epa Research

Evidence Synthesis Report 6

Just Transition Indicator Framework for Ireland

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Rialtas na hÉireann
Government of Ireland

Environmental Protection Agency

The EPA is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

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2. Office of Environmental Enforcement
3. Office of Evidence and Assessment
4. Office of Radiation Protection and Environmental Monitoring
5. Office of Communications and Corporate Services

The EPA is assisted by advisory committees who meet regularly to discuss issues of concern and provide advice to the Board.

EPA RESEARCH PROGRAMME 2021–2030

Just Transition Indicator Framework for Ireland

(FTP-2023-01)

EPA Research Evidence Synthesis Report

Prepared for the Environmental Protection Agency

by

EnvEcon Decision Support

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DISCLAIMER

This report is based on research carried out/data between March and November 2024. More recent data may have become available since the research was completed.

The EPA Research Programme addresses the need for research in Ireland to inform policymakers and other stakeholders on a range of questions in relation to environmental protection. These reports are intended as contributions to the necessary debate on the protection of the environment.

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Executive Summary

A just transition is a cornerstone of Ireland's climate action strategy, with the ambition of ensuring that the shift towards a low-carbon economy is fair, inclusive and equitable. This Fast-Track to Policy report, funded by the Environmental Protection Agency, explores the potential development of a national Just Transition Indicator Framework (JTIF) to both monitor and guide the implementation of climate strategies, while also fostering inclusivity, economic resilience and environmental justice, paving the way for a climate-neutral future.

Following a thorough review of the stated policy objectives, literature, global best practice and selected stakeholder consultations, the report identifies six key domains for the evolving Irish JTIF:

1. *Electricity:* this domain emphasises renewable energy adoption and community participation in clean energy projects, while also balancing infrastructure needs with equitable access to energy.
2. *Transport and connectivity:* this addresses public transport accessibility, fleet electrification and mitigating transport poverty risk, particularly for rural and low-income high-risk populations.
3. *Buildings:* this focuses on retrofitting and energy efficiency, emphasising reducing energy poverty risk and monitoring the progress on renewable and energy efficiency investments in buildings.
4. *Agriculture and land use:* this monitors farm viability, diversification and the transition to sustainable practices.
5. *Employment and skills:* this prioritises reskilling workers for green jobs and ensuring fair access to economic opportunities across demographic and regional lines.
6. *Participation and community engagement:* this highlights the role of citizens in shaping policy, maintaining engagement and integrating community needs into the transition process.

Drawing on the connections of these domains to the concepts raised in our review of just transition definitions, the report proposes a conceptual and dynamic JTIF tailored towards Ireland's needs and aligned with its Climate Action Plan. The approach also recommends capturing a broad range of perspectives, to support the appropriate representation of needs in the transition.

The JTIF, at this early stage, was thus designed to be adaptable, allowing for periodic updates to reflect shifting priorities, emerging data and new insights. It emphasises certain indicators of regional and demographic disparities, helping to identify areas most vulnerable to particular climate policy-related challenges. Such spatially refined data can enable policymakers to develop and deploy targeted interventions to mitigate just transition risks and allow for management as well as monitoring. Furthermore, community-focused indicators can measure the extent to which citizens feel empowered and involved in decision-making processes. By prioritising inclusivity, the framework may mitigate the risk of unequal distribution of costs and benefits linked to the climate-neutral transition.

The report also emphasises the importance of strong and robust governance for the JTIF, proposing a cross-departmental working group and the use of various means and tools to enhance transparency, policy alignment and decision-making. Moreover, to boost accountability and public engagement, the report recommends taking an interactive, public-facing visual approach to the JTIF, to enable communities, stakeholders and policymakers to monitor progress objectively in a range of domains.

To advance the JTIF from this foundation, the report outlines several key actions that should be taken:

- *Define a governance approach*. The report advises establishing an interdepartmental working group with clearly defined sectoral leads to oversee implementation, periodic reviews and stakeholder engagement. To advance JTIF development, responsibilities must be clarified.
- *Refine indicators.* Further stakeholder consultations will be necessary to refine the indicator list, as indicators should be limited to a

manageable number. Pilot runs of the JTIF across key regions and time frames should also be considered, to test the proposed indicators.

- *Invest in data infrastructure*. Enhancing the precision and granularity of metrics to enable more targeted interventions may be necessary as the final menu of indicators is determined.
- *Run public engagement campaigns.* Raising awareness of just transition principles and encouraging active public participation will be important for building trust and demonstrating transparency and action on just transition considerations.

Overall, establishing a JTIF could represent a significant step in ensuring a fair and just climate transition. By integrating relevant and robust indicators based on stakeholder input and international best practices, the framework could more effectively assist policy development, track progress, address vulnerabilities and support the deployment of both climate mitigation and adaptation strategies. Beyond aligning with Ireland's climate goals at the national and EU levels, advancing this initiative would position Ireland as a leader, demonstrating how to support the delivery of a just transition for all.

1 Introduction

1.1 Objectives

The delivery of a just transition for Ireland has garnered increased policy attention in recent years. The 2021 Climate Action and Low Carbon Development (CALCD) (Amendment) Act made provisions for embedding a just transition within the climate action statutory framework, requiring relevant ministers to consider the impact that policy decisions would have on achieving this goal. The 2021 Climate Action Plan (CAP) articulated a framework for the delivery of a just transition, outlining what such a transition would entail. A key component in this evolving policy landscape is the identification and clarification of suitable indicators for measuring progress. This report contributes to the development of a Just Transition Indicator Framework (JTIF) that could be used to track the progress of policies and programmes as Ireland works towards achieving a just climate transition for all.

This Fast-Track to Policy report is structured as follows. Section 1.2 describes the approach to defining a just transition, section 2.1 provides a review of the literature across several key areas and section 2.2 examines international best practices in framework development. Chapter 3 sets out our high-level conceptual framework approach, which attempts to identify the relevant domains for a JTIF by assessing definitions of just transition, relevant literature, stakeholder perspectives and the broader policy landscape. In so doing, our conceptual framework identifies relevant domains and suggests illustrative potential indicators and future research angles that are deemed to be relevant to each domain. Section 4.1 provides further recommendations on framework development, considering aspects such as indicator suitability, communication strategy, potential dashboard format and an advised governance approach. Section 4.2 offers conclusions, with recognition that this report represents an initial foundational assessment for the potential development of such a framework in Ireland.

1.2 Defining Just Transition

Just transition has been extensively discussed and analysed within the literature across a wide range of disciplines. While its origins can be traced to the American trade union movement of the 1990s, concerns and considerations related to a just transition can be identified throughout history, often in connection with major “technological transitions” in economies (Geels, 2002). Therefore, with time, the term has acquired a broad meaning, leading to multiple interpretations and theoretical approaches. This can make it somewhat challenging to offer a single universally agreed-on definition of what a just transition entails (Wang and Lo, 2021).

At the national level, the 2021 CALCD (Amendment) Act serves as the overarching legislative framework that addresses climate action in Ireland. The act commits Ireland to a 51% reduction in emissions by 2030 and net-zero emissions by 2050. As noted above, it also integrates a just transition into the climate action statutory framework. The act states that the transition towards achieving the national climate objective must have regard to the requirement for a just transition to a climate-neutral economy, which endeavours, in so far as is practicable, to maximise employment opportunities and support people and communities that may be negatively affected by the transition.

Building on this definition, the 2021 CAP provides greater detail, taking a principles-based approach to defining a just transition process for Ireland. These principles, which are aligned with the International Labour Organization (ILO) guidelines, the United Nations Framework Convention on Climate Change (UNFCCC) and European Union (EU) frameworks and recommendations, are as follows:

- An integrated, structured, evidence-based approach is used to identify and plan out responses to just climate transition requirements.
- People are equipped with the right skills to be able to participate in and benefit from the future net-zero economy.

- The costs are shared so that the impact is equitable and existing inequalities are not exacerbated.
- Social dialogue is maintained to ensure that the citizens and communities affected are empowered and are engaged at the heart of the transition process.

In line with the 2021 CAP and subsequent CAPs, the Irish Government now requires that all relevant departments formulate their climate action policies in accordance with the abovementioned four core principles. This should help to ensure that those who are most affected are appropriately supported. Definitions of just transition from sources such as the National Economic and Social Council (NESC, 2020a) and the national Just Transition Fund (JTF) further reinforce these underlying principles, emphasising that a just transition should be fair, equitable and inclusive.

In their 2024 report, the Irish Taskforce on Just Transition outlined a definition that they believe most appropriately reflects just transition in the Irish context. Their agreed-on definition is that:

> A Just Transition to a climate neutral Ireland will build a better future for all and ensure no-one is left behind. This will be achieved through social dialogue, promoting decent living standards, and proactive planning to anticipate change. It will support and develop sustainable and quality jobs and employment opportunities, reskilling and training. Through investment in services, infrastructure and social protection, people and communities that may be affected by this transition will be supported in a manner that is inclusive, equitable and fair.
>
> (DECC, 2024a)

While these Irish definitions and principles are central to this work on developing a JTIF for Ireland, there remains some uncertainty regarding the precise variables and metrics that may be best to use to monitor and manage progress against these qualitative statements. These aspects are explored later in the report. However, in this section, we also take stock of broader definitions to explore the possible boundary conditions and the progress that has been made in those wider contexts.

At the international level, just transition gained significant traction after its recognition in the Paris Agreement (2015). This landmark agreement, adopted under the UNFCCC, explicitly refers to “the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities”. Subsequent years have witnessed a surge in just transition discourse, marked by the development of a declaration, a work programme and other initiatives. These efforts have contributed to a more nuanced understanding of just transition within the global community, fostering more targeted and effective action in a number of countries and regions across the EU.

EU definitions of just transition can be found in various policy documents that seek to address the social challenges arising from the transition to a low-carbon economy. These also merit recognition in the Irish context. For instance, the European Green Deal aims to set a pathway for a transition that is just and socially fair and leaves no individual or region behind. Appendix 1 provides more details on this just transition mechanism, as outlined in the European Green Deal and the 2020 Sustainable Europe Investment Plan. There are also other relevant European definitions to be considered. The European Economic and Social Committee, for example, states that a just transition should be based on the following three core principles (EESC, 2023):

1. environmental sustainability;
2. the right to a decent life and the protection of social values;
3. a sustainable economy that provides for the wellbeing of all within planetary boundaries.

It is also valuable to consider individual national perspectives on just transition. Scotland, which was among the first countries in Europe to declare a climate emergency and commit to ambitious climate targets and principles in legislation, merits recognition in terms of just transition planning. The Scottish Government, through its National Just Transition Planning Framework, offered a twofold definition of just transition as both an outcome and a process. The outcome is to be a fairer and greener future for all, while the process involves close ongoing collaboration with those affected by the transition. In its work, the

Scottish Government emphasised that a just transition process should ensure the following:

- education and skills training to secure high-value jobs in green industries;
- job security for those in industries that will play the biggest part in the transition;
- access to energy-efficient homes and resilient building infrastructure, transport and communities that support decarbonisation efforts and enhance biodiversity;
- that costs do not burden those least able to pay and that the benefits of the transition are felt by all people.

Finally, we note that, drawing on our international review of definitions and, specifically, on a 2024 Organisation for Economic Co-operation and Development (OECD) event, just transition is also somewhat rooted in the context of environmental justice (OECD, 2024), which seeks to address disproportionate exposure to environmental hazards as well as the unequal distribution of environmental benefits among various communities. In broad terms, as articulated by the OECD (2024), the literature on both environmental justice and just transition can be considered connected to several common foundational principles:

- *Distributive justice:* this principle involves the fair allocation of the benefits and burdens of environmental policies and the transition to a green economy. It emphasises the goal of ensuring that vulnerable and marginalised communities do not bear an unfair share of the costs.
- *Procedural justice:* this principle highlights the importance of inclusive decision-making processes. It seeks to ensure that all stakeholders, especially those from disadvantaged backgrounds, have a voice in shaping policies that affect their lives.
- *Recognitional justice*: This aspect focuses on acknowledging and respecting the diverse identities, values and rights of different communities. It recognises the need for policies that are culturally sensitive and responsive to the unique needs of various groups.

Thus, despite the absence of a single, universally agreed-on definition of just transition, there has been a clear advancement in understanding, as seen through the reasonably strong consensus emerging internationally via the Paris Agreement, EU strategies such as the European Green Deal and the preliminary definitions given in national climate policies. These sources provide us with some valuable guidance for the proposed framework development. The review has underlined that a just transition should include the mitigation of social and regional disparities arising from the shift to a carbon-neutral economy while involving the communities affected in a manner that is inclusive, equitable and fair, to endeavour to ensure that no one is left behind and that a better future is delivered for all. On this basis, this research will explore the development of a national JTIF under the following broad pillars:

- sectoral transitions and sustainability;
- employment, skills development and economic resilience;
- social inclusion, equity and community wellbeing.

Chapter 2 considers related academic literature and reports, as well as stakeholder perspectives, to identify and assign potential domains and indicators that sit broadly under these identified pillars. The compositions of pillars, domains and indicators as explored in this report are intended to support the building of the JTIF and to highlight select aspects for consideration. There is of course scope to revisit and revise categories and classifications, and our suggestions and recommendations are not presented as either a definitive or an exhaustive list – this was specifically outside the scope of this initial work on the development of a JTIF.

2 Overview of the Research

2.1 Literature on Just Transition

In the following subsections, we review relevant literature on just transition under the three broad pillars identified in section 1.2. These are (1) sectoral transitions and sustainability; (2) employment, skills development and economic resilience; and (3) social inclusion, equity and community wellbeing. To contextualise these pillars within a comparable national just transition process, we also note that the Scottish Government (2021) has identified the following specific national just transition outcomes in the process it has adopted to measure just transition:

- citizens' communities and space;
- jobs, skills and education;
- fair distribution of costs and benefits;
- business economy;
- adaption and resilience;
- environmental protection and restoration;
- decarbonisation and efficiencies;
- equality and human rights implementation.

The overlap between the thematic focus of a just transition as identified in this report and that identified by the Scottish Government suggests that this proposed approach offers sufficient coverage of the factors relevant to the initial development of a JTIF. This approach also prioritises the CAP's Just Transition Principles Framework approach by generally ensuring that potential indicators are considered based on how they address the question "How can fairness and equity be measured across the mitigation policies within climate action that are developed to achieve our national climate objective?"

