

Matching skills needs with skills reserves:

*Protecting workers & communities for a
just transition*

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MATCHING SKILLS NEEDS WITH SKILLS RESERVES: PROTECTING WORKERS AND COMMUNITIES FOR A JUST TRANSITION

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ABSTRACT

Climate change associated with carbon emissions represents one element of increasing global environmental dysfunction that requires action. This is no less true for Ireland, a climate laggard. At the same time, the effects of change tend to be unequally distributed and communities face significant disruption in the absence of public policy. The principles of a 'Just Transition' state that workers and communities at-risk from the transition should not disproportionately shoulder the burden of adjustment.

With these principles in mind, we identify workers in sectors and regions at high-risk in the transition and examine their skills profiles. It is difficult to identify those who will be most affected given the advance of technology and other factors, but we identify a particular high-risk population in workers in six sectors, which contribute close to 90 per cent of emissions but less than a tenth of employment. There is a strong regional dimension to where these sectors are concentrated. We also find evidence of significant mismatch in the Irish economy despite the presence of underutilized skills supply in the potential labour force that policymakers could mobilize for greener economic production. We present an argument for more comprehensive participation by local actors in planning with an active approach to labour market policy based on international experience. We conclude with proposals to manage the transition in a way that ensures high quality employment for all, particularly for those bearing the brunt of adjustment.

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SECTION 1: INTRODUCTION

Environmental breakdown is occurring at an unprecedented rate (Naafs *et al.*, 2016; Ipbes, 2018). The last half century has seen catastrophic deterioration in a number of key natural systems (Steffen *et al.*, 2015). If left unchecked, these changes could result in serious long-term damage including mass extinctions as well as enormous social, economic and political dislocation for people around the world (IPCC, 2018; Ipbes, 2018). Further, these effects are likely to be unevenly distributed with the most immediate and severe effects concentrated in regions already facing developmental challenges (IPCC, 2014). As such, it is critical that we collectively respond.

A key component of environmental destabilisation relates to human emissions of greenhouse gases into the atmosphere. According to the scientific community, these emissions, associated with a number of industrial processes and broader energy use, are linked to increases in average global temperatures with a high degree of certainty (IPCC, 2014). These emissions relate to fundamental aspects of our economies. The IPCC's recent report investigating the implications of 1.5° C as opposed to the 2° C warming over preindustrial levels,¹ found that a ceiling of 1.5° C limits damage in a number of key respects. However, this will *"require rapid and far-reaching transitions in energy, land urban and infrastructure (including transport and buildings), and industrial systems"* (IPCC, 2018).

The move to a low-carbon economy must incorporate principles of justice for the workers and communities affected. The concept of the *Just Transition* attempts to accommodate and

¹ This marker is the basis of most international agreements.

address social concerns and possible inequities that may emerge as policymakers make efforts to promote ecological sustainability (Snell, 2018). This implies that environmental policy should not cause undue social or economic harm to workers and communities hitherto reliant on environmentally damaging activities (Robins, Brunsting and Wood, 2018).

Job creation, in itself, is not a sufficient criterion for a successful Just Transition (Healy & Barry, 2017). Conditions at work and the social and economic effects of employment for communities is also pivotal.

The European Trade Union Confederation (2015) identified five key elements of a Just Transition:

1. Social Dialogue encompassing all actors, including worker representatives, involved in industry changes.
2. A guarantee of good green jobs.
3. Access to retraining and education for all workers.
4. Respect for democratic rights to trade union and community representation.
5. A social safety net to support affected workers.

On solely pragmatic grounds, an approach that does nothing to protect livelihoods and decent employment is unlikely to succeed. The concentration of emissions intensive jobs in a number of economically depressed regions presents a challenge in this respect. This is proving true in the Irish context, as Bord na Móna and the ESB's wind-down of peat use threatens jobs in the Midlands region, among the worst performing regions in the state (Nugent, 2019). As ICTU (2019) point out, this represents a test case for carbon transition.

Without government intervention, reorienting the economy will severely affect these households and communities. Policymakers should see the gravity and urgency of the transition to a low-carbon economy as an opportunity, not only to establish the conditions for broad-based, sustainable improvements in living standards, but also to realise spatial development goals of successive Irish governments. Indeed, the international literature suggests that a move to environmentally friendly production and consumption offers the potential of a net gain in employment (ILO, 2012; 2018; OECD, 2017).

Where workers have their concerns about their futures addressed in a credible way, the evidence suggests that they support environmentally friendly policy (Chen, 2017; Vachon and Brecher, 2016). Where opposition exists, it is often tied to the economic and social impacts they perceive to be tied to such a transition. The credibility of and support for any disruptive plan for greening the economy depends on the level of participation in decision-making of both workers and communities.

The Just Transition incorporates environmental, labour and social justice value frames into policy design (Christmas & Robinson, 2015). Responding to the international challenge of environmental breakdown – even limited to carbon emissions – will require integrated policy at a number of levels to enact changes consistent with these values. A positive vision of transition should seek to remedy existing inequities globally. Global policy commensurate with the recommendations of the IPCC report will have to address linkages between sectors within economies. On the international stage, this presents a number of challenges. Many of these broader challenges are beyond the scope of this paper.

As such, we limit our focus to essential initial steps needed to ensure today's workforce and communities are equipped to benefit from the transition. This is crucial if we are to manage the transition between the current economy and a reformed and ecologically sustainable one. Experience suggests that this is best achieved with institutions equipped to enact active labour market policy. Developing and deploying the requisite green skills will be essential. This should help prevent regional damage and economic dislocation for workers and their communities.

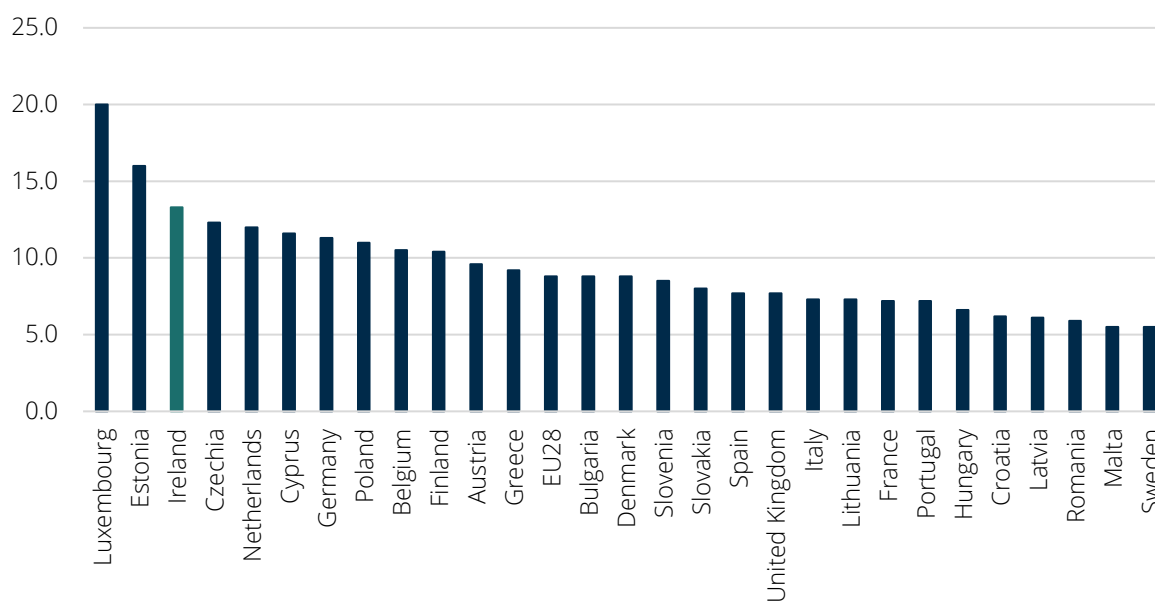
The paper proceeds as follows. Section 2 outlines something of the scale of the challenge posed by emissions internationally and in the Republic of Ireland. Section 3 identifies sectors and sub-sectors with high emissions intensities where employment is consequently likely at high-risk from the transition to a low-carbon economy. The section continues with a discussion on the regional dimension related to employment at high-risk of displacement. Section 4 examines the skills profiles of at-risk workers and the potential labour force in high-risk regions, alongside the broader pool of labour skills that is currently underutilised. Section

5, in turn, examines structural transitions from other countries in an attempt to draw out policy lessons that could be applied in Ireland, which are explored in the following section. Section 7 concludes with some policy recommendations informed by these experiences.

SECTION 2 ENVIRONMENTAL CONTEXT

The world faces an existential ecological crisis. Global emissions to date have already had significant effects on the climate, with human activities responsible for an approximately 1.0° C rise in global temperatures over pre-industrial levels (IPCC, 2018). With current pledges to mitigate emissions, experts estimate a 2.9° C rise in the global average by the end of the century. This is far in excess of the 1.5° C recommended by the Intergovernmental Panel on Climate Change to avoid the most damaging effects of climate change (Climate Action tracker, 2019; IPCC, 2018). The Republic of Ireland is a laggard in carbon mitigation. The latest Eurostat data indicate that Ireland is the third highest emitter per capita in the EU28 (Figure 1). At 13.3 tonnes of emissions per person, Irish emissions were over 51 per cent above the EU28 average in 2017 and over double that of the best European performers. A recent report found Ireland to be 48th of 60 states in terms of climate action, and the worst European performer (CCPI, 2018).

