
Article

How do We Manage a Just Transition? A Comparative Review of National and Regional Just Transitions Initiatives

Tamara Antonia Krawchenko ¹ and Megan Gordon ^{2*}

¹ University of Victoria; TamaraKrawchenko@UVic.ca

² University of Northern British Columbia; gordonm@unbc.ca

* Correspondence: TamaraKrawchenko@UVic.ca; Tel.: +1 250 721 6442

Abstract: The concept of a ‘just transition’ encompasses political and policy imperatives to minimise the harmful impacts of industrial and economic transitions on workers, communities and society more generally, and to maximise their potential benefits. This imperative has gained heightened importance as governments commit to reducing greenhouse gas emissions. A wide range of policies strategies and initiatives have been adopted by national and regional governments to facilitate and help manage a just transition. It is a concept that is increasingly being put into practice. This scoping study identifies and compares strategies, policies and practices that are presently being implemented in order to manage a just transition across 25 countries and 74 regions alongside European Union-level policies. This work develops a typology of policy instruments to manage just transitions and identifies implementation gaps and leading practices.

Keywords: just transition; energy transition; regional development; public policy; governance; OECD; European Union

1. Introduction

The concept of a ‘just transition’ encompasses a political imperative, a policy goal and a set of practices meant to minimise the harmful impacts of industrial and economic transitions on workers, communities and society at large. The term ‘just transition’ was first championed in the 1970s by the North American labour movement to describe a range of measures to secure workers’ rights and livelihoods in the wake of government-led environmental legislation and regulations that could have labour impacts [1]. The idea of a ‘just transition’ became globally prominent in the context of international climate negotiations and through the advocacy of global union organisations [2–4]. This is evident in the sharp increase in the topic as a central theme in academic and think tank work, much of which has grappled with the dual responsibilities of reducing GHG emissions and addressing social justice issues in impacted regions [5]. Within a just transitions approach, justice can be conceived in distributional, procedural and recognitional terms: *distributional* justice is concerned with how different groups benefit or experience impacts from the changes required; *recognitional* justice identifies interest groups and rights holders who may be implicated; and *procedural* justice is concerned with elements of governance—who is included and how [6–8].

The just transitions literature spans ‘jobs-focused,’ ‘environment-focused,’ and ‘society-focused’ interpretations. [3,6,8–10,35,36]. Each approach has implications for where and to whom governments focus their policy supports and investments. The ‘jobs-focused’ interpretation advocates primarily for workers and communities impacted by environmental and climate policies. This interpretation has its roots in the original principles of labour leaders who coined the term. Advocates for a jobs-focused just transition are often social-democratic unions in regions that rely on carbon-intensive industries and resource extraction [9]. This interpretation is closely aligned with a ‘differentiated responsibility’ approach that assumes states and capital have a responsibility towards workers

impacted by environmental regulations [3]. The ‘environment-focused’ interpretation of just transition evaluates transitions based on the primary objective of enabling the shift to a zero-carbon economy. Its lens is socio-technical—examining the production and consumption patterns of a sector [8,10]. ‘Society-focused’ interpretations adopt the broadest approach to just transition with the widest application of solutions. This approach views just transition measures as a means to uplift and support workers, communities and society and encompasses a broad range of interests and advocates for system transformation [6]. It advocates for universal equity and justice through addressing inequities on national and sub-national scales (e.g., marginalized communities facing disproportionate harms of resource development) and on a global scale (e.g., energy poverty in developing countries) [5,11,12]. Each of these focusses have implications for the design of policy responses by governments.

This scoping study contributes to the just transitions literature by focusing on *policy implementation for just transitions*. It synthesizes national and regional initiatives, strategies, policies and practices that are being presently implemented to manage a just transition across 25 countries (advanced OECD economies) and 74 regions plus European Union level policies. It develops a typology of national and regional policy practices and offers comparative policy learning.

2. Methods: Comparative policy scoping review

This study has been conducted as a scoping review: “a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting and synthesizing existing knowledge” (Colquhoun et al., 2014, p. 663). The content of national and regional just transition policies and practices have been collected and analysed alongside a review of academic (peer-reviewed) and documents from other relevant public and non-profit organisations (e.g., International Labour Organisation, Just Transition Centre, Green New Deal). The inclusion criteria for this study were broad: any policies, strategies and interventions directed to managing industrial transitions that address just transitions goals: both those that explicitly employ the term ‘just transition’ and those that do not.

The cases of interested were selected from among member countries of the Organisation for Economic Cooperation and Development (OECD)—so-called ‘advanced economies’. This study has identified 130 sub-regional territories (TL3) across OECD countries where there has been a high share of employment in industry (more than a quarter out of total employment), which subsequently declined in the past decade (timeframe 1999-2019).ⁱ Sub-regions were sorted according to the following four types (see Figures 1,2,3 below):

- *Sub-regions that have undergone transition (transitioned regions)*: These 130 sub-regional territories show a declining trend going from a high share of employment to a lower share over the past two decades. These are TL3 regions where the share of employment in industry was greater than 25% in industry including energy from 2000-2009 and less than 25% from 2010-2019.
- *Sub-regions that may face transition in the future (high industry regions)*: These cases show a high share of employment in industry, greater than 25% from 2000-2019.
- *Sub-regions that are increasing in industrial employment (growing industry regions)*: These sub-regions demonstrate a higher share of employment in recent years: the share of employment in industry is greater than 25% from 2010 onward.
- *Lower industry employment sub-regions (low industry regions)*: TL3 regions for which there is less than 25% share of employment in industry including energy. These are in effect “the rest” [14].

The first type—Sub-regions that have undergone transition—formed the basis of case selection for the regional and national policy scan, resulting in final selection of 74 regions across 25 countries.