The three broad pillars from section 1.2 are extended, as indicated below, with potential subpillars for consideration in the development of the JTIF. These subpillars are intended to assist in providing the additional necessary focus for considering potential indicator areas and creating more specific targets for our literature review process on aspects of just transition. Note that the following are not exhaustive lists of areas for consideration:

- *sectoral transition and sustainability:* home heating, transport, business energy costs, power, agriculture, and land use, land use change and forestry (LULUCF);
- *employment, skills development and economic resilience:* worker vulnerability and reskilling;
- *social inclusion, equity and community wellbeing:* rural communities, community vulnerability and citizen engagement.

2.1.1 Sectoral transition and sustainability

Home heating

Home heating and the associated concept of energy poverty are important issues for a just transition. Energy poverty risk often features prominently in just transition-related discourse. Traditionally, energy poverty, as defined by Boardman (1991), occurs when households spend over 10% of their income on heating. More advanced methods of measurement have since been developed, but, in essence, energy poverty assessment seeks to capture the financial challenges and vulnerabilities that can arise from market changes in energy prices (Bouzarovski and Simcock, 2017; Kelly *et al*., 2020; Numminen *et al*., 2024). Addressing energy poverty is important, since vulnerable groups, such as single-parent households, people with disabilities, older people and families with children (Hihetah *et al*., 2024), are more likely to be affected. In 2022, 9.3% of the EU population struggled to afford adequate heating. Meanwhile, in Ireland, energy poverty affected 29% of households, largely attributed to inflation and higher costs of living (Barrett *et al*., 2022; Eurostat, 2023). The residential sector is the largest energy consumer for heating, and this sector accounted for over 11% of total national greenhouse gas (GHG) emissions in 2021 (EPA, 2023). Therefore, policymakers have many reasons to deploy green technologies and retrofit homes to improve efficiency, reduce emissions and counter energy poverty risk (SEAI, 2023; DECC, 2024a).

When monitoring the impact of the transition on home heating energy poverty, spatial trend analysis

of energy poverty risk indicators will be of more value than national trend estimate values (Kelly *et al*., 2020). This approach better identifies the regions and cohorts most at risk such that targeted support may be deployed. Additional monitoring could focus on fuel use, renewable penetration, energy performance of homes and so on. Understanding these factors spatially and individually is necessary for effective policy development. Still, non-spatial indicators, such as those studied in the developing work of the Economic and Social Research Institute (ESRI) Research Programme on Energy Poverty, may offer value in identifying higher-level trends in energy poverty.

Transport

Decarbonising the transport sector involves adapting to cleaner technologies like electric vehicles, reducing reliance on personal cars in favour of public transport, and promoting active travel for short distances (Brand *et al*., 2021; Government of Ireland, 2023; Liu *et al*., 2024). This may also include solutions such as avoiding greater travel distances through better planning or working-from-home policies (Kelly *et al*., 2022), in line with the Avoid–Shift–Improve framework. Akin to home heating, where energy costs are levied directly on consumers, there is a risk that policies that increase fossil fuel costs may be regressive (Sterner, 2007). Therefore, transport mobility, defined as the potential for movement, is an important consideration in this context, as travel is essential for social inclusion and wellbeing (Spinney *et al*., 2009; Kelly *et al*., 2023).

A just transport transition should ideally balance emission reductions with delivering equitable access to transport mobility. Rural areas face challenges such as longer distances to services and more limited transport options, which can lead to increased private car use (Kelly *et al*., 2023). This reliance on private car use can impose higher costs and greater mobility constraints, exacerbating income and mobility poverty (Ferret and Demoly, 2019; Meloni *et al*., 2024). With 36% of Ireland's population living in rural areas, a large proportion of the population is at risk of experiencing negative impacts from unequal transport resource distribution in these areas (Martens *et al*., 2019). However, it is important to remember that transport poverty risk is not limited to rural areas (Kelly *et al*., 2023). The Irish Government, aligning with the EU JTF and national plans like the Connecting Ireland Rural Mobility Plan and the Sustainable Mobility Action Plan 2022–2025, aims to enhance sustainable public transport and decarbonise local transport for all through a variety of channels, at both the national and regional levels.

Therefore, key considerations for the JTIF could be to account for the impact of policies on transport-related energy poverty risk under the pillars of accessibility, affordability and mobility (Kelly *et al*., 2023). Individual factors to monitor may include trip frequency and purpose, type of transport used, availability and accessibility of different transport options, cost of transport and electric car penetration. These indicators all offer angles to track and understand mobility patterns, paving the way for targeting intervention areas as part of the just transition. Spatial indicators related to transport activity, transport access and regional transport poverty metrics are valuable for evaluating Ireland's progress towards achieving a just transition.

Power

Decarbonised power generation is vital for Ireland's climate strategy success. In 2023, renewable energy sources accounted for 40.7% of total electricity production, with wind energy playing a major role (EPA, 2023). Despite this progress, natural gas still accounts for 44.3% of electricity generation (EPA, 2023). The Irish Government aims to increase the share of renewable electricity in power generation to at least 80% by 2030, as detailed in the 2024 CAP (Government of Ireland, 2023).

The transition to renewable energy is essential for meeting national climate policy goals, and how this is achieved is highly relevant to a just transition. Renewable power can support emission reductions while also generating new economic opportunities in the renewable energy sector. The shift of course requires substantial investment in infrastructure and technology to get renewables in place and to facilitate their integration into the grid (KPMG, 2024).

The move towards renewable energy can also have negative impacts on citizens and communities due to the development of new infrastructure, grid instability and regulatory obstacles, leading to poor community acceptance (SEAI, 2023). However, it can also provide

opportunities to improve citizen and community wellbeing and engagement in decision-making and outcomes. The transition away from peat-fired power generation in the Midlands, which became the focal point of the initial just transition action in Ireland, highlighted the need for careful planning and community consideration, to support local economies, especially in rural areas, by creating jobs, supporting new investments and encouraging community involvement (Wind Energy Ireland, 2024). The shift towards increased renewable energy generation can provide opportunities for community ownership as well as individual energy security, energy cost savings and protection from fossil fuel price fluctuations.

The key indicators suggested for evaluating progress in decarbonising power generation in the context of a just transition could include the proportion of renewable energy in electricity generation and the accessibility and cost of renewable energy; progress with home renewable energy solutions, energy communities and reducing carbon emissions from power generation; and the capacity of renewable energy installations. Moreover, it may be valuable to consider the impacts on citizens and communities that can result from renewable energy projects. Indicators may include the number of dwellings with solar panels by area and/or demographic, the level of microgeneration and the number of community-owned wind or solar farms.

Agriculture and land use, land use change and forestry

Agriculture plays an important role in Ireland's economy, with the agri-food sector being the largest indigenous exporter and accounting for 6.5% of employment in 2022 (DAFM, 2024), predominantly in rural areas. The sector also significantly contributes to GHG emissions, accounting for 38.4% of total Irish GHG emissions in 2021. Dairy and beef production are the largest contributors, and changes will be required to achieve national net-zero carbon targets (EPA, 2023). Ireland's LULUCF sector is closely connected to the agri-food sector and plays a critical role in the country's emissions profile, as intensive land use and land use changes can contribute significantly to GHG emissions. Practices such as livestock farming with high stocking densities, heavy fertiliser use and peatland drainage can represent major emission sources.

To address these challenges, both the agricultural and LULUCF sectors will need to undergo transitions. The EU's Effort Sharing Regulation (ESR) sets a target for Ireland to reduce ESR sector emissions by 42% by 2030 compared with 2005 levels. This encompasses agriculture (approximately half of Irish ESR emissions), domestic transport (excluding aviation), buildings, small industries and waste. Significant costs will arise for Ireland if these EU targets are missed. If the government is required to purchase statistical transfers or credits to make up for projected shortfalls in domestic emission reductions, the cost is estimated at up to €20 billion (Irish Fiscal Advisory Council, 2024). Ireland has introduced a separate 25% reduction target for agricultural emissions by 2030 against 2018 levels (Government of Ireland, 2023), resulting in some misalignment with costly EU targets. The Food Vision 2030 framework emphasises the importance of using sustainable farming practices to achieve these targets while maintaining food security and supporting rural communities (DAFM, 2021). These efforts are intended to align with ambitions for greater sectoral abatement by 2050 and interim 2040 targets, as outlined by the NESC report *Just Transition in Agriculture and Land Use*, which highlights the importance of a shared vision among all stakeholders (NESC, 2023).

The LULUCF sector increasingly focuses on increasing carbon dioxide removals and reducing emissions through strategies such as afforestation, wetland rehabilitation and hedgerow planting. Ireland's forest cover, at 11.6%, remains well below the EU average of 38% (Tree Council of Ireland, 2023). The 2024 CAP framework (Government of Ireland, 2023) identifies key targets for afforestation and wetland reclamation, while the Irish Forestry Programme 2023–2027 emphasises the integration of forestry and agriculture to enhance land use sustainability (Tree Council of Ireland, 2023). When done effectively, with the "right tree in the right place", afforestation can support both climate and biodiversity goals, and create economic opportunities in rural areas (Western *et al*., 2017; Kappen *et al*., 2020). In addition, the development of natural amenities associated with forests can boost property values (Gibbons *et al*., 2014; Izón *et al*., 2016), attract visitors and improve

wellbeing through providing proximity to green spaces (Brereton *et al*., 2008).

However, as these sectors transition, employment impacts will be a key concern. Many rural jobs depend on traditional agricultural and land use practices that may need to be changed or diversified to align with emission reduction targets. Proactive planning is essential to anticipate the needs in relation to reskilling workers and to ensure the provision of reskilling opportunities and diversification support as part of a fair and inclusive transition. Reskilling initiatives can support farmers and rural communities in adopting new sustainable farming practices, such as organic farming, carbon sequestration practices and renewable energy generation. These efforts can then enhance income resilience while also promoting environmental sustainability and biodiversity. Diversification strategies, including agritourism and value-added product development, offer further ways to mitigate employment risks and create new opportunities in rural areas.

Despite these opportunities, challenges remain for farms and rural communities, even with support from national and EU funds and other sources. Lessons from the Midlands' transition away from peat-fired energy highlight the need to consider broader socio-economic impacts, such as rural depopulation and potential economic decline for certain farming cohorts. Enhanced stakeholder engagement, more granular assessment of risks for specific farming typologies and targeted support are thereby crucial to identify and address these vulnerabilities and ensure that no community is left behind. It is important that disaggregate analysis is used to inform just transition in this sector.

Tracking the progress of agricultural and land use policies will be an essential component of monitoring the transition effectively. Key indicators should include metrics for farm viability, reliance on direct payments, farm type diversity, the age profile of farm holders and younger farmer engagement. Teagasc and the Central Statistics Office (CSO) manage relevant surveys that provide insights into agricultural practices, while the Land Use Review (Phases 1 and 2) provides information on metrics such as returns from land use activities and the impacts of land use changes. In the LULUCF sector, monitoring afforestation rates, wetland reclamation, grassland changes and biodiversity impacts will be of value. Enhanced biodiversity tracking may also be necessary for assessing the environmental outcomes of land use changes and practices, thereby ensuring alignment with climate and ecological goals (Pukkala, 2021).

Business costs

Relevant aspects for Irish businesses will include shifting to clean and sustainable energy sources and enhancing energy efficiency to manage costs and competitiveness. The Sustainable Energy Authority of Ireland (SEAI) has highlighted that commercial energy costs in Ireland are among the highest in the EU (SEAI, 2023), which can significantly affect a firm's cost base and competitiveness.

While firms understand that enhancing energy efficiency can lower operational costs, boosting both competitiveness and sustainability (Cagno *et al*., 2022), not all firms have the means or motivation to act. The SEAI Commercial Fuel Cost Archive offers insights into electricity and gas price trends, thereby allowing for the monitoring of relevant energy cost trends. Monitoring these costs can assist with understanding pressures on business costs, and it fits with broader ambitions to secure clean, sustainable and stable renewable energy for firms, as well as supporting the management of overall energy demand through efficiency-related investments (Yang *et al*., 2024). The ESRI Ireland Environment, Energy and Economy (I3E) model (de Bruin and Yakut, 2021) may also provide sectoral assessments of the macroeconomic implications of certain policy-relevant scenarios. Awareness of progress or problems in terms of managing energy efficiency across Irish businesses will be relevant to costs, competitiveness and employment. As such, it should merit consideration as part of an indicator suite.

2.1.2 Employment, skills development and economic resilience

Worker vulnerability

The shift to a low-carbon economy will continue to have an impact on the labour market in both negative and positive ways. Throughout the transition, there may be both the creation and destruction of employment roles. Negatively affected workers

may face job losses as cleaner energy and climate mitigation policies take effect, potentially leading to the loss of primary income sources (OECD, 2017; Montt *et al*., 2018). This can create a "scarring effect", where affected individuals struggle to re-enter the job market, thereby increasing associated poverty risks (Fondeville and Ward, 2014). Disruptions have already been experienced globally in similar contexts, such as the closure of peatlands in Ireland and Finland, and the reduction of coal mining in Germany, the UK and India. The ILO stresses that a just transition should safeguard workers' rights, ensure decent work and create green jobs to accommodate displaced workers while addressing inequalities (ILO, 2022).

Some governments worldwide are actively addressing worker vulnerability as part of such transitions and are working to integrate packages of just transition measures into climate policies to aid affected workers and communities. For instance, Ireland's NESC (2020a) has specifically assessed the vulnerability of workers, firms and sectors arising from the transition to climate neutrality. Moreover, Ireland's Territorial Just Transition Plan (Government of Ireland, 2022) provided support to peat workers in the Midlands through early retirement and severance schemes and retraining, supported by initiatives like the national JTF (Bastiaanssen *et al*., 2020). Similar measures have been implemented in New Zealand, Finland, Germany and the USA (Gurtler *et al*., 2021; KCI, 2022; Sicotte *et al*., 2022). Tackling worker vulnerability is crucial to gaining political support for green growth policies and ensuring the equitable distribution of benefits (OECD, 2017).

The key indicators for assessing worker vulnerability and just transition policies can include the transition of the workforce into the green economy, worker employment status, participation rates in areas affected by the green transition of energy generation and other industry transitions, and the type of work concerned, which can each provide insights into labour market health and wellbeing, worker engagement and job creation by the transition. Labour utilisation rates can also help to evaluate the quality and sustainability of job opportunities. Relevant to this is the growth in remote working, which affects employment mobility and dynamics and carbon emissions (Kelly *et al*., 2022; Akgüç *et al*., 2023). Inward migration can further influence local labour markets, while satisfaction with time use can be used to reflect broader social and economic impacts. These types of indicators may then aid policymakers in crafting interventions to monitor and support workers in the transition (OECD, 2017; Efoui-Hess, 2019).

