivise emissions reductions, Ireland introduced a carbon tax of €15 per tonne of carbon dioxide in 2010, applicable to all fuel in sectors not covered by the EU ETS. This is scheduled to increase each year, reaching €100 per tonne by 2030⁶². Ireland imposes a carbon tax rate of €56 per tonne of CO₂ emissions⁶³, above the EU average of €42.67, and

⁶² <https://www.irishstatutebook.ie/eli/2020/act/26/enacted/en/html>

⁶³ Sources: The World Bank, “Carbon Pricing Dashboard,” last updated Apr. 1, 2024, https://carbonpricingdashboard.worldbank.org/map_data; Ministry of Climate and the Environment, Poland, “Notice on Environmental Fee Rates for 2024,” Aug. 4, 2023,

planned increases to €100 exceeds the 2019 recommendation of €80 per tonne by 2030 set out by the Joint Oireachtas Committee on Climate Action in the Climate Change: A Cross-Party Consensus for Action⁶⁴ report.

Figure 8: Carbon Taxes



The proposed increases in the carbon tax annually are clearly set out providing businesses and consumers the time, and stable price signals, to adopt more sustainable practices. The government introduced a relief for increase in carbon tax on farm diesel to account for the fact that farmers are disproportionately disadvantaged by the tax increase with no alternative sustainable fuel options available.

The Irish government has committed to use some of the revenue generated from the planned carbon tax increases, estimated to be €9.5 billion to help combat fuel poverty. Additional funding under the Carbon Tax Funded Programmes 2024 as part of Budget 2024 has been allocated to residential and community energy efficiency upgrades, targeted social protection interventions, and to incentivise sustainable farming.⁶⁵ Of the €718m increases from 2021-2024, retrofitting and energy efficiency upgrades (€380m), ACRES (€110m), qualified child payments (€103m), the fuel allowance (€99m) and living alone allowance (€45m) have been the biggest beneficiaries; with the just transition (€6m), peatlands (€5m), and Green Agriculture Projects (€3m) among programmes receiving smaller benefits (ibid).

<https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WMP20230000914>;
 Ministry of Finance, Portugal, “Government Order No. 244-B/2023 (Article 2),” Jul. 28, 2023,
<https://files.diariodarepublica.pt/1s/2023/07/14601/0000200003.pdf>.

⁶⁴ Joint Oireachtas Committee on Climate Action, Climate Change: A Cross-Party Consensus for Action (2019) Dublin: Houses of the Oireachtas – Available at:
https://data.oireachtas.ie/ie/oireachtas/committee/dail/32/joint_committee_on_climate_action/reports/2019/2019-03-28_report-climate-change-a-cross-party-consensus-for-action_en.pdf

⁶⁵ <https://assets.gov.ie/273321/07262fac-d631-4b1c-a3eb-1e103bfe2c2e.pdf>

Emissions Trading Schemes are allowances representing the right to emit a specific amount of greenhouse gas. Companies that need to increase their emissions buy permits from those who produce less than permits allow, rewarding those who pollute less at a cost to those who produce more. Emissions trading schemes are designed to incentivize emitters to find cheaper sources of abatement. The largest emissions trading scheme is the EU-ETS, a cap-and-trade scheme where the total volume of greenhouse gas emissions within an industry that can be emitted by all companies is limited. Only certain industries are governed by EU-ETS, the cap being set at the EU level and reduced each year in an attempt to meet emissions reductions targets. A market price for carbon is created through companies buying and selling allowances, with the annual reduction in caps each year designed to increase the price. Companies subject to EU ETS face heavy penalties for failing to account for emissions through carbon allowances. The scope of the EU ETS is set out by the European Commission.⁶⁶

In an effort to counteract carbon leakage, the European Commission introduced the Carbon Border Adjustment Mechanism (CBAM), designed to ensure that a fair price is applied to carbon emissions caused by the production of carbon intensive goods entering the EU. The overarching aim is to “ensure the carbon price of imports is equivalent to the carbon price of domestic production, and that the EU's climate objectives are not undermined”⁶⁷. The transitional phase of the CBAM covers the period from October 2023 until 2025, while the definitive regime is effective from 2026 onwards. Eicke et al. (2021) examine the impacts of the CBAM on countries across the globe under two scenarios: a scenario where only emissions-intensive and trade-exposed goods are targeted under the CBAM, and an alternative scenario where the CBAM is applicable to all goods imported into the European Union. They find that the relative impact of the CBAM is generally greater for countries in the Global South than elsewhere. Beaufilet et al. (2023) similarly find that some low-income and middle-income countries would be disproportionately affected given their dependence on the EU for their exports.