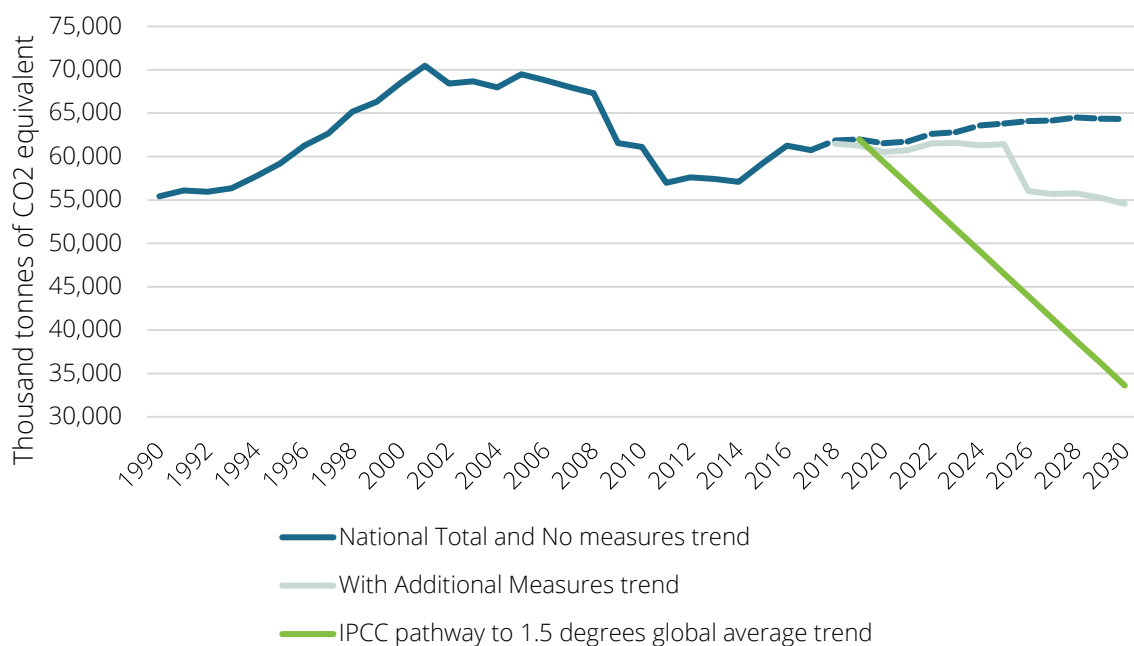
Figure 2.1: Tonnes of emissions CO₂ equivalent per capita 2017



Source: Tonnes of CO₂ equivalent per capita (Eurostat, 2019)

Current policy in Ireland is not consistent with the scale of change required to mitigate the worst effects of climate change. The Environmental Protection Agency (EPA) produces annual estimates of carbon emissions given enacted and proposed policy. The most recent projections of emissions, which considers a scenario of currently enacted policy and a second scenario which includes proposed measures, sees Ireland miss its EU targets for 2020 and 2030. According to the report projections, Ireland will fall significantly short of its 2020 target of a 20 per cent reduction from 2005 levels under both scenarios. In the reports projections, Ireland will exceed its carbon budget for the 2020s by between 7-22 million tonnes of CO₂ equivalent (EPA,2019). Missing its targets will result in Ireland incurring significant economic costs in the form of fines (up to €600 million a year) from the European Commission up to 2030. Given the IPCC recommendation to limit global temperature increases to 1.5° C above the preindustrial level, which as a developed state would entail 45 per cent reduction in emissions compared to 2010, Ireland’s strategy will have to be even more ambitious.

Figure 2.2: EPA Projected Emissions pathway vs IPCC 45% reduction target for 1.5° C



Source: Ireland’s Final GHG emissions data 1990-2017 (EPA,2019), Ireland’s 2019 GHG Emissions Projections 2018-2030 (EPA,2019), Author’s calculations based on Special Report Global Warming of 1.5° C (IPCC,2018)

Note: The blue dashed line represents the EPA’s estimates of emissions from 2017 given existing policy commitments. The orange line represents a projection based upon existing and planned policies and measures. The red line represents a linear application of the 45% reduction over 2010 emissions by 2030 as estimated in the IPCC’s pathway to 1.5 degrees. This is applied from 2019 from the “existing measures” estimate.

Policymakers should also recognise that, while emissions and associated climate change is a pressing social emergency, it is not the sole environmental crisis facing us. The Stockholm Resilience Centre have outlined what they see as nine operational boundaries defining safe, sustainable thresholds for human activity (Rockstrom *et al.*, 2009). Since that original paper, human activity has breached four thresholds: A) for climate change, B) loss of biosphere integrity, C) land-system change and D) altered biogeochemical cycles (Steffen *et al.*, 2015). This implies that a move to ecologically sound practices will encompass changes beyond emissions and involve changes including in land-use, habitat preservation and a reduction in waste (Ipbes, 2018). Even where economic and other activity is non carbon intensive, workers, firms and government may still need to change and adapt to new environmentally sustainable practices.

SECTION 3: WHAT JOBS ARE AT RISK FROM A TRANSITION TO A GREEN ECONOMY?

3.1 Sectoral distribution of emissions and associated employment

While there is the potential for a net employment gain given the right policies in implementing a Just Transition, the move to an environmentally sustainable economy will effect some jobs more than others (ILO, 2018; Van der Ree, 2019). The extent of job losses or substantial job change are difficult to quantify directly, but they are likely highest in the sectors that contribute disproportionately to Ireland's emissions.

Non-household emissions are concentrated in three broad NACE sectors in Ireland: *Agriculture, forestry and Fishing; Industry and Transportation and storage* (Figure 1). *Agriculture and Fishing* is the largest single contributor, accounting for 35 per cent of non-household emissions in 2017. This sector accounted for just under 5.2 per cent of total employment in 2017 or close to 111,000 jobs. Jobs in the sector include growing crops, animal farming and the harvesting of timber (Eurostat, 2006).

The broad category of *Industry* comprises a number of smaller subsectors, including *Mining and Quarrying, Electricity, gas and air conditioning supply* and *Water supply; sewerage; waste*

management and remediation activities. Employment in *Manufacturing* makes up nine tenths of *Industry*. The *Manufacturing* sector produces the second highest share, contributing a third of non-household emissions in 2017 and makes up 11.6 per cent of Irish employment or 249,000 jobs (2017).

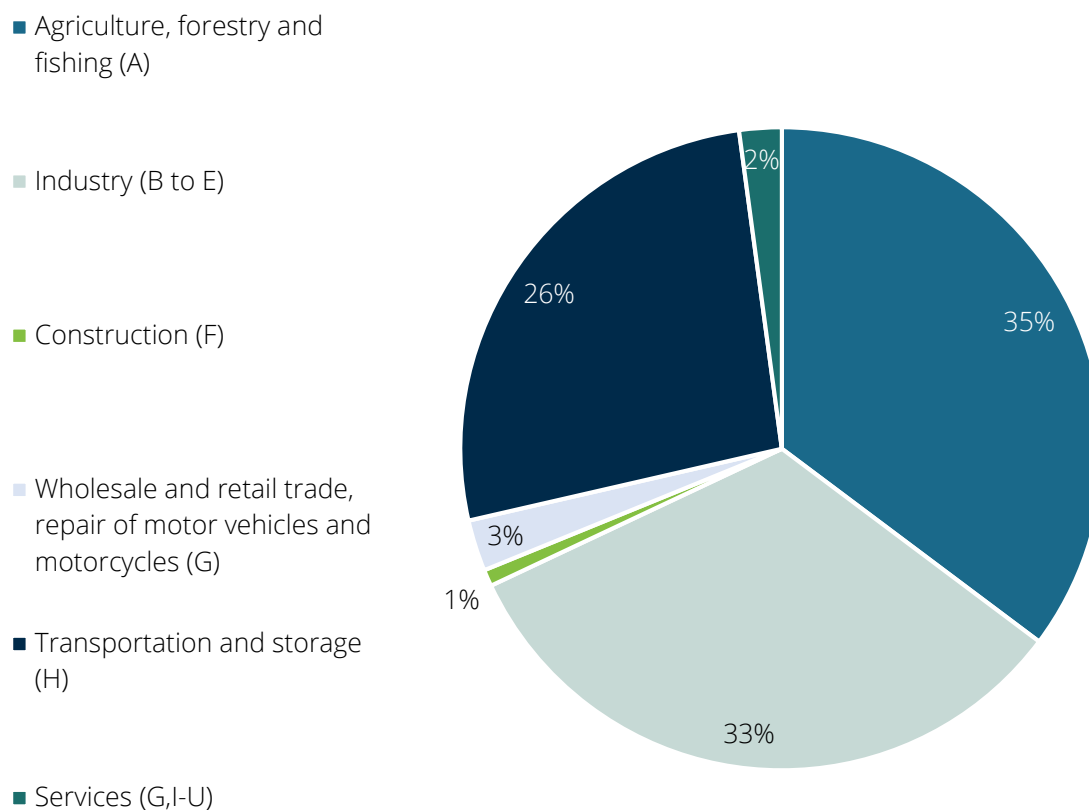
The sector with the third highest share of carbon emissions is *Transportation and storage* (2017). This sector makes up 4.2 per cent of Irish employment and just over a quarter of emissions. Close to 91,000 people were employed in the sector in 2017 providing services such as passenger and freight transport, storage, the rental of transport equipment along with postal and courier service activities (Eurostat, 2006).

According to the latest estimates, these sectors account for just over a fifth of employment (2019 Q2), but nearly 95% of emissions. As such, any shift in economic activity to reduce aggregate production emissions will be concentrated in these sectors. Jobs in these sectors are most vulnerable in the transition. Although some will become obsolete, it is likely that the nature of most of these jobs will have to change.

Table 3.1 displays emissions per persons employed in all subsectors with an emissions intensity above the total economy average in 2017.² These data demonstrate the variability in emission intensity of jobs in different economic sectors. Emissions intensity per job in broad NACE sector *Electricity, gas, steam and air conditioning supply* and subsector *Air Transport* are over 45 times the whole economy average (over 1,200 tonnes of CO₂ equivalent per person employed). Several subsectors within the broader *Manufacturing* sector are also high emitters: *Manufacture of coke and refined petroleum products*; *Manufacture of other non-metallic mineral products* and *Manufacture of basic metals* emit between 7.5 and 17 times the carbon per person employed than the whole economy average. The subsector *Crop and animal production, hunting and related service activities* accounts for nearly all emissions from the *Agricultural* sector in Ireland with an emissions intensity of 165 tonnes per person employed in 2017 (more than 7 times the economy average).

² NACE A64 data does not break down *Electricity, gas, steam and air conditioning supply*; *Construction*; or many of the service sectors further. The former are more relevant in emissions terms.

Figure 3.1: Non-household emissions by broad NACE sector 2017



Source: Air emissions accounts by NACE Rev. 2 activity (Eurostat, 2019a)

Table 3.1: Emissions per person employed by Sector 2017

Sector	Emissions per person employed (tonnes)
Electricity, gas, steam and air conditioning supply	1231.1
Air transport	1225.6
Manufacture of coke and refined petroleum products	462.9
Manufacture of other non-metallic mineral products	396.4
Manufacture of basic metals	205.4
Crop and animal production, hunting and related service activities	195.6
Sewerage, waste management, remediation activities	165.0
Land transport and transport via pipelines	57.8
Water transport	55.8
Mining and quarrying	50.2
Fishing and aquaculture	35.1
Sectoral Average	27.2

Source: Air emissions accounts by NACE Rev. 2 activity (Eurostat, 2019b), National accounts employment data by industry (up to NACE A*64) (Eurostat, 2019c).

Note: These emissions do not include those associated with households.

