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March 2021

How can we manage a just transition?

A comparative review of policies to support a just transition from carbon intensive industries

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SSHRC  CRSH

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CONTENTS

Executive Summary	3
Background.....	5
Objectives	6
Methods	6
Case selection.....	7
Results	11
National initiatives	11
Regional initiatives	17
Regional profiles	18
Implications	21
Conclusion	29
Knowledge gaps	29
Knowledge mobilization activities	37
References	38
Appendix.....	45

EXECUTIVE SUMMARY

Significant sectors of the Canadian economy will require widespread transformation for a sustainable future in order to bring our life into line within the limits of the earth's carrying capacity. The production, distribution and consumption of all forms of energy, but especially fossil fuel energy, will be key to that transition. While Canada has an abundance of renewable resources and vast potential to transition to a post carbon economy, this transition needs political, social and technological momentum. Progress has been too slow to date to meet our climate commitments. Entrenched interests, systems and structures in Canada's regional political economies challenge the political feasibility to accelerate such transitions (Haley, 2011). Given this, a key challenge is: *how can we transition to more sustainable and ecological industries in Canada, support green jobs and develop resilient communities?* In other words, how can we manage a 'just transition'?

This study examines *national and regional policies for ongoing sustainability transitions in Canada and internationally*. 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 as economies shift to sustainable production (Smith, 2017). This scoping study compares practices across select member countries of the Organisation for Economic Cooperation and Development (OECD)—so-called 'advanced economies'. It synthesizes national and regional initiatives, strategies, policies and practices that are being presently *implemented* to manage a just transition across 25 countries and 74 regions plus European Union level policies. OECD countries were selected on the basis of them having had sub-regional territories with a significant share of labour in industry (25%+) which subsequently declined within the past decade (n=130). Just transition initiatives were identified through web-based searches using key search terms (and facilitated by google translate) and thematically coded in Excel. Through this process, seven main thematic areas were identified: i) governance mechanisms; ii) climate and sustainability planning; iii) workforce development; iv) economic development; v) regional and rural development; vi) innovation and research; vii) social security.

The key findings are as follows:

- *Jobs and environment-focussed initiatives are the most common.* Jobs-focused and environment-focused strategies, policies 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. Social justice language is largely absent from industrial transition policies (e.g., addressing structural inequalities, social issues, race, gender, socio-economic status, etc.).
- *Targeted strategies are common for coal industries—but lacking for others.* Besides coal, specific carbon intensive industries are rarely identified in strategic documents. National climate strategies tend to address jobs, the economy and clean growth in overarching terms. At the regional level, policies are more likely to be targeted in places where: there industry of national importance; there is a long history of dependence on a given sector; the sector in transition is clearly identifiable, regionally concentrated and important (in terms of employment and contributions to GDP); and/or there has been a sudden shock causing job loss.

- *Proactive planning to identify regions and industries in transition are uncommon.* 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, 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 future labour market demand/skills. However, these strategies are commonly *aspatial*.
- *Strategies and initiatives are often poorly integrated.* Many of the policies and strategies are poorly integrated with other policy areas. Sectoral initiatives such as infrastructure strategies and programmes, Industry 4.0 strategies and investments and workforce development plans commonly lack coordination mechanisms. Across the countries and regions of study, economic development strategies commonly acknowledge the need for greener industries but generally do not identify declining ones or the nature of their fixed infrastructure. Economic development strategies tend to be poorly integrated with workforce development ones (i.e., skills and training). Innovation or Industry 4.0 measures are mostly focused on SMEs and not existing large industries.
- *Several important policy levers are missing.* Land management is rarely recognised as an important policy lever for managing a just transition. Social security systems have rarely been used as a policy mechanism to facilitate a just transition in a *targeted* way. Direct funding for community-level economic development supports was not common among the regions studied.
- *Multi-level governance mechanisms are uncommon.* Upper level governments can help to mobilise and target supports where they are needed; this requires an understanding of community characteristics and needs. For example, Italy's Transition 4.0 strategy is national in scale but this risks being not targeted enough for a region like Piedmont, which is experiencing a decline in auto manufacturing. Across the countries of study, multi-level governance mechanisms are often missing in states and regions experiencing transitions.

The work points to three key policy lessons. First, *solutions demand an integrated suite of policies and effective multi-level governance*. Here, Spain's Just Transition Agreements are notable as they address multi-level governance in a comprehensive manner. Second, *proactive planning can support place based responses*. Many policy responses take the form of crisis management once an industry is already in decline. Proactive policies such as New Zealand's just transition unit are a leading practice to manage change in advance. Third, *accountability mechanisms are needed for determinations of justice*. Notions of justice—distributional, recognitional, and procedural—are foundational to the concept of a just transition. The establishment of Just Transitions Commissioners in Scotland and Ireland is one such accountability mechanism that governments could use to track, measure and report on these elements of justice.

How can we transition to more sustainable and ecological industries, support green jobs and develop resilient communities? How can we manage a ‘just energy transition’?

Canada has committed to reducing its greenhouse gas (GHG) emissions. The 2020 Reference Case scenario, which includes actions taken by governments, consumers and businesses up to September 2020, indicates projected emissions of 674 megatonnes of carbon dioxide equivalent (Mt CO₂ eq) in 2030, or 8% below 2005 levels (Environment and Climate Change Canada, 2021). Approximately 40% of Canada’s GHG emissions are in the industrial sector, of which the vast majority are from oil and gas. This sector accounts for approximately 11% of nominal GDP and 2% of direct employment in Canada (Government of Canada, 2019c). Industrial transitions are central to meeting Canada’s climate commitments, yet progress has been slow in the face of entrenched industries, infrastructure and interests. Hence the importance of a ‘just energy transition’.

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 as economies shift to sustainable production (Smith, 2017). There is a large literature and a growing interest in managing just energy transitions in Canada. This literature has been shaped by the work of the American labour movement and networks such as the BlueGreen Alliance which unites America’s largest labour unions with environmental organisations (Rosemberg, 2010; Sawchuk, 2009). Internationally, the International Labour Organisation has championed the importance of just energy transitions, calling for urgent action by governments and social partners (ILO, 2018)—a position which is echoed by other international organisations such as the Organisation for Economic Co-operation and Development (OECD) (Botta, 2018). Meanwhile, government-led initiatives such as the federally-convened Task Force on a Just Transition for Canadian Coal Power Workers and Communities and the Pan-Canadian Framework on Clean Growth and Climate Change have detailed policy recommendations on how to strengthen partnerships for action and develop targeted policies in support of just energy transitions (Government of Canada, 2019d; Pan-Canadian Framework on Clean Growth and Climate Change, 2017).