Reskilling

In Ireland, an important focus of the response to displaced power sector workers in the Midlands involved reskilling and training to facilitate their re-entry into the job market (Government of Ireland, 2022). Reskilling and upskilling are paramount for a just transition, enabling workers to shift into new roles as the job market evolves. Bord na Móna aimed to create 1435 jobs in the Midlands by 2026, focusing on sustainability. However, Banerjee and Schuitema (2022) highlight that training may not always align with workers' needs, thereby complicating reintegration into the workforce and hindering progress. Lempinen and Vainio (2023) emphasise the need for adequate transition periods for effective retraining.

The Irish Government supports reskilling through initiatives aimed at stimulating activities in the green economy, such as home retrofitting and adopting renewable energy technologies. The goal is to equip workers with skills that are increasing in demand in sustainable sectors, thereby supporting the transition, enhancing economic resilience and reducing unemployment. This also extends to the younger generation of workers. Planning for and developing skilled youth workers is crucial for mitigating future worker vulnerability. Early career job disruptions can have long-term scarring effects, including impacts on future earnings, health and social inclusion. Engaging young people in the transition to green economies is essential, as it offers them the opportunity to be involved in shaping a sustainable future. Effective youth engagement requires inclusive measures throughout the planning and monitoring phases of just transition policies (Manca and Schreuder, 2022).

Indicators for assessing reskilling efforts may then encompass participation in education, as well as the level and field of study. These indicators can assist in evaluating the effectiveness and appropriateness of training programmes and their alignment with market demands. Moreover, it is also important to monitor training participation rates, training availability and the focus of the particular educational programmes at various levels (NESC, 2022).

2.1.3 Social inclusion, equity and community wellbeing

Community vulnerability

Vulnerable communities are often characterised by demographic factors, such as age, gender, ethnicity, and socio-economic factors, such as housing situation, education level, employment status and income level (Min and Lee, 2023). Indicators for these factors, along with other indicators such as risk of poverty and consistent poverty, can help to identify vulnerable groups. The literature broadly identifies these groups as the elderly, those with disabilities and medical conditions, racial and ethnic minorities, low-income individuals and those with lower educational attainment (Lukanov and Krieger, 2019; Sunter *et al*., 2019; O'Shaughnessy *et al*., 2021).

White (2014) notes that these vulnerability factors often interact and reinforce each other, creating systemic barriers to an effective just transition (Tikkakoski *et al*., 2024). Vulnerable communities also frequently face inequitable exposure and sensitivity to environmental hazards (OECD, 2024), such as exposure to point-source pollution like toxic chemical releases from industrial facilities, non-point-source pollution such as water contamination from agricultural run-off and natural hazards like flooding, all of which have adverse health impacts. Furthermore, structurally vulnerable groups are often more reliant on fossil fuels for employment, housing and mobility, increasing their risk of maladaptation during the clean energy transition (Irish Human Rights and Equality Commission, 2023). The risks faced by vulnerable groups are compounded by low adaptive capacity, often due to financial constraints, which limits access to mitigation measures (Doremus *et al*., 2022). Non-financial factors, such as a lack of knowledge, can also hinder adaptation, even when policy support and mitigating options are available (Klemick *et al*., 2024).

Wellbeing, social inclusion and health are all relevant indicators of a community's ability to adapt and thrive, as they can reflect overall quality of life and the extent to which individuals feel they are a part of society. The Pobal HP Deprivation Index uses census data to measure disadvantage across the Irish population based on factors such as employment status, educational attainment and household size. This index, along with related data on wellbeing and health, for which Ireland also has operational indicators, may be considered for use in the context of monitoring a just transition. The number and location of energy communities may be another suitable indicator for highlighting how the benefits of the transition are shared.

Rural communities

Rural communities in Ireland face significant challenges in the context of a just transition, particularly regarding deprivation, poverty, employment and connectivity issues for transport and broadband access. These areas often experience higher deprivation rates than urban areas, with regions such as the northern and western parts of Ireland showing the highest at-risk-of-poverty rates and the lowest median incomes. This economic disparity is further exacerbated by rural areas' more limited access to employment opportunities and essential services, which are vital for reducing poverty and enhancing social inclusion (Social Justice Ireland, 2024). Moreover, some dwellings, especially those occupied by older people, lack broadband and digital access, thus excluding the occupants from participating in processes related to the just transition and having a significant impact on their wellbeing and financial security.

Delivering a just transition for rural areas entails addressing the particular, but non-exclusive, challenges these communities face. As noted earlier, those in rural communities are more likely to have longer distances to travel to public services and more limited public transport options, which can then increase their reliance on private cars and thus contribute to higher living costs (Ferret and Demoly, 2019; Kelly *et al*., 2023). This situation can create a cycle where income poverty can lead to mobility constraints, and mobility poverty further restricts access to better employment and training opportunities. However, the transition, while challenging due to the impacts on traditional rural industries, can also offer potential growth in renewable energy and other green transition sectors that are well suited to non-urban areas, creating new employment and opportunities (Teagasc, 2024).

Relevant aspects for assessing the impact of a just transition on rural communities could include

deprivation rates, poverty levels, employment opportunities and connectivity. However, developing data for specific communities presents a challenge: while certain data exist spatially (e.g. the deprivation index), other data (e.g. for employment opportunities) do not yet exist in the form desired for an indicator.

Citizen engagement

The complexity and economy-wide scale of the climate transition necessitates a decision-making process that embraces diverse knowledge and values (Reed, 2008; Pahl-Wostl *et al*., 2013). Despite this view broadly representing international best practice, genuine citizen engagement in transition research is relatively uncommon, even where the process places a strong emphasis on community empowerment (Huttunen *et al*., 2022). Studies point to the potential for more meaningful involvement of citizens in transition research and policy implementation (Wittmayer *et al*., 2014; Bergmann *et al*., 2021).

In the Irish context, one approach to engaging citizens in the just transition process is the People's Transition model (McCabe, 2020). This is a participative framework that integrates community needs into the transition process. The Think-tank for Action on Social Change (TASC, 2024) applied this model in Larchville and Lisduggan, Waterford, emphasising the importance of community involvement, participative decision-making, integration with local development, and local ownership of assets and benefits for an inclusive and fair transition. Such approaches, which promote social dialogue and community empowerment, are aligned with the government's just transition strategy.

As noted by the Irish Human Rights and Equality Commission (2023), structurally vulnerable groups are also more at risk of being adversely affected by climate policy. Engaging these communities in policy formulation may help to address their needs more effectively. However, beyond the vulnerable groups identified, engagement that allows for broad stakeholder representation will be important for achieving a just transition. Monitoring and representing the level and quality of engagement will be a valuable indicator or set of indicators for assessing how the Irish just transition performs in this regard.

2.1.4 Summary

Section 2.1 qualitatively reviews prominent aspects of a just transition covered in the literature. This short review sought to capture some of the various just transition elements that will be further explored in Chapter 3, which focuses on the input from the stakeholder engagement processes. Connecting these insights will then support an initial illustrative framework design. We reiterate that this Fast-Track to Policy report does not provide an exhaustive review of all just transition elements. Rather, it identifies commonly cited aspects of just transition and organises these to inform the initial design of a just transition framework for Ireland. Guidance is then also offered on the operational considerations for the framework in terms of indicator types, governance and presentation. Importantly, there is clear recognition that any formal JTIF will evolve and further develop over time.

Two further considerations that we note for the future development of the JTIF are:

1. *Regional and demographic disparities in terms of risks and impacts*. Incorporating spatial and distributional justice dimensions, where viable and relevant, is extremely valuable for both communicating progress and targeting corrective interventions effectively.
2. *Forward-planning elements*. The importance of incorporating predictive elements to assist policy formulation is noted within the literature on indicator development. While understanding either the current state or past trends of an indicator is valuable, policymakers must also evaluate the potential impacts of policy changes and utilise analytical techniques to improve policy. Integrating machine learning into indicator development (Spandagos *et al*., 2023) and utilising scenario modelling tools and composite indicators (Kelly *et al*., 2020, 2022, 2023) can offer significant value in this regard.

2.2 International Best Practices for Framework Development

To effectively develop a JTIF, it is useful to examine the international best practice for indicator development. This section explores best practices across multiple

contexts and at different levels, starting from a more general perspective and subsequently narrowing this perspective to directly comparable international indicators relating to climate change and just transition. The review draws on the guidelines and standards of reputable organisations such as the UNFCCC, the EPA (Ireland), the OECD and the national statistics offices of various countries. The key considerations, as determined by this review of best practices, are summarised in the following subsections. These are incorporated into the subsequent consideration of the initial indicators for a JTIF based on combined insights from Chapter 3.

2.2.1 Data quality and integrity

- *Data availability*. The selection of core indicators should consider existing data-gathering capacities and access to various information channels. This will support the routine updating and future adaptability of the indicators.
- *Qualitative and quantitative data*. Not all inequalities arising from transitions can be measured quantitatively. As such, indicators should be open to both quantitative and qualitative approaches (Kopke *et al*., 2018; EC, 2023).
- *Routine surveys*. When using qualitative measures obtained through surveys, it is important to draw from routine surveys to allow for reliable scheduled updating and coherent progress tracking. It is also necessary to recognise appropriate methods for representative surveys.

2.2.2 Conceptual framework

- *Comprehensive framework.* Developing indicators as part of an overall framework aligns with best practices in regard to general monitoring, reporting and evaluation (Kopke *et al*., 2018).
- *Objective-driven approach*. The overall conceptual framework should clearly reflect specific objectives and thereby enable the prioritisation of actions and indicators. This approach aligns with best practices in similar thematic contexts as identified by the OECD (2015), which links indicator development directly to climate adaptation priorities, and by the United Nations Development Programme (UNDP, 2007), which emphasised selecting thematic areas based on key climate priorities.

2.2.3 Thematic high-level approach versus detailed approach across multiple policies

- *Combined indicator types*. A combination of indicator types should be employed to facilitate applicability at different stages within the framework (EPA, 2018).
- *Balancing high-level and detailed analyses*. Statistics New Zealand's Living Standards Framework provides a high-level overview of core concepts and dimensions. However, it is employed alongside other detailed systems and specific indicators tailored to particular scenarios. This layered approach allows for a less complex and more communicable overview, while still offering scope for more detailed analysis and policy responses. It also avoids overloading the framework with too many indicators while maintaining the integrity and complexity of complementary perspectives.
- *Use of a thematic approach*. The German Climate Adaptation Strategy, highlighted by the EPA, provides another good example. Its adaptation indicator system does not replace any sectoral or domain-specific reporting on adaptation. Instead, the system provides a nationally focused thematic overview but uses a restricted number of indicators.

2.2.4 Stakeholder engagement and expert elicitation

- *Stakeholder engagement.* All of the documents and guidelines reviewed emphasise the importance of stakeholder engagement as international best practice in the context of a just transition.
- *Understanding stakeholder views and experiences*. Stakeholder engagement across different levels is necessary to ensure that indicators are developed with an understanding of stakeholder views and experiences regarding how best to capture and address the needs of those concerned. Care should be taken to ensure representative consultation processes.
- *Use of expertise*. Expert elicitation on the indicator choices and framework design can also provide value and assist in consolidating an approach based on multiple stakeholder viewpoints.

2.2.5 Monitoring channels to allow for progress tracking and course correction

- *Establishing bodies*. The European Commission's report *Just Transition Measurement Approaches* emphasises the importance of setting up oversight bodies for measurement systems (EC, 2023). These bodies must follow good governance and democratic principles such as transparency and inclusion.
- *Indicator baseline*. The establishment of an indicator baseline is important, as it creates a reference point against which future monitoring and tracking of progress can be achieved (UNDP, 2007; Turner *et al*., 2014).
- *State versus progress indicators*. In some cases, it is considered good practice to split indicators into those that measure the current state of things and those that measure progress over time. For instance, the *German Climate Adaptation Strategy* separates related indicators into two groups: impact indicators and response indicators (BMUV, 2024). The impact indicators focus on assessing the impacts of climate change on key action fields in Germany and the response indicators monitor progress towards adaptation.

Other international best practices for indicators are based on SMART goals (as defined below), which provide a suitable generic starting point for developing indicator criteria. The definition of the SMART goals are widely recognised as describing best practice in the monitoring and evaluation fields (OECD, 2021):

- *Specific*. The indicator is specific if it can be translated into specific terms associated with an intervention. The data collected should also be specific to the achievement of a particular objective.
- *Measurable*. The indicator is measurable if it can be observed, counted and analysed. The methodology used to compute the indicator should also be transparent and challengeable.
- *Attributable and achievable*. The indicator is attributable to an intervention if it varies due to the intervention. It is achievable if the performance target outcome established is realistic.
- *Relevant*. The indicator is relevant if there is evidence that it is linked to the desired outcome.
- *Time-bound, timely, trackable and targeted*. An indicator is targeted if it can be tracked cost-effectively for a set period and at an appropriate frequency.

2.2.6 Framework governance

The OECD's 2015 review of emerging practices in monitoring and evaluation also highlights a number of useful considerations in the context of good governance practices that are relevant to the JTIF:

- *Aligning with the wider context*. Frameworks should be designed with the wider context in mind. This involves incorporating data that both align with national priorities and recognise existing capabilities.
- *Periodic assessments*. Periodic assessments are useful for tracking shifts in priorities, identifying emerging risks and assessing new potential.
- *Political commitment*. Political commitment and buy-in are important for prioritising efforts and promoting appropriate funding and adoption of indicators in policy considerations.
- *Stakeholder engagement*. Involving a wide range of stakeholders in the development of monitoring frameworks is a useful approach for ensuring policy relevance, as well as supporting data collection, raising awareness and supporting other operational needs.

3 Examination of the Findings

3.1 Just Transition Indicator Framework

This Fast-Track to Policy project has resulted in an initial guidance report on the development and design of a national JTIF for Ireland. A key deliverable of the project is the outline of a viable conceptual framework that can be applied in Ireland. Our approach draws on earlier guidance and established best practices for framework development and incorporates the following elements:

- the identification of domains;
- stakeholder consultation;
- connection to policy;
- suggested indicators;
- recognition of future research.

This section provides greater specific insight into these elements, to establish a foundational framework for building a JTIF to monitor progress on the Irish just transition across various sectors and themes. Our approach uses insights from prior definitions, existing literature and best practice.

Section 3.1 details the approach taken to assessing what is important from the point of view of a just transition. These are the domains of the JTIF. Section 3.2 presents a further discussion of each of the domains that were identified in section 3.1. In each case, a domain narrative is presented, outlining core elements of the climate transition that may be illustrated within each domain. For each domain, we also present a number of subdomains that give refined detail and context regarding how indicators can be interpreted and connected to policy goals. It is noted that overlap between subdomains and indicators can present challenges.