Table 3 examines the six sectors with shares of two per cent or more of total emissions in 2017. These sectors contribute the vast bulk (88 per cent) of total non-household carbon emissions in Ireland but less than 9 per cent of total employment in 2017. Over three quarters of sectoral emissions came from *Crop and animal production, hunting and related service activities, Air transport* and *Electricity, gas, steam and air conditioning supply* activity but make up only 5.8 per cent of employment.

Table 3.2: Proportions of emissions and employment by Sector 2017

Sector/Subsector	Broader NACE Sector	Percentage of total non-household emissions (CO ₂ equivalent)	Percentage of total employment
Crop and animal production, hunting and related service activities	A: Agriculture, forestry and fishing	35.1	4.9
Air transport	H: Transportation and storage	21.4	0.5
Electricity, gas, steam and air conditioning supply	D: Electricity, gas, steam and air conditioning supply	19.0	0.4
Manufacture of other non-metallic mineral products	C: Manufacturing	5.5	0.4
Land transport and transport via pipelines	H: Transportation and storage	4.5	2.1
Manufacture of basic metals	C: Manufacturing	2.0	0.3
Cumulative share		87.5	8.6

Source: Air emissions accounts by NACE Rev. 2 activity (Eurostat, 2019b), National accounts employment data by industry (up to NACE A*64) (Eurostat, 2019c)

3.2 Where are emissions intensive jobs concentrated in Ireland?

CSO data indicate that emissions intensive sectors are concentrated outside of the Dublin area for the most part, with the exception of *Transportation and storage*.³ “Emissions intensive sectors” refers to broader sector aggregates containing the subsectors identified in the previous section. These broader sector aggregates are used in the absence of more detailed regional data.⁴

³ See CSO [information note for data users](#) for further detail on the county disaggregation of NUTS 3 regions.

⁴ It is important to note here that emissions intensities come from Eurostat measures of emissions inventories by sector. These data do not include emissions associated with supply chains outside of Ireland which may lead to an overstatement of the “green” nature of jobs in these sectors.

The share of employment in *Agriculture, forestry and fishing* in the Border and Midlands regions is approximately twice as high as the national average. However, all regions except Dublin (which does not report data) and the Mid-East show higher employment shares in this sector compared to the national average.

Similarly, most regions outside of Dublin have higher shares of employment in *Industry*. This is most apparent in the West, South West and Midlands, where an individual is between 29 and 43 per cent more likely to work in *Industry* than the national average. Employment in Dublin and the Mid-East is disproportionately concentrated in *Services*, where carbon emissions are much lower.

Table 3.3: Regional Composition of National Sectoral Employment Q2 2019

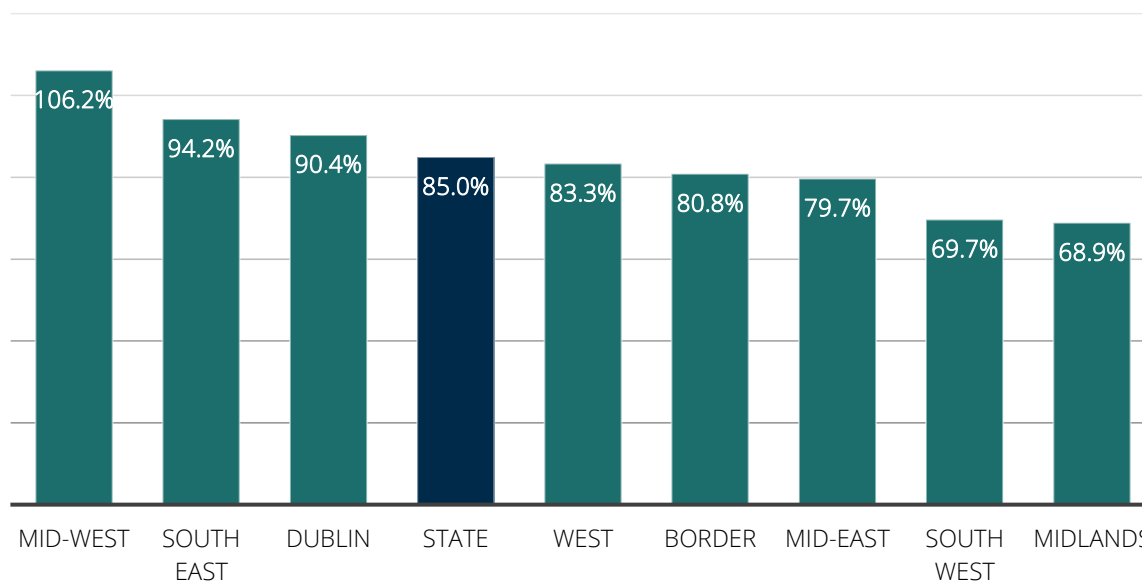
Sector	B	W	MW	SE	SW	D	ME	M
Agriculture, Forestry & Fishing (A)	18.2	11.1	14.5	12.9	17.9	4.6	10.5	10.3
Industry (B to E)	9.8	13.3	10.9	10.0	18.4	16.2	14.2	7.2
Construction (F)	9.5	9.3	9.8	10.1	13.8	23.2	19.1	5.3
Transportation ...(H)	6.8	8.5	8.9	7.4	13.0	35.7	14.7	5.1
Services (G, I-U)	6.9	8.7	8.9	7.4	13.1	35.5	14.5	5.1
All Sectors	7.9	9.3	9.4	8.1	13.9	31.2	14.7	5.5

Source: Persons aged 15 years and over in Employment (Thousand) by Sex, Region, NACE Rev 2 Economic Sector and Quarter (CSO, 2019)

Note: The Dublin region did not report employment data for *Agriculture, forestry and Fishing*. B=Border, W=West, MW=Mid-West, SE=South East, SW=South West, D=Dublin, ME=Mid East, M=Midlands

Table 3.3 similarly demonstrates the substantial disparity between Irish regions in the proportion of new 'low emissions intensive' jobs. While these sectors make up the substantial majority of total employment growth (85 per cent), this was not the case for several regions. Particularly apparent is the relative underperformance of the South West and Midlands regions. The share of carbon intensive jobs in employment growth in these regions since 2012 has been much higher than average. Less than 70 per cent of new jobs generated between the second quarter of 2012 and 2019 were in low emitting sectors. While employment in the Border and West have higher shares in high carbon emitting sectors, the trend has been towards sectors with lower emission intensity.

Figure 3.2: Proportion of employment growth explained by Non-Emissions intensive sectors Q2 2012- 2019



Source: Persons aged 15 years and over in Employment (Thousand) by Sex, Region, NACE Rev 2 Economic Sector and Quarter (CSO, 2019)

Note: Non-Emissions intensive sectors =total employment less employment in *Agriculture, forestry and fishing (A)*, *Industry (B to E)*, and *Transportation and storage (H)*. A value over 100% implies an absolute loss in jobs in non-emissions intensive sectors.

3.3 The challenge outside these sectors

A move to a green, environmentally stable economy implies that government must pay attention to a number of environmental boundaries and systems. While emissions reductions are critically important, environmentally sustainable economic practices will also mean improvements in resource use efficiency.

Management and remediation activities (referred to as *Water supply; sewerage, waste management and remediation activities* in Eurostat data) is both emissions intensive relative to the total number of jobs and productive of waste, generating over 1.1 million tonnes of waste in 2017. In contrast, while *Transportation and storage* is a large contributor to carbon emissions, its waste profile is modest. While the services sector does not account for most carbon emissions, resource use is significant in these sectors (Table 5). While *Construction* is a comparatively low emitting sector, these activities produced nearly 3 million tonnes of waste and over 2 million tonnes of water in 2017. Similarly, *Wholesale and Retail trade*, and

Accommodation and food services activities generated about a quarter of a million tonnes of waste each, and used over 1.2 and 4 million tonnes of water.

Table 3.4: Resource use in the Services Sector 2017

Sector	Employment 2017	Waste (000's tonnes)	Energy use (ktoe)	Emissions (000 tonnes CO ₂ equivalent)	Water (000's tonnes)
Wholesale	6.0%	39	196	971	141
Retail trade (total)	9.7%	204	249	532	1,073
Transportation & storage (H)	4.2%	7	2,425	15,430	No data
Accommodation & food (I)	8.5%	256	533	140	4,030
Information & communication (J)	4.0%	28	78	220	493
Finance, insurance & real estate (K, L)	4.7%	21	114	121	587
Professional, scientific & technical (M)	5.8%	23	104	58	733
Administrative & support service activities (N)	4.8%	24	154	62	1,026
Public administration & defence (O)	5.6%	21	79	246	595
Education (P)	7.3%	20	99	174	614
Hospitals (Q)	11.9%	38	164	155	6,405
Management & remediation activities (E)	0.4%	1,124	389	1,093	No data
Construction (F)	6.4%	2,917	120	488	2,085

Source: Reproduced from McCarthy et al. (2019), Air emissions accounts by NACE Rev. 2 activity (Eurostat, 2019b),

National accounts employment data by industry (up to NACE A*64) (Eurostat, 2019b)

Note: Emissions data and emissions come from Eurostat data. Other data come from table 4.4 in McCarthy et al. (2019). Sector labels conform to CSO categorization which is slightly different from Eurostat nomenclature. These sectors were matched through NACE codes.

While this paper's attention is primarily directed to those sectors with the highest emissions densities/contributions, which will inform many of the direct actions the paper suggests for public policy, the resource use of other sectors should be examined. The economy should operate within resource use bounds, which will require changes in work practices more broadly. In addition, emissions in one sector may not be cleanly divisible from activity elsewhere. For example, the Air Transport sector constitutes a major source of emissions whereas many tourist related sectors do not have substantial emissions profiles in isolation. However, international air travel is key to demand in these sectors and as such, any change

there will likely have implications elsewhere. Therefore, while the sectors we examine here may constitute those whose jobs are at high risk in the short term, longer-term shifts will likely incorporate changes to all jobs.

SECTION 4: SKILL NEEDS AND JOB QUALITY IN THE JUST TRANSITION

Although the shift to a low carbon economy will likely affect some sectors more than others (see section 2) it will have implications across the economy. The transition offers significant opportunities for new and decent employment creation given a coordinated policy response. Appropriately designed and supported, the transition could even improve participation rates (which are yet to recover from the financial crisis), have a positive impact on economic growth and contribute to spatial development objectives (Nugent 2019).

A successful transition should minimize redundancies and maximize redeployment of workers. A key prerequisite to a realized just transition is policy to ensure that the existing workforce and future workers are suitably equipped for new roles and tasks. Options for upskilling current employees for redeployment should take precedent where possible. For instance, some of the skillsets in highly polluting industries, maintenance and engineering in peat for example, will be relevant for renewable energy industries such as wind or solar (Stroud et al 2014). Where an individual's skills levels do not match future skills requirements, government should facilitate opportunities for reskilling to meet demand for new green industries.