Despite this growing attention, ‘just transition’ remains a contested term with varying support within the labour movement and encompasses differing conceptions of environmental and social justice (Stevis & Felli, 2014). There are ongoing debates about how to best measure and track progress on achieving just transitions (Healy & Barry, 2017). Moreover, the management of just transitions has tended to be reactive in the face of declining or unsustainable industries as opposed to proactively addressing the need for change, hampering its transformative potential. Canadian academic literature has grappled with how Canada’s ‘staples economy’ might break free from its ‘carbon trap’, given the circular lock-in of centre-margin relationships and various rigidities (ecological scarcity, institutions, vested interests) (Haley, 2011). Overall, the literature on just transitions is multi- and inter-disciplinary—drawing from economics, political science, environmental studies and law to name a few—and is broadly concerned with how to transform socio-technical systems (Meadowcroft, 2009).

OBJECTIVES

While there have been efforts to develop frameworks for a just transition, these tend to be narrow in terms of how they scope policy actions and describe networks of governance (Harrahill & Douglas, 2019; Heffron & McCauley, 2018; Pollin & Callaci, 2019). Much of Canada's just transitions literature and practice has drawn heavily from US models to the exclusion of potential learning from European and other contexts and governance coalitions (Gass & Echeverria, 2017; Lundström, 2017; Morrison, Lynch, Rodley, & Rowan, 2019). European case studies are of interest due to the European clean energy targets and associated policy instruments (Weijermars et al., 2011).

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 practices and offers comparative policy learning.

METHODS

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). It has collected and thematically analysed the content of national and regional just transition policies and practices in OECD countries that have experienced regional industrial transitions in the past decade.

This study casts a wide disciplinary net. It has included both academic (peer-reviewed) literature as well as policy documents from governments and other relevant public and non-profit organisations (e.g., International Labour Organisation, Just Transition Centre, Green New Deal). The scoping review compares practices across select member countries of the Organisation for Economic Cooperation and Development (OECD)—so-called ‘advanced economies’ (see section on case selection methods for details). These methods broaden the number of cases under consideration by including literature/policy documents that do not necessarily explicitly identify with the concept of ‘just transition,’ but which address its policy aims to transition to low carbon economies and industries while addressing potential negative impacts on workers, communities and marginalised groups. Therefore, inclusion criteria were broad: any policies, strategies and interventions directed to managing industrial transitions that address just transitions goals. The scoping review entailed a scan of national and regional just transition policies, strategies and interventions.

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 focussed 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). As relevant policies and strategies were identified, this led to a snowball approach to identification as additional initiatives were described and linked to them. 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 triangulated 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. This is particularly the case for documentation in other languages as using Google Translate to facilitate such searches is imprecise at best.

CASE SELECTION

This study has identified 130 sub-regional territories 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. These sub-regional territories correspond to 74 regions across 25 countries plus European Union policies. The research examines these cases in order to understand the nature of this transition and the role of the public sector (national and regional governments) in supporting or managing it.

The time period of analysis for case selection was 1999 to 2019; this was chosen on the basis of comprehensive data availability and also to analyse employment trends in industry in the near term, capturing changes before and after the 2008 economic crisis. 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 geography of study is territorial level 3 (TL3) which are sub regions below the level of a region, state or province across OECD countries.¹ This is a useful geography to understand local economic dynamics and how they are targeted by government policies across levels of government; in some places, TL3 corresponds to labour market commuting zones. OECD TL3 regions for which sub regional data was available 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

¹ There are a total of 1,802 Territorial Level 3 regions across the OECD area.

greater than 25% in industry including energy from 2000-2009 and less than 25% from 2010-2019. These sub-regions form the basis of case selection for the regional and national policy scan.

- **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”.

This threshold of economic/employment activity has been employed in other studies to identify clustered activities (see for example Bruce and Yen 2004).