Academic and policy literature including government websites were searched through a number of key search terms related to just transitions in order to develop a comprehensive understanding of the range of policies that are being used to manage industrial transitions (or not as the case may be). The searches focused on policies, strategies and interventions within the past five years (2015-2020). Multiple searches were conducted for the purposes of exhaustive coverage (facilitated by Google translate for non-English and non-French documentation and studies). Search terms included a mix of policy instruments types (e.g., policy, strategy, commitment, programme, initiative, mechanism, fund) alongside sectoral or thematic descriptors (e.g., industry, workforce, climate adaptation and mitigation, energy, energy transition, fair transition, transition, employment, community, coal). Literature was coded by key terms and core findings have been synthesized using Mendeley reference management software (thematic tagging) and in Excel tables in order to identify the main thematic areas of policy interventions and strategies. The policy intentions (i.e., type of supports, how they were directed) were summarised, recoded and thematically bundled, forming the basis of the comparative typology and summary tables. Wherever possible, comparative analysis was verified against with existing resources (e.g., OECD, 2017). There are a number of limitations of this study. This research has relied on web searches of publicly available documentation, largely from government websites. It is possible that some information is not up to date and that, despite best efforts at conducting comprehensive searches, important policies, initiatives or strategies were missed.

Figure 1. Case selection typology, North America

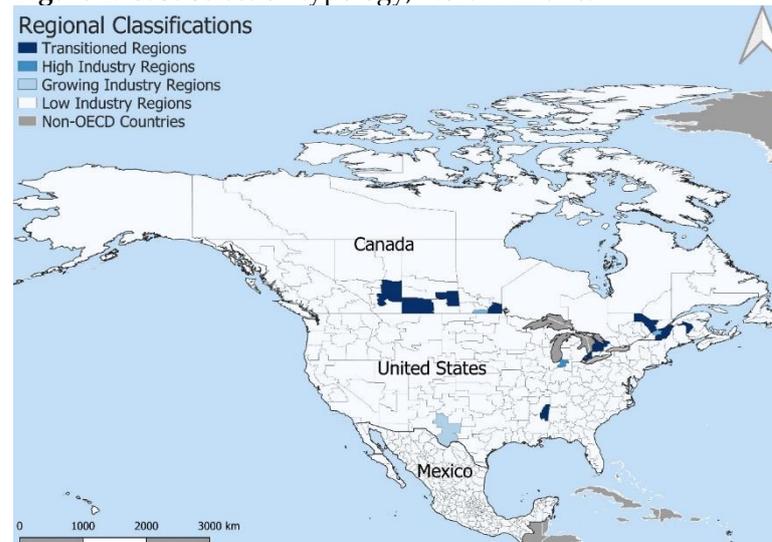
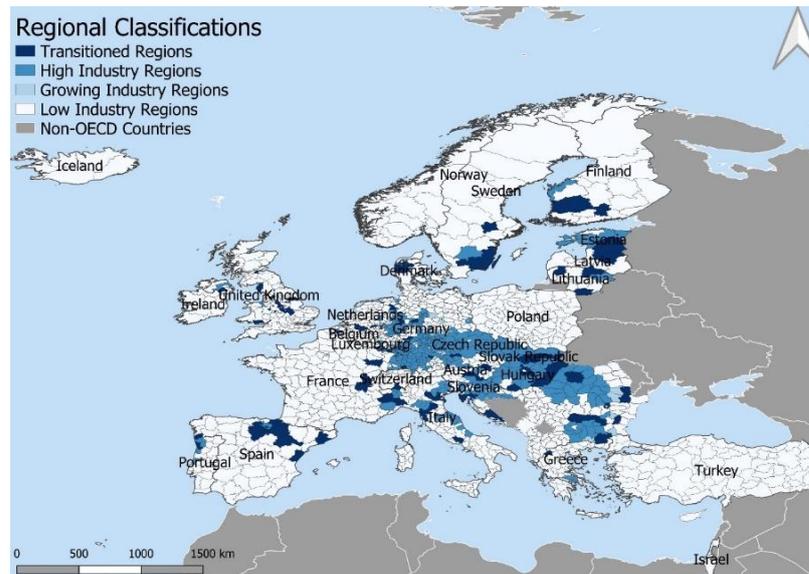
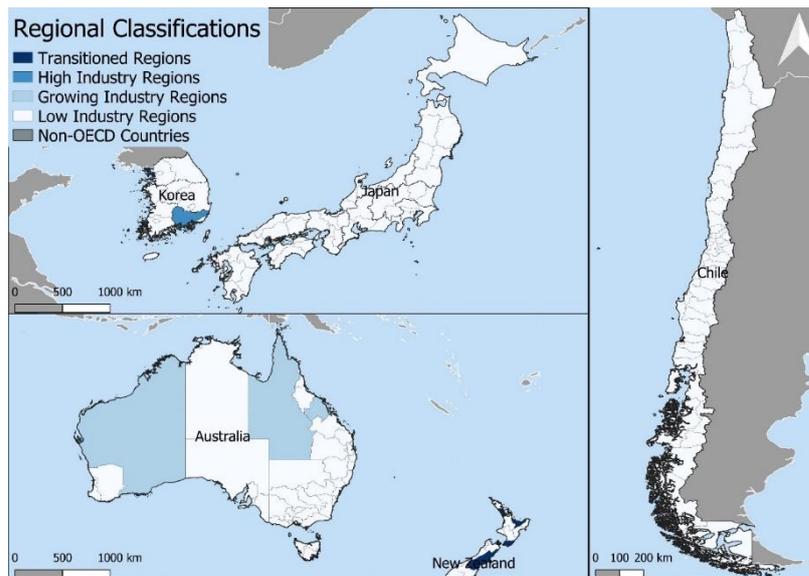


Figure 2. Case selection typology, Europe**Figure 3.** Case selection typology, Korea, Japan, Chile, Australia