A coordinated policy approach should also consider the unutilized or underutilized potential labour supply on a regional level, giving special attention to relatively depressed regions and regions facing a significant number of job losses. Policy should aim to increase labour market participation through green employment accordingly. Local committees should identify skills requirements and inform government strategy as part of an ongoing process (see section 5). Any strategy should avoid reliance on low-skilled, low-paid and transitory work, such as that experienced in coal regions in Wales (Pickernell, 2011). Decent employment should be a government objective in the transition and policymakers can achieve this through a high-skill/high-pay approach (Lloyd and Payne, 2002).

This leads to a series of questions regarding the nature and level of underutilized skills in the economy, the skills profile of workers likely to face significant disruption or redundancy in the coming years and the skills needed to realize an employment focused, growth-enhancing, Just Transition to a low-carbon economy.

4.1 What are green skills?

Any general accounting of skills needs for the green transition requires knowledge of the kinds of jobs and tasks that are associated with new “green” jobs or new tasks within existing jobs. However, there is no consensus on the definition of a green job. The European Centre for the Development of Vocational Training (2019) in their synthesis report of six European countries point out that there is no common approach to identifying green jobs and green skills across these states. Even within states, different organisations define green skills and jobs, and subsequent governments can interpret the green economy in different ways (Cedefop, 2019).

The ILO defines green jobs as those which ‘reduce the consumption of energy and raw materials, limit greenhouse gas emissions, minimise waste and pollution, protect and restore ecosystems and enable enterprises and communities to adapt to climate change’ (ILO, 2018). In addition, UNEP (2008) states that green jobs must be decent ones. Decent jobs offer adequate wages, safe working conditions, job security, reasonable career prospects and worker rights. This entails several roles across the economy including but not limited to the environmental goods and services sector identified by the European Union (Eurostat, 2019). Green skills are defined by Cedefop as ‘the knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society’ (European Commission, 2014). According to the OECD, green skills demand is defined by three main trends (OECD, 2015). The need for upgraded skills and changed qualification will influence skills demand needs across jobs and industries. Secondly, emergent green industry will require new or renovated occupations with attendant demands for skills. Finally, structural change will instigate realignment in declining sectors, where workers will require retraining.

Data for green employment in Ireland are collected under the Eurostat defined *Environmental goods and services* sector. Table 4.1 shows that this sector grew considerably (though from a low base) between 2013 and 2016, more than doubling over the period. This significantly outstripped growth in aggregate employment in Ireland over the same period. Growth in the sector in Europe by contrast was lower than aggregate employment growth. Despite impressive growth rates, the sector remains comparatively small in Ireland, at just over 32,000 full-time equivalents.

Table 4.1 Green Jobs growth

	2013	2016	Δ 2013-2016%	Δ 2013-2016% (employment)
Ireland	16,171	32,710	102.3	8.9
EU-28	4,329,000	4,451,000	2.8	3.6

Source: Employment in the environmental goods and services sector (Eurostat, 2019); Employment and activity by sex and age - annual data (Eurostat, 2019).

4.2 Future skills need

In the absence of clear definitions, a precise profile of skills needs is difficult to compile. Technological developments also make future demand difficult to predict. However, some international research has attempted to predict skills needs based on current trends.

In general terms, the UK government (2011) identified skills demand around management and practical application of new technologies and processes, which will apply to all business. The economy will require strategic management, both public and private, to begin to implement more sustainable processes, to develop new business models and to develop and respond to a new regulatory environment. Project management will have to incorporate resource efficiency as an explicit goal. Accounting services will require skills to apply carbon and environmental accounting. At the production level, skills will be required to adopt and design new sustainable processes. In the public service, the need for upskilling in more sustainable processes will apply as in the private sector. There will also likely be high demand for similar management skills in the public sector in coordinating projects, liaising with private sector actors and advising on new regulatory frameworks.

Other sectors will require discrete technical skills for renewable electricity generation and for adopting practices and technologies to minimize energy consumption, in the built environment for example. Energy intensive industries will also have to adapt to meet climate and environmental targets (UK government, 2010). These industries require skills in the sciences and engineering at the level of process design and technical implementation, including research and development. Similarly, these industries will require new technical skills to install new technologies or infrastructure to reduce energy consumption, such as in the deep retrofitting of the built environment. Many workers in energy intensive industries will need upskilling to adopt energy/carbon efficient practices.

The report also identifies skills to “support climate resilience” and “manage natural assets” (UK government, 2010). The former will require scientific and technical skills including the operation and use of climate modelling, risk management based on these models or resource availability, technological design and adoption skills. Natural assets management will entail new environmental accounting services, skills to act on environmental impact assessments as well legislative changes.

Consoli, Marin, Popp and Vona (2015) identify skills requirements for future green jobs, the majority of which are in four broad categories, which broadly mirror the two discussed in the previous report:

- Engineering and technical skills involved in design and construction,
- Qualifications in Science and Mathematics
- Qualifications in Operations management to adjust to new green prerogatives
- Monitoring skills to ensure technical and regulatory compliance.

Of course, the state, as the economy's largest actor, could drive demand for specific skills by targeting investment in emerging industries (Gross et al 2012). This could be particularly fruitful in areas where Ireland has a comparative advantage such as off-shore and on-shore wind, wave and tidal technologies etc. or in energy saving industries such as retrofitting or public transport. Indeed, government focus on some of these areas for development in the recent Climate Action Plan (retrofitting and renewables in particular). Regardless of quickly

changing technologies, the literature suggests that skills demand to realise the transition to a low carbon economy skew towards *STEM* (Science, Technology, Engineering and Mathematics) and *Administration, Management and Business* qualifications.

The following section provides a skills profile of workers in at-risk sectors to identify, in broad terms, potential skills gaps to manage the transition. The section also looks at unutilized skills in Ireland's potential labour supply, which policymakers could mobilize to drive the transition. This includes analysis of specific regions 1) that are relatively depressed and facing high volumes of redundancies 2) have been identified by successive governments as target areas to realise spatial development goals and 3) where natural conditions present opportunities for the rollout of renewable energy technologies.

4.3 Mismatch in the Irish Economy

Relative to other high-income EU member states, the Irish economy is one of the worst performers in matching skills to appropriate employment, pointing to a vast pool of underutilized expertise and skills. This is not only a serious issue for individuals in terms of unemployment risk and wage penalties but also to the economy and society as a whole. The best return to society from significant investment in education is to match employees and their skill sets with appropriate employers. The data show that 30.6 per cent of Irish workers with tertiary education between 25 and 34 are working in fields unrelated to their skills competencies. For those with tertiary qualifications in *Science, Mathematics and Computing* (key skills in the transition) the rate is even higher at 39.2 per cent (Table 4.2).

Table 4.2 Horizontal Skills Mismatch (25-34)

		Science; mathematics, computing - Horizontal skills mismatch rate, %	
		ISCED 2011 5-8	2018
		2018	2018
UK	35.5	UK	49.9
AT	31.7	EL	46.0
IT	31.5	ES	40.8
EL	31.2	PT	39.4
IE	30.6	IE	39.2
ES	30.6	EU-28	38.6
NL	30.3	IT	36.9
EU-28	29.1	NL	36.1
BG	29.0	BG	35.6
PT	28.5	AT	35.6
SE	28.2	SE	34.8
DE	24.8	FI	34.7
DK	24.5	FR	33.1
FR	24.3	DE	28.5
FI	24.3	DK	28.3
BE	21.3	BE	24.3

Source: Over-qualification rate by economic activity for the period 2008 to 2018 (Eurostat, 2019f)

Note: Persons in employment who have attained tertiary education (ISCED level 5 to 8).

Table 4.3 Vertical Skills Mismatch

Whole economy		Wholesale & retail trade		Manufacturing		Transportation & storage	
2018		2018		2018		2018	
ES	37.3	EL	70.1	ES	48.6	ES	75.2
EL	31.6	ES	64.4	EL	42.9	SE	60.2
IE	29.5	IE	53.9	IE	36.1	UK	58.6
AT	28.1	UK	52.6	AT	34.1	IE	55
UK	25.4	AT	48.1	BE	28.9	AT	52
EU28	22.7	IT	46.3	IT	26.4	BE	51.5
FR	21.7	EU28	46	EU28	26.2	IT	51.9
BE	20.6	FI	42.1	UK	25.7	EU28	51.4
IT	20.6	BE	41.3	FR	22.4	EL	49.6
DE	18.7	FR	40.4	NL	21.9	FR	48.5
FI	18.5	NL	39.6	PT	20.5	DE	48.2
SE	16.2	DE	36.9	DE	20.3	DK	44.5
NL	15.6	SE	36.3	SE	19.8	NL	44.3
DK	15.2	PT	36	FI	17.3	PT	41.2
PT	13.7	DK	31.1	DK	14.4	RO	39.7

Source: the rate of horizontal skills mismatch by field of education for the period 2014 to 2018 (Eurostat, 2019g)

Note: % of people aged 20-64 with tertiary education and working in ISCO 4-9

Ireland fares even worse in international comparisons in the over-qualification rate or vertical mismatch with 29.5 per cent of all workers with tertiary education working in occupations that do not require that level of education or training (Table 4.3). For those working in Wholesale/Retail, one of the largest sectoral employers, 53.9 per cent of workers with a tertiary qualification are overqualified for their positions. For Manufacturing and Transport, two of the sectors identified as 'at-risk' (see section 2) the over-qualification rates are 36.1 and 55 per cent, respectively.

Ireland's ability to take advantage of opportunities arising from the transition to a low carbon economy and to take a high-road development approach to productivity, employment and growth is dependent on investment in education, skills and training. Notwithstanding significant skills mismatch throughout the Irish economy, the Irish state spends a relatively small amount on tertiary education compared to some top performers in Europe and is falling further behind. Spending, as a share of national income was half that of the Netherlands, Austria and Sweden in 2016 and significantly lower than in 2012. Cutbacks to higher education over the past decade has also resulted in a predictable slide for Irish universities in international rankings and will hamper the Irish economy in competing in high end technologies related to the transition, such as in renewables into the future.

Chart 4.1: International Comparison of Total Higher Education Expenditure per Pupil
2010=100



Source: [Table C1.3 - Change in total expenditure per student on educational institutions \(2005, 2011 and 2015\)](#) - Education at a Glance 2018 (OCED, 2018)

Ireland also has low rates of in-job training relative to highly productive industrialised economies. The share of employed persons undergoing in-job training (23.3 per cent) is less than half that in the Netherlands, Sweden and Finland (60.6, 58.6 and 58.3 per cent respectively).