Figure 1 Case selection typology, North America

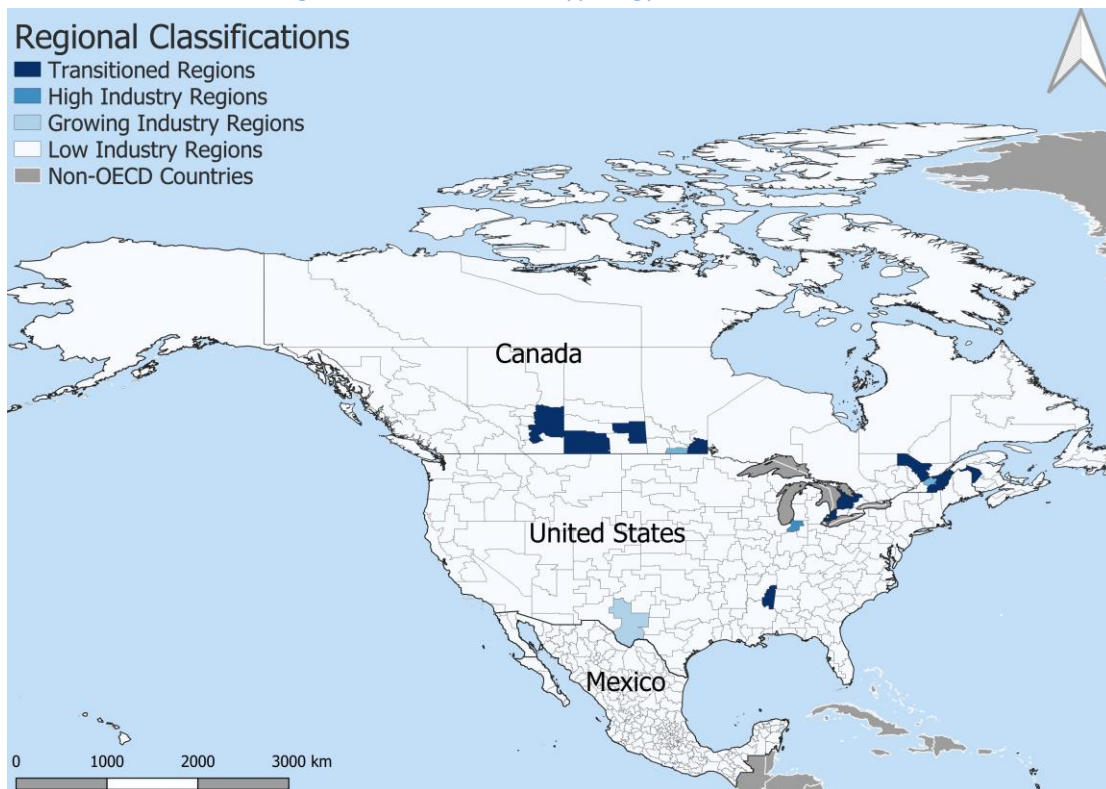


Figure 2 Case selection typology, Europe

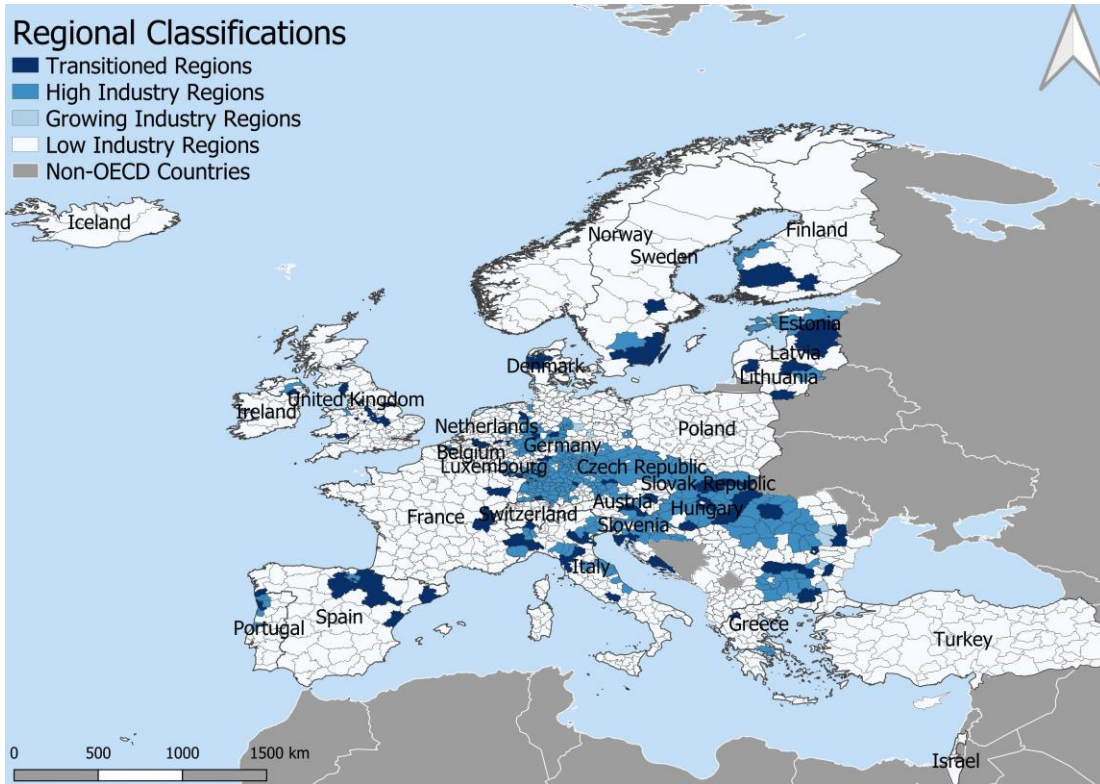
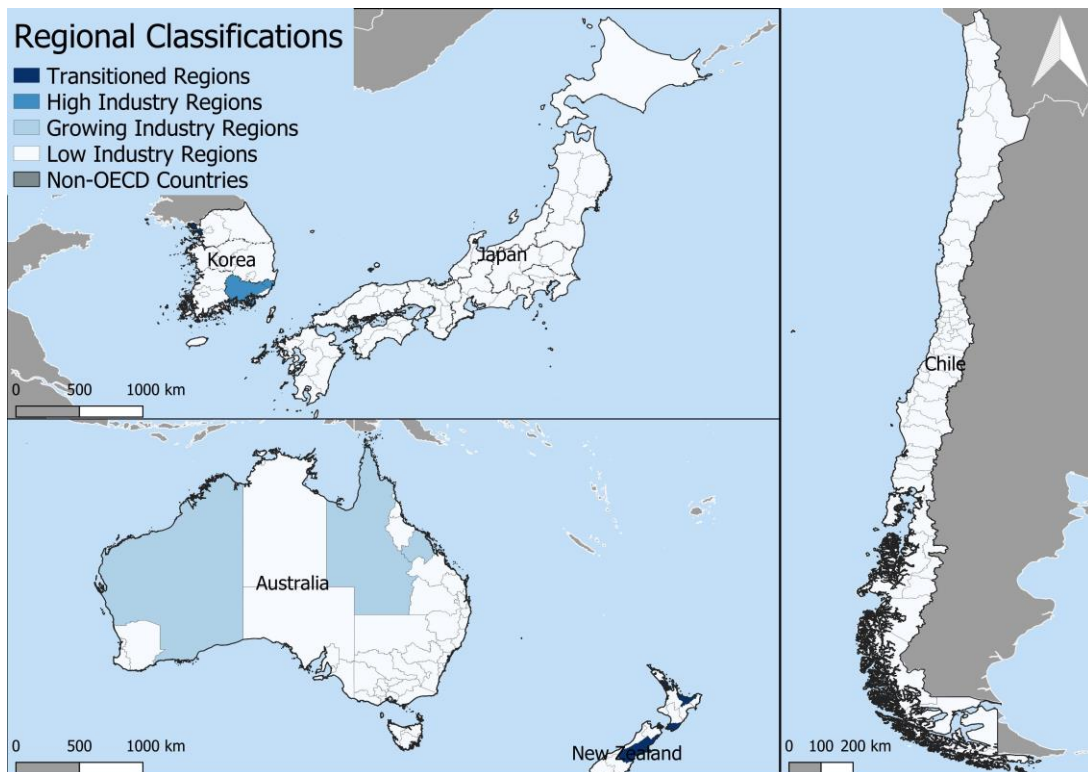


Figure 3 Case selection typology, Korea, Japan, Chile, Australia



The low share of transition cases in the United States is in part a product of the high threshold levels of a quarter of employment and also due to the chosen geography of TL3 regions which is larger in North and South America, thus capturing greater economic diversity. It also bears noting that the data does not capture the present transitions, including those related to Covid 19 (e.g., regions experiencing declines in oil and related industries). It is as yet unclear whether these industries will rebound or whether a more permanent shift towards lower oil prices will lead to a collapse in oil sector employment in some places such as northern Alberta where a high value for crude is needed to make extraction cost effective. Even if oil prices remain high, it is anticipated that there will be labour shedding due to automation in the sector, a decline in the construction phase of major projects and divestment as economies shift in line with their climate action commitments.

Additionally, in-depth profiles of ten regions were conducted in order to understand how national and regional policies address industrial transitions in a given sub-region (see Appendix for regional profiles). In order to better evaluate government responses, only sub-regions with a clearly identifiable sector in transition were chosen. The following criteria guided the analysis of each profile.

Table 1 Case selection criteria

Criteria	Selection considerations
Direction and Transparency	<ul style="list-style-type: none"> • Is industrial decline clearly acknowledged in government policies and communications? • Is the direction of transition clearly documented or established? • Where is the focus on future opportunities? • Are opportunities in the low-carbon economy emphasized?
Distribution and Integration	<ul style="list-style-type: none"> • Are there governance mechanisms in place? • Are there social supports in place? • Is there a workforce development plan or program in place? • Is there an economic development plan or program in place? • Is there a regional development plan or program in place? • Is there a rural development plan or program in place? • Is there an innovation/research/digitization plan or program in place? • Is there a climate or sustainability plan or program in place?
Targeted Measures	<ul style="list-style-type: none"> • Is there an industrial transition strategy in place? • Is there an industrial transition strategy in place for the sector in transition? • Are there targeted measures for the region in transition? • Are there targeted measures for the sector? • Are there targeted measures for persons who depended on the sector?
Jurisdiction and Policy Coherence	<ul style="list-style-type: none"> • What is the focus of regional government’s policy approach? • What is the focus of the national government policy approach? • Is the regional government or national government leading/guiding transition? • Is there policy coherence between national and regional approaches?
Community-Level Considerations	<ul style="list-style-type: none"> • Are there efforts to strengthen social infrastructure in communities? • Are there efforts to achieve social justice, equality and inclusion in communities? • Are ideological or identity challenges addressed? • Are opportunities in the green economy realized? • Is there an attempt to redistribute power in communities? • Are place-based assets considered in planning?