3.1.1 Identification of domains

The methodology applied for the identification of domains relevant to a JTIF is described in Figure 3.1. We integrated insights from the stakeholder engagement processes with evidence from the literature identified in Chapter 2 to identify relevant topics and provide suitable coverage of the three broad pillars of just transition. In addition

Figure 3.1. Approach to identifying just transition domains.

to reinforcing the themes identified in the literature, our stakeholder engagement process offered some specific suggestions relating to monitoring a just transition in Ireland. These included monitoring environmental performance and the climate aspects of the transition, connections with broader policy ambitions and the level of citizen engagement with just transition. Attention has been drawn to this aspect of the stakeholder review by matching these topics with the actions articulated in the Irish CAP.

NESC (2020b) outlines the critical need for a local and community voice in achieving a transition that leaves no one behind. Such an approach, which places stakeholder engagement at the heart of the process, is a desired feature of just transition in Ireland. NESC determined that a just transition should not be imposed, but rather worked out with citizens and stakeholders. As such, it is appropriate to consider the views of stakeholders when advising on the menu of indicators that could be used to track the just transition in Ireland.

As part of this Fast-Track to Policy project, our consultation included initial outreach to selected national stakeholders, relevant experts and interest groups. They were invited to participate in this project via a "contact sheet"[1] that was sent to contributors to request their input on the identification of new and existing indicators and data sources, as well as input on an eventual communication strategy and destination framework. This engagement activity was conducted to quickly gain a contemporary perspective on just transition in Ireland. In the context of this work, a comprehensive national engagement process was not viable, and this is acknowledged. However, in addition to this outreach, EnvEcon revisited findings from consultations held with bodies in the Midlands under the Irish Territorial Just Transition Plan (Government of Ireland, 2022). These consultations included those with the primary industries affected, key regional actors, research agencies and relevant government departments. These interviews were conducted in 2021 as part of the support provided by EnvEcon for the drafting of the Territorial Just Transition Plan within the overall framework of the EU JTF for the European Commission (Government of Ireland, 2022). The combination of both of these engagement processes thus features a range of opinions and perspectives from respondents, including government departments, agencies, research groups, representatives of industries affected and local stakeholders.

While consolidating all of the various perspectives is challenging, we provide a cursory summary of the submissions and discussions below. We found that there is a preference for an approach that captures a wide range of socio-economic, environmental and community-focused metrics, such that all voices and sectors are represented in the transition to a sustainable future. Social and environmental justice was also highlighted as a crucial aspect of a just transition. It was recommended that this be reflected in the indicator framework through indicators designed to measure procedural and distributive justice for vulnerable groups. Community engagement was also considered vital, with a view, for example, to encouraging community participation and development in green industries. Economic resilience should also be monitored. This, it was suggested, could be done by monitoring job creation, investment metrics and alignment with broader policy frameworks. In the context of achieving a just transition to a climate-neutral economy and society, climate and environmental considerations were also highlighted as important factors, with stakeholders stressing the need for the JTIF to be accessible and engaging, which could be achieved by making indicators public and available in multiple formats, and supported by effective communication strategies and media campaigns.

Our review of the literature and our consultation with stakeholders led us then to a framework that covers a number of just transition topics. As described in Figure 3.2, these include the electricity, agriculture and land use, buildings, and transport and connectivity sectors, complemented by a recognition of additional cross-cutting domains, including employment and skills, participation and community engagement, and environment.

In addition to these topics, it is also noted that industry is an important sector to monitor in relation to a fair and effective transition, given its role in meeting Ireland's CAP targets and sectoral emission ceilings. Industry-specific indicators in the JTIF can help to track progress, address vulnerabilities and support sustainable practices, while protecting jobs,

1 For transparency, a list of organisations that returned completed contact sheets under this project is provided in Appendix 1.

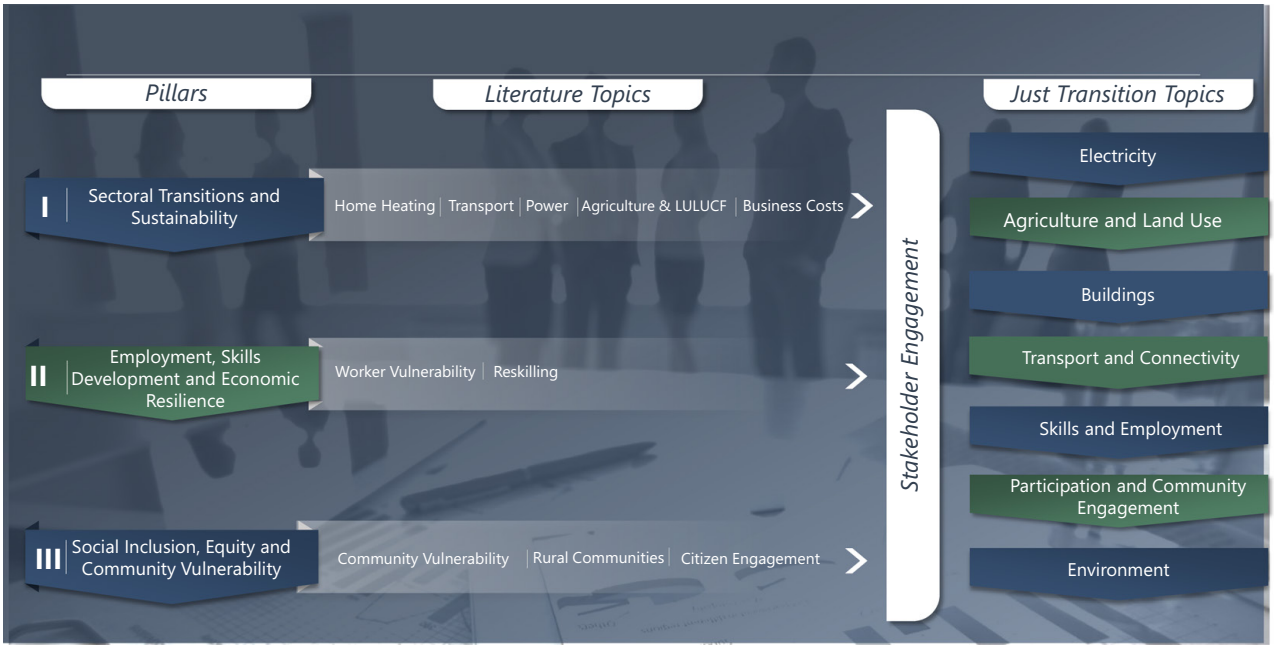

Figure 3.2. Identification of just transition topics.

fostering innovation and supporting competitiveness in high-carbon sectors. While broad in scope and not highlighted in detail in this initial JTIF exploration, this is an area that we recommend be revisited in time as potential indicators are reviewed and developed.

Another consideration, reinforced by our engagement process and our review of best practices, is that indicators should be connected to the wider policy landscape. A report produced by the Scottish Just Transition Commission (2023) and described by Shapovalova *et al*. (2023) highlights the importance of outlining clear deliverables and milestones in driving the delivery of a just transition. While indicators alone are useful for developing a narrative of progress or the description of an emerging policy challenge, in a public policy context they will carry more weight if they are linked to the delivery of a given government strategy and can convey their impact.

To determine the domains covered in the JTIF, we followed a structured approach to link the topics listed in Figure 3.2 with themes identified in the CAP, thereby supporting JTIF integration into policy and progress measurement. The matching process applies the following criteria to differentiate between two domain types:

- *Sectoral domains*. These describe specific sectors and align directly with the emission ceilings set in the CAP for those sectors. CAP sectors focus on direct emission-reduction targets with specific actions for decarbonisation and involve clear sectoral policies.
- *Cross-cutting domains*. These include areas that reflect just transition principles and that intersect across multiple sectors. They involve actions that span sectors, including areas such as skills development, equitable participation and public engagement, ensuring that all sectors align with just transition principles.

3.1.2 Domain narratives

This section summarises each domain's relevance to just transition. In each case, we provide a domain narrative, which is intended to highlight elements of the transition that could be illustrated under the domain. We then offer context as to how indicators can be interpreted and connected to policy goals. This includes a brief justification and explanation of the relevance of the domain and a summary of relevant stakeholder sentiment, followed by some commentary on the potential suggested subdomains. We used the following to determine the relevant indicators within domains, which then guided the initial just transition indicators:

- *Policy priorities*. Indicators that represent policy priorities for climate action should be considered where they can offer coverage of progress in relation to key policies and priorities associated

with the domain and with the transition to a climate-neutral economy and society.

- *Just transition principles and social impact*. Indicators should be considered that cover the concept of vulnerability and as such provide coverage of socio-economic and other impacts identified as being relevant to the domain as the transition unfolds. In addition, indicators that provide insight into how the principles of a just transition are being applied in policy or policymaking should also be considered. These may include datasets related to the equitable allocation of costs and benefits, equal access to and participation in decision-making, and recognition and consideration of vulnerable communities and people.

We outline available illustrative indicators that are relevant to each domain and subdomain. In addition, we highlight some areas of research and policy that will be relevant to domains and indicators in the future so as to emphasise the importance of future consultations and review processes. It is stressed again that the suggested indicators and highlighted future research are *indicative and explorative*. It is expected that the ultimate list of indicators will be decided following a broader consultation process with relevant stakeholders and decision-makers. Similarly, the coverage suggested in the tables below reflects a static illustrative snapshot of each domain. Climate policy and just transition are dynamic. This can and should be reflected in the framework governance.

An important consideration in this context is the spatial refinement of indicators. Where possible, spatially refined data should be used to inform possible indicators, as this would support efforts to track the varied impacts and effects of the transition in more meaningful ways. For the indicators in Tables 3.1–3.6, we therefore also highlight the spatial level of data available where relevant. Further descriptions of the primary data sources relevant to many of these indicators are provided in Appendix 1.

Electricity

In the context of just transition, the electricity domain can include progress on cleaner energy transitions and the participation of communities in developing, accessing and utilising renewable energy, particularly solar and wind energy (Table 3.1).

The energy transition is a fundamental part of the climate strategy for electricity and the power sector. Furthermore, enabling community renewable generation projects is considered in the CAP as an important means by which Ireland may progress towards its clean energy targets. Stakeholders championed such approaches as a way to achieve targeted renewable energy generation and support long-term community resilience. The consultation process advised community-led approaches across

Table 3.1. Electricity domain

Proposed subdomains	Examples of available indicators	Examples of methods or new areas in development
Electricity decarbonisation	Performance against CAP sectoral targets (national), such as those for: • onshore wind capacity; • solar photovoltaic capacity; • grid flexibility.	There could be spatial assessment of progress on decarbonisation and renewable installations and capacity.
Community participation in the energy transition	SEAI's Community Energy Projects Map (by county). SEAI's Sustainable Energy Community Network Map (by county). SEAI domestic renewable grants and installations (by county).	The SEAI has developed the Solar and Wind Atlases, which denote the best areas for renewable energy generation in Ireland. Currently, the atlases denote large-scale projects. The atlases could be revised to include community energy projects. The SEAI is currently conducting a research project focusing on social acceptance and citizen engagement for successful energy transitions. The farming and agriculture sector's participation in renewables could be examined and developed at a later stage. Further to this, Shapovalova *et al.*'s (2023, p. 71) paper on measuring just transition examined community-owned energy projects by local authority area and business/community type.

all sectors. It was felt that such approaches, which are collaborative and participative, achieve community buy-in and can support resilience by allowing those communities to make decisions that create wealth in their own regions, as well as supporting business investments in cleaner renewable power.

Overlaps between this domain and the participation and community engagement domain are evident. In examining community wind and solar projects, it may be important to recognise the spatial aspects of renewable energy suitability, as, for example, not all areas have the same opportunities for solar or wind generation. This approach may also align with the concept of regional renewable energy targets that is set to feature in the revised National Planning Framework. The relevant policy priorities in this domain are decarbonisation and driving community participation in the energy transition.

Agriculture and land use

The agriculture and land use domain may focus on a just transition for people and connected communities in the context of changing farming and land use choices (Table 3.2).

Table 3.2. Agriculture and land use domain

Proposed subdomains	Examples of available indicators	Examples of methods or new areas in development
Farm diversification	National Farm Survey (NUTS 2) – annual frequency: • share of farms that are viable by farming practice; • reliance of farms on direct payments by farming practice and region; • off-farm employment by farming practice. Teagasc National Farm Survey Sustainability Report (national scale) – annual frequency by farming practice: • household vulnerability; • family farm income per ha; • hours worked on farm; • total hours worked; • answer to "When did you last take a break from the farm?" Farm diversification in line with CAP priorities: • organic farming; • tillage; • agro-forestry; • performance against CAP sectoral targets and indication of relevance to impacts, cost and benefit sharing; • chemical nitrates use; • beef cattle finishing; • biomethane production.	In line with CAP priorities, this subdimension could measure: • bioeconomy; • carbon farming. The progress against the results-based indicators for monitoring a transition in farming practice, identified in the Common Agricultural Policy Strategic Plan, could also be examined.[a]
Diversity and sustainability	National Farm Survey (NUTS 2) – annual frequency: • gender of farm operators nationally; • average age of farmers by region and farming practice. Teagasc National Farm Survey Sustainability Report (national scale) – annual frequency by farming practice: • age profile by farming system; • proportion of farms with "female labour input".	With regard to farm demographics,[b] currently the National Farm Survey measures gender diversity by "farm operators", while the Teagasc National Farm Survey Sustainability Report measures gender diversity by "female labour input".

[a]For example, the Common Agricultural Policy Strategic Plan recommends indicators that measure the number of young farmers benefiting from setting up with support from the Common Agricultural Policy, including a gender breakdown; the share of utilised agricultural area under different supported commitments; and/or the number of persons benefiting from advice, training or knowledge exchange, or participating in European Innovation Partnership operational groups.

[b]The Common Agricultural Strategic Plan notes that farming has a perception of being a male occupation, with the number of women working in agriculture being extremely low, particularly in management roles.

NUTS, Nomenclature of Territorial Units for Statistics.

