

Supporting People and Place:

Planning for a Just Transition in Northern
Ireland

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A JUST TRANSITION FOR NORTHERN IRELAND

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ABSTRACT

A just transition is often defined as one which includes decent work for all, social inclusion and the eradication of poverty. Northern Ireland faces a significant challenge to decarbonise its economy and society. While the obligation to reduce carbon emissions is a shared one, the capacity to bear the brunt of such a large-scale transition is unequal. The burden of economic transformation is often felt first by workers, particularly those in the power or fossil fuel extraction sectors. However, other sectors and geographic areas may be at risk from negative impacts of decarbonisation. A just transition framework provides a structure for stakeholders and government to assess sectoral vulnerabilities and collaborate in the design of carbon reduction policies which support vulnerable workers and communities. This paper examines the risks for workers in Northern Ireland from decarbonisation in particular, identifying the sectors and the geographic areas most at risk from transition. It will also examine some of the elements needed to embed a Just Transition in principle and practice in Northern Irish climate policy.

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SUPPORTING PEOPLE AND PLACE: PLANNING FOR A JUST TRANSITION IN NORTHERN IRELAND

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SECTION 1: INTRODUCTION

Northern Ireland is at a critical point in its path to decarbonisation. Left without a functioning Government for three years, the Executive was finally re-established early in 2020 just a few weeks before the Covid-19 crisis struck. Similar to its neighbours, Northern Ireland is grappling with the challenge of decarbonising its economy and society in a period of heightened global uncertainty. However, the political limbo has meant there has been less opportunity to progress climate action in the past few years.

The political agreement struck in January 2020 re-establishing the Executive (New Decade, New Approach, 2020), commits to bringing forward a Climate Change Act with “environmental targets” and a Green New Deal. It also commits to forming a new energy strategy with “ambitious targets and actions for a fair and just transition to a zero carbon society”. Thus, following years of decision-making stasis due to the lack of a functioning executive, there is a concerted effort being made to bring Northern Ireland climate policy into line with other UK countries.

Globally, the public demands for action have become louder and more persistent over the last number of years, amplified, no doubt by the rising voice of youth leaders such as Greta Thunberg and leaders of the Global Fridays for Future movement; however, climate policy can be seen as ‘top down’, technocratic and difficult to communicate. Just transition frameworks and programmes represent an effort to address this weakness in climate policy making and consider the impacts of transition to a low carbon economy in a more inclusive way.

Recent NERI work on this topic includes a number of papers examining just transition in the Republic of Ireland. This paper should be read in conjunction with that ongoing work.

This paper will address the challenge of planning a just transition for Northern Ireland. Section 2 will explore the concept of a just transition. Section 3 will examine the climate change challenge for Northern Ireland, reduction targets and emissions profile. Section 4 will look at the vulnerability of certain economic sectors and workers to negative impacts on job security from a transition to a low carbon economy. Section 5 will look at the agri-food industry and the section 6 will discuss green jobs, and skills in Northern Ireland. Finally, the paper will discuss the just transition framework and the role of social dialogue.

SECTION 2: WHAT IS A JUST TRANSITION?

The obligation to decarbonise our economy and society is a shared one, yet it exists in a context where the capacity to bear the brunt of such a large-scale transition is unequal. A rich and growing literature on energy justice provides a starting point for discussion on how the transition to carbon neutrality can be a socially inclusive one, undertaken in a democratic way (Healy and Barry, 2017, Gambhir *et.al.* 2018). The scale of the transition needed to meet the goals of the Paris Agreement will require a significant reshaping of the economy, which in turn will impact on jobs, livelihoods and job opportunities. This will be acute for segments of the workforce. Without intervention by the state, the impacts of the transition on parts of the population may be negative. Yet, if managed well, the transition could lead to more job opportunities, better quality higher paying work in addition to a healthier environment.

The concept of the just transition originated in the trade union movement and was primarily focused on the employment and workers' rights related impacts of decarbonisation (Galgóczy, 2018). However, for some, the idea has come to include other groups who may be vulnerable to negative impacts from an economic transition, such as rural communities (Healy and Barry, 2017). Whether a just transition policy focuses only on workers or targets a broader group of people, what is common to both approaches is the question of where power lies and the capacity of vulnerable individuals or groups not only to withstand, but also to flourish under the transition.

Experience of mismanaged transitions coupled with a feeling of exclusion from both the conversation and the decision-making process has left some local populations and groups of workers distrustful of climate action (NEF, 2019). Regions such as the north of England, still scarred from closures of coal industries decades ago, are a prime example of badly managed transitions (Emden and Murphy, 2019). The north of England is facing a new transition, this time to a low carbon economy; for communities who were impacted by the closures in the 1980s, however, the effects of economic devastation are all too recent. Far off promises of greener, better jobs may have little relevance to those who feel that their current jobs are at risk, especially in sectors or geographic areas which have previously experienced an unjust transition. Discussion which highlights the potential creation of green jobs but does not acknowledge that those jobs may be created in different locations, require different skill sets and are not yet a reality, may be met with scepticism from those whose livelihoods and careers are threatened (Gambhir *et.al.* 2018). In addition, climate action policies and debates must recognise the historical and cultural heritage connected to certain industries and their contribution to the economic and social development of their nation, and how the destruction or transformation of these industries may be negatively perceived by the communities who built them (NEF, 2019). This may also hold true for farming communities, another industry with a strong cultural heritage and identity, regardless of country. Experiences of the transition to a carbon neutral economy will be place specific and will have their own particular social and historical context.

The journey of *just Transition* from trade union demand to widely accepted policy framework - albeit not as widely implemented - has been well-documented (Galgóczi, 2018; Nugent and Goldrick-Kelly, 2019; Mercier, 2020). Within the UN the International Labour Organisation (ILO) has been leading on defining the concept and creating a policy framework. As a tripartite agency, including government, employer and worker representatives, it is well-placed to develop programmes/guidelines which 'mainstream' and promote the advancement of a green economy that prioritises green jobs and an equitable shift to a low carbon society. This work and the work of member countries and activists led to the inclusion of j

ust transition in the preamble to the Paris climate agreement, resulting in the adoption of a work programme focused on “economic diversification and transformation and just transition of the workforce, and the creation of decent work and quality jobs” (UN, 2016)

“Taking into account 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. ”

Paris Agreement

The International Trades Union Confederation (ITUC) defines a just transition as one which ‘secures the future and livelihoods of workers and their communities in the transition to a low-carbon economy’. While a just transition is concerned that the outcomes are just, the process is equally as important, especially given the long-term nature of the transition.

An influential 1998 article by D.B Kohler, a Canadian trade union leader ‘Just Transition – A Labour View of Sustainable Development’, articulated the view that “the real choice is not jobs or environment. It is both or neither” (Rosemberg, 2010). The trade union movement during this period, while understanding the economic benefits of a developing low carbon economy, was also aware of the complexity of this task and that a just transition approach/framework should operate in tandem with environmental policies rather than in opposition to them. With this in mind, a just transition framework should incorporate the following principles for guiding policy making for a low-carbon economy (*op.cit.*). The first is an investment approach which upholds decent work and human rights. The second is social dialogue, and meaningful, democratic consultation with stakeholders that is inclusive of the wider community. The third is a thorough and early research and assessment of the social and employment impacts of carbon reduction policies. The fourth is the development of social protection policies and labour market policies to minimize risk of job losses and/or provide income support for vulnerable workers. Finally, the fifth is the development of local economic diversification plans, in order to prepare for transition in vulnerable areas.

Just transition, as it has found form in UN frameworks, accords with the related but broader concept of sustainable development and specifically the Sustainable Development Goals (SDG). It creates a framework for economic development which can help achieve a number

of the SDGs: One (no poverty), seven (affordable and clean energy), eight (decent work and economic growth), 10 (reduce inequality) and 13 (climate action).

While just transition policies, where they have been implemented, have been subject to many evaluations, there is relatively little critique of the concept itself. Galgóczi (2019) warns that just transition as a concept will/has become too broad “and general and often even overstretched” to be meaningful.

However, just transition might be defined or constituted; the ILO has provided guidance on common principles to inform implementation.

- Social dialogue leading to a strong social consensus on the goals and the pathway to transition. Social dialogue must be part of the framework and consultation with stakeholders must be informed and ongoing;
- Respect for rights at work;
- Policies must take into account gender equality;
- Policies must be coherent, providing a just transition framework which will promote the creation of decent jobs, anticipate the impacts of transition on employment, provide for adequate and sustainable social protection for job losses, promote skills development and allow collective bargaining and the right to organise;
- Policies and programmes should be bespoke policies and programmes;
- International cooperation between countries should be fostered (ILO, 2015).

Fundamental to the success of just transition policies, is the creation of a framework, enabling policy-making under the principles listed above.

SECTION 3: CLIMATE CHALLENGE FOR NORTHERN IRELAND

Like its neighbour south of the border, Northern Ireland has often been labelled a 'climate laggard'¹. While it makes up 3% of the UK population, Northern Ireland currently accounts for approximately 4% of the UK's GHG emissions (CCC, 2019). Among the constituent countries of the UK it is the only one not to have climate targets set out in law and while it is included in the UK 2008 Climate Change Act and accompanying targets, it does not have specific Northern Ireland legislation setting out a framework for meeting such targets. Many of the levers required for climate mitigation policies are devolved or partially devolved, making it more important that the devolved counties have legislative frameworks which enable coherent policy-making (CCC, 2019a).

Under the 2008 Climate Change Act (the Act), carbon budgets are set for five year terms with emissions reduction targets for the UK as a whole and, as requested, proposed targets for the devolved administrations². However, each country can, if it chooses, set targets beyond those set out in the carbon budgets. The Act set a 2050 target of an 80% GHG emissions reduction on 1990 levels by 2050. In 2019, it was amended to set a new target of net zero emissions by 2050. Following this, Scotland and set a new targets of net zero by 2045 and Wales accepted the CCC recommendation of a 95% reduction by 2050 but announced its ambition to develop a path to net zero. The Northern Ireland executive of 2011-2016 set a target of 35% by 2025 in its Programme for Government. The Fifth Carbon Budget under the Act proposed a pathway for Northern Ireland for reaching at least 35% reduction in GHG emissions by 2030. Until 2019, Northern Ireland was projected to miss this 2025 target by approximately 3%, but, due to the announced closure of the Kilroot coal-powered electricity station³ the Department of Agriculture, Environment and Rural Affairs (DAERA, 2020) has projected that the 35% target will actually be exceeded in 2025.

¹ See for example, <https://www.belfasttelegraph.co.uk/news/northern-ireland/edwin-poots-accused-of-blocking-climate-change-legislation-39385663.html>

² Minister Poots wrote to the CCC in 2020 requesting that it provide advice on a 'fair target' for Northern Ireland and advice on how to meet it (CCC, 2020c)

³ It has since been announced that it will be converted to a gas-powered station with the retention of 150 jobs.

The collapse of the executive in 2017 means that Northern Ireland's GHG emissions reductions targets have not been updated since the 2011-2016 Programme for Government. The Sixth UK Carbon Budget, set in December 2020, proposes updated 2030 and 2050 targets for Northern Ireland, in line with the UK target of net zero emissions by 2050. However, like Scotland, there is no barrier to Northern Ireland setting its own, higher targets in a Programme for Government and/or climate change legislation. The all-party agreement re-establishing the government in early 2020, *New Decade New Approach*, commits to a "*climate change Act with legally binding and ambitious sectoral emission reduction targets*"⁴. Aside from a climate change act, *New Decade New Approach* commits to a number of other environmental and related economic policies including the establishment of an independent environmental protection agency, a Green New Deal and new energy strategy which "*will set ambitious targets and actions for a fair and just transition to a zero carbon society*" (New Decade New Approach, 2020: 44). At the time of publishing this paper, these commitments were either in the very early stages or had not been commenced.⁵

The lack of a functioning Assembly or Executive in Northern Ireland between 2017 and 2020 meant that there was little policy development during those years in devolved policy areas. An estimated 160 pieces of legislation were held up during this period and only essential legislation was introduced by Westminster (Gstrein and Prince, 2020). This stagnation in policy making in Northern Ireland may perhaps be seen in the projections for GHG emissions made by DAERA, which show a levelling off of reductions in 2025 due to "no further policy savings".

"Emissions are expected to decrease year-on-year until 2025 when they level off. The downward trend is mainly driven by the energy supply sector with Kilroot power station closing in 2024 contributing to the decrease between 2018 and 2025 before levelling off as no further policy savings are included."

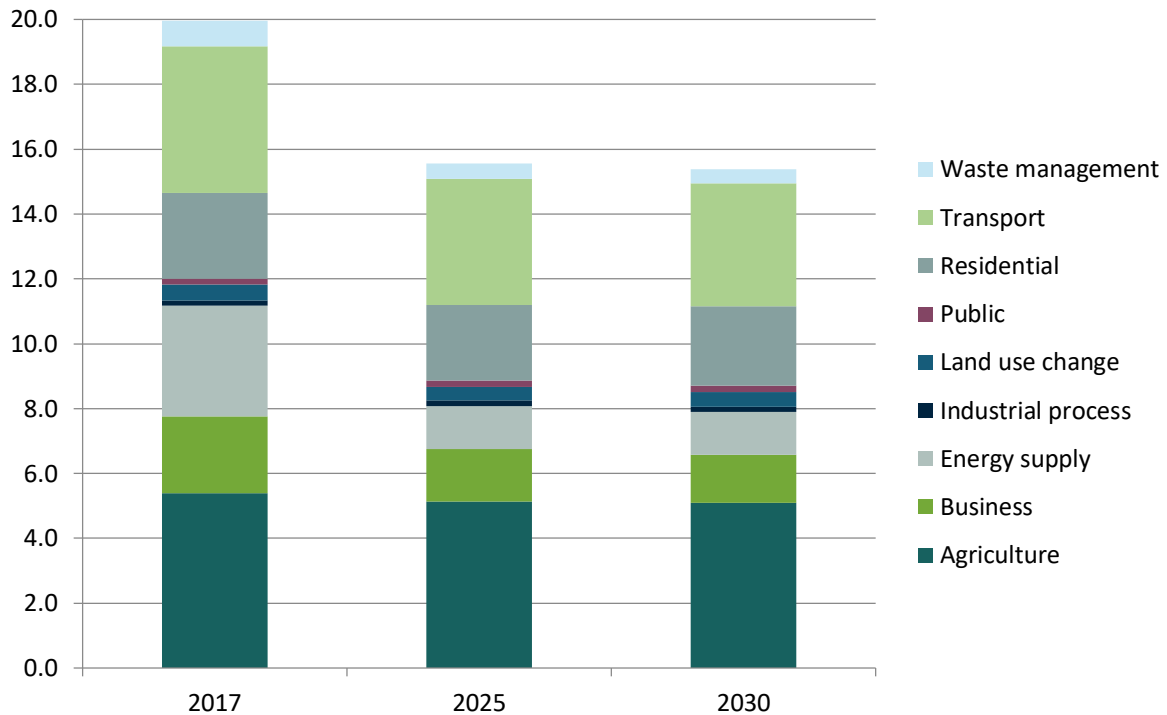
⁴ *New Decade New Approach* can be found at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/856998/2020-01-08_a_new_decade_a_new_approach.pdf

⁵ Consultations have begun on the energy strategy, climate legislation and the programme for government and the green economy (green new deal).

Figure 1 below, shows 2017 reported emissions and DAERA projected emissions for 2025 and 2030. The tailing-off of projected emissions reductions between 2025 and 2030 can be clearly seen in the chart; total emissions are projected to fall 22.1% from 2017 to 2025 and a further 1.1% between 2025 and 2030.

Figure 1: Northern Ireland emissions 2017 and projected emissions 2030



Source: DAERA (2020) Northern Ireland Greenhouse Gas Projections based on 2017 GHG inventory

As highlighted by DAERA, the reduction in emissions from energy supply make up the largest saving, 61% from 2017 to 2025 and a further 0.6% from 2025 to 2030. This is followed by reductions in business and waste management (see table 1).

⁶ <https://www.daera-ni.gov.uk/articles/northern-ireland-greenhouse-gas-projections>

Table 1: Percentage change in Northern Ireland emissions 2017 and projected emissions 2025 and 2030

	% change 1990 to 2030	% change 2017 to 2025	% change 2025 to 2030
Agriculture	-3.4	-4.7	-0.6
Business	-52.2	-31.9	-9.4
Energy supply	-75.1	-61.0	-0.6
Industrial process	-78.4	0.2	0.0
Land use change	15.7	-11.6	6.4
Public	-59.4	-0.6	5.3
Residential	-33.5	-12.0	4.9
Transport	9.7	-13.5	-2.6
Waste management	-76.8	-42.8	-6.3
Total	-36.7	-22.1	-1.1

Source: DAERA (2020) Northern Ireland Greenhouse Gas Projections based on 2017 GHG inventory

The Climate Change Committee (CCC) is the independent advisor on climate change to parliament. It provides advice and progress reports to both the UK and devolved governments/parliaments. A 2019 CCC report on the net zero target provided advice on mitigation policies, sectoral challenges and targets for the devolved administrations (CCC, 2019b). It analyses sectoral reduction possibilities and obstacles under three different ambition levels, 'highest possible ambition', which correlates to net-zero emissions by 2050, 'further ambition' which correlates to 96% GHG reductions and 'core ambition' which correlates to the previous 80% target. To move from *further ambition* to *highest possible ambition*, the report provides what it terms 'speculative options', which include more difficult policy options such as demand reduction in aviation and diet, radical shifts in land use and more extensive use of carbon removal and storage technologies.