RESULTS

This section provides an overview of 25 national and 74 regional approaches (across 130 sub-regions) to managing just transitions across policy domains, plus European Union initiatives. Together, this work develops a typology of national and regional policy instruments to manage just transitions. This analysis reveals that just transition policies remain disproportionately reactive and often sectorally-siloed. Many policy responses take the form of crisis management once an industry is already in decline. However, proactive policies are growing. Examples include Canada’s Task Force on Just Transition for Canadian Coal Power Workers and Communities, Spain’s Just Transition Agreements and New Zealand’s Just Transition Unit. The European Commission’s Green Deal and Just Transition Mechanism and Korea’s Green New Deal present overarching objectives for a carbon neutral economic transformation. Broader proactive society and economy wide transformations are increasingly articulated in strategic policy documents, but the extent to which policy instruments address them is questionable.

NATIONAL INITIATIVES

This synthesis review has taken a broad view of just transition initiatives, examining strategies, policies and practices across select OECD governments that address some element of industrial transitions. Seven thematic areas have been identified:

- i) *Governance mechanisms*: measures to manage, coordinate, plan and dedicate specific resources towards transition;
- ii) *Climate and sustainability planning*: ensuring preparedness for the effects of climate change and realizing new opportunities in a green economy.
- iii) *Workforce development*: supporting employed and displaced workers with the skills, training and information required to find and keep jobs;
- iv) *Economic development*: creating new economic opportunities to replace traditional industries or update existing ones;
- v) *Regional and rural development*: ensuring all regions have the assets and capabilities to be successful and supporting places negatively impacted by industrial transitions;
- vi) *Innovation and research*: ensuring readiness for an evolving global economy and advancing technology to ensure industries and regions are modern, efficient and functional; and,
- vii) *Social security*: ensuring access to basic financial and social supports during periods of economic change.

The national cases have been selected on the basis of their having sub-regional territories with a high share of employment in industry which has subsequently declined in the past decade (see section on methods for details). They include federal, quasi-federal and unitary states and one supranational body in the case of the European Union (EU). Table 2 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

INSTRUMENT TYPE	Austria	Belgium	Bulgaria	Canada	Croatia	Denmark	Estonia	European Union	Finland	France	Germany	Greece	Hungary	Italy	Korea	Latvia	Lithuania	Malta	New Zealand	Portugal	Romania	Slovakia	Spain	Sweden	United Kingdom	United States	
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 SECURITY																											
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	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	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	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	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	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	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	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	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	X
Spatial planning	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	X	
Industry 4.0 Strategy	X								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	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	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	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	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	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.

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 specific 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 (Government of Canada, 2019d). This has subsequently resulted in federal funding for transition centres in impacted communities (Government of Canada, 2019a);
- *Spain's Just Transition Agreements* with territories experiencing coal mine, coal power plant, and nuclear power plants closures, leading to local job losses (Government of Spain, 2019a);
- *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 (Government of New Zealand, 2020a).

These initiatives work in different ways. Canada's Just Transition Task Force has entailed a *targeted response* to the coal sector. A taskforce was 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 (Government of Canada, 2019d). 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 Canadian federal government is discussing the creation of a new “Just Transition Act,” which would update the Canadian Environmental Protection Act (CEPA)(Pinkerton, 2020). 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 (CC.OO, UGT and USO) 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) (Press, 2020). EU regional development funds are a key part of Spain’s just transitions efforts (La Comarca, 2020). 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 (Taranaki, 2020). The work of New Zealand’s Just Transitions Unit is notably proactive—seeking to identify regions that are negatively impacted by ongoing efforts to decarbonise the economy and to proactively co-develop new economic strategies. The literature on just transitions as well as expert recommendations (such as by Canada’s just transitions coal force) all note the importance of early interventions. New Zealand’s approach seems poised to deliver on that front.

Among the vast majority of the countries studied, national 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 (European Commission, 2020b).

In EU states, the regional development funds are key as more money is now available through the transition mechanism. As part of these efforts, the EC has launched a Just Transition Platform that will offer technical and advisory support. 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 (EC, 2020). The plans will detail timelines, operations and governance mechanisms to meet prescribed targets. Thus, this is a quickly changing area of government planning in Europe.

Overarching national strategies may bring coherence to what are at present a patchwork of initiatives. Fourteen out of the 27 countries examined have binding net zero GHG commitment, with Finland's 2035 commitment being the most assertive. But 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. In some cases such as the UK, however, despite these commitments, some would argue that the transition has not been actively planned and managed (Fothergill, 2017). Almost all countries are investing in innovation and green energy, but these are not necessarily linked to economic development plans and regional development initiatives or address elements of justice. Some countries have an energy transition fund (e.g., Belgium), but this is not linked to broader multi-level governance mechanisms.

It bears noting that social security and workforce development initiatives at the national level tend not to be targeted to transitioning regions or industries on a regular basis, but can be employed for these purposes when needed. Social insurance programmes 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) (U.S. Department of Labor, 2020). The United States also has a separate national pension plan for miners. Knowledge economy, digitalisation and Industry 4.0 initiatives do commonly include a just transition lens (in their policy

documentation), but they are generally focused on manufacturing industries (and often SMEs)—not the energy sector.

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 not mentioned. The European Commission's Just Transition Mechanism (JTM) is shifting the status quo in this area 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 (Energy Press, 2020). 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" (Energy Transition Korea, 2020; Government of Korea, 2020), 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 (Prime Minister of Australia, 2020).

This national 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. Multiple potential policy tools are in evidence, but only some of these are being directly applied to peoples, communities and industries in transition. Further questions are whether more should be done, how instruments should be combined and how they should be targeted. Is the present workforce development and social security system adequate to address the pace of changes happening now and in the future? 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? Does it make sense to have a central coordinating unit such as that employed in New Zealand? To what extent can overarching policies and programmes in such areas as social security and workforce development support 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 most importantly, how do any of these policies address justice in procedural, recognitional and distributional terms?

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 in some manner. The jurisdictional responsibilities of regions differs 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 municipal governments. 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. Even in federal countries like Canada, national subventions (i.e., health and social transfers) and policies (i.e., GHG reduction commitments) remain important.