3. Results: National and regional just transitions initiatives

This section provides an overview of national and regional just transition initiatives. Seven thematic policy areas of intervention have been identified from this analysis:

1. *Governance mechanisms*: Measures to manage, coordinate, plan and dedicate specific resources towards transition;
2. *Climate and sustainability planning*: Ensuring preparedness for the effects of climate change and realizing new opportunities in a green economy.
3. *Workforce development*: Supporting employed and displaced workers with the skills, training and information required to find and keep jobs;
4. *Economic development*: Creating new economic opportunities to replace traditional industries or update existing ones;
5. *Regional and rural development*: Ensuring all regions have the assets and capabilities to be successful and supporting places negatively impacted by industrial transitions;

6. *Innovation and research*: Ensuring readiness for an evolving global economy and advancing technology to ensure industries and regions are modern, efficient and functional; and,
7. *Social Supports*: Ensuring access to basic financial and social supports during periods of economic change.

The remainder of this section describes the prevalence of national and regional initiatives across these seven thematic areas.

3.1 National initiatives

The national cases span federal, quasi-federal and unitary states and one supranational body in the case of the European Union (EU). Table 1 below provides an overview of national interventions by thematic area. A broad range of policy instruments can address aspects of a just transition; however, only those interventions which are *specifically targeted to industries or regions/communities facing industrial transitions* have been highlighted in *blue*.

Table 1. National just transition initiatives and related policies, by instrument type and country

Country code	AUS	BEL	BUL	CAN	HRV	DNK	EST	EU	FIN	FRA	DEU	GRC	HUG	ITA	KOR	LVA	LTU	MLT	NZL	PRT	ROU	SVK	ESP	SWE	UK	USA
GOVERNANCE																										
Consultations & engagements			X	X				X															X			
Multi-stakeholder collaborative tables				X															X							
Coordination offices				X															X				X			
SOCIAL SUPPORTS																										
Temporary financial support for displaced workers	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Employment services	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Social insurance/ unemployment support	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Pension supports	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WORKFORCE DEVELOPMENT																										
Employment and skills strategies	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Training and education programs	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Job databases & labour market info.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECONOMIC DEVELOPMENT																										
Industrial transition commitments/strategies	X	X		X					X	X	X	X				X	X		X	X		X	X	X	X	
Business and tax incentives	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sector-specific Investments	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SME and entrepreneurship support	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
REGIONAL DEVELOPMENT																										
Strategies & plans	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Regional development program	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rural development program	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Infrastructure investments	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Spatial planning	X					X	X		X		X	X	X		X					X	X	X	X	X	X	
KNOWLEDGE ECONOMY, DIGITALIZATION, INDUSTRY 4.0																										
Innovation investments/ initiatives	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Industry 4.0 Strategy	X								X	X		X		X	X								X	X		

Funding for research and higher education	X	X	X			X	X	X	X	X	X			X	X		X				X	X	X
CLIMATE SOLUTIONS																							
Binding net zero GHG commitment	2040			2050*		2050		2050	2035	2050	2050		2050		2050			2050	2050		2050	2045	2050
Climate change & energy strategies	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Adaptation programs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mitigation programs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Investments in clean tech./ energy transition fund	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Source: Authors' own elaboration based on multiple sources. Scan of national policies across all thematic areas. Additional resources: Bautista, J.O.R., Lozada, M.Á.R. and Gutiérrez, J.L.C., Main Industry 4.0 Initiatives in Member Countries of the OECD; OECD (2017). Land-use Planning Systems in the OECD, OECD Publishing, Paris. *Note: Act introduced in Parliament. Country codes: AUS, Australia; BEL, Belgium; BUL, Bulgaria; CAN, Canada; HRV, Romania; DNK, Denmark; EST, Estonia; EU, European Union; FIN, Finland; FRA, France; DEU, Germany; GRC, Greece; HUG, Hungary; ITA, Italy; KOR, Korea; LVA, Latvia; LTU, Lithuania; MLT, Malta; NZL, New Zealand; PRT, Portugal; ROU, Romania; SVK, Slovakia; ESP, Spain; SWE, Sweden; UK, United Kingdom; USA, United States of America.

A major delineation in approaches is the *overarching policies* and strategies that seek to propel socio-technical transitions towards new low carbon activities versus those that are *directed to specified sectors or industries* (in regions). Among the countries of study, only three have clearly defined just transitions mechanisms that are directed to specific sectors. These are:

- *Canada's Task Force on Just Transition for Canadian Coal Power Workers and Communities* which developed recommendations on how to manage the transition [16]. This has subsequently resulted in federal funding for transition centres in impacted communities [17];
- *Spain's Just Transition Agreements* with territories experiencing coal mine, coal power plant, and nuclear power plants closures [18];
- *New Zealand's Just Transition Unit* housed in the Ministry of Business Innovation and Employment which conducts research and provides advice to government on challenges and opportunities created by the transition to the low-carbon economy [19].

These initiatives work in different ways. Canada's Just Transition Task Force has entailed a *targeted response* to the coal sector. An external group of experts were convened to understand the problem of coal phase outs in specific communities and 10 recommendations were subsequently made to the government on how they could act to support this process. These recommendations focus on multi-level government coordination with an emphasis on income and labour market supports and community investments (e.g., local infrastructure development). In 2019, the Government of Canada funded the fourth recommendation of the Task Force: to fund the establishment and operation of locally-driven transition centres in affected communities [16]. Canada has also agreed to fund the eighth recommendation to identify, prioritise and fund local infrastructure projects in affected communities. The purpose of these units is to create a single hub for community members to access a wide range of services, such as re-employment support, training and social support services. The Government of Canada is discussing the creation of a new "Just Transition Act," which would update the Canadian Environmental Protection Act (CEPA)[20]. It is not yet clear what aspects of the environment the Act would address.