Taking into account each county's particular emissions profile and feasibility challenges, the report gives indicative targets for the devolved administrations which would be needed for the whole of the UK to reach the net-zero target on a cost-effective basis. The characteristics of each administration's economy, biogeography, society and culture/history present different opportunities for effective and efficient emissions reductions and also present different obstacles. Scotland has a greater capacity for emissions removal through the Land Use, Land Use Change and Forestry (LULUCF) sector for example than the other

administrations, giving it greater flexibility in policy making in other areas (see figure 2 below).

UK emissions reductions in recent years have been concentrated in the energy sector due to the move away from coal-fired electricity generation, due to be complete by 2025 (CCC, 2020). This means that future reductions must come from other sectors, transport, residential, agriculture and a transition from gas-fired to renewable energy. In order to reach the net zero target for 2050, the CCC has recommended, as part of its Sixth Carbon Budget, that the UK set a target for emissions reduction of 63% by 2035 (CCC, 2020b).

While the carbon budgets for the 2030-40s provide important signals for investment, both public and private, there is pressure to increase the interim 2030 targets and frontload emissions reductions. This pressure stems from those who advocate greater earlier action for both moral and economic reasons. Reports of record-breaking heat over the last decade provide a scientific argument for accelerating, or front-loading emissions reductions. The economic argument of greater cost effectiveness, articulated forcefully in the Stern Report of 2006, has also been made by the Committee itself in its Fourth Carbon Budget: “pathways with early [domestic] action...are more cost-effective over time than pathways which delay action towards meeting the 2050 emissions reduction target” (CCC, 2010)

Northern Ireland has an emissions profile more similar to that of the Republic of Ireland⁷ than that of other UK administrations. Its agriculture emissions are just over 27%, nearly three times that of the UK as a whole, which is around 10%, but close to those of the Republic of Ireland, which sit at 34%. Agriculture also holds a similar socio-economic and cultural place in Northern Ireland as it does in the Republic of Ireland. It is the only devolved administration where LULUCF is a source of emissions rather than a sink, for both biogeographic and socio-economic historical land-use reasons.

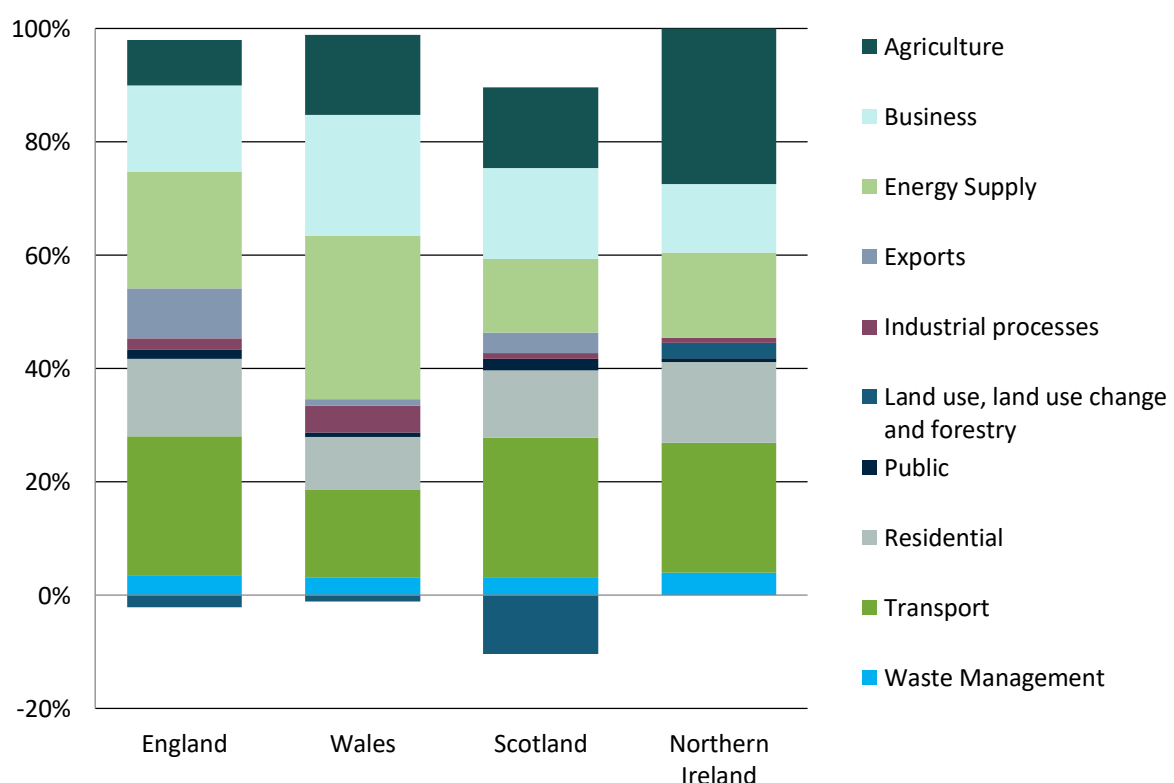
In contrast to the land-use, at 15%, Northern Ireland has the lowest energy supply emissions of the four administrations, which is unsurprising given the historical and current

⁷ Republic of Ireland GHG emissions by source 2018 Agriculture – 33.9%, Transport – 20.1%, Energy – 17.5%, Residential – 10.2%, Business – 7.8% Industrial Processes – 3.8% (Source: EPA, 2020).

importance of the coal and oil industries in Britain. Energy emissions in Wales, where the coal industry has been historically dominant, is at 30% and in England it is 21.5%. Scotland, while home to a large oil and gas industry has energy emissions on a par with Northern Ireland, at just 16%. Scotland has built a strong renewable energy sector.

Due to Northern Ireland's emissions profile, the CCC has recommended that the 2050 target be set at an 82% reduction over 1990 levels. Interim targets would be as follows: 69% reduction in all GHG emissions by 2040 and 48% by 2030. This means the period of the Sixth Carbon budget, 2033-2037 would see a 60% reduction over 1990 levels (CCC, 2020c). For Northern Ireland, the CCC does believe that a net zero for all GHG emissions is attainable by 2050, instead they have recommended that CO₂ emissions would reach net zero by that stage but that other GHG emissions (in particular methane) would not. This is due to the agricultural profile of Northern Ireland and the fact that it is an important exporter of beef, lamb and dairy to the rest of the UK.

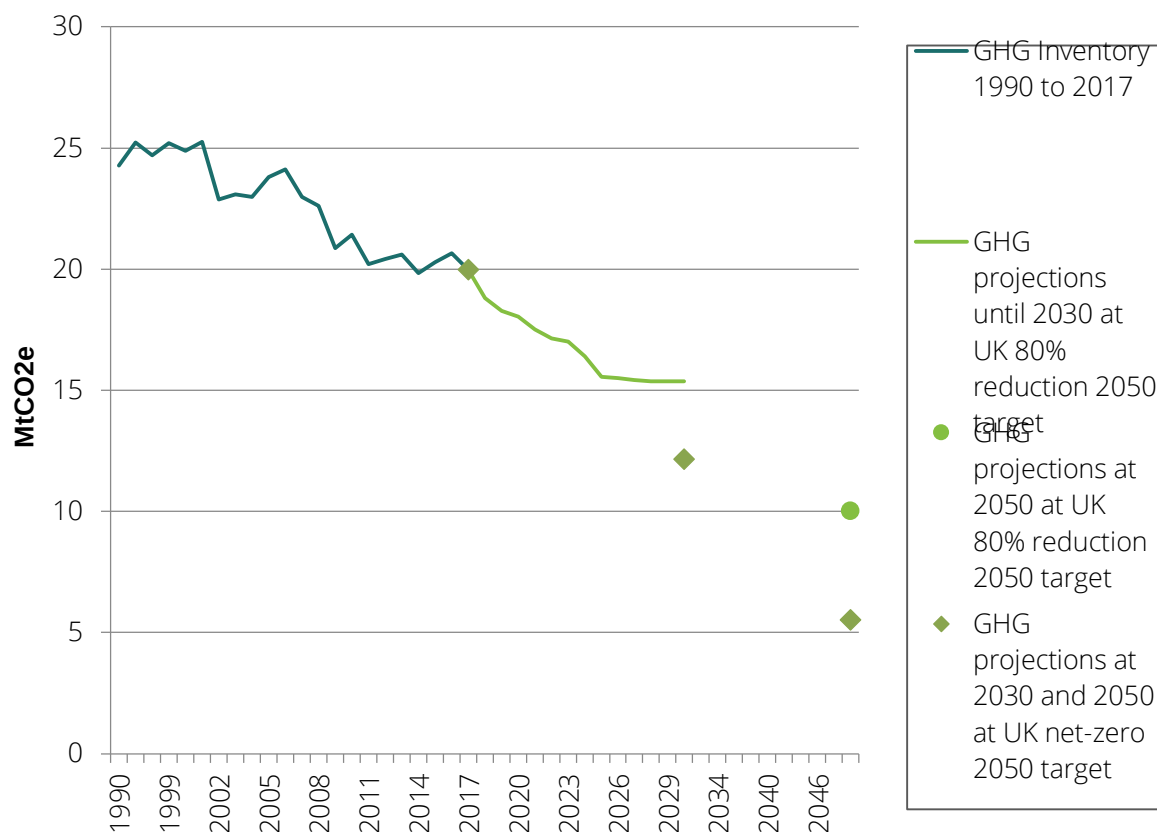
Figure 2: Northern Ireland and UK GHG emissions profiles - 2018



Source: NAEI (2020) Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland 2018

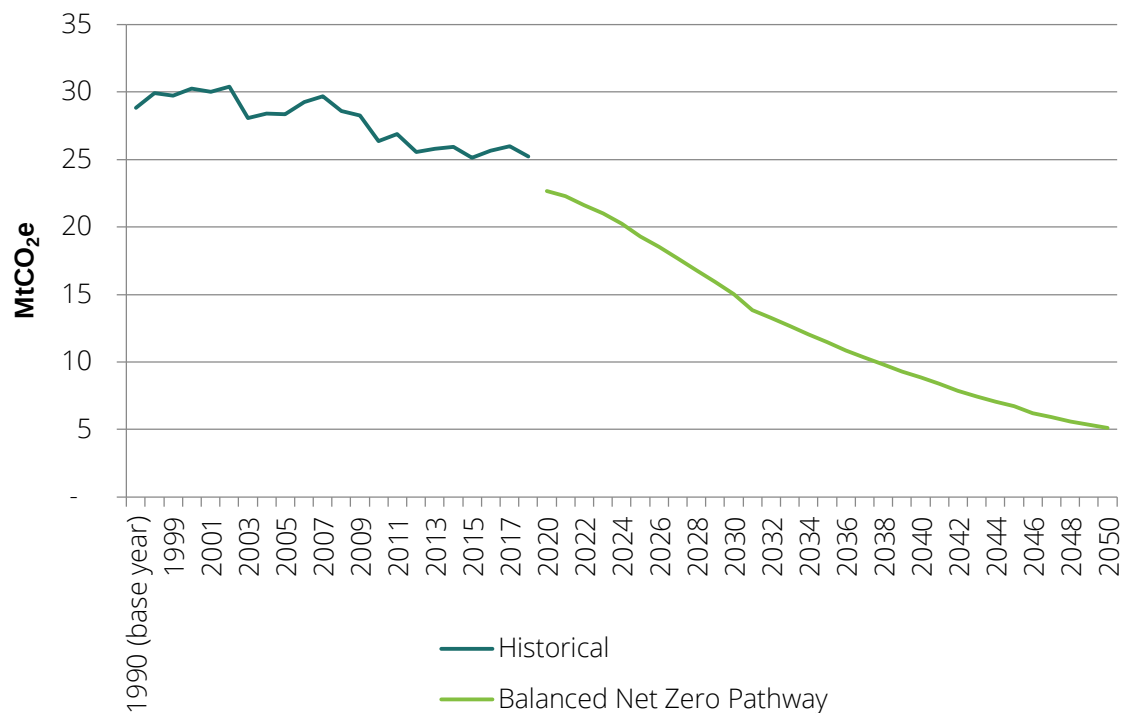
While Northern Ireland may account for an almost negligible amount of UK emissions, when taken together, the policies of the devolved administrations are critical to the UK reaching its target (CCC, 2019). Advice from the CCC in its 2019 recommendations on policy measures to reach the fifth carbon budget target of 35% in Northern Ireland by 2030 include: Developing a route to market for low-cost intermittent renewables, in particular offshore wind; replace the common agricultural plan payments with payments that are linked to agricultural emissions reductions and sequestration; increase the rate of tree planting; introduce a policy to incentivise homeowners to install low-carbon heaters, replace oil boilers with heat pumps; develop policy for delivering energy efficient improvements in homes targeted at low income households and finally, assist in more rapid deployment of electric vehicles. These policy options if properly implemented will deliver a reduction in emissions to Northern Ireland of 40% by 2035 (CCC, 2019). The net zero UK-wide target requires Northern Ireland to reach a 48% reduction in all GHG by 2040 (CCC, 2020c)

Figure 3: Northern Ireland GHG emissions historical and targeted at the 80% and Net-Zero targets



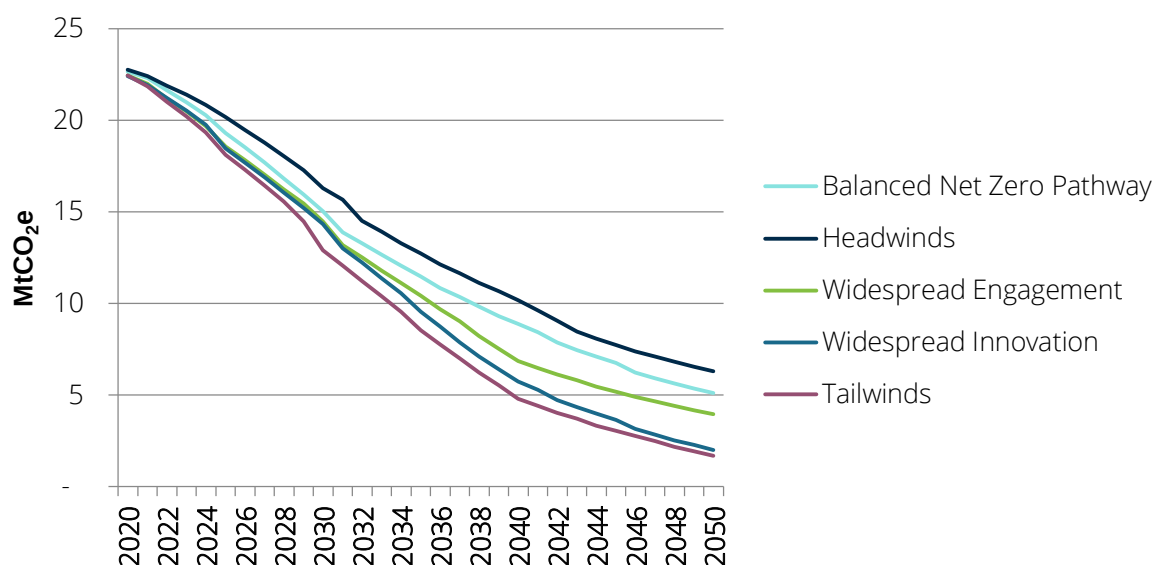
Source: DAERA (2020) Northern Ireland Greenhouse Gas Projections based on 2017 GHG inventory, SONI (2020) and the Climate Change Committee (2019) Net Zero: The UK's contribution to stopping global warming

Figure 4: Northern Ireland historical emissions and projections 1990-2050



Source: CCC (2020), Sixth Carbon Budget

Figure 5: Path for reaching the net-zero target – Northern Ireland



Source: CCC (2020), Sixth Carbon Budget

In its Sixth Carbon Budget, the CCC presented a recommended pathway and scenario (Balanced Net Zero) under four other scenarios for the UK as a whole and the devolved administrations. The other scenarios are from *Headwinds*, Widespread Innovation, Widespread Engagement and *Tailwinds*. Headwinds is similar to the *Further Ambition* pathway laid out in the 2019 scenarios discussed above (96% UK-wide reduction), which sees some (but not widespread) behavioural change and some technological advancement. It is more reliant on carbon capture and storage and hydrogen infrastructure than the other scenarios. At the other end of the scenario spectrum, the Tailwinds scenario assumes considerable success in technical innovation and behavioural change, such as a 50% reduction in meat and dairy UK-wide by 2050. The Balanced Zero Pathway seeks to make significant reductions in emissions in the 2020s, frontloading the reductions burden. It assumes for example, a 35% reduction in domestic consumption of all meat and dairy.