3.2 Renewable Energy

The Climate Action Plan outlines Ireland’s aim to have 80% of electricity generated from renewable sources by 2030. Policy and financing for renewable energy investment has evolved considerably in Ireland in order to increase the amount of renewables on the system. To date, private and institutional investors are not investing sufficiently into green energy infrastructure due to lack of confidence given the technology risks, unstable policies, high up-front capital requirements of renewables, high capital costs for commercialization, lack of information, lack of experience and capacity gaps and high

⁶⁶ https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/scope-eu-emissions-trading-system_en

⁶⁷ https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en#:~:text=Why%20CBAM%3F-,CBAM,production%20in%20non%2DEU%20countries.

transaction costs etc. (Ernst & Young, 2010; Irena, 2016; Organisation for Economic Co-operation and Development (OECD), 2016; Jones, 2015).

In order to achieve climate targets, Ireland has to continue attracting utility scale renewable energy investment. Financing renewable energy projects typically comes from three sources; debt, equity and grants or subsidies. Lam and Law (2018) identify the different developmental stages of renewable energy projects and the various methods of financing each technology at different phases in the development cycle. They show that the financing structures for renewable energy projects depend on policy support, the availability of the natural resource, the maturity of the technology, and the economic viability of the renewable energy technologies. Ireland has progressed considerably in terms of policy support, particularly with respect to attracting utility scale solar and off-shore wind.

The need to diversify the renewable energy mix in Ireland led to the introduction of the Renewable Energy Support Scheme (RESS), whereby support is allocated by way of auctions. RESS 1 included a “Solar Preference Category” with the aim of attracting utility scale solar investment, which had previously been unsupported by policy. The provisional results from the fourth round of the Renewable Energy Support Scheme show that of the 1,334 MW of onshore renewable electricity awarded support, 960MW of this was for solar⁶⁸. The latest auction will see an increase in Ireland’s renewable capacity of 20%.

The European Union are also implementing changes to accelerate the clean energy transition, introducing the revised Renewable Energy Directive⁶⁹ in 2023. Aligned with the just transition principle, a separate community category is also available under the RESS Scheme assigned with the remit of supporting communities to develop renewable electricity⁷⁰. RESS also provides that a Community Benefit Fund (CBF) be established with each developer paying €2 per MWh of electricity generated annually to the fund. Community benefit funds are designed to share the benefits of a natural resource in recognition of project impacts. The Sustainable Energy Authority of Ireland (SEAI) have created a website to display information from the Community Benefit Fund National Register, providing examples of case studies of selected community projects, and a map allowing users to identify current CBFs.⁷¹ It is clear that the intention to share the benefits of the transition with the community of Ireland and the principal of justice for the citizens of Ireland are pivotal priorities in the State’s plan. A public consultation was run in 2017 on the design principles of RESS and found that there was “very strong public and

⁶⁸ <https://www.eirgrid.ie/industry/renewable-electricity-support-scheme-ress#ress-4>

⁶⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023L2413&qid=1699364355105>

⁷⁰ <https://www.gov.ie/ga/foilsuichan/5f12f-community-projects-and-benefit-funds-ress/>

⁷¹ <https://cbfnationalregister.seai.ie/home>

industry support for Community proposals including mandatory investment opportunities for those in closest proximity to renewable electricity projects”.⁷²

Specific community benefits are most relevant in regions where the wider benefits of renewable energy infrastructure such as employment and local taxes are limited (Hassan et al., 2005). Unlike other European countries with large manufacturing capacities such as Spain, Germany and Denmark, it is not expected that Ireland will develop any significant manufacturing facilities. A significant proportion of the capital investment in Ireland’s offshore wind industry will go to other European nations with turbine manufacturing capacities (BVD associates). A Danish study found that citizens were sometimes conflicted, accepting the need for renewable energy while simultaneously concerned about the local community impact. (Upham and Johansen, 2020). Under the RESS scheme, €2 per MW/h will be contributed to a community benefit fund scheme for a twenty-year period. Opposition to a hypothetical onshore wind farm more than halved, from 44% to 20% when community benefit payments were offered (Hyland and Bertsch, 2018), yet a survey of Irish Citizen found that 87% of respondents would support or actively support an offshore windfarm planned in their locality. The small proportion of citizens that are opposed to renewable energy installations are found not to be influenced by benefits offered (Knauf, 2022). Community benefits have been perceived to be compensation for impacts without clear evidence societal attitudes would shift (Cowell et al., 2011) although proponents of renewable energy installations appreciate all of the tested benefits (Knauf, 2022). Cowell et al., 2011 argue for the need to “open up debates about the appropriate use of community benefits...given the vastly larger flow from RE expansion” giving due consideration to “issues of justice long-term, sustainability and rural development.”