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 (see methods section for case study elaboration and territorial maps). Across these 74 regions, all had a significant share (25% or more) of employment in the industrial sector which subsequently declined. 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. A scan of regional strategies and policy instruments was conducted in order to determine whether they 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 obviously the most effective type 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 had a big impact on many regions and there is national compensation to facilitate this adjustment. There are regional energy strategies in several provinces; some of these have been developed in a highly participative manner and are described as best practices in the literature: e.g., Rhineland-Palatinate and North Rhine-Westphalia. Also notable is Scotland’s Just Transition Commission, which 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.

REGIONAL PROFILES

Ten regions were chosen to profile how national and regional policies address industrial transitions in a given sub-region (see Appendix for profiles). 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. The regional profiles highlight how various transition policy instruments have manifested – not only in their propensity but in their structure and quality.

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 security 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. When it comes to governance mechanisms, Canada’s Task Force on Just Transition for Canadian Coal Power Workers and Communities was both an ‘expert panel consultation’ and a ‘multi-stakeholder collaboration table’ as there was a consultation phase of the mandate where the group travelled to different communities to collect feedback, and policy recommendations were developed to inform government programs, utilizing the respective expertise of members across a variety of disciplines (labour, sustainability, local government, workforce development, etc.). The following table summarizes the distribution of regional instruments across these ten profiles.

Table 3 Regional just transitions initiatives and related policies

INSTRUMENT TYPE	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 & Islands, Sweden		Wales, United Kingdom	
Regional Code	CA35		FRF		DEC		EL53		ITC1		KR01		NZ14		ES21		SE21		UKL	
Sub-Regional Codes	CA3540N CA3570N CA3580N		FRF34		DECA		EL532		ITC11 ITC14 ITC17		KR012		NZ014		ES212		SE212 SE213		UKL15 UKL16 UKL17	
Jurisdiction	Region	Nation	Region	Nation	Region	Nation	Region	Nation	Region	Nation	Region	Nation	Region	Nation	Region	Nation	Region	Nation	Region	Nation
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

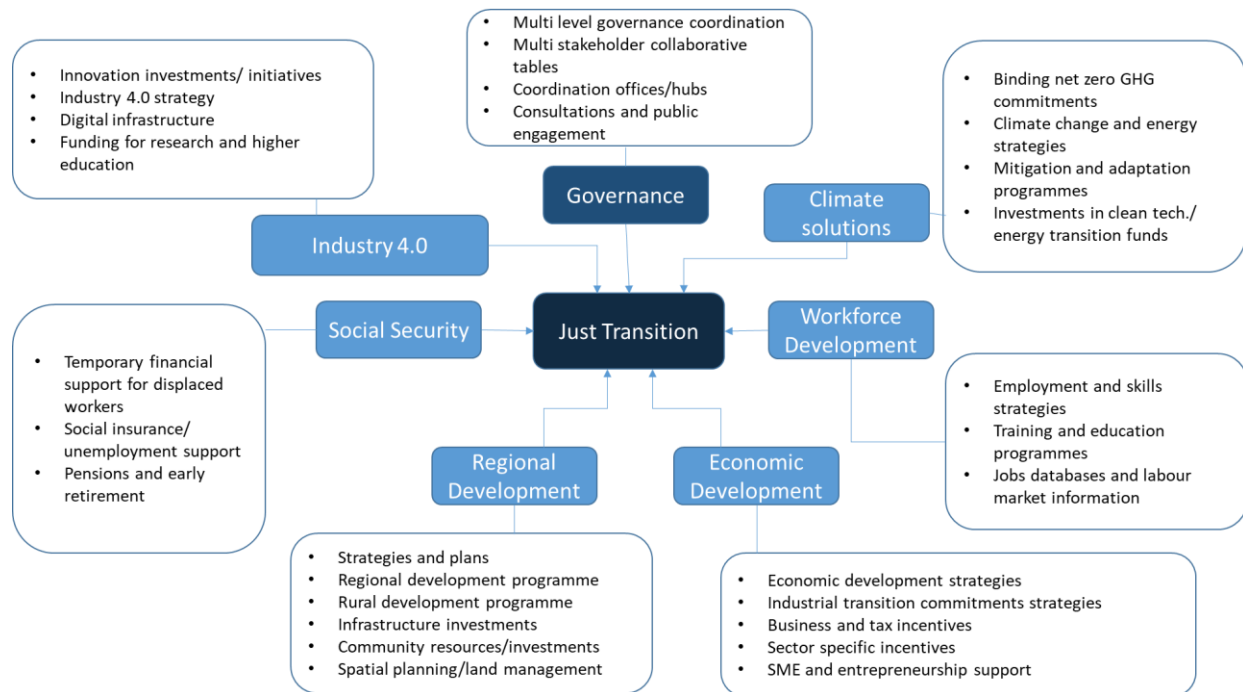
Sector-specific Investments and programs	O	X	O	X	O	X	O	X		X		X		X	O	X		X	O	X
SME and entrepreneurship support		X	O	X	O	X	O	X	O	X		X		X	O	X	O	X	O	X
REGIONAL DEVELOPMENT																				
Strategies & plans for regions and sub-regions	O	X	O	X		X		X	O	X		X	O	X		X	O	X	O	X
Regional development program	O	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

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

IMPLICATIONS

This review of national and regional initiatives for managing just transitions has examined strategies, policies and practices across seven thematic areas. Figure 5 provides an overview of the main themes and initiatives therein. The following section shares the key policy lessons from this comparative review spanning regional and national initiatives.

Figure 4 Just transition policies



Source: Authors' own elaboration.

THERE IS NO ONE BEST WAY...

Initiatives differ by region...

While it is possible to identify leading practices among the countries of study, there is no one best way to manage just transitions. Much depends on the nature of the region, including the share of employment in a particular industry, the structure of the local and regional economy, endogenous assets such as quality of local infrastructure and institutions and geography and the robustness of the social security system.

Each region approaches matters of transition in a way that is unique to the regional and national context and circumstances. Whether regions are urban or rural, or economically advantaged or disadvantaged are important factors to consider in evaluating transition responses. Grand Est Regional Council in France established a Pact for Rurality which aims to enhance, diversify, and promote place-based assets; an illustrative example of how a predominantly rural region must explicitly address this characteristic in its transition and economic development planning. Regions also have unique and innovative approaches with potential to be applied as best practices across other areas in transition. For

example, Ontario provides a strong example of a sectorally and territorially targeted programme to manage industrial transition through the Ontario Automotive Sector Strategy. As another example, just transitions initiatives in Wales, UK and Piedmont, Italy provide a strong focus on reducing social inequalities through the Equality Planning Strategy and the We Care Regional Strategy, respectively. A robust system of social security could allay the need for territorially targeted supports. Regardless of whether there is a single sector in peril or a series of incremental shifts taking place, industrial transitions will be more successful with more proactive measures in place.