Until targets are set by domestic legislation or policy, Northern Ireland will fall primarily under UK-wide legislation. The levers for policy-making are split between devolved and reserved. The balance of powers is outlined in the CCC Report (2019):

- ***Economic and fiscal:*** Mostly reserved
- ***Energy (apart from nuclear):*** Fully devolved
- ***Planning:*** Fully devolved
- ***Local government and housing:*** Mostly devolved (including domestic and public energy efficiency and fuel poverty).
- ***Industry:*** Mostly reserved.
- ***Transport:*** Vehicle standards and taxation is reserved. Demand side measures are mostly devolved.
- ***Agriculture and land use:*** Mostly devolved.
- ***Waste:*** Fully devolved.⁸

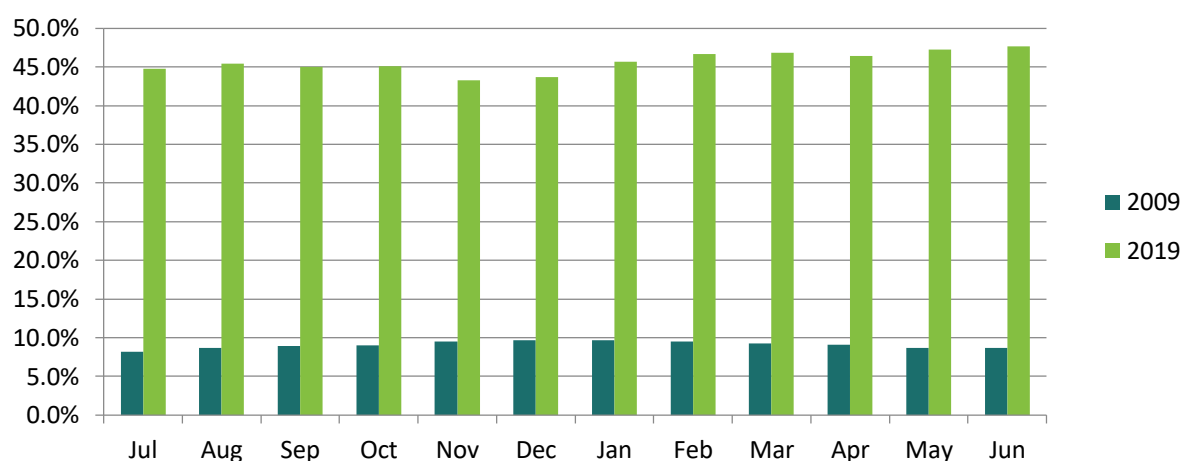
The importance of the devolved administrations to the UK effort is made clear in the budget. Of the abatement pathways identified for Northern Ireland, Scotland and Wales, nearly 60% are in the ‘mostly’ or ‘partially’ reserved policy areas (CCC, 2020b).

⁸ Northern Ireland Office, (2018), *Devolution settlement: Northern Ireland*. See also CCC (2019), *Reducing Emissions In Northern Ireland*

3.1 Energy Sector

The emissions intensity in energy production in Northern Ireland has decreased over the last ten years. As discussed above, Northern Ireland has met its 2020 target of 40% share of renewable energy in electricity production. Emissions reduction in the electricity generation sector will deliver the majority of emissions reduction in Northern Ireland between 2020 and 2025. Beyond 2025, there are no current policies driving additional emissions reductions. The forthcoming closure of the Kilroot power plant and its subsequent conversion from a coal plant to a gas plant means that there will no longer be any coal burning electricity generating plants in Northern Ireland.

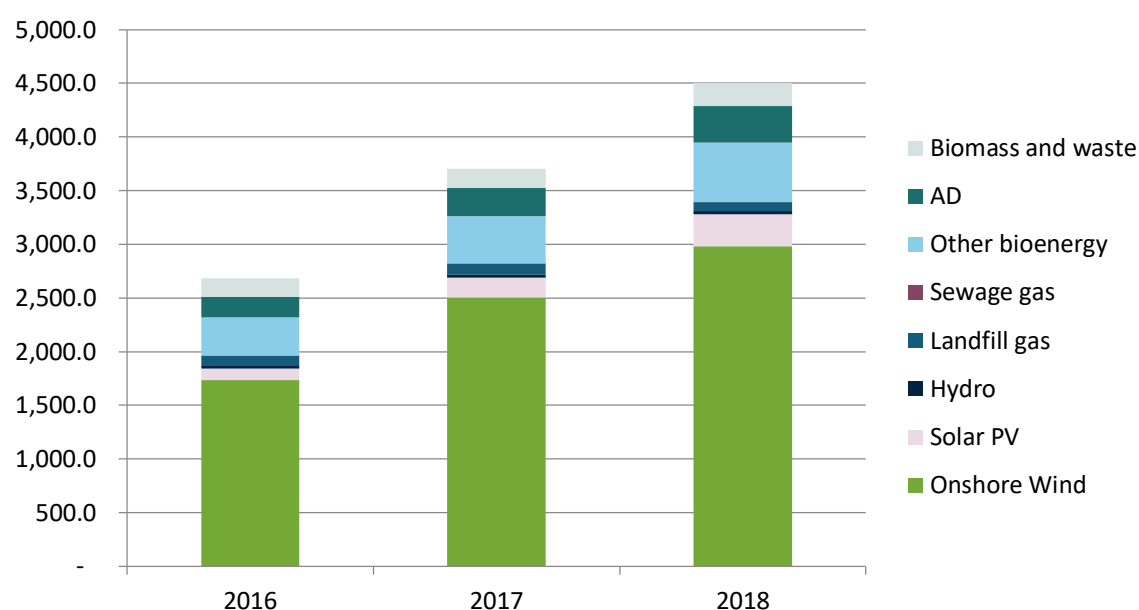
Figure 6: NI consumption of renewable energy generated as a percentage of total energy consumption



Source: Department for the Economy, (2020)

Over 70% of the renewable share of electricity generation comes from onshore wind sources. There is currently no offshore wind capacity and it is not expected until 2027.

Figure 7: The breakdown of the generation energy from renewable sources 2015-2018



Source: Department for the Economy, (2020)

Energy policy, while fully devolved, is impacted by Northern Ireland's membership of the Integrated Single Electricity Market (I-SEM) with the Republic of Ireland. The Department for the Economy is currently reviewing the energy strategy, due to be published at the end of 2021. The strategy will be informed by the net zero 2050 target.

As discussed above, the hiatus in government in Northern Ireland following the collapse of the Assembly in 2017 meant that there was little-to-no new policy-making or legislation introduced. In the renewable energy sector in particular, new policy direction and new investment vehicles for infrastructure are needed in order to make more progress in the area.

While the CCC has recommended an 82% reduction in all GHG emissions in Northern Ireland by 2050 in its sixth carbon budget, it states that there is no technical reason that net zero could not be achieved (CCC, 2020). Getting to net zero however, would require a substantial reduction in livestock and greater GHG removal technologies being located in Northern Ireland. A private members bill introduced by the Green Party and supported by all other parties apart from the DUP, commits to net zero emissions by 2045. Northern Ireland is free to set a higher target than that recommended by the CCC; however, the level

of agricultural emissions and the importance of the agrifood industry to Northern Ireland provide a significant challenge to higher ambition.

The policy recommendations set out in the CCC 2019 advice for Northern Ireland will require a significant action by the state across sectors, from agriculture to transport, energy and housing. However, the actions set out will reduce emissions by 40% by 2030 only, whereas the new net zero target will require a reduction of at least 48% in 2030. To meet the 82% reduction by 2050, a much greater reduction in LULUCF emissions will be required (CCC, 2020c).

SECTION 4: VULNERABILITIES AND RISK FROM AN UNJUST TRANSITION

The concept of just transition evolved from the trade union movement's concern that the costs of transition to a low or carbon-neutral economy would disproportionately negatively impact groups of workers. While this has developed over time to include other vulnerable populations such as lower income groups in rural areas (Galgóczy, 2019) this paper will concentrate on the livelihoods and wellbeing of workers.

Climate legislation in Northern Ireland is imminent. At the time of writing this paper, a private members bill with cross-party support had been introduced and the Executive had begun consultation on its own planned legislation. There is also growing political, civil society and business pressure on the Government to introduce both binding targets to reduce emissions and a commitment to a just transition.⁹ With this in mind, what would a just transition in Northern Ireland look like?

The principles outlined in the ILO guidelines include the idea that policies and programmes are specifically tailored to the needs of every country/region. Just transition frameworks provide the structures which guide policy-making. The first step in process must be to provide a full analysis of the economy, the labour market, the decarbonisation policies available and the risk to specific sectors and to the livelihoods and wellbeing of workers and vulnerable populations.

The first group of workers to find themselves impacted by decarbonisation are usually those in the energy generation and fossil fuel extraction sectors (Botta, 2018; Gambhir *et al.* 2018). As noted earlier, in some countries, such as the UK, some communities may have experienced similar transitions due to other economic factors and policy decisions, such as the closure of coal mines in the 1980s. Northern Ireland, while having a historically important industrial and manufacturing base, does not have the same fossil fuel extraction industry that was prevalent in Great Britain.

⁹ Just transition is mentioned in New Decade New Approach and in the CCC, 2020 Sixth Carbon Budget

4.1 Decarbonisation – winners and losers

Globally, decarbonisation will bring many benefits including a healthier environment and the creation of millions of new jobs.¹⁰ The economic and/or employment benefits may not be equally felt however, with specific regions and sectors exposed to adverse impacts, such as job losses (Gambhir *et.al.* 2018). Employment contraction is expected in industries which are carbon intensive, but at the same time low-carbon intensive industries such as renewable energy generation are expected to see an increase in employment (Botta, 2018).

Negative impacts from a low carbon transition are likely to be concentrated in specific geographic regions (*op.cit.*). These negative spatial/sectoral impacts may be short-term initially, but unaddressed they can lead to longer-term economic decline if they are not replaced by new jobs in the same location. Negative impacts can be amplified by structural changes driven by new technologies, such as digital, automation and artificial intelligence (NESC, 2019). This technological advancement is already transforming production, business models and supply chains and will likely bring with it some short-term disruption and costs to specific workers and sectors.

NESC research explores the twin challenges of digital and low-carbon transitions in tandem, stressing the need for a planned approach to both, in order minimise risks and negative impacts (Moore, 2020). The two transitions are inter-related in more ways than just their common risks. The push to drive energy efficiencies and low-carbon solutions across the economy will lead to technological advances and digital innovation (Moore, 2020). In the Republic of Ireland there is evidence to suggest that 40% of employment is at risk of displacement or a change in task, in particular in the agricultural, industry, construction, retail, transport, accommodation and food service, and administrative sectors (NESC, 2020). NERI research on Northern Ireland found that the advancement in automation, AI, and other technologies was likely to lead to a greater polarisation of the workforce, with an increase in both higher skilled and lower skilled employment and a relative stasis in the level of middle skilled employment (MacFlynn and Wilson, 2019). The nature of the task (e.g. routine or non-routine) of the worker being an important factor in whether the job was at

¹⁰ Recent research has estimated a global loss of 6 million jobs by 2030 but an increase of 26 million jobs in comparison with a 'no action' approach. (Gambhir *et.al.* 2018).

risk of displacement. This polarisation has an impact on inequality as lower skilled jobs generally have lower wages and fewer opportunities for career progression.

Due to this technological advancement, some industries will see a complete change in their business models, supply and value chains. The car industry is one such example. Many countries have plans to phase out the sale of new petrol and diesel cars; the UK has vowed to do so by 2030.¹¹ While this should lead to increased demand for electric vehicles, moving to electrified powertrains will mean a 30% reduction in value added at the manufacturing stage. In addition, it is estimated that electrified vehicles will require less maintenance over time and fewer spare parts (Galgóczy, 2019). Thus advancement in technology in the car industry could have a negative impact on the maintenance workers in the motor vehicles and motorcycles sector in Northern Ireland.

Therefore, given the level of technological advancement required to reduce emissions in certain sectors, there will be risks to particular jobs in those sectors from both transitions, in particular in the agricultural and food processing sector and transport and manufacturing sectors (NESC, 2020). The process of identifying jobs which are at risk from a transition to a low carbon economy will need to take the digital and technological transition into account, as threats to employment may come from task-specific displacement due to low-carbon technological solutions rather than the demise of an industry such as fossil fuel extraction. This makes estimating risk to employment a difficult undertaking.

Labour Market in Northern Ireland

The labour market in Northern Ireland took far longer to return to its 2008 level than the rest of the UK (Mac Flynn, P., 2019). While the employment levels recovered and economic inactivity rates dropped, structural issues in the economy remain, in particular, the proportion of part time workers, which increased from 23% in 2009 to 26% in 2019 and temporary workers which increased 5.4% to 7.1%. (Mac Flynn, 2019). Part time employment is often accompanied by lower pay, less job security and less opportunity for career progression (Wilson, L., 2017).

¹¹ <https://www.gov.uk/government/news/government-takes-historic-step-towards-net-zero-with-end-of-sale-of-new-petrol-and-diesel-cars-by-2030>

The number in full time employment in all sectors between March 2012 and March 2020 increased 14.3% and in part time employment by 10.9% (table 2 below). The largest increase in full time employment was in the professional, scientific and technical activities sector and the information and communication sector, 60.6% and 44.3% respectively, followed by the administrative and support service sector at 41.2%. In contrast, fulltime employment in manufacturing rose only 15.9%, with a 35.9% rise in part time employment.

Table 2: Employment in Northern Ireland by SIC (2007)

Standard Industrial Classification (2007)	Mar-12		Mar-20		Percentage Change	
Industry Section	Full Time	Part Time	Full Time	Part Time	Full Time	Part Time
Agriculture, Forestry and Fishing	3760	8340	4440	8820	18.1	5.8
Mining and quarrying	1560	110	1960	100	25.6	-9.1
Manufacturing	68820	5010	79770	6810	15.9	35.9
Electricity, gas, steam and air conditioning supply	1240	70	1700	220	37.1	214.3
Water supply, sewerage, waste management and remediation activities	4680	290	6210	1000	32.7	244.8
Construction	28670	2740	32310	3350	12.7	22.3
Wholesale and retail trade; repair of motor vehicles and motorcycles	64520	58500	64590	64650	0.1	10.5
Transportation and storage	19840	4650	23390	5980	17.9	28.6
Accommodation and food service activities	15690	25320	19630	30980	25.1	22.4
Information and communication	13620	2030	19660	2520	44.3	24.1
Financial and insurance activities	15110	4150	15160	3670	0.3	-11.6
Real estate activities	6320	2880	7260	2680	14.9	-6.9
Professional, scientific and technical activities	18140	4850	29140	7030	60.6	44.9
Administrative and support service activities	26680	13410	37670	17050	41.2	27.1
Public administration and defence; compulsory social security	44990	10620	38550	10700	-14.3	0.8
Education	37400	32930	38120	34220	1.9	3.9
Human health and social work activities	62980	51360	78170	51800	24.1	0.9
Arts, entertainment and recreation	7570	7500	7470	7760	-1.3	3.5
Other service activities	6950	6840	7330	8450	5.5	23.5
Total	448,570	241,570	512,530	267,800	14.3%	10.9%

Source: Labour Force Survey 2020

Estimating GHG emissions by sector in Northern Ireland

Emissions per economic sector data are only available at the UK level and are not available at the Northern Ireland level. Employment by sector and SIC (standard industry classification 2-5 digit disaggregation) is available for Northern Ireland, but there is no similar data for emissions by sector. Northern Ireland emissions data is published in line with IPCC National Communication sectors as seen in the section above. However, it is not possible from the emissions reports to calculate the emissions per economic sector, or indeed per persons employed.

Eurostat provides a breakdown of UK emissions by sector, e.g. manufacturing, electricity, agriculture, transport and storage etc. See table 3 below.

Table 3: UK GHG Emissions by sector (NACE)

Industry Section	% of total GHG emissions
Transportation and storage	21.8
Manufacturing	19.6
Electricity, gas, steam and air conditioning supply	19.6
Agriculture, forestry and fishing	12.3
Mining and quarrying	5.9
Water supply; sewerage, waste management and remediation activities	5.9
Wholesale and retail trade; repair of motor vehicles and motorcycles	4.3
Construction	3.3
Human health and social work activities	1.6
Public administration and defence; compulsory social security	1.3
Accommodation and food service activities	0.9
Administrative and support service activities	0.9
Education	0.7
Professional, scientific and technical activities	0.6
Information and communication	0.4
Arts, entertainment and recreation	0.4
Other service activities	0.4
Real estate activities	0.2
Financial and insurance activities	0.0
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	0.0

Source: Eurostat (2020), UK GHG Emissions by sector (NACE)

The lack of GHG emissions per sector data for Northern Ireland presents a difficulty when attempting to identify those sectors and those workers which are more at risk from job displacement or losses due to a transition to a low carbon economy. IPCC Inventory categories can be of some assistance; for example, it is clear that agriculture is a high GHG emissions sector. While the carbon intensity of the sector has decreased since 1990, the overall emissions have remained static. This is due to increased output, as evidenced in the dairy sector, where gains in reducing emissions per unit of production (31% since 1990) were matched by growth in total milk production (increase in yield per cow) (DAERA, 2020).

However, unlike agriculture, it is much more difficult to identify sectors and subsectors within the 'business' source category.¹² As discussed in the previous section, the emissions profile of the Northern Ireland differs from that of Great Britain, in particular in the weight of the agriculture sector. The structure of agricultural sector in Northern Ireland also differs from that of the rest of the UK; on average farms are smaller and pastoral farming, in particular beef and dairy farms are more prevalent.

Given the emissions profile of Northern Ireland, is it possible to identify the jobs and sectors that are at risk from losses or displacement? If they exist are these at risk jobs concentrated in particular geographic areas and if they are, are there wider implications for those communities? NERI research on just transition in the Republic of Ireland identified sectors at risk through estimating emissions per person employed by sector using Eurostat statistics on GHG emissions and employment per NACE sector (Goldrick-Kelly and Nugent, 2019). The broad NACE sectors of agriculture, forestry and fishing, transportation and storage, electricity, gas steam and air conditioning supply, and manufacturing accounted for three quarters of sectoral emissions. Within those broad sectors six subsectors were identified with a share of 2% or more of total emissions: crop and animal production hunting and related service activities; air transport; electricity, gas, steam and air conditioning supply; manufacture of other non-metallic mineral products; land transport and transport via pipelines and manufacture of basic metals (Goldrick-Kelly and Nugent, 2019). NESC research identifies the following sectors as being particularly vulnerable to the

¹² Another difficulty with using the source rather than the end-user is that it gives a partial estimation of the emissions used in the production of good (or service).

transition in the Republic of Ireland: “those employed in the supply of fossil fuels and generation of electricity from peat and coal, transport, parts of manufacturing and agriculture. The agri-food sector is a major sector in terms of employment that will be affected by the move to a low-carbon economy” (NESC, 2020: 9).