To enable small scale renewable electricity projects that are not eligible or not suitable for other current policy support measures, the government have approved the design of the Small-Scale Renewable Electricity Support Scheme (SRESS). The main beneficiaries of this scheme are expected to be SME, farm, and community projects. Currently, the scheme will provide support to solar and wind renewable energy projects with the option to expand the scope to include other sources later on⁷³. To encourage the uptake of renewable energy on an even smaller scale, the Micro-generation Support Scheme (MSS) was approved in December 2021 with a phased introduction taking place over 2022⁷⁴. Under this scheme, businesses and Irish homeowners have been able to sell unused renewable energy generated with a registered microgeneration device back to the grid. A solar energy survey was carried out by energyefficiency.ie⁷⁵ in late 2023 to gauge Irish

⁷² https://www.gov.ie/en/search/?type=consultations&organisation=department-of-the-environment-climate-and-communications&page=16#search_result_label_id

⁷³ <https://www.gov.ie/en/publication/96110-small-scale-generation/#background-to-sress>

⁷⁴ <https://www.gov.ie/en/publication/b1fbc-micro-generation/#micro-generation-support-scheme-mss>

⁷⁵ <https://energyefficiency.ie/wp-content/uploads/2024/05/Energy-Efficiency-Ireland-Solar-Survey.pdf>

citizen's opinion of solar energy. Of the 2,955 respondents, twenty percent currently have solar installed in their homes, and 99.8% had a positive attitude to solar energy. Reducing energy bills was viewed as the biggest advantage of solar (approximately 70% of respondents), while environmental benefits lagged some distance behind in second place, with approximately 16.5% of respondents. The average installation costs to the respondents with solar was €9,093, taking an average of 8 years to repay. The average monthly savings on electricity bills was €95.50. The biggest deterrent to installing solar was high upfront costs (64% of respondents), followed by suitability of the Irish climate, fear of maintenance requirements, and lack of information. When asked about government incentives, 54% were aware of direct grant funding for panels on the roof, 6% were aware of the reduced VAT rate on solar panels, 4% were aware of the ability to sell excess solar back to the grid, with just 3% aware of the removal of planning permission for rooftop solar. Refer to Ryan et al. (2023) for a comprehensive review of policies for rooftop solar in Ireland.

Hydrogen has been identified as a key enabler for decarbonising difficult to electrify sectors of the Irish economy. As part of the Irish government's climate ambitions, it is the intention to support green hydrogen production via surplus offshore wind energy. Set out in the National Hydrogen Strategy⁷⁶, Ireland specifies a target of 2GW from offshore wind towards renewable hydrogen production by 2030. Genovese et al. (2023) review the potential for power to hydrogen in Europe and find opportunities in transportation, energy storage, industrial processes, and heat and power. At present, hydrogen provides only up to 2% of the EU's energy yet has the potential to meet 5-20% of industrial energy needs and 20-50% of transportation energy needs. Power to hydrogen is still in its very early stages of development in Ireland but is seen as an ideal energy carrier, serving as a key solution to ensure both decarbonisation and energy security (Leahy et al., 2021). The intermittent nature of wind energy presents a challenge of how to effectively integrate it into the grid.

A number of potential risks have also been identified and need to be adequately identified and measured in order to identify appropriate policy support measures if power to hydrogen is to be successfully commercially deployed in Ireland. Upfront investment costs including the site development cost of offshore wind farms such as site selection, seabed surveys, permits, and turbine structures, as well as cost of converters such as electrolyzers (Rubio-Domingo and Linares, 2021) should be adequately modelled. Information relating to demand uncertainty and the identification of routes to market in Ireland is extremely limited and clarity on this issue would be beneficial to potential developers. Price risk, lack of competitiveness with alternatives, and policy and regulatory risk, environmental and social risks also need to be incorporated. While

⁷⁶ National Hydrogen Strategy, last updated on 31 July 2023. <https://www.gov.ie/en/publication/624ab-national-hydrogen-strategy/#>

Ireland has established clear mandates to prioritise the development of renewable hydrogen, clarity relating to strategy, specific policy measures and supports should be provided. National strategy and policy should address a number of factors, including the mitigation of investment risks, and the harmonisation of standards and removal of barriers (IERC, 2023)⁷⁷. The expected costs of hydrogen hardware such as electrolyser stacks are expected to fall considerably over the next decade (Zapantis, 2021; Salkuyeh et al., 2017). Ireland scores well on the Renewable Energy Country Attractive Index (RECAI), compiled by Ernst and Young ranking 14th globally and 5th in the normalised ranking of economies. The report cites previous prolonged underinvestment in grid infrastructure as a major impediment to connecting renewables to the system and acknowledges the efforts EirGrid have made to address this (Casey, 2024).