The agri-food and land use sectors are socially important sectors that also contribute a substantial share of total national emissions of GHGs and ammonia in Ireland. Based on the scale of action needed to achieve the required level of abatement in the sectors, change is expected and stakeholders have advised that specific consideration be given to the impacts of the transition in this domain. The NESC report *Just Transition in Agriculture and Land Use* (NESC, 2023) outlines a stakeholder-inclusive process for achieving a just transition for agriculture, which notes that the policies enacted to achieve the scale of abatement required by the sector should take into account the impact on individual farms and farmers, such that policies are enacted with a just transition in mind. This was also reflected in the feedback from selected stakeholders. Other key questions faced by the sector concern conforming to CAP targets

Table 3.3. Buildings domain

Proposed subdomains	Examples of available indicators	Examples of methods or new areas in development
Energy poverty	One example is EnvEcon's composite Energy-poverty Risk Indicator (by small area). ESRI has published work examining the different ways individuals can be exposed to energy poverty, developing indicators such as: • incapable of keeping adequately warm; • incapable of affording adequate warmth; • arrears on utility bills in the last 12 months (arrears).	The Energy-poverty Risk Indicator developed by EnvEcon can be updated in part or in full as new data become available.
Decarbonisation of heating	The EPA report *Residential Solid Fuel Use in Ireland and the Transition Away from Solid Fuels* utilises CSO data to review the main types of fuel used in central heating and the main types of fuel/energy used to heat homes (Eakins *et al*., 2022). Performance against CAP targets for district heat capacity: the existing target is to reach 0.1 TWh of district heating infrastructure by 2025 to decarbonise heating in commercial and public buildings. The application of SEAI's National Energy Balance to indicator development provides an annual breakdown of the share of each fuel type used in the sector.	The EPA report *Residential Solid Fuel Use in Ireland and the Transition Away from Solid Fuels* (Eakins *et al*., 2022) could be updated to reflect census data, with maps being developed outlining the change in fuel type across censuses. Recommendations made by the District Heat Steering Group.
Installation of renewable energy	"Does your accommodation use any of the following renewable energy sources?" was a new question for Census 2022. An econometric analysis report similar to the EPA's *Residential Solid Fuel Use in Ireland and the Transition Away from Solid Fuels* could be produced. Indicators regarding the decarbonisation of heating and the installation of renewable energy in commercial and residential buildings can be developed by using resources to analyse existing data.[a]	The SEAI maintains data on grants provided, and these data could be made available to support indicator development.
Retrofitting of existing buildings	Performance against residential share of CAP sectoral targets, the SEAI National Retrofit Plan Progress Report (county): • homes retrofitted to BER B2 rating; • ASHP installations; • homes below a certain BER; • performance against commercial and public share of CAP sectoral targets; • commercial retrofits supported. Application of the SEAI BER dataset (small area) to indicator development. Updated monthly to provide information on energy ratings, fabric quality and heating systems for all assessed homes.	Building stock plans to be developed to determine the optimum management of property portfolios for decarbonisation.

[a]As an example, matching BER data or National Retrofit Plan data with census data can allow for demographic analysis of the sector allowing energy performance to be broken down by ownership status, age, disability and other cohort and spatial characteristics.

ASHP, air source heat pump; BER, Building Energy Rating.

as well as managing the socio-economic impacts of climate policies on farms and farmers. Some of these priorities are reflected in the illustrative highlighted subdimensions.

Buildings

The buildings domain examines the built environment, including how communities are being supported with the retrofitting and decarbonisation of heating and the installation of renewable energy systems. The domain also examines energy poverty and the various ways that individuals can be exposed to it (Table 3.3). While just transition discussions often focus on individuals, this domain also refers to both commercial and public buildings, as they are addressed in the CAP and by sectoral emission ceilings.

In the built environment sector, there can be a disproportionate impact of climate policy on the least energy-efficient buildings. Where the occupants of such homes are on lower incomes, the transition may intensify their risk of energy poverty. Similarly, for commercial and public businesses, the transition could affect operational costs and competitiveness. Increasing the carbon tax will have an impact on the price of carbon-intensive fuels, and this impact will of course be felt more by those reliant on such fuels. Stakeholders expressed concern that the transition will contribute to more homes falling into energy poverty and more people struggling to heat their homes. This was raised as an important factor for the JTIF to measure, with the built environment being seen as an important dimension related to the support of the health and wellbeing of Irish communities. Monitoring the performance of Irish homes and buildings against CAP targets for energy efficiency upgrades, as well as the risk of energy poverty, as the transition unfolds will be useful for assessing how the transition affects people across this domain.

Transport and connectivity

The transport and connectivity domain focuses on the equitable decarbonisation of the transport sector, including the development of sustainable transport accessibility in urban and rural areas. The domain also examines transport energy poverty risk and the various ways individuals can be exposed to transport energy poverty (Table 3.4).

Stakeholders expressed concern regarding the increasing risk of isolation in certain cohorts and regions as a result of climate policy. Akin to with the buildings domain, they are concerned about the risk of transport poverty increasing as measures such as the carbon tax increase the cost of petrol and diesel. A just transition may account for the fact that such policies typically affect vehicle owners on lower incomes, who spend proportionately more of their income on fuel, more acutely than those on higher incomes. It was suggested that regions and groups most at risk from the transition are often rural and reliant on private transport. This is also a concern for young people due to the more limited public transport opportunities in such areas. Accessible and affordable public transport is thus important from the point of view of both supporting connectivity and mitigating the impact of increases in fuel prices. Additionally, broadband connectivity can represent a challenge that limits the ability of students and workers to operate remotely. As well as having an impact on the ability to create a sustainable region, this lack of connectivity negatively affects a region's ability to attract foreign direct investment or sustain indigenous enterprise.

It will be important to match subdomains in this context with the Avoid–Shift–Improve framework to align them with government goals. Measurement of transport patterns and transit accessibility may be a suitable indicator type for the transport and connectivity domain.

Skills and employment

The focus of this domain is the transition of the workforce to the green economy in all sectors, including policy priority areas such as agriculture, transport, construction and energy (Table 3.5).

Equipping people with the right skills to participate in and benefit from the future green economy is presented as a cornerstone of the government approach to just transition and is articulated by the CAP. This is also reflected in the stakeholder sentiment that both the acute impacts of job losses on individuals and the broader impacts that job losses can have on regions and their future potential should be considered. Considering the Midlands transition away from peat-fired electricity production as an example, stakeholders saw education as a key response to the impact of the transition. It was suggested that this

Table 3.4. Transport and connectivity domain

Proposed subdomains	Examples of available indicators	Examples of methods or new areas in development
Transport poverty	EnvEcon has developed a composite Transport Poverty Risk Index (small area scale). This analytical system covers multiple aspects of transport poverty risk, from accessibility and affordability to mobility.	With the future introduction of the EU Social Climate Fund, new categories of socio-economic indicators for the transition may emerge, including the affordability of transport and the accessibility of transport.
Transport-orientated design/planning	Census 2022 (small area) examined: • means of commuting to work by county (Map 4.1) and by town (Map 4.2); • distance of commute (Map 4.4); • commutes of 1 hour or more by county (Figure 4.8) and by town (Map 4.3). Application of the EnvEcon Work from Anywhere Potential Index (small area).	Accessibility of public transport from social housing has been examined on an international level and could be utilised to measure a just transition in Ireland's public transport. The DHLGH and the Transport Orientated Development Working Group could be engaged regarding this.
Electric vehicles	Performance against CAP sectoral targets: • fleet electrification data; • grant data from the SEAI; • analyses from Zero Emission Vehicles Ireland.	Analyses of total cost of ownership offer robust objective measurements of cost that are relevant, such as those in Guo *et al*. (2022). Caulfield *et al*. (2022) consider the number of household charging points in each electoral area against the Pobal HP Deprivation Index and CSO data on average household income.
Urban and rural mobility	The National Transport Authority's Connecting Ireland Rural Mobility Plan provides data on the population that live within 400 metres of a route or service that allows a minimum of at least three return trips every weekday. The Connecting Ireland Rural Mobility Plan examined public transport connections between villages and local and regional centres and identified the level of connectivity across counties. The Department of Education's School Transport 2030 phase 3 report showcased the uptake of the School Transport Scheme relative to the Social Deprivation Index. The Pulse Survey – Our Lives Online – Remote Work report (last examined in 2021 at NUTS 3 level) can be used for indicator development.	EnvEcon's Transport Poverty Risk Index offers a national (urban and rural) small area objective assessment of transport poverty risk that includes mobility, affordability and accessibility pillars. Other research has been carried out in this field on transport disadvantage and car dependency in rural Ireland, assessing public transport access nodes against the Pobal HP Deprivation Index (Carroll *et al*., 2021).
Equitable public transport	Regarding equitable public transport, the National Travel Survey (NUTS 3) examined: • frequency of transit use; • main mode of travel used; • frequency of active travel. Regarding public transport accessibility, the National Transport Authority records (small area): • public transport stop density; • frequency of public transport services. Performance against CAP sectoral targets is examined for active transit journeys.	

DHLGH, Department of Housing, Local Government and Heritage; NUTS, Nomenclature of Territorial Units for Statistics.

Table 3.5. Skills and employment domain

Proposed subdomains	Examples of available indicators	Examples of methods or new areas in development
Green skills acquisition and green employment	Labour Force Survey: • participation rate; • unemployment; • education level; • education subject; • lifelong learning rate; • income. Labour Force Survey (NUTS 3), which is conducted quarterly: • occupation categories; • remote working. Education and Training Boards, IDA Ireland and other agencies: • Education and Training Board data on training courses; • IDA Ireland's Labour Market Pulse; • Skillnet Ireland reports, EI reports; • OECD Skills Strategy reports.	The Nevin Institute's *Measuring "Green" Jobs in the Republic of Ireland* report from January 2024 provides an overview of green employment nationally and by county using CSO and other data – not recurring (De Vita et al., 2024).
Employment of vulnerable workers	Application of existing data is possible for indicator development. Labour Force Survey indicators described above, i.e. occupation categories, education level, education subject, etc., are relevant and there is developing work on this topic.	EnvEcon has work on employment risk under development for 2025 that has been advanced with CSO support.
Transition of workforce	Census records (small area): change in employment by county. GHG emission intensity of employment – Eurostat (national), yearly.	IDA Ireland's *Labour Market Pulse* report from 2023 uses University College Cork LinkedIn data to illustrate green skills, job trends and demands – not recurring. Research carried out by the London School of Economics and Political Science's Grantham Institute, and published in the report *Investing in a Just Transition in the UK* (Robins *et al*., 2019, p. 20), and research described in the UK Climate Change Committee's 2023 report *A Net Zero Workforce* (p. 82) examined workers affected by just transition by sector, region, age, worker ethnicity and gender.

EI, Enterprise Ireland; NUTS, Nomenclature of Territorial Units for Statistics.

come in the form of both reskilling and jobs training to match displaced workers with opportunities created by the transition, as well as an increased focus on third-level education to support the attraction of new industry to the region. Monitoring progress on this could assist in identifying and addressing skills gaps and ensuring that appropriate implementation capacity exists to support the transition to a green economy.

It was also suggested that performance in relation to this domain be measured based on tracking educational attainment metrics as well as the uptake of training and upskilling courses. Just transition indicators may include those that measure the employment and skills development of vulnerable workers, whereas progress indicators may pertain to the GHG emission intensity of different types of

employment and the availability of "green jobs" in a location. An important development will be transposing these indicators to capture their relevance to just transition and worker vulnerability. For example, further research will be required to determine what constitutes a "green job" and what job categories should be classified as green jobs or at-risk jobs in the transition.

Participation and community engagement

This domain emphasises the importance of community participation and engagement as a central component in achieving an equitable climate transition. This approach aims to actively involve and support citizens, especially those from vulnerable communities, in the transition process (Table 3.6).

The participation and community engagement domain reflects the CAP just transition principle of "social dialogue to ensure impacted citizens and communities are empowered and are core to the transition process" (Government of Ireland, 2023, p. 90). The need to account for the views of those most affected by the transition is frequently raised as a concern by stakeholders and relevant experts. Indeed, approaches that do so are accepted as international best practice and are ubiquitous throughout the referenced literature and case studies. Typically, such a process can be orchestrated through direct engagement with affected groups and regional stakeholders. However, in the context of establishing a set of nationwide indicators for monitoring a just transition, representative attitudes and surveys are appropriate. The complexity of designing and capturing representative views should be recognised in this context.

In this domain, measurement can also focus on community input into policy and community development through mechanisms such as the Department of the Environment, Climate and Communications (DECC) National Dialogue on Climate Action (NDCA) and efforts at the Department of the Taoiseach to track and coordinate communications activities. Engagement in specific community-focused actions can also be considered, such as the Community Benefit Funds established under the Renewable Electricity Support Scheme, which aim to enhance local economic, environmental and cultural wellbeing. This type of scheme can enable local communities to financially benefit from renewable energy projects in their areas and represents another potential indicator.

3.2 Closing Note on Domains, Narratives and Indicators

Chapter 3 has assigned initial narratives to the domains identified and provided illustrative indicator examples that can assist with defining the menu and format of indicators in the formal development of a national JTIF. It will only be through suggesting and evaluating individual and collective indicators across the full scope of domains that the final decision will be made as to what to include or exclude. We would recommend that the Irish system seek good coverage of domains, while recognising that not all aspects and interests can realistically be included. Without restraint on indicator selection, and without acknowledgement of the constraints around maintaining robust and reliable routine indicators, the system developed would be likely to struggle. However, by considering the domains and indicators suggested, and adapting them as necessary, it should be possible to develop a functioning system that offers value.

Table 3.6. Participation and community engagement

Proposed subdomains	Examples of available indicators	Examples of methods or new areas in development
Place making and balanced regional development	Deprivation level (Pobal HP Deprivation Index, small area). Income distribution (Labour Force Survey). Life satisfaction, risk of poverty, deprivation and household wealth levels (Survey on Income and Living Conditions). Access to services (CSO/GEOHive, location). Assessing the availability of natural spaces that contribute to community wellbeing – measured using the EPA National Land Cover Map.	In alignment with the place-based wellbeing framework: • tracking overall wellbeing through health, social inclusion, and quality of life indicators; • mental health and stress levels: monitoring the impact of the transition on community mental health; • social cohesion and community resilience: measuring the strength of social networks and community support systems.
Engagement with marginalised communities		Aspects to be considered in future outreach and consultation: • public awareness of just transition: assessing the level of public knowledge about just transition efforts; • engagement of marginalised communities: assessing the participation of vulnerable groups in decision-making; • participation rates in climate-related public consultations: tracking the involvement of the public in climate policy discussions.
Perceptions of national climate action	Data captured under the Climate Change in the Irish Mind project: • support for investments in various sectors; • recognition of the role of policy in climate change mitigation; • agreement that a green transition would have positive economic outcomes.	
Perceptions and community engagement of local climate action	Data captured under the Climate Change in the Irish Mind project: • concern about local environmental hazards; • risk of extreme weather in the community. Responses to the following statements from the SEAI Irish national survey of households near new commercial wind and solar farms[a] could also be utilised: • If I want, I can have a say in the planning process of a local wind/solar project. • My community can have a say in the planning process of a local wind/solar project, if they want to. • Project developers and the planning authorities take account of the opinions of communities close to wind/solar projects. • The planning process in Ireland is not fair and transparent.	The CSO Trust Survey could also be utilised; however, this was last conducted in 2021. Community engagement was examined in Shapovalova *et al.*'s (2023) paper, which measured:[b] • the percentage of people who agree with the statement "My local council is good at listening"; • the percentage of people who agree with the statement "I can influence decisions affecting my local area"; • The percentage of people who agree with the statement "I want greater involvement in my local area".