If the methodology applied by Goldrick-Kelly and Nugent were applied to UK emissions, the top six subsectors (SIC 2007) would be as follows: products of agriculture; hunting and related services; electricity production – gas; crude petroleum and natural gas; waste collection; treatment and disposal services; materials recovery services; electricity production – coal, and manufacture of refined petroleum products (BEIS, 2020). Given the emissions profile of Northern Ireland and its similarity to the profile of the Republic of Ireland, it is reasonable to assume that the top GHG emitting economic sectors are part of the broad SIC 2007 sectors agriculture, forestry and fishing, manufacturing, electricity, gas, steam and air conditioning supply and transport and storage.

In the absence of data per economic sector (SIC or NACE), a possible supplementary approach would be to identify the high emissions companies who are part of the EU Emissions Trading Scheme.¹³ All companies and corporate bodies, public or private, who emit a high level of carbon annually, must register under the European Trading Scheme.¹⁴ A list of companies registered and their installations can be found in the European Commission’s Union Registry. This registry thus provides an indicator of which power stations, waste and manufacturing plants emit GHG emissions on a large scale. The registry also includes large publicly-owned installations such as hospitals and third level education campuses.

¹³ A similar methodology was employed by UK Trades Union Congress and Orion Innovations (2015) in report on the Yorkshire and Humber region, *Industrial regions and climate change policies: Yorkshire and the Humber regional report*. Using the EU-ETS registry and the Local and Regional CO₂ Emissions Estimates, the paper calculated approximate emissions from large emitting industrial sites and power generation sites to identify number of employees working in high emissions sectors/sites.

¹⁴ The withdrawal of the UK from the EU will mean that it will no longer be part of the EU-ETS. There are plans to create a UK emissions trading scheme. <https://www.pinsentmasons.com/out-law/guides/uk-emissions-trading-scheme-2021> However, Northern Ireland, as part of the all island single energy market, will remain in the EU-ETS, <https://www.gov.uk/government/publications/meeting-climate-change-requirements-if-theres-no-brexite-deal/meeting-climate-change-requirements-if-theres-no-brexite-deal>

4.2 Geographic evaluation of risk

Given the difficulties described in the previous section in identifying jobs at risk from the transition by economic sector, a geographic approach might be more fruitful. This section uses the available data at district council level to identify at risk populations by geographic area. Data for CO₂ emissions and large high emissions installations are mapped by district council to show the geographic intensity of carbon emissions across Northern Ireland. Figures for each district council are then discussed, along with the employment statistics per sector to give an overview of the possible risk to each district from the transition to a net zero economy.

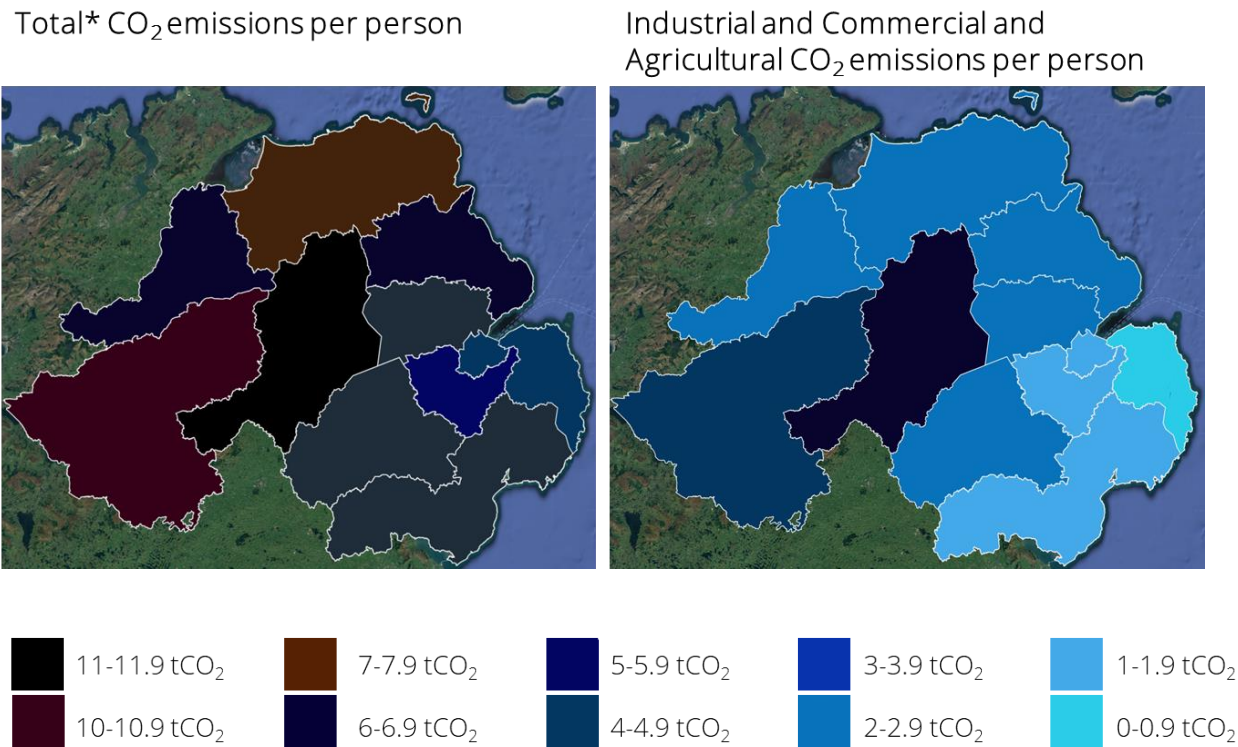
Mapping high emissions installations gives a picture of the geographic spread of GHG emissions. The installations currently taking part in the EU-ETS in Northern Ireland are mapped below. In addition to the EU-ETS register, the Department for Business, Energy and Industrial Strategy (BEIS) publishes regional carbon emissions data.¹⁵ The data provides a breakdown by end-user category (industry, agriculture, residential, transport and LULUCF) per district council. As part of this breakdown, BEIS provides data emissions from large industrial installations, most of whom are EU-ETS participants. The data include CO₂ emissions but do not include other GHG emissions such as methane. Therefore, while it gives a good picture of the industrial, transport and residential emissions per local authority, the picture it provides of agricultural emissions is partial. The National Atmospheric Emissions Inventory (NAEI) provides another useful dataset including most EU-ETS emitting installations but not their 2019 verified emissions.

The maps below use all three data sources to provide a picture of the spread and intensity of carbon emissions across Northern Ireland. The maps were created by using Google Earth Pro.

¹⁵ Territorial emissions according to end-user

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/894785/2005-18-local-authority-co2-emissions-statistical-release.pdf

Figure 8: Northern Ireland CO₂ emissions per person by District Council



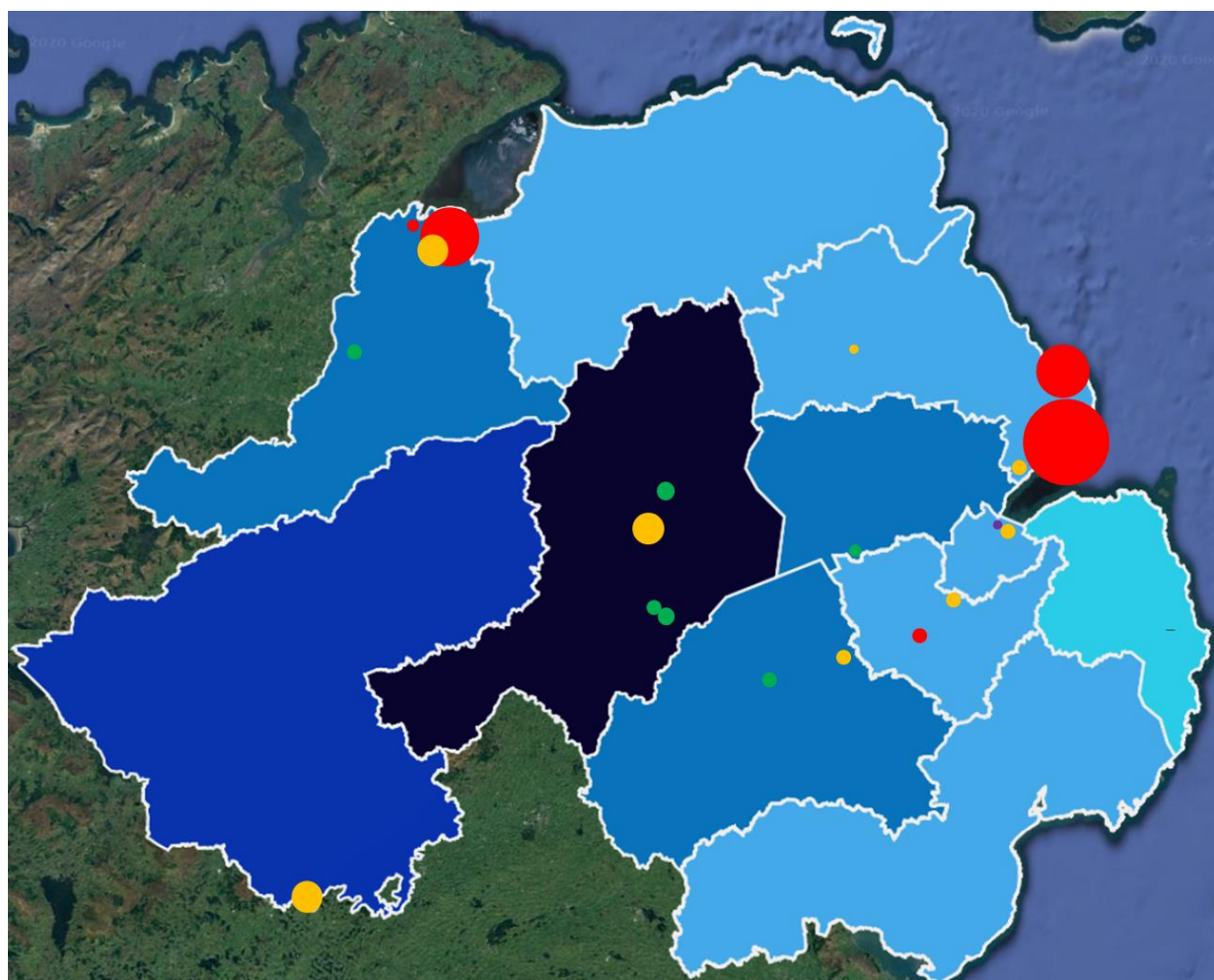
* Total includes Industrial and Commercial, Agriculture, Residential, Transport and LULUCF

Source: BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018

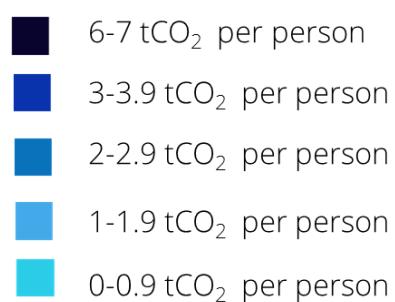
The two maps above show the total CO₂ emissions per person per district council. The three highest emitting councils are Mid-Ulster, Fermanagh and Omagh and Mid and East Antrim. When only the industrial, agricultural and commercial emissions per person are shown the two highest emitters are still Mid-Ulster and Fermanagh and Omagh.

The map below shows the high emissions installations per district council in addition to the industrial and commercial emissions per person. This gives a good indication of the location of the highest emitting industries. It does not include agriculture but it does include agrifood manufacturing.

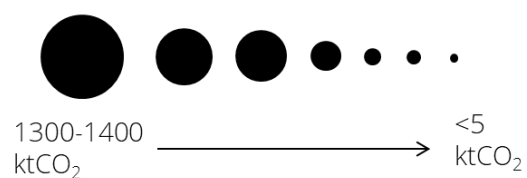
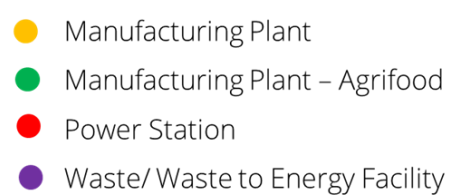
Figure 9: Northern Ireland high emissions installations (2019) and industrial and commercial emissions by District Council



Industrial and Commercial emissions (not including Agriculture) CO₂ per person



High emissions installations



Source: EU-ETS Registry (2019) Verified Emissions and BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 (ktCO₂); NAEI (2020) Interactive Map

According to the EU-ETS registry, there are five power stations taking part in the scheme (one of which is co-located with a drinks company), one waste/waste-to-energy site, eight manufacturing plants, including, cement, glass, textiles, aerospace and drinks. Public institutions such as hospitals are also included in the scheme, but are not mapped here. Finally, there are six agrifood manufacturing plants mapped. Many of these installations are located in regional towns or rural/ semi-rural areas.

An examination of GHG emissions by source and by district council can provide some evidence of how each area may be impacted by the transition to a net zero economy.

Table 4: NI Emissions by sector and district council

Name	Total kt CO ₂	Total Per Capita Emissions tCO ₂
Mid Ulster	1,756.8	11.9
Fermanagh and Omagh	1,233.1	10.6
Derry City and Strabane	1,026.6	6.8
Antrim and Newtownabbey	1,027.1	7.2
Armagh City, Banbridge and Craigavon	1,541.5	7.2
Newry, Mourne and Down	1,261.1	7.0
Mid and East Antrim	901.6	6.5
Causeway Coast and Glens	1,020.7	7.1
Lisburn and Castlereagh	811.0	5.6
Belfast	1,418.5	4.1
Ards and North Down	665.3	4.1

Source: BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 (kt CO₂)

While the **Armagh City, Banbridge & Craigavon**¹⁶ district is home to two high emissions EU-ETS installations – one meat manufacturer and one packaging manufacturer which serves the agri-food business. The BEIS data (2020) show that in 2018 there were also two dairy manufacturers who were no longer participating in the EU-ETS with emissions of 1 ktCO₂ and 0.5 ktCO₂ operating in the district council area. There also a hospital with emissions of

¹⁶ The Ards and North Down, Antrim and Newtownabbey, Newry, Mourne and Down, and Causeway Coast and Glens local authorities did not have any large installations in their districts and are not included in these tables.

just below 1 ktCO₂ in 2018. The two dairies and the hospital are included in the industrial emissions in the table below, along with the current EU-ETS installations.

The industry and agricultural emissions per capita in the district are 2 tCO₂, below the average of 3 tCO₂. Armagh City, Banbridge & Craigavon has the second highest population after Belfast district and its population is approximately 80% rural/small town. Unsurprisingly, given its population and large rural and small town population, it has the highest transport emissions and the second highest domestic emissions among the district councils, with total per capita emissions at 7.2tCO₂. Manufacturing, including food, is a large employer; at 24.3% full time employees (FTE), it is the largest of the higher emissions industries in the district. One of the agrifood manufacturing plants alone has 2,000 full time employees and 300 agency workers.¹⁷

Table 5: Armagh City, Banbridge & Craigavon¹⁸

Employment 2019			Emissions 2018		
	% Total FTE	Total FTE	% Total PTE		(ktCO ₂)
Agriculture, forestry and fishing ¹⁹	*	2,976	*	A. Industry and Commercial Electricity	132.6
Mining and quarrying	0.4	219.0	0.0	B. Industry and Commercial Gas	94.5
Manufacturing	24.3	12,401	2.0	C. Large Industrial Installations	11.0
Electricity, gas, steam and air conditioning supply	*	*	0.0	D. Industrial and Commercial Other Fuels	188.5
Water supply, sewerage, waste management and remediation activities	1.5	756.0	0.1	E. Agriculture	78.0
Construction	7.0	3,574.0	0.9	Domestic Total	439.2
Wholesale and retail trade; repair of motor vehicles and motor cycles	14.8	7,567.0	14.6	Transport Total	562.6
Transport and storage	6.8	3,463	1.4	LULUCF Net Emissions	35.3
Per Capita Emissions (t)					7.2

¹⁷ <https://www.irishnews.com/business/2020/05/26/news/moy-park-writing-the-rule-book-on-safety--1951537/>

¹⁸ All district council tables are from BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 and the LFS Tables for Local Government Districts 2008-2019 (2020)

¹⁹ Statistics on farmers and agricultural workers are found in the Agricultural census and are not included in the LFS

Table 6: Mid and East Antrim

Employment 2019			Emissions 2018		
	% Total FTE	Total FTE	% Total PTE		(ktCO ₂)
Agriculture, forestry and fishing	*	1465	*	A. Industry and Commercial Electricity	47.4
Mining and quarrying	*	*	*	B. Industry and Commercial Gas	94.5
Manufacturing	25.4	6,940	2.6	C. Large Industrial Installations	11.9
Electricity, gas, steam and air conditioning supply	*	*	*	D. Industrial and Commercial Other Fuels	137.6
Water supply, sewerage, waste management and remediation activities	1.4	374	0.2	E. Agriculture	45.4
Construction	6.7	1,819	1.6	Domestic Total	272.2
Wholesale and retail trade; repair of motor vehicles and motor cycles	15.0	4,094	27.9	Transport Total	291.0
Transport and storage	6.4	1,738	2.9	LULUCF Net Emissions	23.6
Per Capita Emissions (t)					6.5

Source: BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 and LFS (2020) Local Government Districts 2008-2019

Mid and East Antrim industry and agricultural emissions per capita are 2.3 tCO₂, and its total per capital emissions are 6.5 tCO₂ twice the average per capita emissions. The district has three EU-ETS installations, one tyre manufacturer and two major power plants, Kilroot and Ballylumford. Also included in the BEIS data, and therefore in the map above, but not in the EU-ETS data is an aluminium manufacturing installation. Manufacturing is at 25.4% FTE in this district; the next nearest sector is wholesale and retail trade; repair of motor vehicles and motor cycles is at 15% FTE. The employment numbers of the energy sector have not been disclosed in the data; however, news reports show that at the time of its sale in 2019, the Kilroot plant had an average of 121 employees, and in 2018 Ballylumford had approximately 250 employees.²⁰ As can be seen in the map, the levels of emissions from the energy installations far outweigh those of the manufacturing installations, by a 185%

²⁰ <https://www.belfasttelegraph.co.uk/business/northern-ireland/company-report-kilroot-38592890.html> ; <https://unitetheunionireland.org/2018/11/08/an-estimated-80-aes-job-losses-and-a-further-60-contractor-redundancies-likely-across-kilroot-and-ballylumford-power-stations/>

and 104% respectively.²¹ The full emissions from the power stations are not reflected in the table, above, which is taken from the BEIS data; they are however, available from the EU-ETS Registry (2020) and the NAEI Interactive Map (2020).