Spain's approach to managing just transitions is far more encompassing. Through its Just Transition Agreements, Spain has entered into pacts with social partners. For example, the transition deal between the Government, trade unions, and the National Federation of Coal Mining Businesses (Carbunion) covers Spain's privately-owned pits until 2027 (other agreements will cover public sector mining operations and other industries such as electricity unions) [21]. EU regional development funds are a key part of Spain's just transitions efforts [22]. National and EU funding will support: i) investments in business and clean energy initiatives (2019-2023); ii) early retirement for miners over 48 and; iii) retraining for green jobs; and, environmental restoration of the affected areas. This last

point is worth noting—environmental restoration and land management are often absent from transition plans. For example, Canada’s Just Transition Task Force made no recommendations to the government regarding environmental remediation and land management. Land is a critical asset in affected communities and, absent remediation and effective land management, these industrial closures could become a major liability for the community.

In contrast to Spain and Canada’s just transition initiatives, New Zealand’s Just Transition Unit offers a centre of governmental expertise on how to manage just transitions and broker partnerships in affected regions. New Zealand has committed to a low carbon economy: the Climate Change Response (Zero Carbon) Amendment Act 2019 is now law and in 2018 it was announced that no further offshore oil and gas exploration permits would be issued. This transition impacts certain regions more than others. The Taranaki region—where the energy sector represents 28% of the regional economic output—has been a major focus of the Unit’s partnership efforts and governmental and local and regional partners have co-developed the Taranaki 2050 Roadmap which sets out a strategy for economic diversification [23]. The work of New Zealand’s Just Transitions Unit is notably proactive, seeking to identify regions that are (or will be) negatively impacted by ongoing efforts to decarbonise the economy and to co-develop new economic strategies. The just transitions literature, as well as expert recommendations (such as by Canada’s Task Force), all note the importance of early interventions. New Zealand’s approach aims to do just that.

Among the vast majority of the countries studied, *national* level just transition plans are absent: *this is about to change*. In January 2020, the European Commission unveiled a *Just Transition Mechanism* that aims to mobilise EUR 150 billion (100 billion direct EC contribution, remaining matching funds) through three main mechanisms:

- A new *Just Transition Fund* that provides funding that should be matched by member states through the European Regional Development Fund (ERDF) and the European Social Fund Plus (ESF+).
- An *InvestEU* scheme that will provide financing according to just transition objectives in targeted territories. These funds will be used to support a wide range of projects including those for energy and transport infrastructure, including gas infrastructure and district heating, but also decarbonisation projects, economic diversification and social infrastructure.
- A *new loan facility* leveraged by the European Investment Bank (EIB) that will primarily entail grants to public sector entities with resources to implement measures to facilitate the transition to climate neutrality [24].

EU countries will produce *Territorial Just Transition Plans* to 2030 that will describe the nature of the social, economic and environmental challenges stemming from fossil fuel-related phase-outs and/or GHG decarbonising initiatives. These will outline the transition process to 2030, including development, reskilling and environmental rehabilitation [25]. The plans will detail timelines, operations and governance mechanisms to meet prescribed targets. Thus, government planning in Europe is poised for change.

Overarching national transition strategies, such as those being promoted by the EC’s Just Transition Mechanism, may bring coherence to what are at present a patchwork of initiatives related to the thematic policy areas relevant to industrial transition. Fourteen out of the 27 countries examined have binding net zero GHG commitments, with Finland’s 2035 commitment being the earliest. However, only in eight cases do these commitments specifically address industrial or economic transformations. Coal phase out legislation, strategies, and commitments have been made in Austria, Canada, Denmark, Finland, France Germany, Greece, Italy, Latvia, Lithuania, New Zealand, Portugal, Slovakia, Sweden and the UK. The Powering Past Coal Alliance—a group of 104 countries, cities, regions and organisations aiming to accelerate the fossil-fuel phase out of coal-fired power stations—have been instrumental in building momentum on this. Despite these commitments, some would argue that the transition has not been actively planned and managed [26]. Almost all countries are investing in innovation and green energy, but these are not

necessarily linked to economic development plans and regional development initiatives, nor do they address elements of justice (e.g., excluding important stakeholders and rights holders from decision making). Some countries have an energy transition fund (e.g., Belgium), but this is not linked to broader multi-level governance mechanisms.

Social insurance programmes are another critical transition policy instrument which serve to support individuals who have lost their jobs as they transition to new employment, as do labour market supports (e.g., skills upgrading, retraining, employment placement supports). These resources can be mobilised for targeted interventions; this is most commonly done at the regional or local level, depending on how these services are organised (i.e., they may not be absent, but delivered at a different scale). As a response to the COVID 19 pandemic, states have adopted a wide range of temporary income supports for individuals who have lost their jobs. However, only the United States offers temporary income supports for displaced workers in a specific industry – the US Department of Labour offers POWER Dislocated Worker Grants and Resources for Coal Miners in three states (Ohio, Kentucky and West Virginia) [27]. The United States also has a separate national pension plan for miners.

In the 14 countries that have national spatial planning frameworks, mechanisms to address the transitioning uses and remediation of land in high industry regions are absent. The European Commission's Just Transition Mechanism (JTM) is shifting the status quo as spatial plans will need to be submitted to the EC for approval for JTM funding. For example, Greece, which has vast lignite dependant regions, will need to present analytical spatial plans detailing spatial transitions in accordance with the National Energy and Climate Plan [28]. These plans will then be incorporated into the EU's National Strategic Reference Framework.

The just transitions policy landscape is quickly changing due to new climate commitments and economic stimulus measures as a response to Covid 19. For example, Korea's Green New Deal regulates and ends financing for coal plants, imposes phased carbon taxes and increases "energy welfare" [29,30], and Germany's federal Structural Development Act provides support to lignite regions. While the policy response in some countries has been to embrace a decarbonisation agenda and address the social aspects of such a shift, in others, carbon intensive industries are being championed as key to recovery efforts. For example, the Morrison government in Australia is promoting a "gas-led recovery" and the renewable energy target will not be extended beyond 2020 [31].