[a]This surveys households on their own and the community contribution to the planning process, willingness of project developers to take account of the opinions of communities, and general thoughts on the planning process in Ireland.

[b]A shift in emphasis can be detected in indicators research associated with "engagement and voice". Shapovalova *et al.* (2023) make recommendations on further developing national-level perceptions of climate action.

4 Conclusions, Including Policy Recommendations

4.1 Recommendations for Framework Development

This section focuses on key considerations for designing the JTIF that align with the approaches highlighted in the previous chapters. We offer guidance regarding the suitability and availability of indicators, the communication strategy and dashboard development, as well as governance approaches that recognise the necessarily dynamic nature of the JTIF.

4.1.1 Assessing the suitability of domains and indicators for a just transition framework

The JTIF would be a dynamic system comprising domains and indicators. Both the domains and the indicators within the domains may evolve over time as the green transition progresses. This adaptability is important for the framework to remain relevant and to effectively address emerging challenges and opportunities.

Our approach has been to propose a framework for monitoring the impacts of a transition to a climate-neutral economy and society, developed in line with international precedent and best practices and connected to the existing national strategies for environmental policy and just transition. The following points should be considered in assessing the suitability of indicators for the framework:

- The climate transition itself will be dynamic. As the transition and our policies evolve, sectors and groups not recognised in Chapter 3 may be expected to be more acutely affected. The framework should thus adopt a flexible approach, whereby domains, subdomains and indicators can be updated to reflect the prevailing policies and impacts of the transition. In this context, periodic reviews should be a feature of the framework.
- It was recognised throughout our assessment of suitable illustrative indicators, as well as our consultation with stakeholders, that further indicator development is required for certain sectors and domains. Specific focus was given to the development of indicators relating to participation and community engagement, the importance of employment and skills, and the need for indicators that provide intelligent job market insights. General development around the possibility of improving the spatial granularity of indicators such that local- or regional-level data are available for those indicators is also recommended.
- As outlined in section 2.2, best practice regarding assessing the suitability of indicators includes considering existing data-gathering capacities and access to information channels, thereby allowing for the regular updating and future adaptability of the indicators.
- Although our review of available indicators considers the data sources largely available to us, it is recommended that consultation is undertaken with agencies and departments to consider other sources not in the public or policy research domain and, where appropriate, to obtain the relevant administrative or other data that may be harnessed for indicator development.

In addition to these best practice recommendations for indicator framework development, this section provides specific recommendations for the application of demographic detail for monitoring distributional inequality associated with the transition, as well as the application of analytical systems to provide sufficient foresight capacity within the framework.

Insights on addressing and monitoring distributional inequality

The 2021 update of the CALCD (Amendment) Act adopts a statutory approach to just transition, whereby all relevant ministers are tasked with formulating and implementing climate action policies informed by a just transition approach. Further to this, the *Report of the Taskforce on Just Transition* (DECC, 2024a) indicates that this statutory requirement entails an integrated evidence-based approach to the design and delivery of climate policies that puts the objectives of

just transition to the forefront in CAPs. With this broad policy focus in mind, the JTIF will be an important tool for ministers and decision-makers in "ensuring that costs are shared so that the impact is equitable and existing inequalities are not exacerbated" (DECC, 2024b).

Addressing vulnerability should be at the forefront of monitoring efforts for a JTIF, as the transition to a low-carbon economy will inevitably have varied impacts across different populations and regions. To adequately represent vulnerability, it is important to consider indicators that accurately reflect demographic diversity. Monitoring distributional equality should therefore be considered when assessing policy impacts. This relies on approaches and indicators that allow for demographic nuances and capture differences across regions, income levels, age groups and other relevant societal segments. Such indicators may allow identification of socio-economic disadvantages and advantages as well as communities that are experiencing structural inequalities, identity-based discrimination and poverty.

The CSO datasets suggested for inclusion in this framework (summarised in Appendix 1) are typically nationally representative household surveys in which the sample of people surveyed accurately reflects the broader population of an entire country in terms of key demographics, such as age, gender, race, income, education level and geographical distribution. They are designed to ensure that the estimates from the survey can be generalised to the entire population of the country. This is achieved through careful sampling methods, such as random sampling or stratified sampling, such that segments of the population can be proportionally represented in the reference sample. Using these datasets and others with similar levels of disaggregation allows for the segmentation of results based on these demographic factors. Such an approach emphasises the importance of accounting for the socio-economic profiles of regions and population groups to gauge the impacts of policies on different communities. When we consider the data mentioned in Chapter 3 and their suitability for use in a JTIF, we should consider the extent to which demographic insights can be applied. As an example, unemployment is not an ideal just transition indicator; however, regional unemployment or unemployment among a certain cohort may offer value for just transition policy.

Analytical systems

While the indicators suggested in Chapter 3 are for the most part individual metrics based on publicly available data, some established composite indicators were also included. These approaches should be considered to offer insight beyond individual metrics. In the context of developing a high-level framework for monitoring just transition, it is important not only to know that there is a problem, but to also be able to assess and evaluate what can be done to address that problem and determine how climate policy interventions may affect just transition risks and outcomes.

In support of the statutory requirements to account for just transition in policy, we advise that a suite of policy tools be developed for the JTIF through collaboration with relevant stakeholders, to expand research and foresight capacity on just transition and ensure that sufficient systems are in place to enable bespoke policy that can be used to assess the impact of an intervention on just transition domains and outcomes.

The use of analytical systems will provide for this level of analysis and policy assessment. Such systems will also allow for the assessment of policy impacts across the defined domains. As well as providing updatable indicators, these systems can also serve at an operational level for policy support. Appendix 1 lists some existing systems that can be used directly in this process. In addition to the examples detailed in Appendix 1, it is suggested that research groups and experts be engaged to discuss additional analytical systems that might be developed. One such consideration in this respect is the development of a community vulnerability index to provide an analytical overview of how the transition may affect particularly vulnerable groups.

Connected to this, it will be valuable to develop, in parallel, a function for scenario analyses relating to indicators. By engaging with research groups or the developers of the systems identified, the impact of policy interventions (or indeed economic incidents) may be assessed with a view to gauging the impact on just transition. This will allow policy to not only assess the just transition, but also to anticipate the impacts of policies or events on a just transition. We believe that such systems will become increasingly important in the context of the statutory requirements for ministers to consider just transition in policy.

4.1.2 Destination framework and dashboard development

To function effectively, the national JTIF should apply a suitable destination framework for communicating and presenting indicators and trends across the relevant just transition domains. This Fast-Track to Policy report offers only initial illustrative proposals for the communication and presentation of a JTIF dashboard. In this context, the development of a user-friendly dashboard interface is advised, featuring measurements across categories of indicators, communicated via interactive dashboards, trends and graphs.

A broad framework approach akin to the Well-being Information Hub developed and maintained by the CSO would be a suitable example in this context. Whereas the Well-being Information Hub aims to answer essential questions as to how we are doing as a country, as communities and as individuals, this dashboard could adopt a similar approach in the context of just transition, in which indicators will continue to be developed and monitored as new data are released. It is recognised that there is a need to minimise manual updating, especially if data are drawn from several sources. A reliable timetable of when indicators will be due for updates will be a useful consideration when selecting indicators.[2] Automating data retrieval and reporting via the use of application programming interfaces or similar approaches to reduce the administrative burden associated with manual updating would be sensible, and we recommend that this is explored with the CSO and other key data providers as the panel of indicators takes shape. The CSO Key Economic Indicators dashboard is another useful example in this context. This is a live dashboard that updates to include the most recent information on each available indicator. The dashboard is divided into three themes, macroeconomic, business and people. It includes the key economic indicators produced by the CSO across these domains, including real gross domestic product and gross national product, consumer price index, unemployment rate and residential property price index.

In the context of measuring just transition outcomes in Aberdeen (Scotland, UK), Shapovalova *et al*. (2023) suggest a dashboard approach consisting of a curated selection of singular indicators. A similar approach is also used in monitoring the UN Sustainable Development Goals (SDGs). The UN SDG dashboard presents key indicators and data related to each goal, utilising a traffic-light system to provide a visual representation of progress, challenges and areas needing attention. This style of approach may also merit consideration; however, a degree of flexibility should be ensured to allow the indicators to evolve in alignment with the evolution of the just transition and alongside progress made in international, EU and national policies.

Figures 4.1–4.3 highlight approaches that may be considered by domain-relevant dashboards when considering the policy priority and just transition indicators to be presented. In this case, we highlight the built environment domain, starting with a just transition indicator measuring energy poverty risk (Figure 4.1). To give further insight into the domain, the dashboard includes details on policy priority indicators related to energy balance and performance against CAP targets.

In this instance, trackers can measure the number of homes retrofitted to B2 Building Energy Rating (BER) standards as well as the number of heat pump installations. However, this format can also be applied to measuring progress in electric vehicle uptake and solar uptake, etc. Graphics such as bar charts, line graphs and pie charts could be applied as best suits each indicator. In the case shown in Figure 4.1, a pie chart is used to show the share of each fuel type used to meet residential energy demand. It should be noted that mock data are used for all graphics in Figures 4.1–4.3, as these are illustrative examples only.

Where data are available spatially, an approach such as that shown in Figure 4.2 may also be considered useful. In this case, a map is provided for the indicator (BER grade), highlighting Dublin as an area of interest, with interactive features then allowing for the

2 The indicators highlighted in Chapter 3 come from a variety of sources with distinct release schedules. In determining the JTIF update schedule, a real-time approach may be considered that provides the most recent update of each indicator. Alternatively, data may be consolidated and an annual JTIF update may be scheduled where all indicators (with an annual or quarterly release) are updated together.

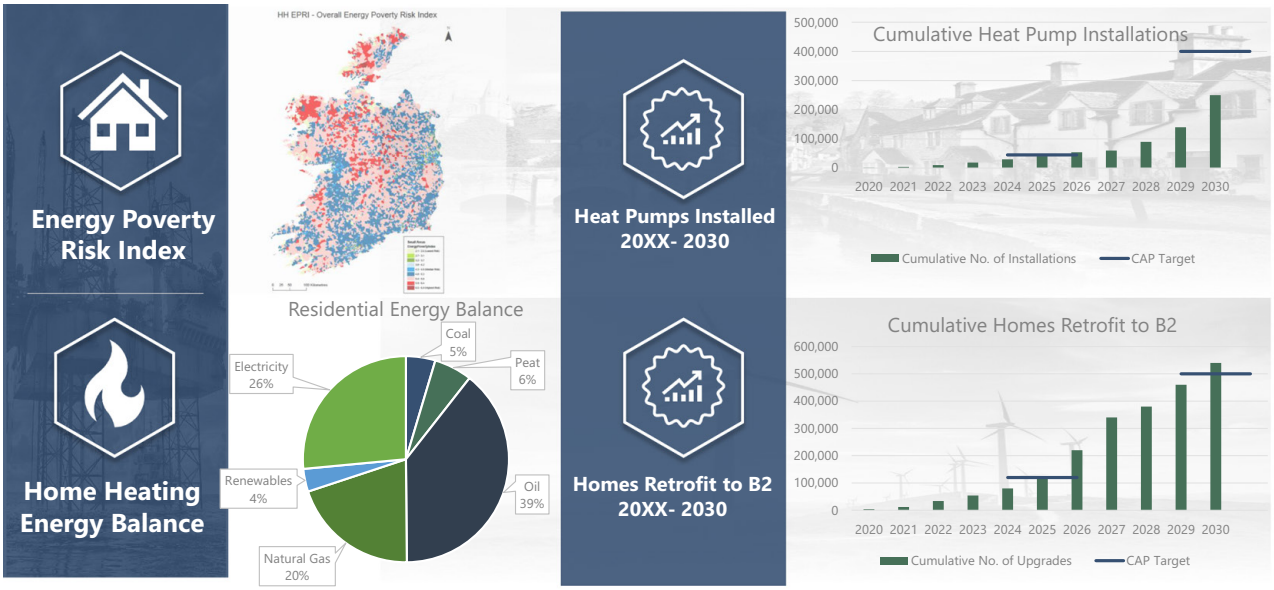

Figure 4.1. Sample indicators I. This figure was generated by the authors using mock data for illustrative purposes.

Figure 4.2. Sample indicators II. This figure was generated by the authors using mock data for illustrative purposes.

assessment of this indicator at a more refined spatial level.

To the extent that such analytical systems are incorporated as part of the framework, the expectation is that policymakers and research groups would be the primary users. These tools are to be developed such that scenario and policy analyses can be conducted to assess the impact of policies on just transition domains. These systems should ideally have built-in spatial dimensions and interactive features, so that policies can be assessed and progress can be measured across each domain and region. Insights from these systems can then be presented in dashboards. Dashboard elements could include maps detailing hotspot regions for domain-specific indicators as well as trend analysis monitoring national and regional performance against indicators such as at risk of poverty indices. Systems designed to identify optimal pathways for achieving existing targets can

also identify and report on these pathways through the dashboards.

Figure 4.3 demonstrates how indicators may be applied where data allow for separation based on specific cohorts. In this case, housing tenure status is used as an example.

In addition to dashboards, more frontline communication strategies are also suggested, including holding community workshops to engage directly with communities, explain the indicators and seek feedback on their relevance and clarity. This participatory approach can help ensure that indicators better reflect local experiences and needs. This approach would need to recognise the impact that digitisation of public services has on socially disadvantaged groups, including those on lower incomes, those with lower educational attainment and older people. Using some non-digital mediums for communication may also be a good strategy for gaining broader and more meaningful participation in these groups.

4.1.3 Governance approaches

Several important considerations should be made when determining an appropriate governance approach for an indicator framework that has a cross-cutting and cross-sectoral scope. Based on engagement with stakeholders, we advise that a structured approach to interdepartmental collaboration be taken such that the framework is supplied with cohesive input from the relevant stakeholders and that cooperation between groups is facilitated. This will require an inclusive process with suitable reporting and feedback loops. Such a governance approach will allow for collaboration while also providing an extended network of contacts to support areas where external data or inputs are required.

To support such a broad governance umbrella, it will be important that a clear vision for the JTIF with clearly outlined roles is set in place, and that efforts are made to promote a culture of transparency and accountability in terms of how the progress and management of the JTIF are reported. As has been discussed throughout, the JTIF will most likely be dynamic, with changing impacts as the transition unfolds and changing capabilities as indicators and data are developed. Periodic reviews should thus be conducted by decision-makers to establish which dimensions and indicators remain relevant.