Table 7: Belfast

	Employment 2019			Emissions 2018	
	% Total FTE	Total FTE	% Total PTE		(ktCO ₂)
Agriculture, forestry and fishing	*	34	*	A. Industry and Commercial Electricity	252.3
Mining and quarrying	*	*	*	B. Industry and Commercial Gas	203.4
Manufacturing	5.4	8712.0	0.9	C. Large Industrial Installations	2.9
Electricity, gas, steam and air conditioning supply	0.5	823.0	0.1	D. Industrial and Commercial Other Fuels	51.8
Water supply, sewerage, waste management and remediation activities	0.8	1321.0	0.1	E. Agriculture	9.8
Construction	2.8	4447.0	0.6	Domestic Total	543.4
Wholesale and retail trade; repair of motor vehicles and motor cycles	9.0	14369.0	19.1	Transport Total	543.4
Transport and storage	3.7	5,929	1.9	LULUCF Net Emissions	543.4
				Per Capita Emissions (t)	4.1

Source: BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 and LFS (2020) Local Government Districts 2008-2019

Belfast has two EU-ETS installations, one waste and one manufacturing. The district has low per capita emissions for both industry and commercial and in total, 1.5tCO₂ and 4.1tCO₂ respectively. Due to its larger population, urban nature and diverse local economy, it is much less reliant on the sectors identified as at risk and thus from the transition to a net-zero economy.

²¹ Source: BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 (kt CO₂) – author's calculations

Table 8: Derry City and Strabane

Employment 2019			Emissions 2018		
	% Total FTE	Total FTE	% Total PTE		(ktCO ₂)
Agriculture, forestry and fishing	*	1525	*	A. Industry and Commercial Electricity	104.2
Mining and quarrying	*	*	*	B. Industry and Commercial Gas	36.6
Manufacturing	14.8	5803.0	2.0	C. Large Industrial Installations	104.6
Electricity, gas, steam and air conditioning supply	0.4	150.0	0.1	D. Industrial and Commercial Other Fuels	139.6
Water supply, sewerage, waste management and remediation activities	1.2	459.0	0.1	E. Agriculture	44.4
Construction	6.1	2406.0	1.8	Domestic Total	297.2
Wholesale and retail trade; repair of motor vehicles and motor cycles	10.7	4189.0	26.1	Transport Total	269.3
Transport and storage	2.8	1,112	1.8	LULUCF Net Emissions	30.8
				Per Capita Emissions (t)	6.8

Source: BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 and LFS (2020) Local Government Districts 2008-2019

The Derry City and Strabane district is home to two power plants, a textile manufacturing plant and a dairy manufacturing plant, all of which are part of the EU-ETS. Manufacturing has the highest proportion of jobs at 10.3%, however like Belfast, it is home to a larger population and thus its industrial and commercial per capita emissions are 3.1tCO₂ - just above the average of 3 tCO₂. Total per capita emissions are 6.8tCO₂

Table 9: Fermanagh & Omagh

Employment 2019			Emissions 2018		
	% Total FTE	Total FTE	% Total PTE		(ktCO ₂)
Agriculture, forestry and fishing	*	3173.0	*	A. Industry and Commercial Electricity	87.1
Mining and quarrying	1.0	260.0	0.2	B. Industry and Commercial Gas	0.0
Manufacturing	20.3	5463.0	2.3	C. Large Industrial Installations	132.2
Electricity, gas, steam and air conditioning supply	*	*	*	D. Industrial and Commercial Other Fuels	189.5
Water supply, sewerage, waste management and remediation activities	1.8	494.0	0.3	E. Agriculture	112.0
Construction	9.8	2645.0	2.6	Domestic Total	207.8
Wholesale and retail trade; repair of motor vehicles and motor cycles	13.6	3669.0	27.8	Transport Total	398.6
Transport and storage	4.2	1,141	2.9	LULUCF Net Emissions	106.1
Per Capita Emissions (t)					10.6

Source: BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 and LFS (2020) Local Government Districts 2008-2019

The Fermanagh and Omagh district has the highest agricultural emissions, 112 KtCO₂. With industry and commercial per capita emissions at 5.4tCO₂, it has one EU-ETS registered manufacturing installation and 10.6tCO₂, total per capita emissions. The proportion of the workforce that is part of manufacturing section is 20.3% FTE. A large number of full time farmers and farm workers (3,173) are also based in the district.

Table 10: Lisburn & Castlereagh

Employment 2019				Emissions 2018	
	% Total FTE	Total FTE	% Total PTE		(ktCO ₂)
Agriculture, forestry and fishing	*	756.0	*	A. Industry and Commercial Electricity	67.3
Mining and quarrying	*	*	*	B. Industry and Commercial Gas	41.4
Manufacturing	14.2	5451.0	1.9	C. Large Industrial Installations	23.2
Electricity, gas, steam and air conditioning supply	0.4	154.0	0.1	D. Industrial and Commercial Other Fuels	80.0
Water supply, sewerage, waste management and remediation activities	1.2	455.0	0.1	E. Agriculture	15.8
Construction	7.4	2828.0	1.6	Domestic Total	257.2
Wholesale and retail trade; repair of motor vehicles and motor cycles	15.0	5752.0	26.7	Transport Total	319.3
Transport and storage	2.9	1,107	1.0	LULUCF Net Emissions	6.8
				Per Capita Emissions (t)	5.6

Source: BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 and LFS (2020) Local Government Districts 2008-2019

The per capita emissions in Lisburn and Castlereagh are the second lowest at 5.6tCO₂. At 1.6tCO₂ the industry and commercial sectors have the second lowest total per capita emissions. There are two EU-ETS installation in this district, a power station for a drinks manufacturing plant and an agrifood installation. The proportion of jobs in the manufacturing sector in this district is 14.2% FTE.

Table 11: Mid Ulster

Employment 2019			Emissions 2018		
	% Total FTE	Total FTE	% Total PTE		(ktCO ₂)
Agriculture, forestry and fishing	*	3144.0	*	A. Industry and Commercial Electricity	112.7
Mining and quarrying	1.4	583.0	*	B. Industry and Commercial Gas	0.1
Manufacturing	39.9	16662.0	1.9	C. Large Industrial Installations	381.1
Electricity, gas, steam and air conditioning supply	0.1	44.0	0.1	D. Industrial and Commercial Other Fuels	410.7
Water supply, sewerage, waste management and remediation activities	0.7	307.0	0.1	E. Agriculture	91.5
Construction	11.3	4720.0	1.6	Domestic Total	242.1
Wholesale and retail trade; repair of motor vehicles and motor cycles	15.8	6605.0	26.7	Transport Total	415.1
Transport and storage	3.5	1,480	1.0	LULUCF Net Emissions	103.6
				Per Capita Emissions (t)	11.9

Source: BEIS (2020) Local Authority territorial CO₂ emissions estimates 2005-2018 and LFS (2020) Local Government Districts 2008-2019

Mid-Ulster, has the highest per capita emissions of all 11 district councils, nearly twice that of Belfast. Its per capita emissions for the Industry and Commercial sector are 7.5tCO₂, more than twice the district average (3tCO₂). The total per capita emissions are 11.9t. CO₂ It has the second highest agricultural emissions at 91KtCO₂. Emissions in the Industry and Commercial sector are twice as high as those in Belfast. It is home to two EU-ETS installations, a meat manufacturing plant and a cement plant whose emissions, at 310ktCO₂, make up 80% of the total (381ktCO₂) large EU-ETS installation emissions. The Mid-Ulster district also has the highest proportion of its workforce in manufacturing jobs (40% FTE).

The maps of the emissions per district council and the EU-ETS installations show the locations where workers might be most at risk from jobs losses/displacement. The three top emitters are Mid-Ulster, Fermanagh and Omagh and Mid and East Antrim. All three of

these districts have a high share of employment in manufacturing, Fermanagh and Omagh at 25.4, Mid and East Antrim 20.3 and Mid-Ulster at 40%.

A successful just transition approach will identify at risk populations, e.g. workers at risk of job loss in specific industries or locations. While it may not be possible to narrow down the economic subsectors at greatest risk in Northern Ireland using currently available data, it is possible to identify geographic areas that have high industrial emissions and high levels of manufacturing employment. Data sources such as the EU-ETS register can be used to identify large emitters, their locations and in combination with sources, their number of employees. However, this is not a substitute for the provision of data on emissions per economic sector.

Without the necessary data, identifying local policies for a just transition becomes more difficult. It is also the case that economic sectors do not exist as discrete categories in an analysis, there are interdependencies between them. When supply chains are accounted for the total emissions in an industry may rise significantly. The construction industry requires considerable production of concrete and tourism in a given area may be dependent on air travel (Goldrick-Kelly and Nugent, 2019), both of which are sources of high GHG emissions. This effect is particularly evident in the agri-food sector, where a life cycle approach applied to the production of cheese for example, will include both the GHG emissions from the farming of dairy cows, but also manufacturing of the final cheese product and the transport of the product in refrigerated vehicles. As discussed in the CCC 2019 *Path to net-zero emissions in the UK* report, a change in dietary habits to reduce consumption of meat and dairy is required to reach the UK target. While the CCC is not advocating reducing the number of livestock in Northern Ireland at this point, if the Executive and the Assembly increase their ambition to net-zero by either 2050 or 2045, a reappraisal of the recommendation not to reduce the livestock numbers may be required.

Mapping the EU-ETS installations and comparing them with the local sector employment figures can provide an indication of what locations, industries and therefore workers are at risk from a transition to a net zero economy. From the maps above two points stand out, apart from power stations, taken in aggregate, the agrifood industry, dairy and meat, is both

an important employer in many non-metropolitan areas, and a significant source of emissions. Those areas strong in food manufacturing also have a significant farming hinterland, meaning that those communities are more vulnerable to negative employment and economic impacts from the transition.

SECTION 5: THE AGRIFOOD SECTOR

The food system as it currently operates will come under significant pressure in the coming decades from both targeted climate mitigation policies and the requirement to reduce emissions, and the impact of climate change itself, putting severe stress on food systems globally. Land-use presents a particularly difficult challenge to climate policy, given the need to reduce land-based emissions and maintain food production. The importance of the agrifood sector to many economies adds to the challenge of emissions reduction. In Northern Ireland it accounts for approximately 70,000 full time jobs (NISRA, 2020, DAERA, 2020). Of these 70,000, over 49 thousand are farm workers of which 62% are farmers, 16% are spouses and 24% are all other workers. On the processing side of the industry, there are approximately 21,000 full time direct employees. Agency employment in the food processing sector was been estimated at 10% in 2018, rising from 7% in 2014.

The CCC (2020a) has identified five actions that would decrease the amount of agricultural land in the UK by 15% by 2020, releasing it for carbon sequestration and reducing emissions.

1. Low-carbon farming practices – e.g. use of fertilisers, improving livestock health and soil management.
2. Afforestation and agro-forestry – e.g. increasing forestry cover, planting trees on farmed land and sustainable management of forests.
3. Peatlands – peat restoration, both upland and lowland.
4. Bioenergy crops – expanding the growing of bioenergy crops.
5. Reducing consumption of the most carbon-intensive foods – reducing the consumption of beef, lamb and dairy by 20% per person and reducing food waste by 20%.

In its 6th carbon budget under the Balanced Pathway it has updated the consumption reduction required to 35% meat and dairy. Some of these actions listed above are best pursued through legislation, such as the banning of peat extraction; others will require public funding and the use of other policy levers such as education.

Agriculture in Northern Ireland is dominated by cattle and sheep farming (80%). The remaining 20% comprises dairy (10%), cereals and horticulture (5%), pigs and poultry (3%)

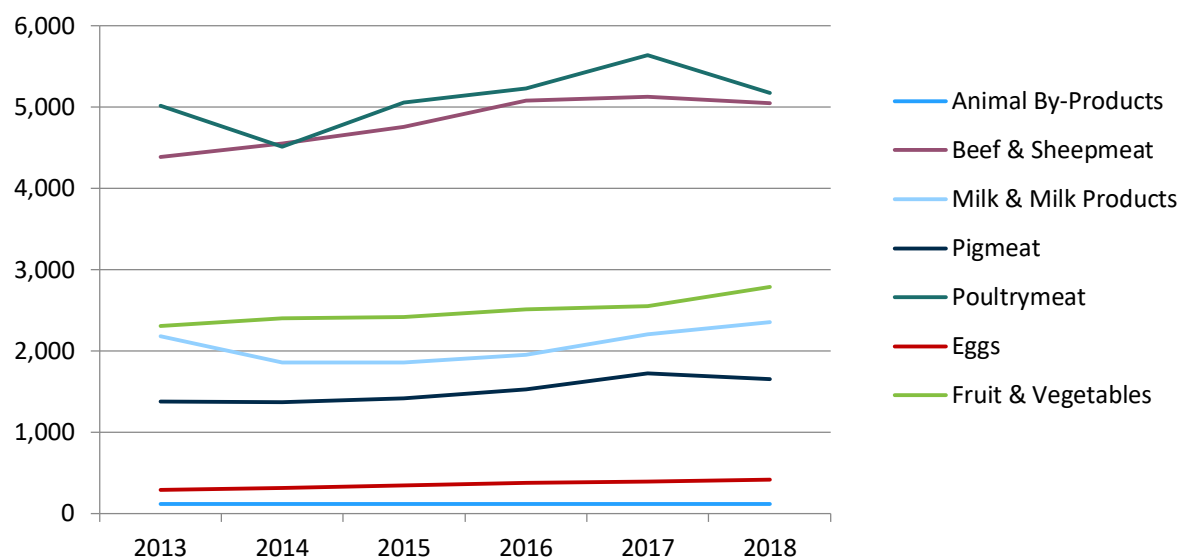
and mixed/other (3%) (NISRA, 2020). In total, livestock represents over 90% GVA in the agricultural sector (CCC, 2019). This high reliance on livestock means that grassland comprises 75% of land area in Northern Ireland. The CCC estimates that Northern Ireland could increase the land covered for lower-carbon uses such as a forestry and agro-forestry by up to 11% (CCC, 2019). The degradation of peatland in Northern Ireland means that instead of being a carbon sink, it is a source of emissions, expected to add 2.3 MtCO₂ over 1990 levels. The CCC estimates that with peatland restoration, this could fall by 0.5MtCO₂ (CCC, 2019).

The reduction in demand for beef, lamb and dairy and/or the change of use of grasslands from livestock to lower carbon uses would most likely impact the wider dairy and meat production industry. Farming incomes are inherently volatile, exposed to the fluctuations of commodities markets and weather conditions (EU Parliament, 2015). The average farm income in Northern Ireland fell from £33,410 in 2017/18 to 28,612 2018/19 (DAERA, 2020). The vast majority of farms in Northern Ireland are classed as 'very small' (77%) and owner occupied (79%) and in 2019 they employed over five thousand workers, 84% of which were part time or casual/seasonal. In comparison with farms in other parts of the UK, Northern Ireland farmers receive a greater amount of direct income support (UK Parliament, 2018). While cattle dominate the lifecycle livestock emissions, post-farm processes have a relatively high impact on poultry and pig meat emissions (aan den Toorn, *et.al.*, 2017). Thus both farmers and workers in the agrifood sector are vulnerable to negative impacts from the transition to a net-zero economy.

5.1 The workforce in the agri-food industry

On the manufacturing side there are approximately 23,000 employees in the food and drinks sector, of which about 21,000 are employed in agri-foods.

Figure 10: Number of direct full time employee equivalent in the agri-food processing industry



Source: (DAERA Northern Ireland Food and Drinks Processing Report, 2019)

Employment in the sector, both farming and processing, is heavily reliant on migrant labour, mostly from non-UK EEA nationals. According to a 2016 Northern Ireland Food and Drink Association (NIFDA) report, 48% of workers in the sector are migrants; this rises to 91% of the seasonal workforce (NIFDA, 2016). The processing sector employs approximately 40% non-UK EEA workers; in the beef and lamb processing sector that figure is 60-70% (House of Commons, 2018;). Given the prevalence of non-UK EEA migrant workers in all parts of the agri-food industry, it is fair to say that as a sector, it will be particularly vulnerable to labour shortages as a result of Brexit.

At the same time, its employees represent some of the most at vulnerable cohorts of workers in Northern Ireland. Migrants in non-metropolitan areas are often employed in positions marked by lower pay, fewer opportunities for career progression or training opportunities. Their employment conditions are often precarious with limited employee protection, especially in the agricultural, horticultural, food processing and construction industries (McAreavey and Krivokapic-Skoko, 2019). DAERA figures show that the majority of workers in the food processing sector in 2017 were process, plant and machine operatives (67%), of these 53% were from EU countries. Migrants from non-EU countries were even more concentrated in the machine operatives occupation (87%) (DAERA, 2018).