...and by type of transition

Understanding the focus of transition helps to determine whether or not policy measures are strategically aligned to address impacts. This is complicated by the challenge that strategic visions are not always in place or clearly articulated. More often than not, regions employ *multiple* approaches to spur their economies. Among the regions studied, the following approaches to transition were evident:

- i. The traditional industrial sector(s) remain in-tact, but are reinvented and repurposed;
 - Example: Grand Est, France transitioning a traditional forest sector manufacturing-based economy into a bio-economy.
- ii. The traditional industrial sector(s) are replaced by another industrial sector;
 - Example: Saarland, Germany's traditional coal-based economy transitions to a high tech and automotive manufacturing economy, thus resulting in the revival of the steel industry.
- iii. The traditional industrial sector(s) remain mostly in-tact, but economic focus is shifted toward increasing the competitiveness of SME's;
- iv. Example; Kalmar, Sweden's forest sector manufacturing base declines and diversification efforts place emphasis on developing and growing SME's.
- v. The traditional industrial sector(s) decline and are replaced by a knowledge and technology-based economy supported by research, innovation and digitization;
 - Example: Piedmont, Italy's traditional automotive manufacturing base is supplemented by high tech and telecommunications.
- vi. The traditional industrial sector(s) decline due to a shift to a low-carbon economy;
 - Example: Western Macedonia, Greece's coal industry declines as a result of climate commitments and an emphasis on renewable energy production.
- vii. The traditional industrial sector(s) decline due to a shift to a service-based economy.
 - Example: Bay of Plenty, New Zealand's forest sector manufacturing base declines and diversification efforts place emphasis on the growth of the tourism economy.

Analyzing region's approaches brought forward a number of findings. Firstly, when adapting or replacing traditional industries in ways that do not fundamentally change or diversify the economy, this risks perpetuating dependence or truncated development, in line with the 'staples trap' theory (Markey et al., 2012). It is imperative that traditional industries that are adapted or transformed are *sustainable* and able to support local and regional economies in the long term. Non-competitive industries with structural vulnerabilities that are provided subsidies or other 'corporate bail-outs' could be more

susceptible to economic shocks and shifts in the global economy, causing significant disruptions into the future. Efforts to ‘reinvent’ or ‘reimagine’ industries must build-in resiliency.

Secondly, regions that are innovating will likely succeed beyond those that are not. Industrial change is inevitable given the rate of rapidly advancing technology, and those that remain modern and adaptive will have greater staying power. For example, the Piedmont Regional Government in Italy supports technological change in industry through both its Smart Factory Technology Program and S3 Smart Specialization Strategies. Thirdly, regions pursuing low-carbon transition will also be better positioned for sustainable, long-term growth. Saarland, Germany is one region where commitments to climate action and energy transition at the national level have been echoed through the regional State Initiative for Energy Innovation Saar strategy. Finally, efforts to diversify the economy should also create opportunities for displaced workers, particularly given the fact that this study involves regions where a high percentage of the workforce is reliant on industrial employment. Furthermore, economic opportunities that simultaneously create jobs for workers and help mitigate or adapt to climate change will equip communities, regions, and countries with the necessary human infrastructure and skills to forward environmental objectives.

MULTI-LEVEL GOVERNANCE MECHANISMS ARE UNCOMMON

Some transitions may be unique to a given community, city or region, while others may be nation-wide. In many countries, especially unitary ones, national governments set the policy frameworks for regional initiatives. The literature on just transitions emphasises the importance of multi-level governance for coordinated actions across policy domains regardless of where and how the transition is unfolding. Upper-level governments can help to mobilise and target supports where they are needed; this requires an understanding of community characteristics and needs. While multi-level governance mechanisms are often missing in states and regions experiencing transitions, there are best practices to emulate such as the Joint Federal/Länder Task Force for the Improvement of Regional Economic Structures established between the Government of Germany and lignite-mining states such as Saarland to identifying investment opportunities. Furthermore, the Climaxion program between the Grand Est Regional Council and the Government of France was established to accelerate transition through investments in green buildings, renewables, and the circular economy.

The literature suggests that governance mechanisms such as public consultations could help meet worker demands for enhanced transparency and decision-making power. The Fair Development Plan for Lignite Areas in Greece involved nationally-led community consultations and a call for proposals for project development to support growth in communities affected by the national coal-phase out. In the literature on just transitions, Canada’s Task Force on Just Transition for Canadian Coal Power Workers and Communities, which resulted in federal funding for transition centres in impacted communities, has been lauded as a leading approach (Government of Canada, 2019a). This led to the creation of hubs that serve as a single access point for community members to access a wide range of services such as re-employment support, training and social support services. This initiative coordinates national and regional services at a local level and is primarily directed at workers; it does not, however, address community development. Here, Spain’s Just Transition Agreements are notable as they address multi-level governance in a much

more comprehensive manner, connected to the territory's economic diversification and economic, social and community development (Government of Spain, 2019).

TARGETED STRATEGIES ARE COMMON FOR COAL INDUSTRIES—BUT LACKING FOR OTHERS

Targeted instruments are those that are either geared towards: i) industrial transition generally; ii) specific regions/communities; or iii) specific sectors or beneficiaries of a sector. This review has found that besides coal, specific measures to address decline in carbon intensive industries are rarely identified in strategic documents. National climate strategies across the countries studied tend to address jobs, the economy and clean growth in overarching terms. Among the regional profiles it was found that there are more likely to be targeted measures in place when: the industry is nationally or regionally important; there is a long history of dependence on a given sector; the sector in transition is clearly identifiable and regionally concentrated; and/or, there has been a sudden shock causing job loss. For example, there is a specific forest sector strategy in the Bay of Plenty, New Zealand where the economy has strong ties to the forest sector and a high percentage of forest sector employment. The situation is similar in Basque Country, Spain which established a Strategic Plan of Comprehensive Support to the Automotive sector given historical dependence.

The review of regions in transition found that targeted supports most commonly take the form of sector-specific strategies that seek to improve the competitiveness of the industry. Governments are less likely to implement specific industrial transition supports when the transition results from uncontrollable factors (i.e., shifts in global markets) and/or the transition takes place over a longer period of time (i.e., 'shock' transition versus long term transition). The terminology "just transition" has yet to reach widespread use in policies and industrial transition strategies – possibly reflecting a lack of consensus over the meaning and implications of the term.

Untargeted approaches are more common and can have indirect benefits to a sector in transition. Policies aimed at boosting the entire economy as a whole may reduce or 'cushion' the impact of a transition in a given region or sector if there are wide-reaching benefits. In Kalmar county, Sweden, transition is guided by overarching goals in the Regional Plan, Regional Development Strategy and Innovation Strategy with underpinning UN Sustainable Development goals, potentially having a less acute but wider-reaching impact on the region in its entirety.

STRATEGIES AND INITIATIVES ARE OFTEN POORLY INTEGRATED

A multi-faceted issue such as 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, with the exception being industries that had obvious negative consequences for the environment. Moreover, the economic development strategies examined were 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. The degree of policy integration could be improved. There 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 PLANNING TO IDENTIFY REGIONS AND INDUSTRIES IN TRANSITION ARE UNCOMMON

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 (Government of New Zealand, 2020). 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.