In this context, an interdepartmental working group, similar to that of the wellbeing framework, could be established to support good governance. In the case of the wellbeing framework, a collaborative approach was pursued, with departmental leads from relevant departments, a wider interdepartmental working group,

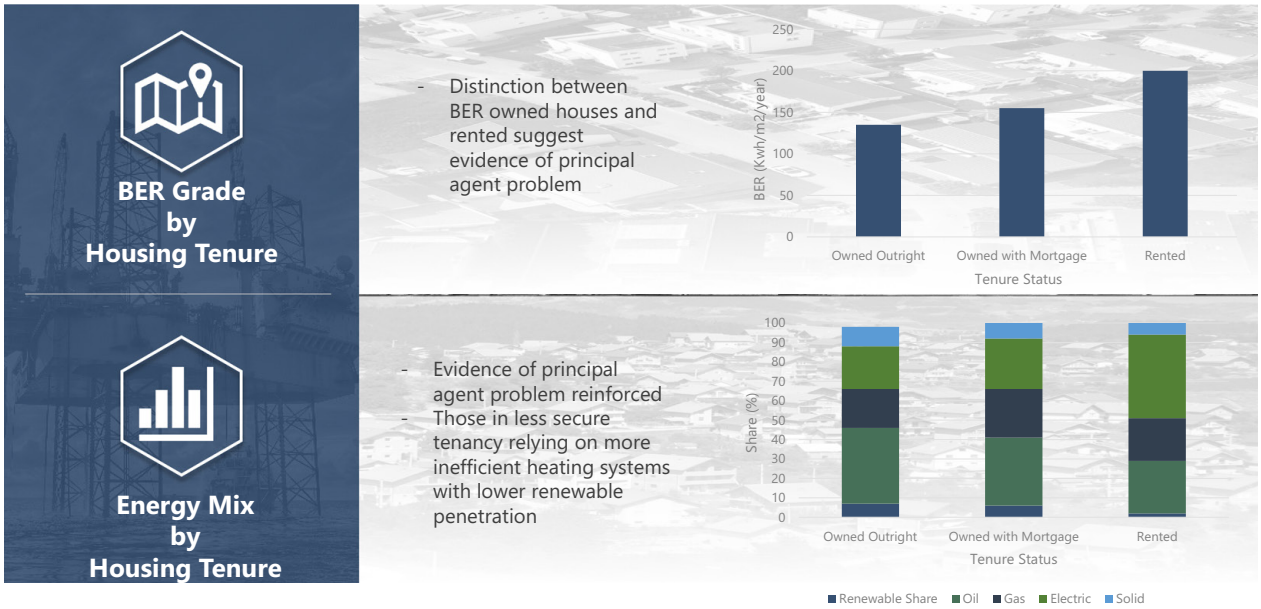

Figure 4.3. Sample indicators III. This figure was generated by the authors using mock data for illustrative purposes.

and the CSO and NESC all working closely together (Department of the Taoiseach, 2021). For example, the CSO had a central role in the design of the first iteration of the interactive dashboard and in informing future data requirements for improving the dashboard over time. NESC then provided a valuable vehicle for consultation on the framework throughout its development through a subgroup of stakeholders and experts. Therefore, valuable lessons can be learned from existing capacities and operational precedents in the Irish system that can support the development and implementation of a national JTIF. Sectoral leads (policy owners) and associated bodies will also play a vital role in the process.

4.2 Summary and Conclusion

This Fast-Track to Policy report explores the development of a national JTIF for Ireland, primarily focusing on the initial development of a robust conceptual framework with progress on domains and potential indicators. The aim of this JTIF is to guide the approach to measuring, monitoring and supporting a fair and equitable climate transition within Ireland.

The proposed conceptual framework is built on key insights from international definitions, national policy goals, relevant literature, national and international best practices, and preliminary stakeholder engagement to broaden the relevance and inclusivity of this initial report. The report identifies six potential domains that the JTIF could cover, including both sectoral (electricity, transport, buildings, agriculture) and cross-cutting (employment and skills, participation and community engagement) domains. This structure offers adequate coverage for monitoring the just transition and highlights areas where an array of climate policies may impact different groups and regions.

The potential indicators presented align with various international, EU and national policy objectives, such that the JTIF may adequately represent progress or lack thereof on those topics and may assist with targeting support and interventions for just transition. A dynamic framework is recommended, allowing for periodic updates, to reflect shifts in data availability, policy priorities and context. The domains presented and the indicators illustrated are neither definitive nor exhaustive; however, they do offer the necessary structure to illustrate a JTIF and support the advancement of such a system.

In brief, this conceptual framework lays the groundwork for the development of a JTIF for Ireland, offering a structured, adaptable approach to monitoring the country's progress in achieving a just transition. To further advance the JTIF, the following actions are advised:

- *Define a governance approach*. Effective governance is essential for the framework's success. This report advises establishing an interdepartmental working group with clearly defined sectoral leads to oversee implementation, periodic reviews and stakeholder engagement. This approach will support the development of a JTIF that remains aligned with Ireland's evolving policy landscape and also with relevant international standards.
- *Refine indicators*. Our review suggests using a number of indicators designed to offer coverage of the identified domains. Further stakeholder consultations and pilot testing in key regions are advised to refine the proposed indicator menu. However, it is important that the indicators remain manageable in number and form, and that their value and relevance are scrutinised.
- *Invest in data infrastructure*. New data collection methods or revisions to existing data-gathering approaches may be needed. Furthermore, capacity to effectively monitor distributional inequalities is noted as an important feature of a JTIF. This may require more granular data collections, as well as spatially referenced metrics.
- *Run public engagement campaigns*. The need for public participation and engagement in a just transition has been flagged throughout this process. Public engagement in refining the menu of indicators for the JTIF is recommended. Furthermore, raising awareness of the JTIF will be important for informing citizens and stakeholders about the progress made against key indicators and for highlighting ongoing government efforts to deliver a just transition.

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Appendix 1 Additional information

Information on Data Sources

CSO Census of Population.[3] Conducted by the CSO every 5 years, the Census of Population is an account of everybody in Ireland on census night. As such, it is the dataset that offers the greatest level of spatial desegregation, presenting indicators at small area (~100-house) level. The 2022 census offers indicators across profiles such as demographics, housing, households and families, health, diversity and employment.

Labour Force Survey (LFS).[4] In the context of developing improved insights into and forecasts of the labour market and skills, the LFS is an important resource. The LFS is a large nationwide survey of households in Ireland designed to produce quarterly labour force estimates. Such estimates include the official measures of employment and unemployment as well as further metrics regarding things such as labour skills and educational attainment. The LFS is conducted each quarter and, as of the first quarter of 2018, it has been scaled to the eight Nomenclature of Territorial Units for Statistics (NUTS) 3 regions. This will allow for segmentation to this level of labour force-relevant statistics such as labour force status, occupational category, educational attainment level and gender of workers. As this is a survey-based dataset, some metrics reflect attitudes and perspectives of respondents.

National Travel Survey (NTS).[5] Conducted by the CSO, the NTS is a household survey that details the travel behaviour of respondents. The survey provides metrics detailing the domestic travel patterns of Irish residents. Relevant indicators include the number of trips, the mode of travel and the frequency of various modes. As is the case with the LFS, certain responses are more suited to the attitudes and perspectives domain. The NTS is conducted every 3 years and can be scaled to NUTS 3 regional level.

Survey on Income and Living Conditions (SILC).[6] Part of a wider EU project, SILC is an annual survey on income and living conditions that allows for comparisons across EU Member States. It is the official source on household and disposable income and is also the source for a number of key poverty indicators, including at risk of poverty rate. SILC incorporates thematic modules featured less frequently including modules on wellbeing and household finance. Data are available at NUTS 2 level.

CSO Well-being Information Hub.[7] The CSO maintains a Well-being Information Hub that features a range of indicators covering a broad range of topics related to life in Ireland across 11 themes. Themes feature data from a variety of sources, including the LFS, SILC and the BER dataset. As such, the availability and spatial level of the data varies for each metric. The *Report of the Taskforce on Just Transition* (DECC, 2024a) recognised that work on the development of just transition indicators would align with the wellbeing framework, which focuses on quality of life, equality and sustainability, thereby offering a rounded view of living conditions and wellbeing in Ireland. Themes identified within the national framework on wellbeing that are particularly relevant to just transition include subjective wellbeing; mental and physical health; income and wealth; knowledge, skills and innovation; housing and built environment; environment, climate and biodiversity; work and job quality; time use and connections; and community and participation. Exploratory work was ongoing in relation to the development of subnational-level indicators for the wellbeing framework as at 2024. Developments in both areas should be tracked and linked for coherence.

3 Census of Population (accessed 20 February 2025).

4 Labour Force Survey (accessed 20 February 2025).

5 National Travel Survey (accessed 20 February 2025).

6 Survey on Income and Living Conditions (accessed 20 February 2025).

7 Well-being Information Hub (accessed 20 February 2025).

SEAI BER.[8] As the issuing authority of Irish national energy performance certificates for buildings (the BER certificates), the SEAI maintains a dataset on all homes that have been assessed for a BER. As of summer 2024, this accounted for over 1 million observations. The dataset contains details regarding the BER of the dwelling as well as energy use, fabric quality, fuel type and use associated with the dwelling. It is updated monthly and can be scaled to county or small area level.

EPA national emissions accounts.[9] In conjunction with EU reporting requirements, national emissions levels for GHGs and air pollutants are published annually. These accounts provide a sectoral breakdown of actual at a 2-year time lag, as well as emissions projections for all sectors out to 2040. All emissions are reported at the national level; however, the MapEIre model of spatial emissions occurs on a longer time horizon (5 years) and can be used to downscale emissions indicatively at finer spatial scales.

SEAI National Energy Balance.[10] The National Energy Balance is the definitive source for data on the supply, transformation and demand of energy in Ireland. It is compiled by the SEAI statistics team based on consultation energy suppliers as well as public administrative data. The National Energy Balance gives the total energy use for each sector and fuel type. Data are available at the national level only. Energy price data are also available from related publications of the SEAI.

National Farm Survey (NFS).[11] The Teagasc NFS has been conducted on an annual basis since 1972. The survey is operated as part of the Farm Accountancy Data Network of the EU and fulfils Ireland's statutory obligation to provide data on farm output, costs and income to the European Commission. A random, nationally representative sample is selected annually in conjunction with the CSO to represent farms with more than €8000 of standard output. Each farm is assigned a weighting factor so that the results of the survey are representative of the national population of farms. These results are based on a sample of 795 farms, which represents 85,860 farms nationally.

Teagasc NFS sustainability report.[12] This report provides the latest available information on the sustainability performance of farms in Ireland, based on detailed analysis of data collected through the Teagasc NFS. Economic, social, environmental and innovation sustainability metrics were produced for dairy, cattle, sheep and tillage farms in 2022. The report also includes time series results over several years, which allow for an assessment of how farm sustainability has changed temporally.

Census of Agriculture.[13] The Census of Agriculture in Ireland is a comprehensive survey conducted by the CSO to gather detailed information about the agricultural sector in the country. It provides a snapshot of various aspects of farming and rural life, serving as a vital tool for policymakers, researchers, farmers and other stakeholders in understanding the state of agriculture in Ireland. The census collects a wide range of information, including farm structure, livestock, crops, farm practices, farm inputs and outputs, economic data, demographic information, and environmental impact.

CAP progress reports.[14] The Department of the Taoiseach publishes regular CAP progress reports, providing crucial insights into Ireland's progress towards its climate goals. These reports serve as valuable resources for policymakers, stakeholders and the public by transparently detailing the implementation of committed climate actions, identifying areas where further action is required, tracking key performance indicators (KPIs) and highlighting achievements and delays made under each successive CAP.

CCAC's annual review of CAP KPIs.[15] To effectively monitor progress towards Ireland's climate goals, a robust monitoring and reporting system has been established. This system tracks progress against the

8 Building Energy Ratings (accessed 20 February 2025).

9 Latest emissions data (accessed 20 February 2025).

10 National Energy Balance (accessed 20 February 2025).

11 National Farm Survey (accessed 20 February 2025).

12 *National Farm Survey – Sustainability Report 2022* (accessed 20 February 2025).

13 Census of Agriculture (accessed 20 February 2025).

14 CAP progress reports (accessed 20 February 2025).

15 *Annual Review 2023 – Recommendations and Commentary* (accessed 20 February 2025).

KPIs outlined in successive CAPs. Commencing in 2025, the DECC will annually publish comprehensive KPI reports.

Climate Change in the Irish Mind.[16] Climate Change in the Irish Mind is a nationally representative survey conducted by the EPA every 2 years. The survey serves as a national hub for understanding a number of key factors pertaining to public understanding of climate change. These include knowledge base, attitudes, policy preferences and behaviours as well as underlying cultural and psychological factors that influence the public. The survey aims to provide an overview of attitudes and behaviours, identify segments of the population based on their attitudes to climate change and estimate policy support and behaviour for climate change-related policies. The survey scales to the national level.

NDCA.[17] The NDCA plays an important role in supporting Ireland's ambitions with regard to climate change mitigation policy. It aims to deliver a systematic means of actively engaging stakeholders and the public with a view to enabling and empowering people at local and national levels. In addition to improving climate literacy by creating awareness, promoting understanding of the issues at hand, and funding and supporting engagement in climate change policy, the programme aims to capture insights from engagement activities and conduct social and behavioural research to inform the CAP and other climate policies. Such research is conducted through a variety of groups and programmes, including Climate Conversations, the National Climate Stakeholder Forum and The National Youth Assembly on Climate. Effectively harnessing the NDCA in the JTIF may be a useful way of incorporating attitudes and perspectives into the process, as well as noting levels of outreach and engagement.

National Retrofit Plan Progress Report.[18] The SEAI releases quarterly updates detailing the progress made on the National Retrofit Plan. These releases feature updates on headline outcomes across each quarter, such as the number of property upgrades completed, the number of homes upgraded to B2 BER standard, and total expenditure on SEAI schemes. The report contextualises the performance across such headlines by comparing them with the previous quarter and the same quarter in the previous year.

CSO Pulse Survey – Our Lives Online – Remote Work.[19] The Pulse Survey, conducted during the time of COVID-19 pandemic restrictions in 2021, examined commutes made by remote workers to remote working hubs. The release is part of the CSO Frontier Series, which uses methods under development or, sometimes, incomplete data. Such releases are designed to allow the CSO to provide useful information to users and be informed of new methods and outputs. It remains to be seen if this survey will be conducted again.