Research suggests that there is evidence that migrants in Northern Ireland are employed in jobs below their existing skill and experience levels across different sectors of the economy. Most migrants in Northern Ireland find employment in SMEs, which have proved to be more discriminatory towards migrant workers (McAreavey and Krivokapic-Skoko, 2019). Following the enlargement of the European Union in 2004 to include eight new countries in central and eastern European, and the subsequent increase in migration from these countries to Northern Ireland, the ICTU documented migrant experiences (ICTU, 2007). During this post-accession period, migrants were being primarily employed in a small number of areas, the health service, the food and accommodation sector and the agri-food sector, in particular meat processing. Some factories responded to this new labour supply by cutting directly employed workers and replacing them with agency ones. These agency workers were mainly migrants, but it was often the case that they were replacing directly employed workers who were themselves migrants. One well-documented case was that of Dungannon Meats, which announced 46 redundancies and replaced the staff with agency workers. The majority of the permanent workforce who were sacked in this instance were also migrants (ICTU, 2007).

Given their prevalence in the agri-food processing industry, migrant workers are especially vulnerable to any decline in production in the industry, or increased automation. In addition, as discussed above, there are often fewer opportunities for training and upskilling available for migrant workers. The agrifood industry is based in rural and regional towns, any closure of farms or businesses in these areas can have negative impacts on the local economy.

If a reduction in the production of meat and/or dairy were to occur due to climate mitigation action, either at Government level or at the individual level or if technological advances to lower carbon in production processes were introduced, this could lead to job losses or displacement in the sector. Given the importance of food manufacturing to specific non-metropolitan areas, any understanding of risk to negative impacts of transition and mitigation of that risk must take geography into account.

SECTION 6: THE GREEN ECONOMY AND GREEN JOBS

A successful just transition both requires and supports the development of a carbon neutral or green economy. The green economy is defined by UN Environment as “low carbon, resource efficient and socially inclusive”.²² The green economy exists within the framework of sustainable development rather than replacing it. It emphasises the support of good employment, targeted investment, development of infrastructure, and provides positive social and environmental outcomes. Natural capital is understood as a critical economic asset upon which poorer people, often rely, especially those whose livelihoods are dependent on it. The green economy exists within environmental resource limits and requires public and private support, policy and regulatory reforms and targeted public investment (UN Environment; OECD²³). An important component of the green economy is the concept of the ‘green job’.

“Green jobs are decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency.” ILO (2016)²⁴

Most descriptions of green jobs define them as producing a good or service which benefits the environment but also is produced using an environmentally friendly process.²⁵ They are categorised and measured in different ways by different states and organisations. Jobs in the Environmental Goods and Services Sectors (EGS), as measured by Eurostat and the UK, are analogous to what many perceive as ‘green jobs’. The UK classification, adopted under the UN framework of environmental economic accounting, includes 17 categories, from renewable energy to environment education. The sector is defined as “areas of the economy engaged in producing goods and services for environmental protection purposes, as well as those engaged in conserving and maintaining natural resources”.²⁶ Goods and

²² www.unenvironment.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/green-economy (Accessed 1 December 2020)

²³ www.oecd.org/general/whatisgreengrowthandhowcanithelpdeliver sustainable development.htm (Accessed 1 December 2020)

²⁴ https://www.ilo.org/global/topics/green-jobs/news/WCMS_220248/lang-en/index.htm

²⁵ For a detailed discussion on definitions of green jobs see Goldrick and Nugent, 2019

²⁶ ONS: *Environmental Accounts*

www.ons.gov.uk/economy/environmentalaccounts/methodologies/environmentalaccountsontheenvironmentalgoodsandservicessectoregssqmi

services that “primarily satisfy technical, human and economic needs” which may be beneficial to the environment are excluded (ONS *Op.Cit.*).

6.1 Jobs in the Low Carbon Economy in Northern Ireland

To evaluate the potential for the development of the green economy in Northern Ireland it is useful to examine its current employment footprint. The ONS provides data on the output, Gross Value Added (GVA), employment and exports by EGGS activity and industry at the UK level; however, this data is not available for Northern Ireland.

A subsection of EGSS data is available at the Northern Ireland level: the Low Carbon Renewable Energy Economy (LCREE) sectors, such as renewable energy and energy efficiency products.

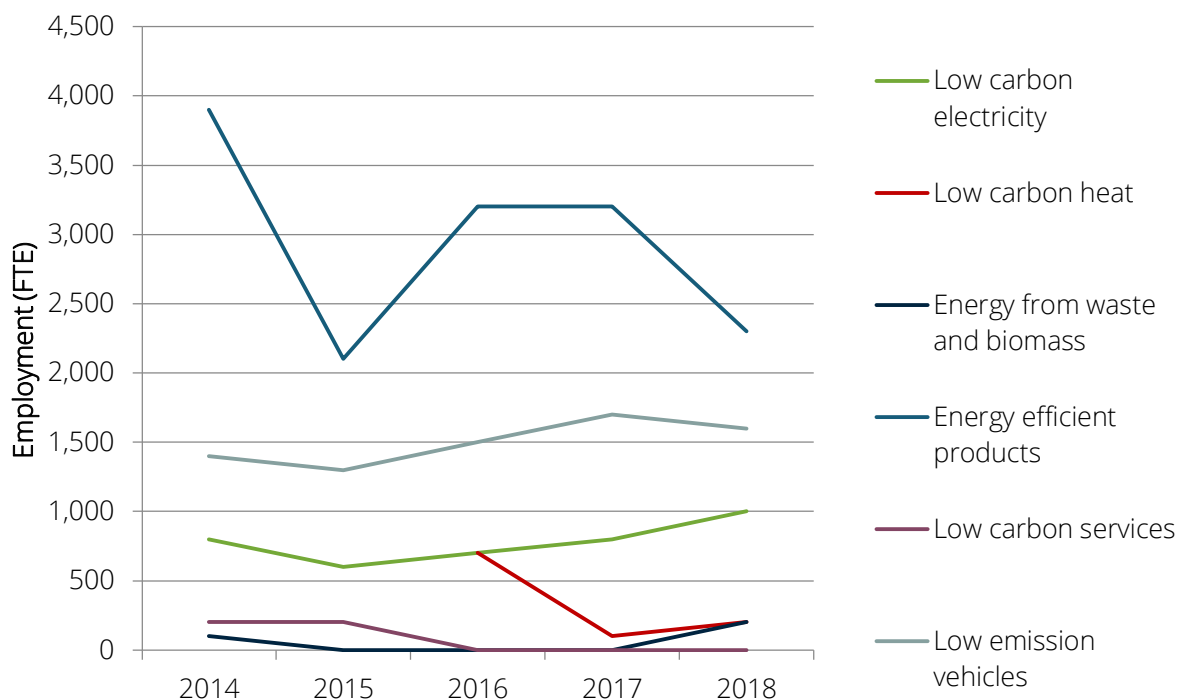
Table 13: List of sectors included in the EGSS and LCREE sectors

Environmental Goods and Services Sectors	Low Carbon and Renewable Energy Sectors
Wastewater	Offshore wind
Waste	Onshore wind
Recycling	Solar photovoltaic
Water quantity	Hydropower
Production of renewable energy	Other renewable electricity
In-house environmental activities	Bioenergy
Management of forests	Alternative fuels
Organic agriculture	Renewable heat
Insulation activities	Renewable combined heat and power
Environment related education	Energy efficient lighting
Managerial activities of government bodies	Energy efficient products
Environmental charities	Energy monitoring, saving or control systems
Energy saving and sustainable systems	Low carbon consultancy financial and advisory services
Environmental construction	Low emission vehicles and infrastructure
Environmental consultancy and engineering	Carbon capture and storage
Environmental low emissions vehicles, carbon capture and inspection and control	Nuclear power
Production of industrial environmental equipment	Fuel cells and energy storage systems

Source: ONS (2020) LCREE Survey

The level of LCREE employment in Northern Ireland is displayed in figure 11 below. Overall the employment in LCREE in total in Northern Ireland has decreased nearly 20% since 2014. This is due mainly to a decrease in the energy efficient product category. Employment in the energy from waste category has increased 100%, however.

Figure 11: LCREE employment in Northern Ireland by group, 2014 to 2018

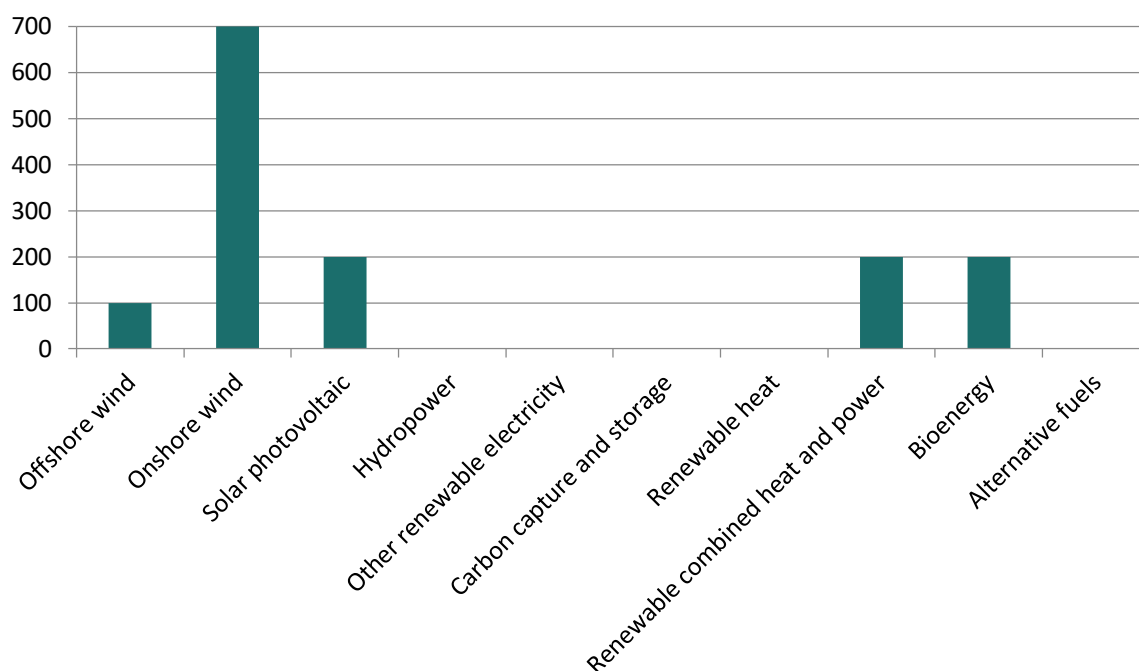


Source: ONS (2020) Statistical bulletin: Low carbon and renewable energy economy, UK: 2018

Low-carbon electricity, while growing to a 40% renewable share of electricity, sustains approximately 1,000 jobs in electricity supply. An estimated total of 5,400 jobs are sustained by the industry in total (Dept. for the Economy, 2020). The largest share of jobs in renewable employment supply is onshore wind. Renewable UK estimated in 2013 that up to 70,000 extra direct jobs could be generated in the wind and marine energy sectors between 2013 and 2030 (RenewableUK, 2013). However, progress on these projects, and thus jobs, has been slower than anticipated. Renewable energy projects currently in the pipeline in Northern Ireland (including battery storage) will have a capacity of 1,208MW (Dept. for the Economy, 2020). According to Northern Ireland Electricity Network (NIEN), the current connected (to the grid) renewable energy capacity is 1,684 MW of connected

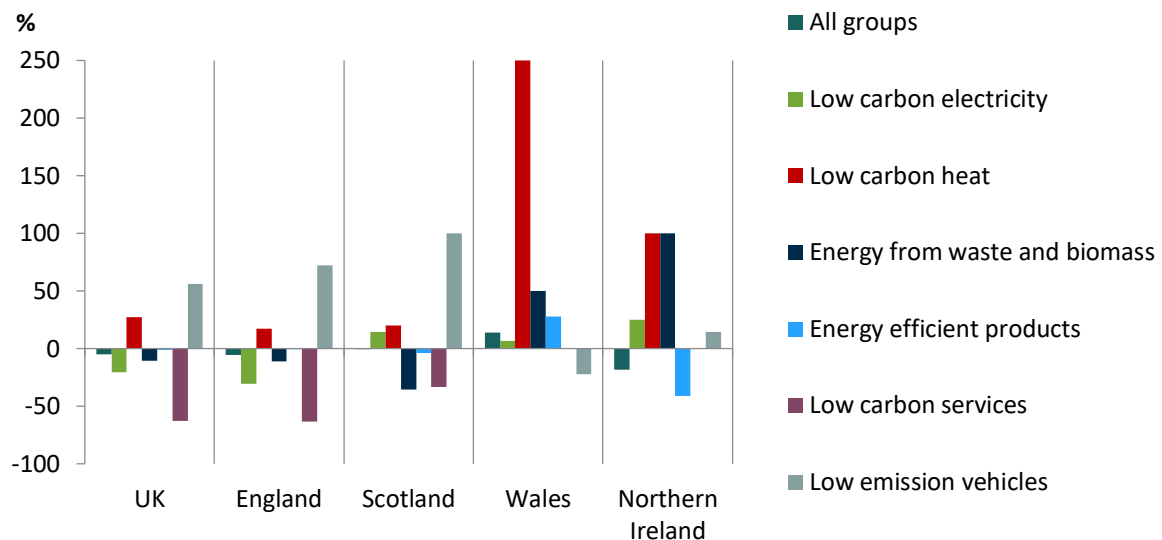
renewable generation technologies (Dept. for the Economy, 2020). Were only those projects in the pipeline to develop, one might expect employment in this sector to be sustained over the coming few years. However, given the ambitious energy and climate targets outlined in section 3 above, there is scope for greater employment growth in the LCREE sector.

Figure 12: LCREE employment in Northern Ireland by renewable energy type - 2018



Source: ONS (2020) Statistical bulletin: Low carbon and renewable energy economy, UK: 2018

Figure 13: Percentage Change in LCREE employment in UK countries by sector, from 2014 to 2018



Source: ONS (2020) Statistical bulletin: Low carbon and renewable energy economy, UK: 2018

Government targets and policies in renewable energy generation and emissions reductions have been an important driver of both increased employment in certain environmental sectors and the development of green skills in the UK (CEDFOP, 2018). Future employment in low-carbon and green jobs will be dependent on government policy and incentives.

6.2 Investing in a Green Economy

Investment in the green economy brings environmental and economic and social returns. As discussed in the section above, the green jobs include wider environmental jobs as well as ones in the low-carbon sector. Investment in the low-carbon sectors tends to be technology focused, such as energy efficient products or renewable energy technologies. The environmental goods and services sector includes these technologies but also a broader set of activities, including services, environmental construction and nature-based solutions.

Many of the climate action policies proposed by the Committee on Climate Change (2019; 2020) require state investment, such as payments for farmers, grants for households to incentivise the take up of energy efficiency and renewable technologies, funding for similar delivery of residential emissions reduction activities in lower incomes households and investment in public transport. NERI research on just transition in the Republic of Ireland

advocated an ‘entrepreneurial state approach whereby the state becomes the largest ‘player’ in the economy especially in key sectors” (Nugent and Goldrick-Kelly, 2020). Successful case studies of just transition approaches have all been marked by substantial state action, either proactive and/or reactive (Gambhir *et.al.* 2018). Investment by the state in low carbon new technologies in particular, brings long-term returns and helps avoid carbon lock-in. Investment in low-carbon infrastructure such as energy can create decent jobs both in the construction and maintenance of assets (Emden and Murphy, 2019) in addition to meeting climate targets and security of supply.

Meeting climate targets will also require a concerted drive to ensure that all residential buildings are energy efficient. A large number of households in Northern Ireland are still dependent on oil for their heating (68%) and 8% of households are dependent on solid fuel for their heating.²⁷ Moving these households to low carbon alternatives such as heat pumps would both reduce emissions and reduce heating costs. Fuel poverty levels in Northern Ireland are high, currently 42% (NIHE, 2016)²⁸. Deep retrofitting of residential buildings would also increase energy efficiency and reduce demand. Approximately 35% of residential buildings do not have cavity wall insulation and 13% do not have full double glazing (*ibid*). Addressing energy use and energy efficiency in the housing stock will require significant funding. However, the commonly taken approach of incentivising private individuals through small grants and subsidies will not be sufficient to make the large scale change that is needed at this stage to meet targets. Such approaches require significant investment on the part of the homeowner, as such, these schemes are usually only available to those who already have the capital upfront, thereby excluding those on middle or lower incomes (Nugent and Goldrick-Kelly, 2020).

Section 5 on the agrifood industry examined the risk to workers posed by decarbonisation. As discussed, these workers are based predominantly in rural or small town areas and a significant number of them are non-UK EU migrants, who would find it more challenging to gain new employment were they to lose their jobs (McAreavey and Krivokapic-Skoko, 2019). These rural and small town locations are areas, however, where the promotion of the

²⁷ <https://www.nihe.gov.uk/Working-With-Us/Research/House-Condition-Survey>

²⁸ <https://www.communities-ni.gov.uk/topics/housing/fuel-poverty>

circular economy and nature restoration could provide jobs of the future. Research on the circular economy in Northern Ireland in 2015 identified jobs creation possibilities under three scenarios, citing from 9,000 to 21,000 under the most ambitious scenario. Circular economy policies focus on reusing and recycling both waste and outputs from production to create uses, extracting the maximum value for the least amount of input. Nature restoration such as restoration of bogs can provide hundreds of jobs. A 2020 announcement by the Department for Environment, Climate and Communications promised the creation of 350 jobs from a €108 million investment in peat restoration in the midlands in the Republic of Ireland.²⁹ In 2019, and €80 million investment was announced in peat restoration which promised to create 200 jobs, over four years, rehabilitating 77,000 hectare of peatland.

The RSPBNI has estimated that green nature investments and projects could support 1,750 FTE jobs in Northern Ireland in the following areas: restoration and creation of priority habitats; restoration and creation of boundary features; environmental land management advice; improving and creating urban green spaces, and planting additional woodland for net zero carbon (RSPBNI, 2020).