Industry Focus: Aviation

Aviation is of particular importance to the Irish economy, contributing an estimated \$975m to the Irish economy in 2023 (PWC, 2023). It is one of the industries where the EU ETS applies, but unlike other modes of transport is difficult to electrify. Airlines are faced with severe challenges when catering to increased demand for air travel with simultaneously achieving carbon reductions (Yue and Byrne, 2024). The literature identifies different methods through which airlines can achieve emissions reductions such as sustainable jet fuels, retrofitting existing aircraft, improving aircraft energy efficiency and deploying greener aircraft with advanced technology (Brugnoli et al., 2015, Grampella et al., 2017, Muller et al., Chao et al, 2019a, Yu et al., 2020, Lo et al., 2020). The effects of including aviation under the EU ETS scheme have been found to be limited due to a low carbon price and abundant surplus allowances limiting the incentive to reduce carbon emissions (Meleo et al., 2016). Siefert et al. (2017) note that the EU ETS only applies to flights within the EU and its partners and find that airlines are more likely to consider environmental performance if they have to include the direct cost of an ETS. The International Air Transport Association (IATA) has set a cap of a 50% reduction of CO₂ emissions by 2050 compared to 2005 levels (IATA, 2021). Depending on the technology used, sustainable aviation fuels costs are between 120% and 700% higher than their fossil fuel counterparts, and further policy measures are necessary to facilitate widespread adoption of SAFs (Watson et al., 2024). Policy measures identified include offering monetary incentives, carbon taxes, cap-and trade targets, and output-based incentives. The IEA (2021) identify green hydrogen as one of the longer-term options for achieving emissions reduction in aviation. Sustainable aviation fuel adoption is crucial for carbon emission reduction (Chao et al., 2019a, Chao et al., 2019b), presenting Ireland with both great risk and opportunity. Unlike other industries, sourcing financially feasible renewable energy alternatives to fossil fuels is extremely difficult, with sustainable aviation fuel prices currently not competitive.

⁷⁷ https://www.ierc.ie/wp-content/uploads/2023/12/IERC_Hydrogen-in-the-Irish-Energy-Transition.pdf

Corporate Power Purchase Agreements to mitigate corporate carbon emissions

One tool that is increasingly used by businesses to mitigate their climate impact is through the use of Renewable Electricity Corporate Power Purchase Agreements (CCPA's). A CCPA is a contractual agreement between a corporation or business and a renewable energy generator to purchase electricity generated from renewable sources. The agreements are fixed term and set a fixed price. The appeal for businesses is twofold; first the carbon footprint of the firm will fall and second, businesses are not exposed to volatility in electricity prices over the course of the agreement. Bolstered by the Irish government's Renewable Energy Corporate Power Purchase Agreements Roadmap⁷⁸, Ireland has climbed to 16th worldwide in the CPPA Index. Bloomberg New Energy Finance report that Corporate Power Purchase Agreement volumes has increased globally from 4.7 GW in 2015 to 46.0 GW in 2023, with volume growth of 74% observed in Europe between 2022 and 2023 (BNEF, 2024)⁷⁹. CCPA's are an excellent way for technology companies to address emissions generated from data centres, an increasingly important area of concern in Ireland. Further, the increased use of CPPAs should encourage more investment in renewable energy as they provide stable and guaranteed sources of income. This in turn will allow generators to raise capital at a lower cost, making renewable energy investment more financially appealing. Additionally, they provided a valuable alternative to generators who are either excluded from or were unsuccessful in the Renewable Electricity Support Scheme (RESS). CPPAs are not limited to technology firms, with recent CPPA agreements in Ireland signed, including Flogas Enterprise and the Bon Secours Health System in 2023, and Pinergy and JLL in March 2024.

4. Adaptation

Climate adaptation is defined by the International Panel on Climate Change (IPCC) as "the process of adjustment to actual or expected climate and its effects", (IPCC, 2014). The barriers to adaptation have been studied extensively in the literature (Biesbroek et al., 2014; Ford and King, 2015, Fuhr et al; 2018) and can arise from factors such as lack of resources, insufficient information and communication, and values and beliefs surrounding climate change (Moser and Ekstrom 2010, Fuhr et al., 2018). While barriers to adaptation are context specific (Moser and Eckstrom, 2010; Measham et al., 2011), financial and resource limitations are the most frequently mentioned (Moser et al., 2019). Residents exposed to adaptation risks due to rising sea levels have been found not to support paying for adaptation impacts they did not cause. Instead, they favour borrowing

⁷⁸ <https://www.gov.ie/en/publication/a0d2e-renewable-electricity-corporate-power-purchase-agreements-roadmap/>

⁷⁹ <https://about.bnef.com/blog/corporate-clean-power-buying-grew-12-to-new-record-in-2023-according-to-bloombergnef/>

via both public and subsidised private channels over solutions such as increasing local sales taxes, surcharges on utility bills and increasing property taxes. (Merrill et al., 2018).

An increasing body of literature focuses on community-led initiatives for climate adaptation, leading to adaptation being framed as a local problem. Hence efforts need to include regional and local governments (Hsu et al, 2017). However, adaptation may not be best governed at the local level (Nalau et. Al., 2015). There are often concerns relating to equity in local adaptation initiatives regarding how decisions are made regarding where the capital is allocated (O’Riordan et al, 2014; Patterson et al., 2019). Aguiar et al. (2018) examine 147 local adaptation initiatives across Europe and find adaptation strategies have increased significantly over the last ten years, and a significant contributor to this is the transposition of national climate policies to legislation. Across European regions, different patterns of planning and capacity were identified (ibid). At a national level, Smith et al., 2022 call for improved policy coherence on adaptation across all levels of governance, while increased awareness and understanding on climate adaptation and enhanced stakeholder engagement can lead to successful adaptation (O’Keefe et al., 2020).