3.2 Regional Initiatives

Regional just transitions initiatives are described here as all those policies and interventions directed to managing industrial transitions at the subnational (regional) level that address just transitions goals. The jurisdictional responsibilities of regions differ across the countries examined, spanning federal, quasi-federal and unitary systems. In countries such as Canada, regional governments (i.e., provincial and territorial government) are a constitutionally independent order of government and have important policy responsibilities including jurisdiction over healthcare, education, natural resources and local government. Many regions (particularly in unitary states) are policy takers, with their capacities and scope for action disproportionately shaped by national governments. As such, national strategies, policies and interventions shape regional agency and functions.

Industrial transitions are inherently place-based and, as such, regional policies are an important instrument to manage these transitions. This component of the research has examined the presence of industrial transition policies in 74 regions identified by their having sub regions where there has been a significant industrial shift in the past two decades. In the case of the region of Leverkusen Kreisfreie Stadt of Cologne, Germany, the share of employment was as high as 36% (in 2000). The greatest proportional declines in industrial employment over the 2000-2019 region were in New Zealand's Auckland and

Wellington Regions, Bay of Plenty Region and the West Lothian, Stoke-on-Trent and Walsall regions of the UK. These places experienced rapid transformations as they shed industrial employment.

The regional scale is closer to workers, community members and local governments than that of national governments and as such can work on the ground with local governments, residents and businesses to support them. This scan of regional strategies and policy instruments was conducted in order to determine whether initiatives could either: i) be leveraged for the purpose of mitigating negative outcomes from industrial transition on workers and communities; or ii) provide wide enough benefit to economic, social or environmental outcomes in order to potentially cushion the negative outcomes of industrial transitions in regions. This included a review of plans and strategies which outline intentions and general approaches to a given subject (e.g., economy, environment). The presence of a strategy does not necessarily mean that there are funded actions associated with it. Strategies can be funded (i.e., clear budget allocations) or unfunded. Funded strategies that are accompanied by tangible, concrete actions and that include implementation plans are the most effective and often serve to coordinate actions across levels of government and between sectoral departments. It is also important to note that strategies are political documents and, as such, may be of a limited time perspective.

Out of the 74 regions examined, around a third (34%) had regional level plans that address some aspect of a just transition. Among these, broad-based just transitions strategies were evident in around a third of the regions (32%) while the remainder were focused on technology and innovation (25%), circular economy (14%), energy efficiency (14%) climate change (11%), skills (7%), and coal phase-outs (7%). In Germany, the coal phase out law has impacted many regions and there is national compensation mechanism to facilitate this adjustment. There are regional energy strategies in several provinces; some of these have been developed in a participative manner and are described as best practices in the literature: e.g., Rhineland-Palatinate and North Rhine-Westphalia. Also notable are the creation of Just Transition Commissioners. Scotland's Just Transition Commission was established in 2019 to develop practical, realistic, affordable recommendations for action to meet Scotland's 2040 net zero emissions goal and its economic strategy. Ireland also has a Just Transitions Commissioner for the Midlands and there have been significant investments in communities facing industrial shifts (e.g., closure of peat harvesting operations). As noted in the previous section, this is a quickly changing field. Under the new 2020-2027 programme in EU states, the Fair Transition Mechanism and Fund are being mobilised for regional development and other activities and, as such, a growing number of regions are orienting their regional operational programmes around these objectives.

Ten regions were chosen to profile in greater detail how national and regional policies address industrial transitions in a given sub-region where clearly identifiable sectors were undergoing significant changes (e.g., automotive manufacturing, coal mining, etc.). These are: Ontario, Canada; Grand Est, France; Saarland, Germany; Western Macedonia, Greece; Piedmont, Italy; Incheon, Capital Region, Korea; Bay of Plenty, New Zealand; Basque Country, Spain; Kalmar, Småland with Islands, Sweden; Wales, United Kingdom. Table 2 summarizes the distribution of regional instruments across these ten profiles. No-Some policy instruments do not neatly fit into one category; for example, while 'jobs and skills strategies' may be considered a workforce development instrument, employment centres, which are considered a social support instrument may be included as part of jobs and skills strategies, or financed through these strategies. Similarly, there is significant overlap between industrial transition commitments, innovation investments and initiatives and Industry 4.0 strategies.

Table 2. Regional just transitions initiatives and related policies

Note: X indicates national instrument; O indicates regional instrument.