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. The governance of land use is multi-jurisdictional in most cases, with national governments (and regional governments in federal states) having important regulatory authority over industrial and natural resource land uses. The lack of integrated spatial strategies to address industrial transitions is problematic. 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 (Government of Canada, 2020a).

As has been apparent under Covid 19, social security systems can be mobilised to address new needs in a time of crisis; however, these have not been commonly used as a policy mechanism to facilitate a just transition. Some examples include 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). In some countries there can be regulatory challenges to having more adaptive and targeted social security systems. Thus, reforms may be needed to ensure that social security systems can be used to support transition. Adaptable programs that permit carve-outs with flexible parameters can help provide timely support. Examples of this approach are the priority access for manufacturing workers to access training support in Ontario, or the Rural Dividend Fund in British Columbia (Government of British Columbia, 2020).

Direct funding for community level economic development supports is not common among the regions studied. One exception to this was the Community Initiatives Plan in the Bay of Plenty, New Zealand, where the regional council flowed funding directly to local governments to support community growth. 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. There can be a presumption that workers are mobile and will move to a new place to seek employment. While this may be true for some people, it is likely not true for all. Communities are more than just a place of employment – people have often deep connections to the places where they live. Community level supports may entail support to convene and develop a new economic development strategy or support for new infrastructure or community assets. The literature on just transitions also points out the importance of community involvement in discussions about their future. Multi-level governance dialogues can help to ensure that transitions are not managed in a top-down manner, but actively involve local governments and residents. Holistic support for communities, such as improving capacity, building infrastructure, reducing industry dependence, supporting low-carbon transition, addressing social issues and addressing ideological challenges can improve the wellbeing of communities.

JOBS AND ENVIRONMENT FOCUSED INITIATIVES ARE THE MOST COMMON

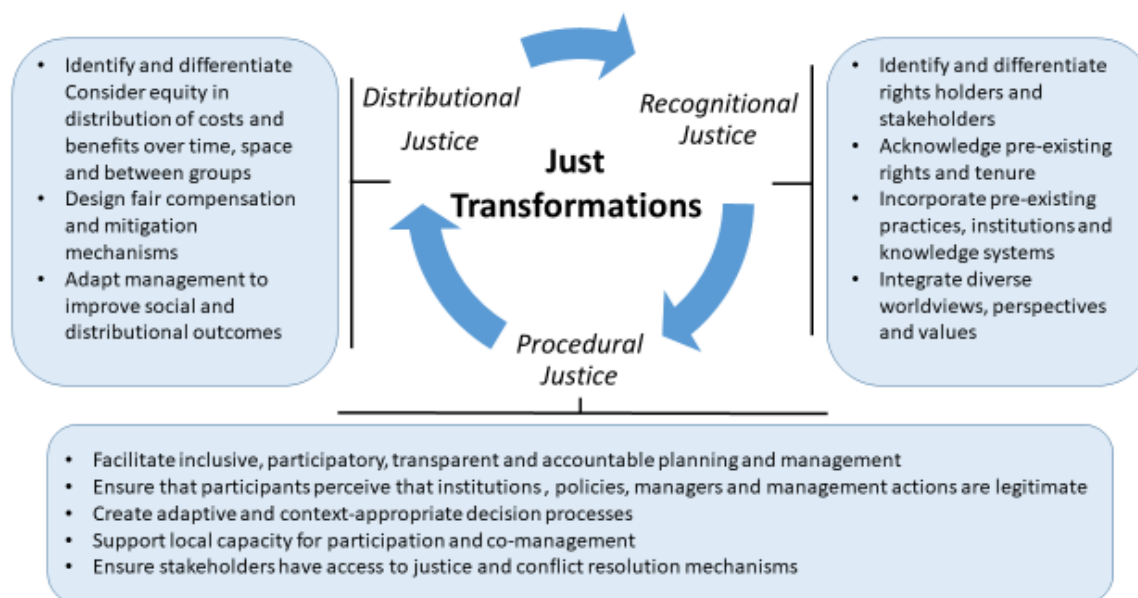
The literature on just transitions reveals three main ideas and approaches: “jobs-focused”, “environment-focused”, or “society-focused” lenses – each of which correspond to national and regional policy

instruments (Bennett, Blythe, Cisneros-Montemayor, Singh, & Sumaila, 2019; Evans & Phelan, 2016a; Goddard & Farrelly, 2018; Meadowcroft, 2009; Mertins-Kirkwood, 2018a; Newell & Mulvaney, 2013; Stevis & Felli, 2014). Jobs-focused and environment-focused strategies, policies 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 are poorly articulated and usually focused on addressing energy poverty. 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.).

ACCOUNTABILITY MECHANISMS ARE NEEDED FOR DETERMINATIONS OF JUSTICE

How do we assess the degree to which policy instruments and strategies adequately address justice and equity? Justice or equity can be conceived in distributional, procedural and recognitional terms (McCauley & Heffron, 2018; Newell & Mulvaney, 2013). Understanding this 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 (Bennett et al., 2019). See *Figure 5* for a breakdown of these elements.

Figure 5 Elements of justice: distributional, recognitional, and procedural



Source: Reproduced from Bennett, N. J., Blythe, J., Cisneros-Montemayor, A. M., Singh, G. G., & Sumaila, U. R. (Bennett et al., 2019). Just Transformations to Sustainability. *Sustainability*, 11(14), 3881. <https://doi.org/10.3390/su11143881> (Bennett et al., 2019)

Elements of justice are more easily identifiable when looking at the design and quality of individual programs and policies. Our analysis did not examine individual policies in depth; however, there were clear indications as to how “just” an approach or instrument would be, based on a few fundamental considerations (particularly for responsive measures):

- Are adequate funds provided to ensure meaningful change/support?
- Are program parameters/qualifications flexible to ensure ease of access?
- Are there clear means to communicate transition and opportunities?

Accountability mechanisms could help bring these elements to light. The establishment of Just Transitions Commissioners in 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.

THE SCOPE OF INTERVENTIONS ARE RELATED TO WELFARE REGIME TYPES

How governments manage just transitions relates to the role of government in those societies. Esping-Anderson’s work categorising developed capitalist nations along three welfare regime types—liberal, conservative and social democratic—is useful here (Esping-Anderson, 1990). Social democratic states (i.e., Nordic countries) provide the most comprehensive benefits and services to their citizens and these are under the direct responsibility of central and local public authorities. Liberal regimes (i.e., the United States and Australia) tend to rely more on private sector provision, and in conservative regimes (e.g., France, Germany, and the Netherlands) welfare goals are met through transfer payments to families as opposed to direct provision funded out of taxation. While Esping-Anderson’s analysis focuses on the study of social transfers such as pensions and unemployment benefits, it is nevertheless a useful framework to describe the logics that underpin how the state provides benefits and to whom.