The European Union’s approach to adaptation is set out in its Climate Adaptation Strategy⁸⁰. The European Union’s Climate-ADAPT⁸¹ provides a series of case studies that identify a continuous stream of funding as central to the long-term effectiveness of adaptation actions. One successful adaptation initiative that has channelled private investment is the issuance of a €300m climate bond by the city of Paris, 20% of which was allocated to the adaptation initiatives (Climate-ADAPT). In 2017 the city of Paris issued a sustainability bond, reissued annually for the period 2020-2023. The 17-year 1.375% coupon bond raised €320m, was heavily oversubscribed, and won the sustainability bond of the year award at the Environmental Finance Green Bond Awards in 2018 (Environmental Finance)⁸².

In line with the five-year requirement of the 2015 Climate and Low Carbon Development Act (the Climate Act)⁸³, Ireland published its second National Adaptation Framework in June 2024⁸⁴. The intention of the framework is to “create a unified approach involving both government and society to adapt to climate change” (NAF, 2024). It proposes a coordinated approach to climate mitigation, addressing both adaptation and mitigation concurrently to maximise the use of resources. The Climate Action Fund (CAF) is the primary channel to secure financial supports for projects that achieve the energy and climate targets set in the Climate Action Plan. Managed by the DECC, the goal is to

⁸⁰ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN> Document 52021DC0082

⁸¹ <https://climate-adapt.eea.europa.eu/en>

⁸² <https://www.environmental-finance.com/content/awards/green-bond-awards-2018/winners/sustainability-bond-of-the-year-city-of-paris.html>

⁸³ <https://www.irishstatutebook.ie/eli/2015/act/46/enacted/en/html>

⁸⁴ <https://www.gov.ie/en/publication/fbe331-national-adaptation-framework/>

provide €500m up to 2027 (NAF, 2024). The total indicative allocation of funding to DECC between 2021 to 2023, including the allocation from carbon receipts is €12.9billion. Funding from Ireland's sovereign bond issue has been allocated to adaptation efforts, with €9.05m allocated to the OPW for flood risk management and €1.395m allocated to climate initiatives in this the latest round of allocations (Green Bond Allocation Report, 2023).

In 2019/2020, just 2.3% of finance that flowed to adaptation projects globally came from private finance. Attracting private finance to adaptation efforts is challenging due the lack of clear potential to generate the revenue necessary to yield a return (Gouett et al., 2023). One strategy to consider is combining revenue generating projects along with adaptation projects (ibid). While Public-Private Partnerships for climate adaptation are one possible solution, private investors seem more predisposed to mitigation projects than adaptation initiatives (Bisaro and Hinkel, 2018). Al-Mashat et al. (2024) aim to develop a new asset class; resilience credits. Their work identifies the many challenges to monetising resilience; the fact that the pricing of returns is based on the likelihood of two uncertainties: the likelihood of future shocks and resulting losses, establishing an initial price for an as yet untraded commodity, and capturing the various priorities of resilience credit users. Their work currently focuses on the agricultural sector so developments in this space will have particular relevance to Ireland.

4.1 Mitigation and Adaptation: Restoration Financing

Biodiversity loss is listed as one of the top three economic risks over the next decade (World Economic Forum Global Risks Perception Survey 2023-2024)⁸⁵. One area that requires significant attention in the transition to net zero is identifying the challenges and opportunities to scale up public and private investment in ecosystem restoration. It is estimated that over half of the world's GDP is generated in sectors that are dependent on ecosystem services yet there is significant underinvestment in restoration (Barbier, 2022). At present, public funding is used to finance most restoration endeavours as attracting private finance to fund ecosystem restoration is challenging. One of the primary reasons for this is that many of the benefits to ecosystem restoration such as climate change mitigation are public goods so the value or yield from such investments are difficult for a private investor to capture. Key drivers of underinvestment include limited knowledge of how important ecosystem services are for driving economic growth, challenges in determining the costs and benefits to restoration, the continued provision of taxes and subsidies that cause degradation, difficulty monetising restoration benefits, and a lack of regulation and policy supports (Blarel et al., 2023). Financial barriers to restoration include insufficient funding, subsidies that support degradation and insufficient financial returns, while the gap between targets and effective

⁸⁵ <https://www.weforum.org/publications/global-risks-report-2024/in-full/appendix-b-global-risks-perception-survey-2023-2024/>

implementation has been a continuing issue for the implementation of European environmental legislation and policies (Cortina-Segarra et al., 2021). The introduction of the EU Nature Restoration Law⁸⁶ in 2024 legally binds member states to restore a minimum of 20% of EU's land and sea area by 2030, and all ecosystems in need of restoration by 2050.