In addition, a recent report by the *Construction Industry Foundation* shows a dramatic contraction in trades and apprenticeships and estimates the number of *Carpentry and Joinery* apprentices at just 21% of its pre-recession peak (Ó Murchadha and Murphy 2018). This trend will likely inhibit government in meeting its deep retrofit targets.

Table 4.4 In-job training rate

2016	Employed persons
Netherlands	60.6
Sweden	58.6
Finland	58.3
Denmark	45.9
Austria	41.4
France	38.9
Germany	36.5
Belgium	34.5
Spain	34.2
Portugal	32.4
EU - 28	31.9
UK	30.6
Ireland	23.3
Italy	11.3
Greece	7.6

Source: Eurostat (2019) Persons participating in training related to professional activity by sex, age, income group, most frequent activity status and educational attainment level [[ilc_ats10](#)].

4.4 Skills profile of workers in at-risk sectors and the potential labour force

This section outlines in broad terms the skills profile of workers in sectors identified as at-risk in section 2 to give a broad picture of future upskilling or retraining demand and address possible gaps to implement a Just Transition for these workers. The section also considers the skills profile of the potential labour supply with a focus on specific regions to inform

policies to increase participation rates through sustainable employment and to realise spatial development objectives.

Some of the sectors identified in section 2 have additional risk factors to consider, whilst the profile of workers in other sectors may signal opportunities for green development with minimal worker displacement. Unfortunately, data limitations constrain this analysis to the top four emitting sectors.

In general, economic downturns, closures and layoffs tend to affect older workers (over 55's) for a variety of reasons including discrimination, the lack of appropriately tailored training and adjustment programmes (Forfas 2001). We assume in this analysis that employees with a bachelor's degree or higher are in a better position to adapt to a changing labour market and require less additional training on average.

Forty-four per cent of those in employment in Ireland have a bachelor's degree or higher and 15.6 per cent are 56 or older (CSO 2019). For *Crop and Animal Production* (one of the highest emitters), only 12.1 per cent of workers have bachelor's degrees or higher and 45.6 per cent are 56 and over. This signals potentially high demand for upskilling in the sector, especially if the use of land is to develop in coming years to allow for renewable energy production and to adhere to a new regulatory environment and more sustainable production processes.

Table 4.5 Additional Risk Factors of high-emitting sub-sectors

	Degree + (%)	55+ (%)
Crop and animal production	12.1	45.6
Electricity, gas, steam and air con	52.7	17.6
Manufacture of other non-metallic products	18.1	23.9
Land transport and transport via pipelines	16.4	29.8

Source: CSO (2019), Labour Force Survey & authors calculations

The *electricity, gas, steam and hot water* sector is a high emitter and likely subject to comprehensive change over the coming years given renewable electricity targets and a likely increase in demand for deep retrofitting of the built environment (involving installation of solar panels, heat pumps etc.). However, the education profile of these workers suggests that

fundamental changes to their jobs or tasks will be relatively easy to address, with 52.7 per cent earning bachelor's degrees or higher and an average cohort of over 55's (17.6 per cent).

In *Manufacturing of other non-metallic mineral products*, approximately 18.1 per cent of workers have a degree or more and 23.9 per cent are 55 or over suggesting a possible future need of widespread upskilling of this workforce.

There exists quite a large supply of underutilized skills in the Irish economy, which good demand side policy could mobilize to address the climate emergency, improve participation rates, promote high-end, sustainable growth and realise spatial development objectives. This would also create employment options for workers facing redundancy in future.

The CSO PLS4 indicator captures a wider potential labour supply than the headline unemployment rate. It includes discouraged workers, others who want a job and the part-time underemployed.⁵ In 2018, the PLS4 rate was 17.0 per cent compared to a headline unemployment figure of 5.7 per cent (or approximately 479,400 compared to about 135,000 unemployed in Q1 2018).

Table 4.6 Highly Educated and Inactive

Potential Labour Supply (PLS4) (%)	2018	Bachelor's degree + in PLS4 (%)	2018
ROI	17.0	ROI	23.2
Western	18.1	Western	21.2
Mid-West	18.7	Mid-West	20.4
South-West	15.5	South-West	27.0
Midlands	23.3	Midlands	18.9

Source: CSO (2019), Labour Force Survey & authors calculations

The data show that 23.2 per cent of the PLS4 group have bachelor degrees or higher (approximately 110,000 individuals), while 53.5 per cent have some kind of post-secondary qualification (approximately 256,000). The survey also provides data on the broad area of

⁵ PLS4= unemployed persons plus Potential Additional Labour Force plus others who want a job, who are not available and not seeking for reasons other than being in education or training plus part-time underemployed persons as a percentage of the Labour Force plus Potential Additional Labour Force plus others who want a job, who are not available and not seeking for reasons other than being in education or training. This indicator is broadly comparable to the previously published S3 indicator.

study of individuals with tertiary qualifications. Of the PLS4 group with tertiary education, almost half have a qualification in broad areas of relevance to the Just Transition as identified previously. An estimated 22.4 per cent have a third level qualification in *Business, Administration and Law*, 4.3 per cent in *Natural Sciences, Mathematics and Statistics*, 9.4 per cent in *Information and Communication Technologies* and 10.9 per cent in *Engineering, Manufacturing and Construction*. For the portion of the PLS4 group who have been in some kind of employment in the previous eight years (about 40 per cent), 28.1 per cent were in the top three occupational categories *Managers, Professionals and Technicians and Associate professionals*, 9.7 per cent were *Craft and related trades workers* and 6.3 per cent were *Plant and Machine operators*.⁶

Table 4.7 Previous Experience of the Inactive by Occupation (8 years or less inactive)

Managers	5.1
Professionals	13.6
Technicians and Associate Professionals	9.4
Clerical Support Workers	9.9
Service and sales workers	30.4
Skilled Ag, forestry, fishing	1.2
Craft and Related Trades workers	9.7
Plant and machine operators and assemblers	6.3
Elementary Professions	14.4

Source: CSO (2019), Labour Force Survey & authors calculations

Table 4.8 Highly Educated and Inactive (National)

Fields of Education	PLS (4) (%)	PLS (4) with Degree +
Business, Administration and Law	22.4	24.9
Natural Sciences, Mathematics and Statistics	4.3	6.9
Information and Communication Technologies	9.4	9.5
Engineering, Manufacturing and Construction	10.9	7.7

Source: CSO (2019), Labour Force Survey & authors calculations

The following is an examination of some of the trends discussed above on a regional basis (Western, Mid-West, South-West and Midlands). We select regions based on relatively low participation rates, high levels of deprivation, high concentration of carbon intensive employment and high-profile up-coming employment displacement (the Mid-West for

⁶ For the *Craft and Related Trades* and *Plant and Machine Operators* categories, these are likely underestimates of the potential labour supply as the collapse in the construction sector in Ireland is now more than 8 years old and this indicator includes only workers who are less than 8 years out of the workforce.

Moneypoint, the Midlands for Bord na Móna). The West coast regions also have specific natural conditions amenable to renewable energy development and as such are possible areas to focus investment and to realize spatial development goals.

Table 4.9 Tertiary Education in relevant fields, Inactive (Regional)

% of PLS4 with post-secondary qualification by Field of Education (2018)	West	Mid-West	South-West	Midlands
Business, Admin and Law	12.1	14.1	16.8	11.7
STEM	14.2	15.3	13.6	11.5

Source: CSO (2019), Labour Force Survey & authors calculations

The West (Galway, Mayo, Roscommon) region has a slightly higher potential labour supply rate than the national average at 18.1 per cent. Of this group, approximately 21.2 per cent have a degree or higher. Of those with a post-secondary education, 12.1 per cent have a qualification in *Business, Administration and Law* and 14.2 per cent have qualifications in *STEM*.⁷

In the Mid-West region (Clare, Tipperary and Limerick and home to Moneypoint coal-fired power station), the potential labour supply is higher again at 18.7 per cent and 20.4 per cent of this group have a bachelor degree or higher. Of those with post-secondary qualifications, 14.1 and 15.3 per cent have competence in *Business, Administration and Law* and *STEM*, respectively.

In the South-West (Cork and Kerry) where employment growth in low emitting sectors has been slow, the potential labour supply (4) is 15.5 per cent with a high share of this group with degrees or higher (27.0). Of that group with post-secondary education, 16.8 per cent have qualifications in *Business, Administration and Law* and 13.6 per cent in *STEM*.

The potential labour supply rate (4) is highest in the Midlands (Longford, Westmeath, Offaly, Laois and home to most of the Bord na Móna and ESB jobs under threat from the move away

⁷ The granular level of analysis of fields of education is not possible on a regional basis. For these figures we grouped the fields of *Natural Sciences, Mathematics and Statistics, Information and Communication Technologies* and *Engineering, Manufacturing and Construction* as an approximation of *STEM*.

from peat burning) of any region under consideration at 23.3 per cent, with 18.9 per cent of that group in the higher education category. Of those with specialist education, 11.2 per cent studied *Business, Administration and Law* and 11.5 have *STEM* qualifications. Of those inactive with previous work experience, 14.4 per cent are former *Craft and related trades workers* and 7.9 per cent are *Plant and Machine Workers*, skillsets appropriate to retrofitting and renewable energy rollout respectively.

Table 4.8 Previous work experience by Occupation and Region of Potential Labour Supply (Inactive less than 8 years)

2018	Managers, Professionals, Technicians & Associate Professionals	Craft & related trades workers	Plant & Machine Operators
Western	25.9	9.0	12.2
Mid-West	28.1	10.8	6.6
South-West	26.5	8.0	8.9
Midlands	19.4	14.4	7.9

Source: CSO (2019), Labour Force Survey & authors calculations

It is clear that there is a significant underutilisation of the available skills in the Irish economy, much of which is relevant to the future skills needs of the Just Transition and much of which is located in relatively depressed regions. This suggests a significant demand-side problem.

With an uncertain future ahead, targeted government support could support markets for emerging technologies. The state, as the biggest single actor in the economy should drive demand, targeting strategic green industries and lay the basis for balanced, sustainable growth to safeguard against future exogenous shocks. Indeed, we have already mentioned the example of Wales. The narrow focus on reskilling redundant workers, without demand for those skills from employers was a developmental failure (Lloyd and Payne, 2002).

This data suggest in the first instance that a coordinated policy approach to the just transition could mobilize a significant share of this pool of mismatched and underutilized overqualified workers with relative ease into new greener employment and minimal need for upskilling. Second, the level of underutilized skills in the economy points to a failure in government policy in implementing a ‘high-road’ approach to productivity and high-end employment.