While investment in low carbon technology and infrastructure is a crucial component in supporting the green economy and green jobs, investment in nature restoration and stewardship along with promotion of the circular economy is required to ensure that broader environmental sustainability targets are met along with emissions reduction.

6.3 Skills for Green Jobs

The development of a successful green economy is highly dependent on a supply of skilled labour. An initial step in planning a just transition would be to examine the skill-base and to conduct local and sectoral skills audits (ILO, 2016)

In relation to skills policy, the Northern Ireland skills system is currently supported by the 2011 *Success Through Skills Strategy*, due to run until December 2020 when a new strategy

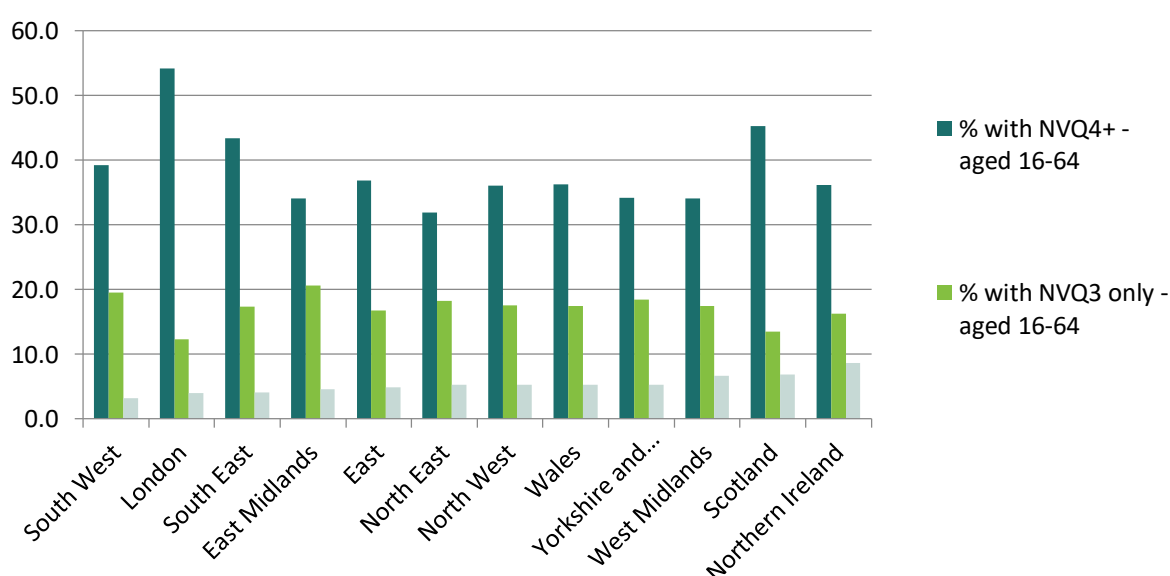
²⁹ <https://www.gov.ie/en/press-release/2aae1-cabinet-approves-108m-funding-for-groundbreaking-bord-na-mona-bog-rehabilitation-plan-minister-ryan-also-announces-that-47-more-projects-in-the-midlands-totalling-278m-are-approved-under-the-just-transition-fund/>

will be launched. The *vision* underpinning the strategy was to ensure that it supported the economy, which itself was the top priority of the Executive. The aspiration was ‘to grow a dynamic and innovative economy to provide the wealth and resources required to grow a peaceful, prosperous and fair society’ (Department for Employment and Learning, 2011). The aim of the strategy was raise the skill level of the entire workforce, thus raising productivity,

Skills in the low carbon economy require long periods of study, and skills levels of NVQ3 upwards (IPPR, 2019). Climate resilience and the management of natural assets, for example, require scientific, mathematical and technical skills such as climate modelling, risk management and environmental accounting (Goldrick-Kelly and Nugent, 2019). Most of the roles in the LCREE are also of a technical nature.

Of those in Higher Education Institutions in Northern Ireland, 50% are enrolled in broad STEM courses for their first degree, with that number falling to just over 40% at postgraduate level. NVQ4 is equivalent to a certificate of higher education. Chart 10 shows the percentage of workers with NVQ3+ skill levels in the UK, as can be seen; only 36% of workers in Northern Ireland have NVQ4 level or higher of education/skills, the 5th lowest in the 12 regions.

Figure 14: Percentage of workers with NVQ3+ levels by UK region 2019

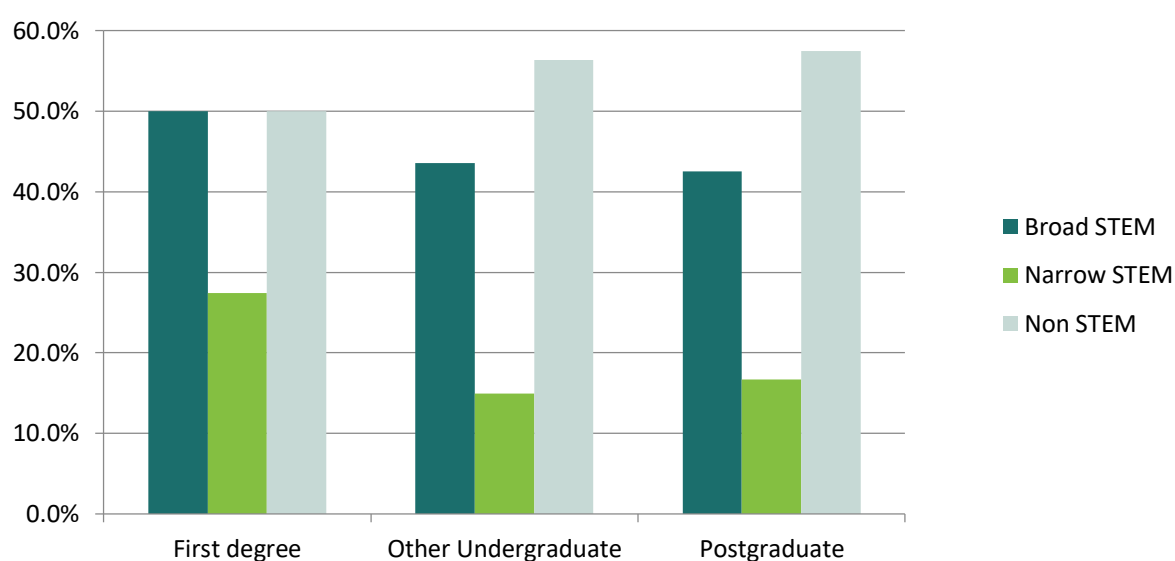


Source: ONS (2020) Annual Population Survey

In Northern Ireland only 16% have NVQ3 level qualifications and 8.6% of economically active workers had no qualifications, the highest percentage in all the regions of the UK. Thus, there is considerable room for improvement in the skills base.

English school leavers are the most likely school leavers in the UK to remain in their own country to attend higher education (HE) institutions (96%); this compares to 62% in Wales, 86% in Scotland and 73% in Northern Ireland (HESA: 2018). Of those school leavers from Northern Ireland who study in Northern Ireland, 5% leave to take up employment. In England this figure is less than 1% and in Scotland and Wales it is 7.8% and 10% respectively. Finally, of those Northern Irish students who study in the rest of the UK, 14% return to Northern Ireland for employment, this compares with 73% for English students, 45% for Scottish students and 42% for Welsh students. Compared with England and Scotland, Northern Ireland retains fewer of its HE-qualified school leavers.

Figure 15: Proportion of students gaining qualifications at NI HEIs in Broad and Narrow STEM subjects by level of qualification - 2018/19



Source: Department for the Economy (2020), Statistical Bulletin, Student enrolments on higher education courses

In the university sector, the proportion of students studying STEM³⁰ subjects declines from 50% at the degree level to 43% at the postgraduate level in 2018/19. The number of

³⁰ Broad STEM -Medicine and Dentistry; Subjects allied to Medicine; Biological Sciences; Veterinary Sciences; Agriculture and related subjects; Physical Sciences; Mathematical Sciences; Computer Science; Engineering and Technology; and Architecture, Building and Planning.

students studying narrow STEM subjects declines even more, from 27.4% of undergraduate to 16.7% of postgraduate (chart 11). In comparison with other UK countries, Northern Ireland had a similar participation rate in broad stem subjects at 49.6% of students, compared with 45.5% for England, 49.5% for Wales and 47.7% for Scotland in the 2017/18 academic year. However, in the narrow STEM subjects, Northern Ireland had the lowest participation rate at 26%, compared with 27.1%, 29.9% and 30.8% for England, Wales and Scotland respectively (Department for Education, 2019).

Medicine, dentistry and medical related subject are the most popular STEM subjects across the UK, at 40% in Northern Ireland, 33% in England, 31% in Wales and 30% in Scotland. Engineering and technology, identified by industry as being in high demand for the development of the low-carbon economy (Emden and Murphy, 2019), is studied by only 14% of students in Northern Ireland, 15% in England, 17% in Wales and 16% in Scotland (Department for the Economy, 2019).

The profile of subjects studied is not just a function of student demand, however; it is also dependent on courses offered by the education institutions, which have high levels of autonomy in the courses they can provide. Northern Ireland universities and third level colleges have expanded their range of courses through a Government and Employer sponsored initiative 'Carbon Zero Northern Ireland'. Courses offered under this initiative include: renewable energy awareness; technologies for wind, solar, biomass and hydro; waste management; responsible sourcing of materials; and sustainable construction (DfE, 2019).

IPPR (2019) research on the skills system in Northern Ireland found that funding for the skills sector had suffered a decline since the financial crisis and there was less training provided to workers by their employers than in other UK countries. While urgent, the transition to a net zero economy and society is a long-term undertaking, ensuring that the skills system is fit for purpose will require comprehensive audits, consultation and collaboration across all Government levels, education providers, industry and trade unions. Market-measures alone will not bring about successful change, the state must engage in

Narrow STEM - subset of Broad STEM and includes the following subject areas: Biological Sciences; Physical Sciences; Mathematical Sciences; Computer Science; and Engineering and Technology.

systematic planning to anticipate the future skill needs of the green economy (NESC, 2020). CEDEFOP (2018) research found a weak connection between policy makers working on environmental policy and those working on labour market and skills policy. A just transition framework can provide the structure in which these discussions can take place, ensuring that the principles outlined in section 1 are embedded in policies and decision-making.

SECTION 7: DESIGNING A JUST TRANSITION

A first step in planning a just transition must be the collection and publication of the relevant data so that workers and geographic areas which are most at risk from possible negative impacts of the transition can be identified. Investment and take-up of low carbon technologies, especially renewables, is often driven by Government regulations, policies and targets. Climate Change legislation which provides a framework for policy making, sectoral plans and legally binding targets is an important mechanism for defining the challenge and ensuring a whole of government approach.

As discussed in section 4, job displacement/losses are a risk of a transition to a low carbon economy. Workers in the fossil fuel extraction and electricity generation industries are usually the first to be exposed to closures due to climate mitigation policies. The phasing out of petrol and diesel vehicles in the UK will be accompanied by an Automotive Transition Fund, to fund the acceleration of technologies and innovation in this area. The UK Government estimates that this will create 169,000 jobs in the midlands and the north east, home to the British car industry. While a fund targeted at promoting innovation and research and development is extremely welcome, it does little for the individual who has lost their job and cannot find another one.

“Fairness is also fundamental to public support and must be embedded throughout policy. Only a transition that is perceived as fair, and where people, places and communities are well-supported, will succeed. UK Government policy, including on skills and jobs, must join up with local, regional and devolved policy on the just transition. Vulnerable people must be protected from the costs of the transition.”

Climate Change Committee, 2020: 14

As has been discussed above, workers in the energy sector are often first to feel the impacts of the transition to the low-carbon economy. Decarbonising the energy system will require building of renewable energy installations, such as wind and solar, which in turn will need the support of local communities, farmers as well as workers (Mercier, *et.al.*, 2020). While this paper has concentrated on the impact on Northern Ireland workers from the transition, ensuring a positive outcome for local communities where renewable energy

infrastructure is located is an important feature of a just and democratic energy transition and is discussed in Healy and Barry, (2017) and Mercier, *et.al.*, (2020).

7.1 Features of a Just Transition Framework

There are examples of sector specific and regional just transition programmes which do not have permanent administrative structures around them; however, for a whole of economy and country approach, it is preferable to have a framework which is true to the guidelines of the ILO. Successful transition programmes/policies are guided by a long-term vision as well as providing short-term responses and importantly, they are anticipatory (NESC, 2019). Common features include: social protection policies such as income support and early retirement packages (OECD, 2017); Nugent and Goldrick-Kelly, 2019; Mercier, 2020); social Dialogue and co-operation between unions, employers, Government and other government agencies; state and private investment in infrastructure, skills and training and diversification of the local economy; early implementation of strategies designed to mitigate the impact of the decline of specific industries, and public and private investment in education and innovation, designed to stimulate long-term regional growth and support new industries (Gambhir *et.al.* 2018).

Figure 16: Components of a just transition framework

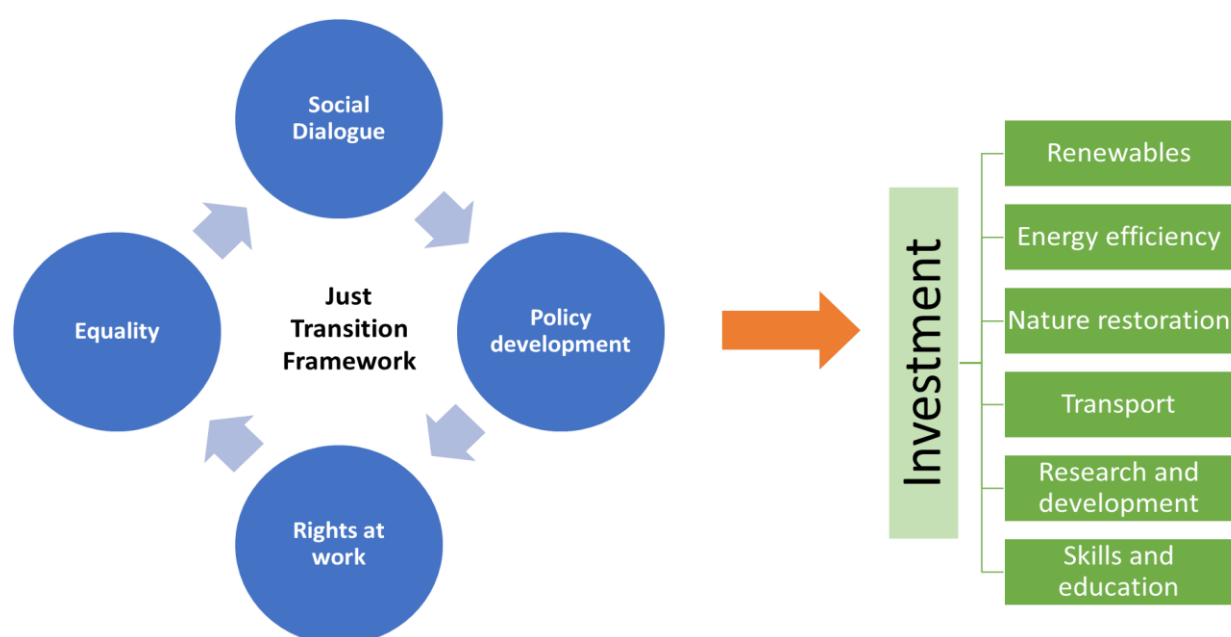


Figure 16 above illustrates the relationship between the principles of social dialogue, equality, workers' rights and policy development which feed into decision making on investment in transitioning to a net zero economy. Each of the components is important to the process. Central to the social dialogue and the policy development is developing an understanding of the possible risk to workers and communities from the transition. This in turn should promote a collaborative response to both the short-medium term risks (e.g. income supports, training) and the longer term ones (economic and social decline).

The state should harness its power as an important lever in economic development and create an ambitious investment plan targeting both low carbon technologies and nature-based solutions. Most crucially, the framework should empower stakeholders, including communities to plan and invest in climate resilience.

7.2 Social Dialogue in Northern Ireland

Emanating as it did from the trade union movement, it is unsurprising that social dialogue is central to any just transition framework. Social dialogue in Northern Ireland is underdeveloped in comparison with many other countries. The Belfast/Good Friday Agreement provides for the establishment of a Consultative Civic Forum. The Forum was designed to facilitate dialogue between social partners, including the Stormont Assembly, trade unions, employer and business associations and other sectors, such as the voluntary sector. As a Strand 1 body, it was created (although not directly specified) to interact with and feed into the legislative and policy making process (Hough, 2019). The composition and the sectors included are entirely up to the discretion of the First and Deputy First Minister. It first met in 2000, following a cross-party consultation, with 60 members and a chairperson appointed by the First and Deputy First Minister. The composition of the Forum was weighted towards Minister, trade unions and the business sectors, with 6/7 members each. The remaining membership comprised the following sectors: community relations, education, agriculture and fisheries, churches, arts and sports, victims and culture

(NI Executive³¹). Environmental groups were not specifically included. The Forum was discontinued in 2002 due to the collapse of the Stormont Assembly.

The Forum has not been reconstituted since 2002. A review in 2007 proposed that it be replaced with a six member Civic Advisory Panel. There was support within the political sphere to bring it back but that support was not cross-community (Nolan and Wilson, 2015). While the results were not published, according to the NI Executive, the responses to the review:

“...did not suggest a widespread desire for a return to a structure of the size and expense of the Forum as it had previously operated. The Stormont House Agreement envisaged that a new engagement model could be achieved through the establishment of a compact civic advisory panel which would meet regularly to consider key social, cultural and economic matters and to advise the Executive.”