Jurisdiction	Ontario, Canada		Grand Est, France		Saarland, Germany		Western Macedonia, Greece		Piedmont, Italy		Incheon, Capital Region, Korea		Bay of Plenty, New Zealand		Basque Country, Spain		Kalmár, Småland & Islands, SWE		Wales, UK	
Territorial level of initiative R = Regional N = National	R	N	R	N	R	N	R	N	R	N	R	N	R	N	R	N	R	N	R	N
GOVERNANCE																				
Expert panel consultations & engagements		X														X				
Multi-stakeholder collaborative tables		X			O								X							
Coordination offices		X			O		O						X		X					
SOCIAL SECURITY																				
Social insurance/ temporary income support		X		X		X		X	O	X		X		X		X		X		X
Employment services	O			X	O	X		X		X		X		X	O	X		X	O	
Social insurance/ unemployment support		X		X		X		X		X		X		X		X		X		X
Community care programs					O				O											
WORKFORCE DEVELOPMENT																				
Jobs and skills strategies		X	O	X		X		X		X		X		X	O	X	O	X	O	X
Training and employment programs	O	X		X	O	X		X	O	X		X		X		X		X	O	X
Job databases & labour market info.	O	X		X		X		X		X		X		X		X		X		X
ECONOMIC DEVELOPMENT																				
Economic development strategies		X			O		O		O		O				O				O	
Industrial transition commitments/strategies				X		X		X		X		X		X		X		X		X
Business and tax incentives		X		X		X		X		X	O	X		X		X		X		X
Sector-specific Investments and programs	O	X	O	X	O	X	O	X		X		X		X	O	X		X	O	X
SME and entrepreneurship support		X	O	X	O	X	O	X	O	X		X		X	O	X	O	X	O	X
REGIONAL DEVELOPMENT																				
Strategies & plans for regions and sub-regions	O	X	O	X		X		X	O	X		X	O	X		X	O	X	O	X
Regional development program	O	X		X		X	O	X	O	X		X	O	X		X		X		
Rural development program	O	X	O	X	O	X		X	O	X		X		X	O	X	O	X		X
Infrastructure investments	O	X		X	O	X		X	O	X		X	O	X		X	O	X	O	X
Spatial and land use planning	O				O	X		X				X				X		X	O	X
Community resources					O															
KNOWLEDGE ECONOMY, DIGITALIZATION, INDUSTRY 4.0																				
Innovation investments/ initiatives		X		X	O	X		X	O	X		X		X	O	X	O	X	O	X
Industry 4.0 Strategy				X				X	O	X		X				X		X		
Digital infrastructure	O				O													O		O
Funding for research and higher education		X	O	X	O	X				X		X			O			X		X
CLIMATE SOLUTIONS																				
Climate change & energy strategies	O	X	O	X		X		X	O	X		X	O	X	O	X		X	O	X
Mitigation and/or adaptation programs		X		X		X	O	X		X		X		X		X		X		X
Clean technology/energy transition funds		X		X	O	X		X	O	X	O	X		X		X		X		X

4. Discussion: Leadings practices, gaps, and areas for future study

This scoping review has examined the broad range of national and regional government just transitions initiatives in countries and regions that have experienced industrial transitions. This broad overview has uncovered a number of implementation gaps and identified several leading practices.

Managing a just transition is a multi-level government challenge. A multi-faceted issue such as just transition requires integration across policy areas. Across the countries and regions of study, infrastructure strategies, Industry 4.0 strategies, and workforce development plans commonly lack coordination mechanisms. Furthermore, economic development strategies commonly acknowledged the need for low carbon industries but they generally did not identify declining ones or the nature of their fixed infrastructure. The economic development strategies examined were generally poorly integrated with workforce development planning (i.e., skills and training). Economic development strategies and Industry 4.0 initiatives tend to display an urban bias, especially in terms of how technology and innovation are viewed. Innovation or Industry 4.0 measures tend to be focused on SMEs and not existing large industries. A gap in any of the above policy instruments areas means that key aspects of transition planning are absent, creating the risk of an inadequate or ineffective response to industrial transition. There are opportunities for regions and countries to link industrial transition strategies and clean growth opportunities, as demonstrated in the Korean New Deal: National Strategy for Great Transformation, which includes both a climate plan, a digitization plan, and foundational measures to strengthen the employment and social safety net, thus addressing several integrated policy issues under a single strategy.

Proactive initiatives are needed. Climate and economic strategies across the countries of study acknowledge that a shift towards less carbon intensive activities is needed and that this will impact the economy (and distinct regional economies). However, among the initiatives studied, very few identify how those shifts can be proactively identified and addressed in order to facilitate their transition. This has been a common criticism of policies in support of coal transitions; they have often been adopted *after* the transition is already well underway, with workers and communities already impacted (e.g., UK, Poland and Greece). One exception is workforce development measures which do tend to have a proactive outlook that anticipates the skills needed in the future (e.g., Future Skills Centre, Canada; National Skills Strategy; Germany). However, these strategies are commonly implemented at the national level and are aspatial in their outlook. A leading practice for proactive measures is the Welsh Government's Future Generations Act and the establishment of the Future Generations Commissioner whose role involves examining the long-term impacts of government decisions and prevent persistent problems such as poverty, health inequalities, and climate change. There is potential for an initiative such as this to hold decision makers to account and incentivize actions that emphasize long-term gains rather than short term political wins that do not extend beyond electoral cycles. Among the practices reviewed, New Zealand's Just Transition Unit housed in the Ministry of Business Innovation and Employment does explicitly seek to provide research and advice to anticipate where future transitions will occur in order to coordinate actions and manage them [19]. As such, it is one example of proactive and anticipatory planning. However, it is not a centre of government function and therefore the extent to which the Unit is able to coordinate actions across ministries is unclear.

Jobs- and environment-focussed initiatives are the most common. Jobs-focused and environment-focused strategies, polices and initiatives were most prevalent among the countries of study. Well-developed workforce and skills strategies and wide ranging climate action plans were evident. However, society-focused framing is less common. The policy documents reviewed acknowledge that a society and economy wide transformation is needed, but the policy measures to support this were lacking. Among the regional profiles it was found that social justice language is largely absent from industrial transition

policies; that is, language rooted in whole economy thinking (e.g., addressing structural inequalities, social issues, matters of race, gender, socio-economic status, etc.).

Several policy levers are missing. This study examines how a wide range of initiatives addresses the aims of a just transition and how they are targeted to specific industries and regions experiencing these shifts. This overview has also revealed gaps, particularly with regard to spatial planning and land use, and the use of social security systems and direct funding to communities facing transitions.