There is a strong case for government intervention to address the lack of demand, which has led to high rates of horizontal mismatching, over qualification and high rates of highly educated individuals who are economically inactive. As the biggest actor in the economy and with borrowing costs at record lows, the government is in a position to create demand and unlock the Irish economy's productive potential. Similarly, government policy commitments can effect skills demand in the short term for individual state projects. In the longer term, state policy can influence green industrial specialisation and consequent skills demand.

SECTION 5: MANAGING THE TRANSITION FOR WORKERS

5.1 The necessity of Just Transition policy

While a green transition offers the potential for net employment gains, policymakers should make the necessary steps to equip workers to seize future opportunities. The current situation in Bord na Móna and the ESB is a major test for policymakers and provides a good case study to examine some of the policy proposals that will follow. Bord na Móna was established with a regional employment mandate and has supported decent employment in many communities in the Midlands for decades. Its main production is in peat, for use in heating households and for supplying the ESB (owned by the state) to generate electricity. As a particularly carbon-intensive fuel, Bord na Móna will phase-out the extraction of peat and the ESB will close its peat-fired power stations, leaving the Midlands at serious risk of further economic decline.

Managing a transition justly for workers implies responses to address the short to medium term disruption caused by the shift to greener production. In the extreme case where workers face jobs losses, as in the case of Bord na Móna, a managed transition should entail programmes to mitigate negative impacts and ensure workers are redeployed or upskilled for new green jobs where possible. In the absence of a Just Transition framework, redundancies can exacerbate local economic weakness and labour market dysfunction. Poorly managed transitions can result in negative spirals and damage for workers and their communities (Wanberg, 2012).

Weller, Sheehan and Tomaney (2011) suggest that, in the absence of an integrated policy framework with the input of workers in negotiating viable transition pathways, workers tend to experience one of three outcomes. A third of workers tend to find alternative decent work that utilises their skill set. Market conditions force the remaining two thirds to accept jobs of lower calibre or to accept unfavourable retirement conditions.

Prevailing local conditions will make worker transitions into unemployment or non-decent employment more or less likely. If labour markets are characterised by relative oversupply of a given skillset, the market may leave workers with few decent employment options. Where business closures affect local supplier firms and in turn hit local market demand formerly supported by the salaries of local workers, decent options are even fewer. These issues can be particularly acute for older workers who may enter long-term unemployment or exit the labour market entirely (Jones and Tee, 2017). In the context of the transition away from peat transition, the Midlands relatively low rates of labour market activity and high rates of long-term unemployment are troubling (Nugent, 2019).

Even where workers find jobs, they can be forced into less secure work or underemployment (Jones and Tee, 2017; Weller, Sheehan and Tomaney, 2011). These jobs are often lower skilled and can lock workers into a cycle of non-decent employment (OECD, 2016). Where workers transition into non-unionised workplaces, the experience for many is a decline in pay and benefits offered on the job (Wiseman, Campbell and Green, 2017). In the Irish case, the semi-states involved in carbon intensive work tend to exhibit high union density and union agreements relative to other private sector jobs. Thus, a transition could imply a decline in workplace representation and worsening job conditions for many workers.

This section begins with a brief analysis of current government policy on managing the transition for Bord na Móna and ESB workers. The following section examines structural adjustment programmes and experienced transitions in carbon intensive industries in several regions. These case studies exemplify relatively successful and unsuccessful

transitions.⁸ The concluding section attempts to draw out the lessons from these examples (and others) for Ireland.

5.2 Current Proposals in the Irish Context

The unfolding situation in Bord na Móna has brought the issue of a Just transition to the public's attention. The semi-state will dramatically curtail peat extraction and burning – for use both in private residences for heating and for electricity generation – in the medium term and eventually discontinue activity in this area. This is due to peat's contributions to Irish carbon emissions as a particularly carbon intensive fuel. This presents problems for existing workers, and the semi-state has already announced layoffs affecting hundreds of employees. In the most recent budget, the government announced the allocation of funds for a Just Transition in the Midlands. Government plans to direct €31 million to retraining and upskilling, a retrofit programme and funds to restore bogs, which it says offers the potential to support around 500 new jobs. The government have also committed to the appointment of a Just Transition commissioner to oversee the process in consultation with parties such as Bord na Móna and the National Economic Social Council (NESC) (Government of Ireland, 2019).

Other proposals include the use of transition programmes that exist at the European level. The European Union established the European Globalisation Adjustment Fund to address employment shocks linked to the opening of trade in 2007. The EGF was set up to assist workers (rather than firms) who have lost their jobs due to disruptions in activity. To date, this has entailed support for workers made redundant due to globalisation and the effects of the global economic crisis. The fund is available for the sole purpose of financing “active labour market measures” of re-training and re-employment for workers made redundant. The EGF can seek up to €150 million in funding each year presently, a reduction from €500 million after the initial 2007-2013 funding cycle (Claeys and Sapir, 2018). The fund can allocate up to 60 per cent of the cost of projects to assist redundant workers (European Commission, 2019). Under current rules the EGF can be availed where at least 500 redundancies in a

⁸ We note that success in these cases generally refers to successfully mitigating the economic impacts of emitting activity in these cases, rather than measures achieving climate measures per se. As we argue later, success must incorporate both criteria.

company or sector have occurred in a four- or nine-month period, respectively (with some exceptions). The fund has provided €75 million to support programmes for nearly 11,000 Irish workers between 2007 and 2016 (ICTU, 2019).

The European parliament has recently voted to open the programme to workers who have lost their jobs due to the effects of policy to combat climate change (European Parliament, 2019). The Irish Congress of Trade Unions have proposed drawing on this programme to assist the workers of Bord na Móna who find themselves displaced by climate initiatives (ICTU 2019).

5.3 Transition Programmes in other countries

In some respects, the approach to transitions in the United States is similar the Irish one. Federal policy is somewhat analogous to the EU's with the Trade Adjustment Assistance programme or TAA (in place since 1962) similar in spirit and scope to the EGF. The programme initially offered income support to workers losing their jobs as a result of the Kennedy round of multinational trade negotiations and later amended to include all workers impacted by import competition (Clayes and Sapir, 2018). The programme currently funds wage and health insurance, counselling services, retraining and job search programmes and offers money for worker relocation. The federal government reauthorized the programme through to 2021 at a cost of an estimated \$360 million a year (Pollin and Callaci, 2019). Other similar federal programmes in the United States include programmes enacted at the end of the Cold War, such as the Defence Reinvestment and Conversion initiative (Pollin and Callaci, 2019).

However, these programmes have been criticised as inadequate to the challenges faced by workers and communities. In particular, Pollin and Callaci (2019) point to the restrictive nature of the wage insurance provision both in terms of who is eligible, and the level of support granted. The measure is only open to the over 50s and offers coverage for 50 per cent of the difference in wages between the new job and the old one to a maximum of \$6,000 over two years. As Pollin and Callaci (2019) demonstrate, the difference between the average auto industry job and a job in retail is \$37,000. In this scenario, even with wage insurance this

individual sees a reduction of income of 46 per cent. Similarly, Powers and Markusen (1999), assessing the Defence Reinvestment and Conversion Initiative, found that most workers displaced between 1987 and 1997 were forced to accept lower paid jobs where their skills were unutilized.

Within states, employers and unions have agreed company level transition plans with some success. The ILO (2018) point to agreements in Washington, Wisconsin and New York as examples of successful social dialogue involving affected parties. In the case of Centralia Coal Plant in Washington in 2011, unions, the employer, environmental groups and the state government came to an agreement to cease activity in two stages in 2020 and 2025. The managed decline allowed the attrition to occur through retirement, while others could adjust to coming redundancies. The transition agreement encompassed \$55 million provided by the owner of the plant and directed to support the region through stakeholder-managed funds to support energy efficiency schemes, further education and green technology.

However, many regional transitions have been less successful. The most prominent example in the US is the case of Appalachian coal, an industry that spanned eight states. Sheldon, Junakar and De Rosa Pontello (2018) identify a number of factors tied to the continued economic decline of the region including the absence of a transition framework away from coal to address worker and community concerns. The Federal government failed to take a lead in planning and coordinating a transition or provide any funds for that purpose. Policy responses by local and state governments were generally top down and reactive to closures. Further, the authors critique the focus on business subsidisation over investment in infrastructure or in regional innovative capacity to promote clustering. Governments similarly did not commit to rectifying skills gaps or funding training programmes for workers. Hostility to trade unionism on the part of employers and the absence of forums for collective bargaining or social dialogue resulted in scant focus on worker or community issues and a just transition. This may account for much of the existing hostility to transition programmes from workers and others living in the region (Abraham, 2017).

In the United Kingdom, the experience of the Valleys of South Wales is a stark example of policy failure in the face of industrial decline in a carbon-emitting sector. Coal mining represented the region's major industry and was a major source of unionised employment for many decades. The coal industry went into decline from the 1920s onwards, even as it remained a major source of employment for much of the rest of the century (Sheldon, Junakar and De Rosa Pontello, 2018). Labour governments from the 1930s to mid-1970s enacted policy intended to address this decline, with initiatives to foster industrial diversification, retraining schemes and social protections to manage the effects of unemployment. Some of this policy was successful on its own terms, and incorporated worker centred initiatives such as funds for relocation and training, a comprehensive welfare state (which moderated unemployment effects), investment in infrastructure and policy to encourage investment in conjunction with local authorities (Merrill and Kitson, 2017). However, according to Sheldon, Junakar and De Rosa Pontello (2018), these efforts were insufficient to realise a Just Transition for a number of reasons. The state failed to build structures to facilitate long-term planning or adequately fund its transition initiative. The plans also suffered from an absence of coordination between policy initiatives and a failure to craft suitably localised policy.

The Thatcher government of the 1980s exacerbated decline in the region and substantially weakened existing policy to adjust for its effects. The government continued to offer redundancy packages for older workers to retire early and offered redundancy payments to younger workers for retraining. However, the government deemphasised demand side policy, which would promote alternative employment to utilise the stock of available skills (Stroud, Fairbrother, Evans and Blake, 2014). In-line with its broader economic approach, the government pursued policy that sought to weaken unions and restrain wage growth while subsidising foreign direct investment directed towards the area. These multinational firms tended to opt for low skill, low wage employment entrenching a "low road" developmental model characterised by cost competition, a minimal social state and conflictual labour relations between unions and employers (Sheldon, Junakar and De Rosa Pollo, 2018; Milberg and Houston, 1999).

However, other UK regions undertook more successful transitions. In Scotland, the economy has been reliant on North Sea oil and gas since they were discovered in the 1970s. Production levels have fallen from their peak in the late 1990s, entailing considerable job losses. This has been particularly concentrated in the north of Scotland. Despite these challenges, the Scottish economy has been able to shift to lower carbon activities, particularly in energy generation (Stone and Cameron, 2018).