Recognising the impact of biodiversity loss, the European Union's Biodiversity Strategy for 2030⁸⁷ commits significant funding to address the challenges, including allocating 30% of the EU budget dedicated to climate change to biodiversity and nature-based solutions. In January 2024, Ireland released its fourth National Biodiversity Action Plan⁸⁸ that sets out 194 key actions designed to address biodiversity loss. The Plan also incorporates recommendations made in 2023 by the Citizens Assembly on Biodiversity Loss⁸⁹, the first of its kind in the world. In their report, they urged the government to take decisive action to combat such losses, to provide sufficient funding to do so, and to enforce existing laws and policies

To date, biodiversity finance in Ireland is almost entirely publicly funded (Rachel et al., 2021). Priority spending on biodiversity in Ireland is centred on the agricultural sector. There is a large spending gap on biodiversity in Ireland with additional estimated expenditures of €40m (farmland), €8.5m (peatland), €11m (native woodland), €26m (freshwater), €6.5m (coasts), and €15m (marine) required to support the initial targets of the Nature Restoration Law (McGuinness and Bullock, 2024). Agri-environmental schemes (AES) are the primary policy mechanism across Europe to address biodiversity in agriculture, yet AES are unlikely to lead to large shifts towards sustainability (Bartkowski et al, 2023). The Agri-Climate Rural Environment Scheme (ACRES) €1.5 billion scheme was introduced in 2022 under Ireland's CAP Strategic Plan and aims to address some of the shortcomings of AES. In 2023, the Irish government doubled the amount of funding provided to the Local Biodiversity Action Fund to €3m, and a further €2.8m was provided in May 2024 to fund community projects throughout the country that address biodiversity loss. Other government initiatives designed to address the biodiversity crisis include the National Biodiversity Data Centre, as well as the provision of funding to the National Parks and Wildlife Service (NPWS).

Options and opportunities that exist for financing future biodiversity initiatives in Ireland include integrating biodiversity benefits into green infrastructure investments, accessing EU Life funding in combination with Strategic Nature Projects to mainstream biodiversity policies, and investing in the proposed Peatland Standard aimed at providing verification for voluntary carbon offsetting investment (McGuinness and Bullock, 2024). Two not-for-

⁸⁶ ELI: <http://data.europa.eu/eli/reg/2024/1991/oj>

⁸⁷ https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en

⁸⁸ <https://www.gov.ie/en/publication/93973-irelands-4th-national-biodiversity-action-plan-20232030/>

⁸⁹ <https://citizensassembly.ie/report-of-the-citizens-assembly-on-biodiversity-loss-report-launches/>

profit organisations, The Nature Trust (established 2021) and Peatland Finance Ireland (established 2022) are working to mobilise private finance to scale up restoration activities. The Nature Trust has issued several financial instruments including the “Woodland Nature Credit” that enables corporations to invest in nature preservation in Ireland. The trust is funded by a blended finance model, supported by both public funding and corporate partners. Peatland Finance Ireland has a mandate to establish and manage a blended financing system for peatland restoration in Ireland.

There is growing concern among investors and financial institutions relating to biodiversity-related risks in their portfolios (Principles for Responsible Investment, 2020). In order to attract private finance to address biodiversity loss, the project being funded must address an investor need. Hence, it must offer either increased revenues or reduce risk in some manner. The most common method of attracting private funding to address biodiversity loss is via carbon offsetting (Sonter et al., 2019). Carbon offsetting through participation in voluntary carbon markets is used by corporations as part of their decarbonisation strategy (Tolhurst and Embaye, 2012) although it has become less popular in recent years (Piper and Longhurst, 2021). Carbon offsets allow corporations or individuals to invest in environmental projects around the globe that reduce carbon emissions in order to cancel out the increased carbon emissions cause by their own activities. It is important to note that carbon offsetting does not reduce emissions at source, and there is some controversy regarding their use (Anderson, 2012).

The private sector can be driven to recognise the financial materiality of biodiversity and ecosystem services loss through various channels including regulations and incentives, productivity gains, corporate sustainability, cost of capital, insurance (Blarel et al., 2023). For example, regulatory and policy measures can subsidise positive contributions to biodiversity restoration or tax negative contributions; firms who seek to conserve or restore nature could derive reputational benefits, which can lower the cost of capital. Only 4% of green bond proceeds was allocated to fund projects that integrate nature in production sectors (CBI,2020). While still a niche area, innovative financial instruments are starting to emerge in the area of biodiversity finance. One such example of this is the Wildlife conservation bond, issued in March 2022 to raise funding to protect a single species, the rhinoceros. A blended finance instrument, the five-year \$150m bond was issued by the World Bank. Institutional investors of the bond will not receive coupon bonds but instead will receive a “coupon success payment” based on the net growth rate of rhino in two locations of up to \$13.76m.