- *Land use is rarely recognised as an important policy lever for managing a just transition.* Large industrial activities have major impacts on land and the environment, particularly where they involve mining, as in the case of coal. Land management is hence a key part of the transition process and becomes a great liability when remediation and rehabilitation are ignored. Moreover, poor and absent enforcement of environmental regulations for environmental remediation leaves communities with a colossal liability that impacts their future development potential. British Columbia's Dormant Sites Reclamation Program which focusses on pandemic recovery, the cleanup orphan wells and jobs creation is a promising example [33].
- *Social security systems are an underused policy mechanism to facilitate a just transition.* Adaptable programs that permit carve-outs with flexible parameters can help provide timely support. This might entail expanding timeframes and amounts payable to those who have lost employment through employment insurance or establishing early pension systems for specific industries (e.g., coal pensions in the US).
- Direct funding for community level economic development supports related to just transitions are not common among the regions studied. While it is well acknowledged that industrial transitions not only impact the workers employed in those sectors but also in the broader community and local economy, community-oriented supports were often absent. Some policies presume workers are mobile and will move to seek employment. While this may be true for some people, it is likely not true for all. People often have deep connections and identifies linked to their communities.

Finally, accountability mechanisms are needed for determinations of justice. Understanding how policy instruments and strategies address justice and equity is fundamental to public policy because it defines the parameters for success. When it comes to sustainability transitions, distributional justice is concerned with how different groups benefit or experience impacts from the changes required; recognitional justice identifies interest groups and rights holders who may be implicated; and procedural justice is concerned with elements of governance—who is included and how [6]. The establishment of Just Transitions Commissioners in Wales, Scotland and Ireland is one accountability mechanism that governments could use to track, measure and report on these elements of justice. The Commissioners act in a coordinating role within and between governments and report annually. A leading practice of a policy approach is the Hapū/Iwi Resource Management Plan in the Bay of Plenty, New Zealand. The plan established legislative requirements to ensure resource management issues important to local Indigenous peoples are taken into account. The inclusion of Indigenous peoples in decision making, particularly regarding resource development, is crucial in establishing recognitional, procedural, and distributional justices.

This national and regional policy review has explored interventions across seven thematic areas ranging from strategies and governance coalitions to sectoral funding programmes to targeted supports for individuals and communities. This research raises a number of questions regarding the successful implementation of just transitions policies. To what extent are targeted national approaches warranted and what types of governance arrangements best facilitate this? As a multi-sectoral issue, where should coordination on just transitions 'sit' as a function within government? To what extent can overarching policies and programmes in such areas as social supports and workforce development facilitate just transitions—do they require adaptation to be more effective? What are the most effective interventions at the national level versus regional and local? And critically, how

do any of these policies address justice in procedural, recognitional and distributional terms?

Funding: This research was funded by the Social Sciences and Humanities Research Council of Canada, grant number #872-2019-1004

Acknowledgments: The authors are grateful for the support of the project team which was comprised of Diana Gibson (Community Social Planning Council of Greater Victoria), Frederick Grouzet (Psychology, University of Victoria, UVic), Trevor Hancock (School of Public Health and Social Policy, UVic), Thomas Heyd (Philosophy, UVic), Katya Rhodes (School of Public Administration, UVic) and; Karena Shaw (School of Environmental Studies, UVic).

Conflicts of Interest: “The authors declare no conflict of interest.”

References

1. Smith, S. *Just Transition A Report for the OECD*; 2017;
2. Rosemberg, A. *Building a Just Transition The linkages between climate change and employment*; 2010; Vol. 2;
3. Stevis, D.; Felli, R. Global labour unions and just transition to a green economy. *Int. Environ. Agreements Polit. Law Econ.* **2014**, *15*, 29–43, doi:10.1007/s10784-014-9266-1.
4. COP 24 Just Transition Declaration - COP 24 Katowice 2018 Available online: <https://cop24.gov.pl/presidency/initiatives/just-transition-declaration/> (accessed on Aug 18, 2020).
5. Pai, S.; Harrison, K.; Zerriffi, H. *A Systematic Review of the Key Elements of a Just Transition for Fossil Fuel Workers*; 2020;
6. Bennett, N.J.; Blythe, J.; Cisneros-Montemayor, A.M.; Singh, G.G.; Sumaila, U.R. Just Transformations to Sustainability. *Sustainability* **2019**, *11*, 3881, doi:10.3390/su11143881.
7. McCauley, D.; Heffron, R. Just transition: Integrating climate, energy and environmental justice. *Energy Policy* **2018**, *119*, doi:10.1016/j.enpol.2018.04.014.
8. Newell, P.; Mulvaney, D. The political economy of the “just transition.” *Geogr. J.* **2013**, *179*, 132–140, doi:10.1111/geoj.12008.
9. Evans, G.; Phelan, L. Transition to a post-carbon society: Linking environmental justice and just transition discourses. *Energy Policy* **2016**, *99*, 329–339, doi:https://doi.org/10.1016/j.enpol.2016.05.003.
10. Meadowcroft, J. What about the politics? Sustainable development, transition management, and long term energy transitions. *Policy Sci.* **2009**, *42*, 323–340, doi:10.1007/s11077-009-9097-z.
11. Delina, L.L.; Sovacool, B.K. Of temporality and plurality: an epistemic and governance agenda for accelerating just transitions for energy access and sustainable development. *Curr. Opin. Environ. Sustain.* **2018**, *34*, 1–6, doi:https://doi.org/10.1016/j.cosust.2018.05.016.
12. McCauley, D.; Ramasar, V.; Heffron, R.J.; Sovacool, B.K.; Mebratu, D.; Mundaca, L. Energy justice in the transition to low carbon energy systems: Exploring key themes in interdisciplinary research. *Appl. Energy* **2019**, *233–234*, 916–921, doi:https://doi.org/10.1016/j.apenergy.2018.10.005.
13. Colquhoun, H.L.; Levac, D.; O'Brien, K.K.; Straus, S.; Tricco, A.C.; Perrier, L.; Kastner, M.; Moher, D. Scoping reviews: Time for clarity in definition, methods, and reporting. *J. Clin. Epidemiol.* **2014**, *67*, 1291–1294.
14. OECD OECD Regional Database. **2020**.
15. OECD *Land-use Planning Systems in the OECD: Country Fact Sheets*; OECD, 2017; ISBN 9264268561.
16. Government of Canada Task Force: Just Transition for Canadian Coal Power Workers and Communities Available online: <https://www.canada.ca/en/environment-climate-change/services/climate-change/task-force-just-transition.html> (accessed on Dec 17, 2019).
17. Government of Canada Budget 2019 Available online: <https://www.budget.gc.ca/2019/home-accueil-en.html> (accessed on Nov 17, 2020).
18. Government of Spain Acta Sobre los Puntos Básicos del Preacuerdo Para Una Transición Justa de la Minería Del Carbón y Desarrollo Sostenible de las Comarcas Mineras Para El Periodo 2019-2027 Available online: <https://news.industrial->