The case of the Orkney island archipelago is particularly notable in that respect. The devolved Scottish government encouraged local authority development through new planning guidelines in 2007 (Cerna, Hime, Norrington-Davies & Weissbrod, 2018). Development plans also included groups at the local level and many projects include shared ownership with the community (Cerna, Hime, Norrington-Davies & Weissbrod, 2018). Nationally, the Scottish Trade Union Congress and affiliate unions have been deeply engaged with government on Just Transition plans and successfully lobbied for measures that benefited communities (Stone and Cameron, 2018). A Just Transition Commission with representation from a number of bodies including unions has been established to advise government on achieving a Just Transition across the Scottish economy, with consultation established with communities (Scottish Government, 2019). The government has set up a national investment bank, alongside a transition training fund. The fund provides grants to workers made redundant in the oil and gas sector for retraining, skills development and accreditation, with close to 70 per cent of participants in employment after retraining (Skills Development Scotland, 2019). Alongside these shorter term transition management policies, longer term renewable investment plans and R&D policy has generated demand for these skills in the local economy. The islands have become leaders in tidal and wave energy research around the European Marine Energy Centre. In addition, the Heriot-Watt University offers higher-level education in renewable energy (Cerna, Hime, Norrington-Davies and Weissbrod, 2018).

In the Ruhr, in the German state of North Rhine-Westphalia, coal mining, power production and heavy industry reliant on coal were the major source of economic activity in the region up until the 1950s. From 1957 onwards where these industries made up about 70 per cent of regional employment, coal and coal related sectors experienced substantial contraction

(Galgoczi, 2014). Sheldon, Junakar and De Rosa Pontello (2018) identify two phases, which laid the groundwork for a relatively successful transition.

The first phase entailed policy responses to falling employment in traditional sectors that took a number of forms. Successive governments directed considerable resources to investment in new alternative sectors and policy to ease the effects of job losses on workers. At the same time, government enacted policy to support contracting coal based industry (Sheldon, Junakar and De Rosa Pontello, 2018). Taylor (2015) notes that top-down adjustment strategies were emphasised with little input solicited from local actors for several decades. At the same time, this top down phase entailed successful programmes such as the establishment of third level institutions and schemes to mitigate environmental damage. The state also offered support schemes in the form of “adjustment money” to miners over 50 as well as an “adjustment allowance” for younger workers, which included training and grants for travel and relocation (Schulz and Schwartzkopff, 2016).

The late 1970s saw a turn as policy makers recognised the limitations of a strictly centralised approach. Trade unions, business, civil society groups and representatives from all levels of government down to local level agreed a new regional programme in 1979, which established a long-term policy forum (Schulz and Schwartzkopff, 2016). From the 1980s, with the introduction of the new “Ruhr action plan”, the state adjusted to a more grass-roots approach, where state government directed long term planning but local participation in policy design and implementation (Schulz and Schwartzkopff, 2016; Taylor, 2015). Galoczi (2014) points to large-scale public investment in infrastructure and education as key developments in this phase. Sheldon, Junakar and De Rosa Pontello (2018) also cite investment in new service industries that utilised existing regional advantages. These include new logistics firms, which took advantage of infrastructure, and environmental industry encompassing industry and technology development. The state encouraged firms involved in coal intensive supply chains to shift to support for renewable systems, with major successes (Galgoczi, 2014; Weller, Sheehan and Tomaney, 2011). Thus, the region experienced reindustrialisation in new sustainable sectors. New innovation systems and

regional clustering established a comparative advantage in energy supplies and waste disposal in the region.

The second phase began with a tripartite agreement on the back of a federal government commitment to end all subsidies for coal mining in line with EU policy by 2018. The operating coal company, the union representing the remaining workers and the federal/state government agreed a final phase out by 2018, which allowed for the staggering of closures and policy to support affected workers. The mining company took responsibility for legacy issues related to the mines from 2019 (Wodopia, 2017). The agreement entailed relocation schemes, provisions for early retirement, training programmes and placement in other sectors. The adjustment programme occurred in the context of wider federal regulation and collective bargaining agreements (Sheldon, Junakar and De Rosa Pontello, 2018).

SECTION 6: LESSONS FOR AN ADEQUATE JUST TRANSITION

FRAMEWORK IN IRELAND

Harrahill and Douglas (2019) offer an evaluative Just transition framework to judge successes according to the European Trade Union Institute's (ETUI) Just Transition criteria. They highlight the need to manage transition in two phases.

The preliminary phase involves setting an agreed timeline for transition through social dialogue, incorporating workers, communities, employers and government at multiple levels. This ensures political viability through local buy-in, as community inclusion lends legitimacy to political decisions (Harrahill and Douglas, 2019). In the case of the transition in the Ruhr, this takes the form of 50 per cent worker representation on large company boards and a tradition of collective agreements with employers (Schulz and Schwartzkopff, 2016). Their inclusion ensured a smoother transition in coal mining regions in Germany than elsewhere (Harrahill and Douglas, 2019).

The engagement of social partners, and local actors in particular, should ensure that transition plans are flexible and responsive to regional needs. While high level direction with respect to carbon and other green targets are necessary, overly top-down approaches to

planning should be avoided (Sheldon, Junakar and De Rosa Pontello ,2018). A failure to include local bodies presents problems for regionally specific planning and programme implementation (Schulz and Schwartzkopff, 2016). Institutions tied to social partnership arrangements should feed back into high level planning with respect to things like skills needs.

The trygghetsråden or job security councils in Sweden could provide a template for such an institution. These bodies are based on collective agreements between employers and trade unions in various sectors and tasked with giving support to employees who have been given notice of redundancies (Diedrich and Bergsrtöm, 2006). Employers finance these bodies through contributions based on employee payroll (Engleblom, 2017). These institutions offer support to displaced workers through coaching, counselling and training on an individualised basis (OECD, 2018). These bodies are among the most successful examples of re-employment assistance internationally, with success rates of between 80 – 90 per cent for job placements within 8-10 months and 80 per cent returning to work at a similar or higher paid job at one of the larger councils (OECD, 2018; Engleblom, 2017). Sector or regional councils could feed back into higher level planning by informing government of trends in skills demands and sectoral shifts in a dynamic way.

Further, the example of the Ruhr highlights the need for public investment in infrastructure and support for high skilled labour demand (Sheldon, Junakar and De Rosa Pontello, 2018). Investment in transport links and institutes of education provided key anchor points within a clustered regional innovation network. Clustering allows regions to specialise in economic activities and can provide an opportunity to seize parts of the supply chain in sustainable industries. In this way, industrial success can foster new employment in other enterprises who provide goods and services to these firms.

The Irish government could help foster innovation systems and regional clustering through investment in physical and digital infrastructure, subsidies for research and development activities, regional initiatives and systems to help research centres and business develop and

share technological advances (Njøs and Jakobsen, 2016; McDonnell, 2018). This is crucial to long-term green development.

Transition planning facilitates management of structural change for the workers involved in the post transition phase. A timeline for transition can allow for a wind-down of employment through attrition that occurs on a voluntary basis. Where funding is available in the form of social protections and agreed terms with the employer, older workers can have their incomes and living standards protected. A coordinated closure and retirement attrition also allows younger workers to stay in employment longer while preparing for life after transition, as occurred relatively successfully in the case of the Ruhr. In Spain, the recent agreement between unions and government has provisions which offer early retirement to older workers along with funds to regenerate former mine areas with jobs earmarked for former miners in many cases (Powell, Stirling, & Mahmoud, 2018). Where multiple closures are agreed on a staggered basis, existing workers can be redeployed to other company branches where there are vacancies, as the Australian Council of Trade Unions propose (ACTU, 2016). In relatively successful transition cases, younger workers could avail of opportunities for redeployment within the firm or work arrangements that enable job search for decent work. Where workers are not equipped for new more sustainable jobs, retraining should be provided as a pre-emptive as opposed to reactive measure (Sheldon, Junakar and De Rosa Pontello, 2018). This entails preparation by government at the various levels, involving an audit of skills levels, supporting skill demand in the form of promoting green enterprise, identification of skills needs and adequate funding to enable workers to avail of upskilling. This should include public funds for a number of skills development options, including in work-training, vocational courses and access to third level education. Training programmes should also be part of negotiated packages between employers, workers and government.

Further measures should include income supports for workers beyond currently available benefits. An income insurance scheme, which supports incomes at close to the former wage level should enable workers to enter into training programmes without experiencing serious detrimental impacts to living standards. This will also support communities reliant on local wages to prop up demand. Similarly, social protection policy can augment labour supply for

the transition nationally through relocation grants. Thus, workers unable to find decent work locally could take up work in another region where skills are needed.

Recent measures and commitments by government in Ireland suggest tentative steps are being made in the right direction. However, funds are limited at present and pre-emptive policy should be enacted in conjunction with timelines agreed between trade unions and other social partners. This will allow for an integrated, whole government approach in stages to address coming adjustments in the Midlands and elsewhere.

SECTION 7 IMPLEMENTING A JUST TRANSITION

7.1 Strategic planning and consultation

Adequately addressing environmental damage and embedding sustainability will require actions at a number of levels. Environmental challenges like climate change cannot be the sole preserve of national governments although they will play a crucial role. At the highest levels, international agreements and supranational organisations must ensure regional and global commitment to emissions and other sustainability criteria. The Paris Climate Accords and EU targets with respect to emissions that are legally binding on Ireland represent progress in this regard.

Unfortunately, these binding targets do not entail commitments to reductions on the scale implied by the IPCC's report to limit warming to 1.5° C, as we discussed in the introduction to this paper. The European Commission's claim that in its long term emissions strategy that an 80 per cent reduction in emissions, at the lower end of its 80-95 per cent emissions reductions targets, is commensurate with the temperature limits set out in the Paris accord is controversial (Wachsmuth, Schaeffer and Hare, 2018).

As an opening step, international bodies must establish binding targets that incorporate the best scientific evidence in relation to climate impacts at the global and EU level. While it is not in the gift of the Irish government to enact these regional and global measures, Ireland should leverage its influence to bring about this outcome. A "Just Transition" internationally

should account for the relative levels of resources different countries can bring to bear on this challenge and the right of poorer nations to develop.

It must also account for the complex supply chains in the global economy, which link emissions activity elsewhere to production and consumption here. Such a system may entail more stringent targets for wealthier states. The EU should examine rules and expand funds to support this. The EU and other international fora should also act to ensure that industrialised nations do not utilize globalized economic links to simply redirect emissions elsewhere. The global nature of the climate system means that strategies that would see countries reduce emissions by limiting intensive production to other jurisdictions do not contribute to our collective goals. This could lead to a race to the bottom between states on environmental standards in the absence of agreed international policy (Kim & Douglas Wilson, 1997). Specific areas in which the EU could have immediate impact is through reform to CAP and existing ETS markets, which should be reformulated with climate action as an explicit goal.