Another blended finance example addressing nature preservation is the Cumberland Forest Project in the US, to preserve land that is culturally and significantly significant to Indigenous American groups. Structured as a \$130million impact investment fund seeking competitive rates of return, the project benefits the private investors through realised financial gains. The returns are generated from a number of different revenue

sources; carbon capture, sustainable timber harvesting, and recreational leases. There are also a number of other beneficiaries of the project; the environment via solar installations on previously disturbed mined lands expected to generate approximately 130 megawatts of solar annually and via carbon sequestration through forestry management, the local community by preserving job loss, creating further employment and benefitting from a community fund, and the public who can access the land for recreational activities (The Nature Conservancy)⁹⁰.

Some Irish organisations, both not-for-profit and private, have leveraged the EU carbon framework to provide carbon offsetting services in Ireland. The Irish Peatland Conservation Council (IPCC) offers the opportunity for individuals to offset their carbon footprint by supporting their efforts to preserve the peatlands (IPCC), while Green Sod Ireland also offer biodiversity friendly carbon credits (Green Sod Ireland, 2024). Companies like Green Belt offer forestry services including the provision of a voluntary carbon trading platform (Green Belt), and ConnectGreen's biodiversity and carbon offsetting platform, launched in 2024 aims to connect farmers and landowners with companies looking for ways to offset their carbon emissions (Leonard, 2024). Another initiative is the "Irish Tech Goes Carbon Neutral" whose aim is to offset carbon emissions by acquiring carbon offsets from the Environmental Preservation Trust (Go Carbon Neutral).

While voluntary carbon offsetting schemes do provide a mechanism for channelling funds to address biodiversity loss, there has been a large amount of criticism surrounding these schemes. Some argue that carbon offsets allow polluters to continue polluting and so, are a form of greenwashing (Polonsky et al., 2010). Other criticisms are that carbon offsets can be used as a substitute to real climate mitigation and adaptation, can increase overall CO₂ emissions (Calel et al., 2021), and that they are poorly regulated (Cullenward et al., 2023). The effectiveness, equity, and unintended consequences of using carbon offset schemes are questionable. A core concern in carbon and biodiversity offsetting schemes is the issue of additionality – the idea that a carbon offset project must result in emissions reductions or biodiversity outcomes that would not have occurred without the offset investment (Schneider, 2009; Greenberg and Fang, 2015; Bento et al. 2015). The biodiversity-carbon trade-off refers to the possibility that projects designed for the purposes of carbon sequestration may not be optimal for biodiversity, and in some cases may be detrimental. There are significant challenges related to the monitoring and verification of biodiversity which is not easily quantifiable, and it can be difficult and costly to collect the long-term data required (Salzman et al., 2000). When presented with arguments about the effectiveness and ethics of offsetting, individual support for such schemes declines (Anderson and Bernauer, 2016). Concerns regarding

⁹⁰ <https://www.nature.org/en-us/what-we-do/our-priorities/protect-water-and-land/land-and-water-stories/cumberland-forest-project/>

carbon credits led to a significant decline in trading in 2023 (Choudhury et al, 2024), with the additionality and environmental integrity of carbon offset interventions found to be questionable (West et al., 2020; Badgley et al., 2022; West et al., 2023). Increasing evidence of systemic problems in the carbon credit markets also led companies to consider the potential reputational risk associated with using carbon credits from nature-based projects (Carboncredits.com, 2024⁹¹; Dawes, 2024). Increased regulation by both government and financial market regulators are necessary to make the carbon credit markets more robust.

5. A Just Transition

Ireland's commitment to a just transition under the Climate Action Plan has progressed. There are differing interpretations of the just transition concept. Banerjee and Schuitema, 2022 use a case study in the Irish Midlands to call for structure in a just transition process to "safeguard the design of a practical just transition programme based on the theoretical interpretations". An analysis of case studies yielded eleven lessons for Ireland when implementing a just transition and highlights the complexities of the nature and process of transitions, the lessons to be learned for what worked and what did not in comparable countries, and that context and framing are key considerations for a successful transition (Mercier, 2020).

Ireland was allocated €77m from the Just Transition Fund from the EU budget 2021-2027 (European Commission). The government will co-fund the just transition programme making the total available over the lifetime of the fund up to €169m. The establishment of a Just Transition Commission in April 2024, an independent body, will provide advice on how to ensure there is a just transition to a net zero society (DECC, 2024). Arising from evidence-based assessments, the wider Midlands region (incorporating counties Laois, Westmeath, Offaly, Longford, Roscommon, and parts of Galway, Tipperary, and Kildare) due to the significant adverse impact the cessation of peat-reliant power stations have on the region, will be the beneficiaries of the fund. The responsibility for the implementation, management and monitoring of the fund lies with the Eastern and Midland Regional Assembly (EMRA), with oversight and governance functions the responsibility of the DECC (EU Just Transition Fund Programme Summary).