- europe.eu/content/documents/upload/2018/10/636754675904108696_ES-1165_001 (003).pdf (accessed on Nov 17, 2020).
19. Government of New Zealand Just Transition | Ministry of Business, Innovation & Employment Available online: <https://www.mbie.govt.nz/business-and-employment/economic-development/just-transition> (accessed on Nov 17, 2020).
 20. Pinkerton, C. First environmental action for Liberals could include “Just Transition Act”, strengthening CEPA - iPolitics Available online: <https://ipolitics.ca/2020/01/21/first-environmental-action-for-liberals-could-include-just-transition-act-strengthening-cepa/> (accessed on Nov 17, 2020).
 21. Press, E. Gobierno, eléctricas y sindicatos rubrican un acuerdo para impulsar los convenios de transición justa. **2020**.
 22. La Comarca La Comisión de Seguimiento para la Transición Justa hace un balance inicial positivo Available online: <https://www.lacomarca.net/comision-seguimiento-transicion-justa-hace-balance-inicial-positivo/> (accessed on Nov 17, 2020).
 23. Taranaki Taranaki 2050 Available online: <https://about.taranaki.info/taranaki2050> (accessed on Nov 17, 2020).
 24. European Commission Just Transition funding sources Available online: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/just-transition-mechanism/just-transition-funding-sources_en (accessed on Oct 27, 2020).
 25. EC Just Transition Platform | European Commission Available online: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/just-transition-mechanism/just-transition-platform_en (accessed on Nov 17, 2020).
 26. Fothergill, S. *Coal Transition in the United Kingdom, IDDRI and Climate Strategies.*; 2017;
 27. U.S. Department of Labor POWER Dislocated Worker Grants - Resources for Coal Miners | U.S. Department of Labor Available online: <https://www.dol.gov/agencies/owcp/dcmwc/powergrants> (accessed on Nov 13, 2020).
 28. Energy Press Decarbonization strategy's spatial planning enters crucial stage Available online: <https://energypress.eu/tag/national-energy-and-climate-plan/> (accessed on Dec 9, 2020).
 29. Government of Korea 에너지복지란? < 서울에너지공사 Available online: https://www.i-se.co.kr/welfare?fbclid=IwAR1rNj_aSU9g1sCRuiO17Nu0rnTkC6FachHO7tpFgbZcPLYgCeHqam9RKJo (accessed on Nov 18, 2020).
 30. Energy Transition Korea [보도자료] 그린뉴딜 핵심은 에너지전환, 기후위기 대응과 일자리 창출 동시 가능 | 에너지전환포럼 Available online: <http://energytransitionkorea.org/post/29273> (accessed on Nov 18, 2020).
 31. Prime Minister of Australia Gas-fired recovery, Prime Minister of Australia Available online: <https://www.pm.gov.au/media/gas-fired-recovery> (accessed on Nov 19, 2020).
 32. Markey, S.; Halseth, G.; Manson, D. *Investing in place: economic renewal in northern British Columbia*; UBC Press: Vancouver, 2012; ISBN 0774822910;0774822929;9780774822923;9780774822916;
 33. Government of Canada Cleaning Up Dormant Oil and Gas Wells, Supporting 1,200 Jobs in B.C. Available online: <https://www.canada.ca/en/natural-resources-canada/news/2020/09/cleaning-up-dormant-oil-and-gas-wells-supporting-1200-jobs-in-bc9.html> (accessed on Mar 16, 2021).
 34. Government of British Columbia BC Rural Dividend - Province of British Columbia Available online: <https://www2.gov.bc.ca/gov/content/employment-business/economic-development/support-organizations-community-partners/rural-economic-development/rural-dividend> (accessed on Dec 17, 2020).
 35. Mertins-Kirkwood, H. *Making decarbonization work for workers Policies for a just transition to a zero-carbon economy in Canada*; Ottawa, 2018;
 36. Goddard, G.; Farrelly, M.A. Just transition management: Balancing just outcomes with just processes in Australian renewable energy transitions. *Appl. Energy* **2018**, *225*, doi:10.1016/j.apenergy.2018.05.025.
 37. Esping-Anderson, G. *The Three Worlds of Welfare Capitalism - Gosta Esping-Andersen - Google Books*; 1990;
 38. Bruce, D.; Yen, J. *Economic Development Framework of Small Communities in Canada Phase Two: Economic Clustering Approaches for Small Communities*; 2004;

ⁱ The OECD regional database (<https://stats.oecd.org>) was used to identify cases at the Territorial Level 3 (TL3), which are sub regions below the level of a region, state or province across OECD countries. There are a total of 1,802 TL3 regions across the OECD area. Employment in industry (under ISIC Rev 4, B-5) includes the following industries: (A) mining and quarrying (B), manufacturing (C), electricity, gas and conditioning supply (D), water supply, sewerage, waste management and remediation activities, construction (F). The OECD regional database (<https://stats.oecd.org>) was used to facilitate comparability. The 25% share threshold of economic/employment activity has been employed in other studies to identify clustered activities (see for example Bruce and Yen 2004).