The absence of international agreements should not prevent Ireland taking immediate steps at the national level to mitigate environmental damage and reduce emissions. Current underperformance with respect to already insufficient committed targets must be rectified. Indeed, the Irish government should aim to exceed these targets in light of the best scientific evidence available.

Recent steps by the Irish government towards the establishment of five-year carbon budgets are a welcome development, as is the commitment to net zero emissions by 2050 among other sustainability measures (Department of Communications, Climate Action & Environment, 2019). However, these commitments are weak relative to recommendations from the Joint Oireachtas Committee on Climate Change (Stop Climate Chaos Coalition and the Environmental Pillar, 2019). Strategic plans should be revised to reflect these recommendations and scientific evidence, with clear timelines and costed targets. Government planning should also account for emission linkages between economic sectors which may not be captured in emissions accounting.

In our view, central direction over overarching strategic goals is appropriate. However, the international experience outlined in section 5.3 indicates that a predominance of top-down policy, particularly at the level of implementation, represents an obstacle to successful transitions. Local engagement is associated with better planning to achieve mitigation goals. It is also essential to achieve a just transition consistent with ETUC principles. Leaving adjustment decisions to commercial actors, with no input from workers or communities risks economic dislocation. Local participation is also essential for political legitimacy, which is essential as a consequence of the extensive changes needed.

Participation in planning should be established between workers and their representatives, employers, farming and community groups and government at various levels. This is crucial for a successful transition and avoids many of the pitfalls of one size fits all policy making for varied regional circumstances (Sheldon, Junakar and De Rosa Pontello, 2018; Stroud, Fairbrother). The recent announcement in Budget 2020 of the planned appointment of a Just Transition Commissioner to facilitate stakeholder engagement represents a positive step in this direction. The government should extend this framework and engage in immediate consultation with local and regional governments and other bodies. This should enable national coherence in green transition while remaining flexible in the face of changing circumstances. Consistent integrated planning across government levels in partnership with local actors should enable pro-active rather than reactive policy responses, with clear timelines in agreements and policy. It also provides long term stability in policy term, which affects the incentives faced by all market participants (Emden and Murphy, 2019).

The examples of the Ruhr in Germany and structural adjustment experiences elsewhere demonstrate that institutionalised partnership between workers organisations and employers does not represent an impediment to successful transition and regional development. Indeed, extensive worker input in the case of the Ruhr transition is credited with much of its relative success (Harrahill and Douglas, 2019). Government should design and implement policy based on lessons from structural transitions with time bound carbon targets as an explicit goal. Structural transitions usually occurred in response to market

shocks or individual climate measures with varying degrees of success as measured by the achievement of diversification from sectors. In our case, policy efficacy must be informed by accomplishing both employment and climate goals.

Successful transition cases appear to be tied to institutions within Co-Ordinated Market Economies (CMEs). These economies are characterised by a systems of non-market social institutions which regulate market activity, including trade unions, employer's groups, works councils and other bodies. This is in contrast to Liberal Market Economies (LMEs) – such as the US, UK and Ireland - where economic coordination is guided by the market (Hall and Soskice, 2001). While these distinctions can be imperfect, with substantial variation in country level institutions, bargaining arrangements and intervention policy across time and place, this model can be useful as a heuristic (Hardiman, 2015; Flaherty and Ó'Riain,2013).

Structural transition experiences LME contexts, at least in the selected cases, do not appear to have conformed to Just Transition goals. There is some evidence that CME arrangements, such as the German dual system of vocational education and training (VET) and the Swedish job security councils, are associated with better labour market outcomes and a high likelihood of transition to decent work (Stroud, Fairbrother, Evans and Blake, 2014; Engleblom, 2017). LME arrangements, in contrast, tend towards poorer efficacy and disincentivize skills development for non-firm specific skills (Bosch and Charest,2008; Lyod and Payne, 2002). Greater coordination in the manner of CME states could enable Ireland to better respond to skills needs for an effective green transition. Sector wide collective bargaining could enable coordination and a move towards a high-road model characterized by high productivity and high wages with diminished inequality (McDonnell, 2019).

7.2 Improving the social protection system

Adequate social protection payments are an essential part of any Just transition package. In the absence of adequate payments, workers and communities facing possible job losses or cessations in carbon activity face a higher risk of poverty and the possibility of regional decline. Income supports and job transition measures will facilitate transitions to new work on more favourable terms for workers. It will also ensure regional damage is mitigated, as

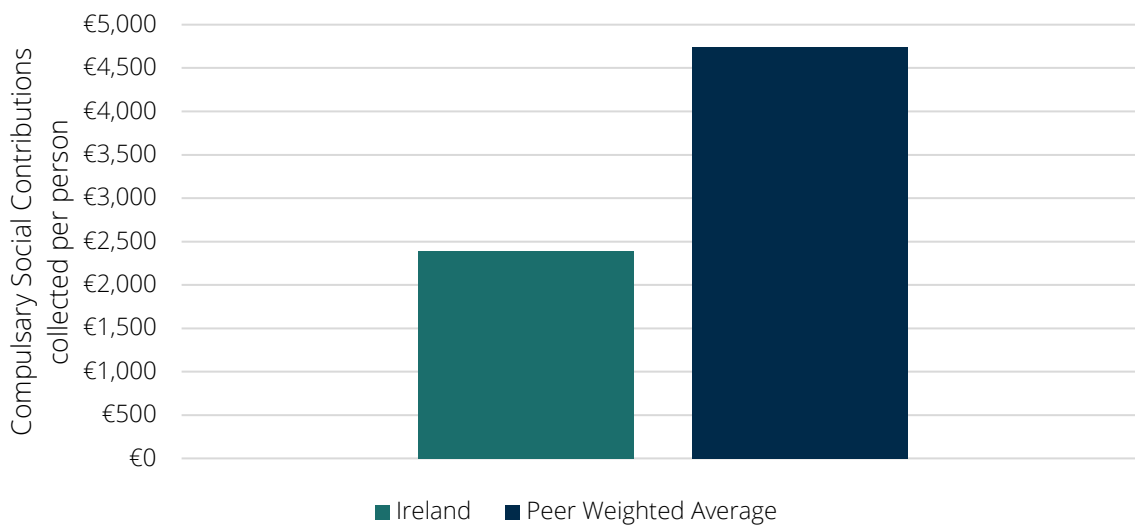
local consumption and demand are supported. It should also ensure that a structural transition to a low carbon economy is not associated with increased inequality.

Given adequate planning and a consequent timetable for structural adjustment, even where jobs are threatened, targeted programmes for highly effected workers are unlikely to be onerously expensive. In the US case, Pollin and Callaci (2019) estimate that full income insurance, retraining and relocation support, pension guarantees and community programmes would cost about \$600 million annually for the entirety of the US coal sector. About half of this fund covers direct payments to workers. Costs are reduced in this programme where agreed wind-downs are put in place. It is likely that a similar programme could be implemented in Ireland at relatively low cost to the exchequer if timetables can be negotiated and acted upon.

More broadly, Ireland exhibits strong gaps in its social protection system relative to other European states. This is particularly true of the social insurance system. On a per person basis, Ireland collected approximately €2,389 in compulsory contributions in 2017. This is only half of the peer weighted average of other similarly developed EU countries, which collected €4,741 per person (Chart 7.1). Scaled to the Irish population, this amounts to an aggregate gap of over €11 billion in government revenue. This is likely tied to the absence of a link between entitled payments and former income (Staunton, 2015). Approaching western European norms in this respect should offer automatic stabilisers in the face of possible job losses, minimise dislocation and encourage job search to decent work.

The Swedish works councils case also points to the possibility of funding independent training bodies through pooled contributions from participating employers. In the Irish context, employer contributions are low compared to other developed EU states. Higher rates to pay for these schemes should not undermine competitiveness given relatively low labour costs and more training could be amenable to higher productivity and thus better performance (Goldrick-Kelly and McDonnell, 2017; McDonnell and Goldrick-Kelly, 2017).

Chart 7.1 Compulsory collected social contributions per capita 2017



Source: Tax Trends 2019 (Eurostat, 2019)

SECTION 8: CONCLUSION

This paper identified a number of key employment sectors, which are likely to come under pressure to adjust in the coming years due to high levels of carbon emissions. These include agriculture, various sub-sectors of *Manufacturing* as well as *Transport*. Examining the broad skills profile of workers in these areas suggests that government should enact active labour market policy to facilitate a Just Transition for workers in specific sectors. A broad skills profile of the potential labour supply suggests that there is a pool of underutilized skills in the Irish economy, much of which could be relevant to implementing a Just Transition to a low-carbon economy. At the same time, Ireland compares unfavourably in terms of spending on third-level education and in the share of workers who undergo in-work upskilling, key inputs for a 'high-road' approach to economic development. This represents a key gap in existing policy.

International evidence points to key role of social dialogue and the inclusion of trade unions and communities in facilitating a Just Transition, including engagement in planning at the implementation phase, to ensure effective, region specific actions to respond to local conditions. This also entails policy to foster appropriate skills and facilitate their take-up. Labour market activation programmes and income supports for affected workers and communities are essential to manage the economic disruption associated with transition.

This strategy however is reliant on demand side measures to lay the basis for sustainable, broad based development. The mere presence of skills does not guarantee success on this front, as the data examined earlier suggest. A supply of skilled labour will not support sustainable regional development in the absence of a demand for those skills in the form of new green enterprises. A key part of fostering that demand will be infrastructural investment to prime development and directly provide jobs. The state can use its considerable heft as a direct market in procurement and as a player that effects perceptions of market risk, to encourage investment and activity in a new green economy. In the longer-term the state should adopt a “mission-orientated” innovation strategy to advance climate goals and capture economic activity that improves living standards (Kattel and Mazzucato, 2018). This developmental approach will require an enhanced role for the public sector to shape and encourage market activity (McDonnell, 2018). This policy path can help address the market failures we observe with respect to skills and employment. Ensuring that workplace organization favours the development of skills that benefit workers will require worker organizations are present to push for it (Lloyd & Payne, 2002). This should be facilitated by policy to enable them to do so.

We acknowledge the importance of a number of issues left unaddressed within this paper. Meeting the challenge of climate change consistent with values of social and economic justice will require attention to a number of other issues. Examination of the interaction between social and economic divisions around factors like gender and proposed transitions are warranted in environmental policy. Indeed, they are essential if the Just Transition is to represent an advance according to social justice principles. Future studies could explore this issue further.

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