(NI Executive)

Although the Forum lasted only two years, it was productive, meeting 12 times and producing a number of responses to government policy, reports on lifelong learning and anti-poverty and three submissions, including one on sustainable development. At the time it was dissolved it was due to meet on the theme of sustainable development (Haugh, 2019). The inclusion of the Forum in the Belfast/Good Friday Agreement was to widen democratic participation and encourage cooperation across sectarian and ethnic divisions (Nolan and Wilson, 2015). *New Decade New Approach* explicitly recognises the value of civic engagement, however, rather than reinstate the Forum as it was originally designed or broaden it beyond sectoral stakeholders, the parties agreed to reform the Civic Advisory Panel, through a Public Appointments process. In addition, the parties agreed that 1-2 issues will be commissioned for “civic engagement”. The issues will be chosen by the Executive and the panel will propose the model, including one Citizens’ Assembly a year

Ireland’s Citizen Assembly model has been praised internationally for providing an inclusive model for deliberative democracy which can tackle contentious and/or pressing subjects such as climate action (Devaney *et.al*, 2020). Ninety-nine citizens randomly selected and broadly representative of Irish society met to discuss climate change in 2018 and made far reaching recommendations that were more radical than initially expected (Torney, 2020).

³¹ <https://www.executiveoffice-ni.gov.uk/articles/civic-engagement>

These recommendations were discussed by a specifically convened parliamentary committee which produced priority recommendations reflecting those of the Citizens' Assembly. The Oireachtas committee report subsequently garnered cross-party support for most of its proposals. The citizens' assembly is a good model for dialogue with broader society, but it is not a substitute for social dialogue with stakeholders, which brings with it the experience and sector specific knowledge of the stakeholder, knowledge which can better inform policy and planning. Research and commentary on successful examples of a just transition have highlighted the importance of dialogue and collaboration between social partners (unions and business) and Government (Gambhir *et.al.* 2018). In addition, social dialogue as part of just transition is a process which is ongoing, unlike the usual citizen's assembly model which comprises a limited number of dialogues resulting in agreed positions and proposals. Respondents to the review of the Forum had highlighted its potential to develop into social partnership institutions such as the National Economic and Social Forum and its related organisation NESC in the Republic of Ireland, bodies which had facilitated ongoing dialogue and the production of research and analysis on strategic economic and social topics (Nolan and Wilson, 2015).

Prior to the re-establishment of the Assembly, the Northern Ireland Committee of the ICTU and Trade NI, the business representative body called for the creation of a Forum of Social Dialogue, which would comprise trade unions, employers, farmers and the community and voluntary sector (ICTUNI, 2019). This forum would be distinct from both the Civic Forum and a Citizens' Assembly. The proposed forum would look at issues such as Fair Work, industrial strategy and productivity.

Given the scale of the challenge of a transition to a net zero economy, social dialogue which facilitates genuine input by stakeholders into decision making will be vital and thus the reluctance to reconstitute the Civic Forum is unfortunate. A well-resourced permanent body such as the Just Transition Commission in Scotland with an ongoing remit to provide practical expert advice and research can take a longer-term view on economic

development and industrial policy while at the same time advising on current issues such as the recovery from the Covid-19 crisis.³²

Northern Ireland should look to creating a mechanism which facilitates ongoing social dialogue between social partners/stakeholders and which also allows for broader civic engagement, such as that which was provided for by the Consultative Civic Forum.

³² See for example: <https://www.gov.scot/publications/transition-commission-advice-green-recovery/>

SECTION 8: CONCLUSION

Northern Ireland faces significant challenges to decarbonise. However, while there may be some job displacement/losses there are also opportunities for the country to develop a low carbon economy and establish itself as a leader in industries such as environmentally sustainable agrifood and renewable energies. In addition, low carbon industries are often accompanied by higher productivity and higher skilled and paying jobs.

For the transition to the low carbon economy to be successful it must be just. But a Just transition does not happen by accident; it requires significant action by the state, from consulting with workers and communities, to directly supporting those displaced and ensuring that the skills system is fit for purpose. The principles and guidelines for a just transition have been laid out in the introduction; there must be social dialogue; respect for rights at work; gender equality must be addressed and the policies and framework must be coherent and bespoke for the area.

In terms of legislation and structures for planning a just transition, Northern Ireland lags behind countries such as Scotland, the wider-UK and the Republic of Ireland. Climate policy is complex and cross-sectoral requiring a whole of Government approach at national and local level. Northern Ireland currently lacks a climate policy framework with legally binding targets and sectoral plans, providing clarity and expectations to both the public and private sectors. Climate legislation alone will not deliver a just transition; it will require a framework for consultation and decision-making. The first step in planning for a just transition is to identify the segments of the workforce and population which are at risk from the transition to a low-carbon economy. This paper took a geographic approach to identifying sectors at risk. Using the EU-ETS register and mapping the emissions by source in each council district, it highlighted the locations and broad economic sectors which are most at risk of jobs losses or displacement as a result of transition. Outside of the main urban centres of Derry and Belfast, dependence in some locations on manufacturing, often in high emissions industries such as cement manufacturing or agrifood, leaves those areas vulnerable to negative impacts from transition. Due to data limitations, it was not possible to identify high emissions economic subsectors on a Northern Ireland-wide basis or by district council.

Planning for a just transition requires proactive data and information collection; in particular there is a need to identify GHG emissions per economic subsector, similar to that provided for the UK or Eurostat. Understanding the emissions profile of economic sectors enables government and local government to better plan for the transition.

REFERENCES

Aan der Toorn, S., van den Broek, M., Worrell, E. (2017), 'Decarbonising meat: exploring greenhouse gas emissions in the meat sector'. *Energy Procedia*.

Belfast Telegraph (2020) 'Edwin Poots accused of blocking Climate Change Legislation' <https://www.belfasttelegraph.co.uk/news/northern-ireland/edwin-poots-accused-of-blocking-climate-change-legislation-39385663.html>

Botta, E. (2019), "A review of "Transition Management" strategies: Lessons for advancing the green low-carbon transition", *OECD Green Growth Papers*, 2019-04, OECD Publishing, Paris.

Climate Change Committee (2018a) *Land use: Reducing emissions and preparing for climate change*. <https://www.theccc.org.uk/publication/land-use-reducing-emissions-and-preparing-for-climate-change/>

Climate Change Committee (2019a), *Net Zero: The UK's contribution to stopping global warming* <https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>

Climate Change Committee (2019b), *Reducing Emissions in Northern Ireland* <https://www.theccc.org.uk/publication/reducing-emissions-in-northern-ireland/>

Climate Change Committee (2020a), *Land-use policies for a net-zero UK*. <https://www.theccc.org.uk/publication/land-use-reducing-emissions-and-preparing-for-climate-change/>

Climate Change Committee (2020b), *Sixth Carbon Budget* <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

Climate Change Committee (2020c), 'Letter from Lord Deben, Chairman of the CCC in response to Edwin Poots MLA, Minister of Agriculture, Environment and Rural Affairs'. <https://www.theccc.org.uk/publication/letter-lord-deben-climate-change-committee-to-edwin-poots-mla/>

DAERA (2020) *Northern Ireland Food and Drinks Processing Report, 2019* <https://www.daera-ni.gov.uk/publications/size-and-performance-ni-food-and-drinks-processing-sector>

DAERA (2020), www.daera-ni.gov.uk/sites/default/files/publications/daera/farm-incomes-in-northern-ireland-2018-19.pdf

DAERA (2018), *Migrant Labour and Trade Enquiry* [DAERA - Migrant labour and trade enquiry - web.PDF \(daera-ni.gov.uk\)](http://www.daera-ni.gov.uk/sites/default/files/publications/daera/migrant-labour-and-trade-enquiry-web.pdf)

DAERA (2020), *Northern Ireland Agri-Food Sector: Key Statistics July 2020*. <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/Key%20Statistics%202020.pdf>

DAERA (2020), *Northern Ireland Greenhouse Gas Projections based on 2017 GHG inventory*. <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/ghg-projections-report.pdf>

DEFRA (2020), *Total Income from Farming in the United Kingdom, first estimate for 2019* (publishing.service.gov.uk)

Department for Business, Energy & Industrial Strategy (2020), *Local Authority territorial CO2 emissions estimates 2005-2018 (kt CO2)*. <https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics>

Department for the Economy (2017), *Economy 2030: A consultation on an Industrial Strategy for Northern Ireland*. <https://www.economy-ni.gov.uk/sites/default/files/consultations/economy/industrial-strategy-ni-consultation-document.pdf>

Department for the Economy (2020), *Statistical Bulletin, Student enrolments on higher education courses*. <https://www.hesa.ac.uk/data-and-analysis/statistical-first-releases>

Department for the Economy (2020), *Renewable Electricity Pipeline FOR NORTHERN IRELAND*.

<https://www.economy-ni.gov.uk/sites/default/files/publications/economy/Renewable-Electricity-Pipeline-Northern%20Ireland-report.pdf>

Department for Employment and Learning (2011), *Success through skills – Transforming Futures: The Skills Strategy for Northern Ireland* <https://www.economy-ni.gov.uk/articles/success-through-skills>

Department for Communities (2020). *Fuel Poverty in Northern Ireland* <https://www.communities-ni.gov.uk/topics/housing/fuel-poverty>

Devaney, L., Torney, D., Brereton, P. and Coleman, M. (2020), 'Ireland's Citizens' Assembly on Climate Change: Lessons for Deliberative Public Engagement and communication'. *Environmental Communication*, 14:2, 14146,

Emden, J. and Murphy, L. (2019) *A just transition: Realising the opportunities of decarbonisation in the north of England*, IPPR. <http://www.ippr.org/research/publications/a-just-transition>

Galgóczi, B. (2018), *Just transition towards environmentally sustainable economies and societies for all – ILO ACTRAV Policy Brief*.

Nolan, O. and Wilson, R. (2015), *Dialogue and engagement: lessons from the Northern Ireland Civic Forum*. https://cain.ulster.ac.uk/othelem/organ/jrct/Nolan_Wilson_2015_JRCT.pdf

European Parliament (2015), *Comparison in farmers' incomes in EU member states*. [www.europarl.europa.eu/RegData/etudes/STUD/2015/540374/IPOL_STU\(2015\)540374_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/540374/IPOL_STU(2015)540374_EN.pdf)

Food and Drink Europe (2015), *A Time to Act: Climate Action and the Food and Drink Industry*. <https://www.fooddrinkeurope.eu/S=0/publication/a-time-to-act-climate-action-and-the-food-and-drink-industry/>

Gambhir, A., Green, F. and Pearson, P. (2018), 'Towards a just and equitable low-carbon energy transition'. Grantham Institute Briefing paper No 26. August 2018

Gstrein, V. and Prince, M. (2020) 'Generating impact in the absence of government: Northern Ireland's unlevel playing field', <https://blogs.lse.ac.uk/impactofsocialsciences/2020/02/19/generating-impact-in-the-absence-of-government-northern-irelands-unlevel-playing-field/> Accessed 15 December 2020

Gunson, R, Murray, C and Williamson, I (2018). *The Skills System in Northern Ireland: Challenges and Opportunities*, IPPR. www.ippr.org/research/publications/the-skills-system-in-northern-ireland

Healy, N. and Barry J. (2017). 'Politicizing energy justice and energy system transitions: Fossil fuel divestment and a "just transition"'. *Energy Policy*, 108 (2017) 451-459

HESA (2018), *UK domiciled higher education leavers in work in the UK by region of domicile, region of HE provider and region of employment*. <https://www.hesa.ac.uk/data-and-analysis/sfr250/figure-15>

- Hough, A. (2019) *Brexit, the Good Friday Agreement and the Environment*.
<https://nienvironmentlink.org/cmsfiles/Brexit-GFA-report-FULL.pdf>
- House of Commons: Northern Ireland Affairs Committee (2018) Oral evidence: Brexit and Northern Ireland: Agriculture, HC 939.
<http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/northern-ireland-affairs-committee/brexit-and-northern-ireland-agriculture/oral/84884.pdf>
- House of Commons Northern Ireland Affairs Committee (2019), Brexit and Agriculture in Northern Ireland Fifth Report of Session 2017–19.
<https://publications.parliament.uk/pa/cm201719/cmselect/cmniaf/939/939.pdf>
- IISD (2018), 'NGO Brief: Just Transition in Focus'.
<https://sdg.iisd.org/commentary/policy-briefs/ngo-brief-just-transition-in-focus/>
- International Labour Organisation, (2015), *Guidelines for a Just Transition*
- Irish Congress of Trade Unions (2007) *Migrant Workers and their families in Northern Ireland: A Trade Union response*
- Irish Congress of Trade Unions (2019) <https://www.ictuni.org/news/2019/12/16/ni-trade-unions-reinforce-support-for-forum-for-so/> [accessed 01 December 2020]
- Ladha-Sabur, A., Bakalis, S., Fryer, P. and Lopez-Quiroga, E. (2019). 'Mapping energy consumption in food manufacturing'. *Trends in Food Science & Technology*. Volume 86, April 2019, Pages 270-280
- Irish Congress of Trade Unions Northern Ireland (2019). 'NI Trade Unions reinforce support for Forum for Social Dialogue for NI'. <https://www.ictuni.org/news/2019/12/16/ni-trade-unions-reinforce-support-for-forum-for-so/>
- Mac Flynn, P. (2019), *Changes in the structure of employment in Northern Ireland*, NERI Research inBrief, May 2019
- Mac Flynn, P. (2017), *Industrial Policy in Northern Ireland: A Regional Approach*, NERI WP 2017/No 42
- McAreevey, R. and Krivokapic-Skoko, B. (2019). 'In or Out? Understanding How Social and Symbolic Boundaries Influence the Economic Integration of Transnational Migrants in Non-Metropolitan Economies'. *Sociologia Ruralis*, Vol 59, Number 2, April 2019
- Mercier, S., Bresnihan, P., McIlroy D. and Barry, J. (2020) 'Climate Action via Just Transitions Across the Island of Ireland: Labour Land and the Low-Carbon Transition.' In Robbins, D., Torney, D. and Brereton P. eds. *Ireland and the Climate Crisis*. Switzerland 2020.
<https://doi.org/10.1007/978-3-030-47587-1>
- Moore, J., (2020), *Approaches to Transition* No.20 April 2020
- NAEI (2020), *Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland 2018*
- NESC, (2020) *Addressing Employment Vulnerability as Part of a Just Transition in Ireland*. No.149 March 2020
- NISRA (2020), *The Agricultural Census in Northern Ireland: Results for 2019*. [Agricultural Census 2019 FINAL - Revised 27 08 20.pdf \(daera-ni.gov.uk\)](https://daera-ni.gov.uk/Agricultural-Census-2019-FINAL-27-08-20.pdf)
- NEF (2019), *Trust in Transition: Climate Breakdown and High Carbon Workers*
- Northern Ireland Assembly (2016), 'Northern Ireland's agri-food sector – background and possible 'Brexit' considerations.' Research and Information Service Briefing Paper 66/16. [Northern Ireland's agri-food sector – background and possible 'Brexit' considerations \(niassembly.gov.uk\)](https://niassembly.gov.uk/Northern-Ireland-s-agri-food-sector-background-and-possible-Brexit-considerations/)
- Northern Ireland Executive, <https://www.executiveoffice-ni.gov.uk/articles/civic->

engagement

Northern Ireland Green New Deal Group (2012), *The Green New Deal and the Programme for Government*.

Northern Ireland Housing Executive (date) <https://www.nihe.gov.uk/Working-With-Us/Research/House-Condition-Survey>

Northern Ireland Office (2018), *Devolution settlement: Northern Ireland*.

Nugent, C. and Goldrick-Kelly, P. (2020), *Investing in a Just Transition. Realising the potential of a low carbon economy*.

OECD (2020), *OECD Skills Strategy Northern Ireland (United Kingdom): Assessment and Recommendations*, OECD Skills Studies, OECD Publishing, Paris.

<https://doi.org/10.1787/1857c8af-en>

OECD (2017), *Investing in Climate, Investing in Growth*.

<https://www.oecd.org/env/investing-in-climate-investing-in-growth-9789264273528-en.htm>

ONS, (2020) Annual Population Survey

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes>

ONS (2020), *Statistical bulletin: Low carbon and renewable energy economy, UK: 2018*

Oxford Economics (2020) *The Impact of changes to migration policy on the Northern Ireland economy*. [The Impact of changes to migration policy on the Northern Ireland economy \(economy-ni.gov.uk\)](https://www.economy-ni.gov.uk)

Rosemberg, A. (2010). Building a just transition: The linkages between climate change and employment. *International Journal of Labour Research*, 2(2), 125-162.

SNYCNi (2020) <https://syncni.com/article/5250/economy-minister-to-deliver-green-economy-in-ni>

SONI, (2020), *Tomorrow's Energy Scenarios: Northern Ireland 2020*, SONI, Belfast 2020

Torney, D. (2020) 'Ireland's Policy Response to Climate Change: An Historical Overview'. In Robbins, D., Torney, D. and Brereton P. eds. *Ireland and the Climate Crisis*. Switzerland 2020. <https://doi.org/10.1007/978-3-030-47587-1>

UK Trades Union Congress and Orion Innovations (UK), (2015), *Industrial regions and climate change policies: Yorkshire and the Humber regional report*. https://www.etuc.org/sites/default/files/document/files/etuc_report_17_july_2015_v1_1.pdf

UK Government (2020), [Government takes historic step towards net-zero with end of sale of new petrol and diesel cars by 2030 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/government-takes-historic-step-towards-net-zero-with-end-of-sale-of-new-petrol-and-diesel-cars-by-2030)

United Nations (20x), *Just Transition of the Workforce, and the Creation of Decent Work and Quality Jobs: Technical paper*. www.unfccc.int/sites/default/files/resource/Just%20transition.pdf

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