The European Green Deal Just Transition Mechanism

The European Green Deal contains a proposal for a Just Transition Mechanism, including a JTF, which focuses on the promotion of social fairness, shared prosperity and decent work, with particular attention on the regions, industries and citizens most vulnerable to negative economic and social impacts resulting from the transition (EC, 2019). The 2020 Sustainable Europe Investment Plan likewise states that the Just Transition Mechanism will and should focus on those regions and sectors most affected by the transition due to their dependence on fossil fuels or GHG-intensive industrial processes.

Just Transition Performance Scores

European Commission: Transition Performance Index

The Transition Performance Index (TPI) is an indicator developed by the European Commission to measure performance through composite indicators. The TPI is a straightforward and transparent tool. It is the sum of 28 internationally comparable indicators focusing on four dimensions:

1. *economic:* education, wealth, labour productivity, research and development intensity, industrial base;

16 Climate Change in the Irish Mind (accessed 20 February 2025).

17 National Dialogue on Climate Action (accessed 20 February 2025).

18 *National Retrofit Plan – Quarterly Progress Report: Quarter 1, 2024* (accessed 20 February 2025).

19 Remote Work Hubs Pulse Survey – Our Lives Online – Remote Work November 2021 (accessed 20 February 2025).

2. *social:* health life, work and inclusion, free or non-remunerated time, equality;
3. *environmental:* GHG emission reduction, biodiversity, material use, energy productivity;
4. *governance:* fundamental rights, security, transparency, sound public finances.

The TPI is unique in its global dimension as it offers coverage of 76% of the world population and dates back to 2011, thereby affording the opportunity for trend analysis. The index is reported nationally and updated annually.

Social Progress Imperative: just transition score

The just transition score is a composite indicator based on the Social Progress Imperative's definition of a just transition. In this context, a just transition refers to the balance between advancing equitable human progress and reducing damage to the environment. As a measure of human progress, the Just Transition Score uses the Social Progress Indicator in conjunction with measures of sustainability such as per capita carbon dioxide emissions and material consumption as well as biodiversity measures. The index is available at a national level and results are updated annually.

Sustainable Development Solutions Network: leave-no-one-behind score

Developed by the authors of the Europe Sustainable Development Report, the leave-no-one-behind score focuses on inequality across four dimensions, namely: poverty, services, gender and income. Examples of indicators include at risk of poverty rate, material deprivation, Gini coefficient, gender pay gap and gender employment gap. The higher the score, the fewer people are considered left behind.

Analytical Systems

Pobal HP Deprivation Index

This index[20] shows the level of overall affluence and deprivation at small area level across Ireland. Based on a composite of census indicators, it is updated in line with each census. The index is based on the combination of three dimensions of relative affluence and deprivation, namely: demographic profile, social class and labour market situation. By giving an overview of the regional deprivation at census time, this index helps inform policy decisions by highlighting areas in need of economic or social interventions. Baseline scenarios based on existing inputs could also be used as indicators.

Energy-poverty Risk Indicator and Transport Poverty Risk Index, EnvEcon

The Energy-poverty Risk Indicator and Transport Poverty Risk Index developed by EnvEcon (Kelly *et al*., 2020, 2023) are composite approaches to assessing the risk of home heating and transport poverty in Ireland. The composite approach is based on a series of weighted indicators, which in the context of home-heating energy poverty include heating requirements, building characteristics and householder characteristics, and in the case of transport poverty include factors relating to transport accessibility, affordability and mobility. Use of census data, along with other more routinely updated data, allows the findings to be scaled to the small area level for granular separation of the risk across each of the 18,641 small areas in Ireland. The index and indicator are dynamic, allowing for scenario modelling (e.g. fuel price or policy changes) and updates with new data. They can thereby support policymaking by assessing the impacts of relevant interventions or events. As with the deprivation index, baseline figures can be applied to offer a broad indicator for use.

Ireland Environment, Energy and Economy, Economic and Social Research Institute

ESRI's I3E model[21] is a comprehensive computable general equilibrium model that examines the intersection of economic activity, energy use and environmental impact in Ireland (de Bruin and Yakut, 2021). The I3E model provides insights into the real-world impacts of climate policies, incorporating sectoral details and various energy inputs, making it suitable to evaluate policy effects on the identified domains associated with just transition. It assumes

20 Pobal HP Deprivation Index (accessed 20 February 2025).

21 ESRI I3E (accessed 20 February 2025).

perfect competition, meaning no individual firm or consumer can influence market prices, which are determined at equilibrium. By capturing multiple household groups, government interactions and international trade the I3E model can aid policymakers in devising strategies to achieve a just transition to a low-carbon economy, balancing environmental goals with economic and social needs.

Framework for Monitoring Rural Development in Ireland, Economic and Social Research Institute

ESRI's framework for monitoring rural development policy in Ireland[22] is designed to assess the impact of initiatives related to the country's just climate transition (Kelly *et al*., 2024). This framework is aligned with the national Rural Development Policy 2021–2025,[23] which encompasses 146 policy measures and 9 key deliverables across its 8 core themes: optimising digital connectivity, supporting employment, revitalising rural towns and villages, enhancing participation, enhancing public services, transitioning to a climate-neutral society, the sustainability of agriculture, the marine and forestry, and the sustainability of the islands and coastal communities. The overlaps between this work and work for just transition are apparent from a review of these themes. The framework operates by identifying KPIs relevant to rural development, with a view to evaluating general wellbeing and the direct impact of policies on rural communities. Through this, the framework offers a way to monitor the direct impact of policies on specific target variables within a defined monitoring framework. This can be an effective approach to considering the rural development impacts of a policy.

List of Participants in the Engagement Process

The organisations contact list for the stakeholder engagements is presented below. Over 60 government departments, agencies, representative groups and stakeholders were contacted to request input. The list represents those organisations for which a contact or contacts returned a completed contact sheet. The process was designed to source additional perspectives to add value to the framework assessment. It is not presented in any way as an exhaustive engagement process. The organisations that returned a completed contact sheet were:

- Climate Change Advisory Council;
- Irish Human Rights and Equality Commission;
- Pobal;
- Department of the Taoiseach;
- Midlands Regional Transition Team;
- Social Justice Ireland;
- Department of Rural and Community Development;
- Think-tank for Action on Social Change;
- National Women's Council of Ireland;
- Fáilte Ireland;
- Department of Public Expenditure, NDP Delivery and Reform;
- The Wheel.

22 *Developing a Framework to Monitor Rural Development in Ireland* (accessed 20 February 2025).

23 *Our Rural Future: Rural Development Policy 2021–2025* (accessed 20 February 2025).

Abbreviations

BER	Building Energy Rating
CALCD	Climate Action and Low Carbon Development
CAP	Climate Action Plan
CSO	Central Statistics Office
DECC	Department of the Environment, Climate and Communications
ESR	Effort Sharing Regulation
ESRI	Economic and Social Research Institute
EU	European Union
GHG	Greenhouse gas
I3E	Ireland Environment, Energy and Economy
ILO	International Labour Organization
JTF	Just Transition Fund
JTIF	Just Transition Indicator Framework
KPI	Key performance indicator
LFS	Labour Force Survey
LULUCF	Land use, land use change and forestry
NDCA	National Dialogue on Climate Action
NESC	National Economic and Social Council
NFS	National Farm Survey
NTS	National Travel Survey
OECD	Organisation for Economic Co-operation and Development
SDG	Sustainable Development Goal
SEAI	Sustainable Energy Authority of Ireland
SILC	Survey on Income and Living Conditions
TPI	Transition Performance Index
UNFCCC	United Nations Framework Convention on Climate Change

An Ghníomhaireacht Um Chaomhnú Comhshaoil

Tá an GCC freagrach as an gcomhshaol a chosaint agus a fheabhsú, mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ar thionchar díobhálach na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialáil: Rialáil agus córais chomhlíonta comhshaoil éifeachtacha a chur i bhfeidhm, chun dea-thorthaí comhshaoil a bhaint amach agus díriú orthu siúd nach mbíonn ag cloí leo.

Eolas: Sonraí, eolas agus measúnú ardchaighdeáin, spriocdhírithe agus tráthúil a chur ar fáil i leith an chomhshaoil chun bonn eolais a chur faoin gcinnteoireacht.

Abhcóideacht: Ag obair le daoine eile ar son timpeallachta glaine, táirgiúla agus dea-chosanta agus ar son cleachtas inbhuanaithe i dtaobh an chomhshaoil.

I measc ár gcuid freagrachtaí tá:

Ceadúnú

- Gníomhaíochtaí tionscail, dramhaíola agus stórála peitril ar scála mór;
- Sceitheadh fuíolluisce uirbigh;
- Úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe;
- Foinsí radaíochta ianúcháin;
- Astaíochtaí gás ceaptha teasa ó thionscal agus ón eitlíocht trí Scéim an AE um Thrádáil Astaíochtaí.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil

- Iniúchadh agus cigireacht ar shaoráidí a bhfuil ceadúnas acu ón GCC;
- Cur i bhfeidhm an dea-chleachtais a stiúradh i ngníomhaíochtaí agus i saoráidí rialáilte;
- Maoirseacht a dhéanamh ar fhreagrachtaí an údaráis áitiúil as cosaint an chomhshaoil;
- Caighdeán an uisce óil phoiblí a rialáil agus údaruithe um sceitheadh fuíolluisce uirbigh a fhorfheidhmiú
- Caighdeán an uisce óil phoiblí agus phríobháidigh a mheasúnú agus tuairisciú air;
- Comhordú a dhéanamh ar líonra d'eagraíochtaí seirbhíse poiblí chun tacú le gníomhú i gcoinne coireachta comhshaoil;
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

Bainistíocht Dramhaíola agus Ceimiceáin sa Chomhshaol

- Rialacháin dramhaíola a chur i bhfeidhm agus a fhorfheidhmiú lena n-áirítear saincheisteanna forfheidhmithe náisiúnta;
- Staitisticí dramhaíola náisiúnta a ullmhú agus a fhoilsiú chomh maith leis an bPlean Náisiúnta um Bainistíocht Dramhaíola Guaisí;
- An Clár Náisiúnta um Chosc Dramhaíola a fhorbairt agus a chur i bhfeidhm;
- Reachtaíocht ar rialú ceimiceán sa timpeallacht a chur i bhfeidhm agus tuairisciú ar an reachtaíocht sin.

Bainistíocht Uisce

- Plé le struchtúir náisiúnta agus réigiúnacha rialachais agus oibriúcháin chun an Chreat-treoir Uisce a chur i bhfeidhm;
- Monatóireacht, measúnú agus tuairisciú a dhéanamh ar chaighdeán aibhneacha, lochanna, uiscí idirchreasa agus cósta, uiscí snámha agus screamhuisce chomh maith le tomhas ar leibhéil uisce agus sreabhadh abhann.

Eolaíocht Aeráide & Athrú Aeráide

- Fardail agus réamh-mheastacháin a fhoilsiú um astaíochtaí gás ceaptha teasa na hÉireann;
- Rúnaíocht a chur ar fáil don Chomhairle Chomhairleach ar Athrú Aeráide agus tacaíocht a thabhairt don Idirphlé Náisiúnta ar Ghníomhú ar son na hAeráide;
- Tacú le gníomhaíochtaí forbartha Náisiúnta, AE agus NA um Eolaíocht agus Beartas Aeráide.

Monatóireacht & Measúnú ar an gComhshaol

- Córais náisiúnta um monatóireacht an chomhshaoil a cheapadh agus a chur i bhfeidhm: teicneolaíocht, bainistíocht sonraí, anailís agus réamhaisnéisiú;
- Tuairiscí ar Staid Thimpeallacht na hÉireann agus ar Tháscairí a chur ar fáil;
- Monatóireacht a dhéanamh ar chaighdeán an aeir agus Treoir an AE i leith Aeir Ghlain don Eoraip a chur i bhfeidhm chomh maith leis an gCoinbhinsiún ar Aerthruailliú Fadraoin Trasteorann, agus an Treoir i leith na Teorann Náisiúnta Astaíochtaí;
- Maoirseacht a dhéanamh ar chur i bhfeidhm na Treorach i leith Torainn Timpeallachta;
- Measúnú a dhéanamh ar thionchar pleananna agus clár beartaithe ar chomhshaol na hÉireann.

Taighde agus Forbairt Comhshaoil

- Comhordú a dhéanamh ar ghníomhaíochtaí taighde comhshaoil agus iad a mhaoiniú chun brú a aithint, bonn eolais a chur faoin mbeartas agus réitigh a chur ar fáil;
- Comhoibriú le gníomhaíocht náisiúnta agus AE um thaighde comhshaoil.

Cosaint Raideolaíoch

- Monatóireacht a dhéanamh ar leibhéil radaíochta agus nochtadh an phobail do radaíocht ianúcháin agus do réimsí leictreamaighnéadacha a mheas;
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha;
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta;
- Sainseirbhísí um chosaint ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Ardú Feasachta agus Faisnéis Inrochtana

- Tuairisciú, comhairle agus treoir neamhspleách, fianaise-bhunaithe a chur ar fáil don Rialtas, don tionscal agus don phobal ar ábhair maidir le cosaint comhshaoil agus raideolaíoch;
- An nasc idir sláinte agus folláine, an geilleagar agus timpeallacht ghlan a chur chun cinn;
- Feasacht comhshaoil a chur chun cinn lena n-áirítear tacú le hiompraíocht um éifeachtúlacht acmhainní agus aistriú aeráide;
- Tástáil radóin a chur chun cinn i dtithe agus in ionaid oibre agus feabhsúchán a mholadh áit is gá.

Comhpháirtíocht agus Líonrú

- Oibriú le gníomhaireachtaí idirnáisiúnta agus náisiúnta, údaráis réigiúnacha agus áitiúla, eagraíochtaí neamhrialtais, comhlachtaí ionadaíocha agus ranna rialtais chun cosaint chomhshaoil agus raideolaíoch a chur ar fáil, chomh maith le taighde, comhordú agus cinnteoireacht bunaithe ar an eolaíocht.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil

Tá an GCC á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóir. Déantar an obair ar fud cúig cinn d'Oifigí:

1. An Oifig um Inbhunaitheacht i leith Cúrsaí Comhshaoil
2. An Oifig Forfheidhmithe i leith Cúrsaí Comhshaoil
3. An Oifig um Fhianaise agus Measúnú
4. An Oifig um Chosaint ar Radaíocht agus Monatóireacht Comhshaoil
5. An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tugann coistí comhairleacha cabhair don Ghníomhaireacht agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

epa Research

Evidence Synthesis Report 6

Just Transition Indicator Framework for Ireland

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