Three priority areas in the region have been identified; 1. generating employment opportunities for former peat communities by investing in the diversification of the local economy. 2. Supporting the restoration and rehabilitation of degraded peatlands and regeneration and repurposing of industrial heritage assets, and 3. Providing former peat communities with smart and sustainable mobility options to enable them to benefit directly from the green transition. Funding available for priorities 1, 2, and 3, is €87m, €57m, and €18m respectively. Delivery partners have been identified under each of the

⁹¹ <https://carboncredits.com/the-pitfalls-of-low-quality-carbon-offsets-are-they-a-threat-to-our-planet/>

priorities. In June 2024, 22 projects were approved for €22.71m funding was approved as part of the Regenerative Tourism and Placemaking Scheme 2023-2026. Details of all of the projects funded under the scheme are available at the Eastern and Midland Regional Assembly⁹².

The Just Transition in Ireland, aimed at ensuring a fair, inclusive and equitable transition to a low carbon economy has garnered significant criticism. While the overall concept of a transition that is just and inclusive is widely welcomed, the implementation of just transition policies are not. There is a narrow understanding of exactly what the term “just transition” means (Morena et al., 2020) and there is “yet to be a clear indication of how increased funding would close the gap between the ideal and the practice of a just transition” (Banerjee and Schuitema, 2023). A bottom-up approach has been found to lead to higher community acceptance than the top-down approach being applied to the just transition in the midlands region (Međugorac and Schuitema, 2023), with striking differences between local and government ideas for a just transition observed. Rural areas should be understood in terms of their local conditions, rather than through an urban lens (Johnsen et al., 2021). Regional disparities are a central concern for a successful Just Transition in Ireland, with prolonged sustained underinvestment in rural Ireland identified as the primary reason for the absence of alternative jobs following the closure of the peat plants (Banerjee and Schuitema, 2023). This spatial injustice has led to many from affected communities feeling further disadvantaged and excluded and existing inequalities could be further exacerbated in the absence of a strong regional strategy.

While the allocation of the funding discussed above is targeted at one region in particular due to the scale of the impact the transition has had in the region, recent policy initiatives such as the community benefit fund mandated under the Renewable Energy Support Scheme will also help to ensure a just transition.

6. Concluding Remarks

Like other economies, there is a large investment gap impeding Ireland’s progress towards a low carbon economy. To address that gap, both public and private funding needs to increase significantly. Consistent barriers to sustainable financing activities relate to a lack of transparent information, inconsistent regulation, inconsistent and inadequate policies, and limited understanding making it difficult to ensure that those responsible for climate and social damage bear the full cost. The introduction of the Corporate Sustainability Reporting Directive (CSRD) should enhance transparency and consistency, enabling investors to better price risk into their decision-making process. Governments and public bodies have a range of options including taxation, subsidies, quotas, and regulations, but other stakeholders also have a significant role to play. The

⁹² <https://www.emra.ie/eu-jtf/>

vast majority of Irish citizens believe that climate change should be a “high” or “very high” priority for the Irish government (Environmental Protection Agency)⁹³. Ireland’s Climate Action and Low Carbon Development (Amendment) Act 2021 sets out the state’s obligation to reduce greenhouse gas emissions by 51% between 2021 and 2030 and to net zero by 2050.

Despite the progress made towards transitioning to a low carbon economy to date, Ireland is anticipated to miss its climate targets. The scale of funding required to achieve its goal requires a concerted effort of all stakeholders to channel both public and private financing towards sustainable activities. Many of the available financing options and opportunities are not yet being utilised to their full potential. Private finance is easier to attract for mitigation rather than adaptation as the financial benefits to private investment are more straightforward to assess. Further research both domestically and internationally is required in this area.

There is appetite, particularly from European investors for sustainable bonds yet they remain underutilised by Irish firms. Public Private Partnerships (PPPs) have significant potential as a mechanism to attract private funding. The conditions required for successful PPPs in this area are well established in the literature and merits further consideration as a financing mechanism. Establishing a route to market for green hydrogen in order to develop capacity will be important for Ireland’s long-term climate ambitions. While there are many funding opportunities available to SMEs, individuals and community groups, the establishment of a comprehensive centralised database detailing all of the funding opportunities would be extremely useful and could be utilised alongside The Climate Toolkit 4 Business. A rapidly evolving regulatory landscape in order to close policy gaps and improve transparency is anticipated and the Irish sustainable finance landscape must evolve accordingly.

⁹³ [https://www.epa.ie/news-releases/news-releases-2024/people-in-ireland-continue-to-be-positive-about-benefits-of-climate-action-.php#:~:text=A%20large%20majority%20of%20Irish,of%20life%20\(74%20percent\).](https://www.epa.ie/news-releases/news-releases-2024/people-in-ireland-continue-to-be-positive-about-benefits-of-climate-action-.php#:~:text=A%20large%20majority%20of%20Irish,of%20life%20(74%20percent).)

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