Across the countries studied it has been found that those with limited interventions tend to emphasise the role of the free market in transition processes, use deregulation to spur economic growth and employ major infrastructure projects to spur jobs creation. Examples include the United States, Ontario (Canada) and Western Finland. These places have regions where main industries are in decline, but there is no actively managed transition or efforts to reinvigorate the sector. In Incheon, Korea, the Incheon Free Economic Zone was established to reduce regulations and thus spur foreign investment in the metropolitan city as a means to reverse industrial decline. In contrast, states with actively managed transitions tend to have a larger role for government and strong social infrastructure. In strong social welfare states there may be less of a need for targeted supports (industry or community).

CONCLUSION

From its labour union origins, the just transitions concept has now been mainstreamed across a wide range of policy measures. This scoping review has looked to those regions that have undergone industrial transitions to explore the range of policy instruments that have been used to manage this change. What we find is that there are a growing range of measures that provide a mixture of sectoral and sometimes targeted supports but that the coordinating mechanisms between these measures and across scales are underdeveloped. Moreover, there is a risk that the branding of instruments as leading a just transition does not adequately address *justice* in its multiple forms; in effect, that the concept has been diluted amidst its growing use. How can just transitions work maintain the important elements of its activist roots amidst its mainstreaming in regional and national policies?

The Covid 19 pandemic has accelerated calls for a just transition and the idea that we have an environmental, social and economic imperative to *build back better* (C40, 2020; Climate Justice Alliance, 2021; The Coalition of Finance Ministers for Climate Action, 2020). There is hope that the scale of impacts from Covid 19 will open up possibilities for more coordinated approaches to the suite of challenges posed by climate change and industrial transitions. The range of policy levers analyzed give an idea of the suite of approaches that can be used, however additional research is needed on the effectiveness of just transitions measures. While there are a growing number of government plans and strategies to support just transitions it is not often evident how GHG emissions will be in fact reduce, how labour transitions will be managed and how workers, communities and marginalized peoples will be included in the process.

KNOWLEDGE GAPS

The concept of just transition is evolving. There are a growing number of examples of policies and practices that aim to achieve just outcomes for workers, communities, the environment and society as they face industrial transitions. However, within the literature on just transitions there remain a number of knowledge gaps in understanding how to create pathways to pragmatic and implementable solutions for governments, communities and stakeholders. The following section offers suggestions for further research and analysis.

WHAT IS THE RIGHT JURISDICTIONAL SCALE TO MANAGE JUST TRANSITIONS? TOP-DOWN VERSUS BOTTOM-UP APPROACHES

Where are sustainability transitions occurring, and what is the 'right' scale of government and governance to design and implement successful interventions for just transitions? Many attempts to examine transitions away from fossil fuels have been initiated at a level of government that does not hold jurisdiction over solutions. For example, the findings from a state-initiated panel examining pathways to achieve targets of 50% renewable energy in Queensland, Australia were contingent on federal policy support, thus limiting their effectiveness (Goddard & Farrelly, 2018).

While the literature suggests that a just process must involve top-down and bottom-up collaboration and support to achieve optimal results, more research is needed to evaluate and assess how this occurs *in practice* (Evans & Phelan, 2016b; Weller, 2019a). Even those examples that have been

deemed unsuccessful offer useful lessons. For example, Australia's Latrobe Valley was involved in a top-down, multilevel governance arrangement which excluded local actors from the transitions process, thus creating procedural justice issues (Weller, 2019b).

Scale is a critical consideration when examining options for low-carbon solutions in energy transitions (Goddard & Farrelly, 2018). Much of the current academic research focusses on just transition from a high-level, global scale (Healy & Barry, 2017). Yet this is an abstract scale for which to understand the nature of transitions and how they are locally managed. For example, fossil fuel dependence is usually regionally concentrated (Mertins-Kirkwood & Hussey, 2020a).

WHAT ABOUT THE COMMUNITY PRIORITIES AND CONCERNS OF RURAL PLACES?

In a jobs-focused interpretation of just transition, many concerns and priorities of workers overlap with the concerns of communities. Given that the majority of case studies on the topic of just transition or sustainability transitions examine coal communities where workers are typically more deeply connected to place, it is logical that workers and communities demands often overlap. However, a hyper-fixation on measures for workers means that community needs risk being overshadowed. The solutions for workers are not necessarily solutions for the community. For example, the Alberta Government's attempt to support workers through reimbursing moving expenses of coal workers leaving to find new jobs could drain the community of residents and exacerbate challenges, particularly given the existing trends of urbanization (Mertins-Kirkwood & Deshpande, 2019a). In order to achieve a just transition for communities, many advocate that new jobs opportunities for the displaced workforce should be provided in the community wherever possible (Government of Canada, 2019d).

The added challenges faced by rural and small-town places (e.g., fewer services and amenities, less diversified economies, greater reliance on personal transportation, rural poverty, etc.) mean that solutions for communities must take a place-based approach to addressing specific challenges, determining unique assets and considering priorities (Weller, 2019b). Particularly in Canada, tensions exist between rural and urban places where resource-dependent economies contribute royalties to support the economic well-being of the region. The economic stability of the region also influences receptiveness to climate action. Rural areas experiencing rapid development have also been found to be more in favour of conservation than those living in weak economies (Mayer, 2018).

Furthermore, communities (rural or otherwise) are complex ecosystems composed of unique sub-groups and stakeholders who are also impacted by transitions on a social and personal level. In addition to workers in the impacted sector, families, businesses, service providers, contractors, local governments, non-profit organizations and marginalized groups have unique challenges as a result of transitions. The 'ripple effects' can be wide reaching and extend beyond challenges related to economic diversification and employment. For example, historic examples of industrial transition have demonstrated that communities have faced population out-migration, an increase in poor health and mental health conditions, increase in social issues such as poverty, addiction, domestic violence, housing market slumps, increased cost of living, a decline in available service providers, and other severe consequences that threaten their vitality (Cooling, Lee, Daub, & Singer, 2015a; Government of Canada, 2019d). Through careful consideration for procedural, distributional and recognitional elements of justice, just transitions

could be achieved for communities by taking a place-based approach, while simultaneously reducing resistance to climate action and forwarding environmental objectives and progress (Newell & Mulvaney, 2013). For example, full collaboration and engagement between communities and decision-makers, support for community led-initiatives, along with socio-economic analysis can help foster greater community support and buy-in to transitions (McCauley & Heffron, 2018). Just outcomes must consider communities as unique units of study within greater socio-technical energy transition and sustainability transformations.

NOT ALL ARE TREATED AND AFFECTED EQUALLY – HOW TO INCLUDE AND ADDRESS THE NEEDS OF MARGINALIZED GROUPS?

The literature on just transition notes the importance of examining distributional, procedural and recognitional justice in order to ensure measures do not perpetuate existing inequalities in society (Goddard & Farrelly, 2018; Healy & Barry, 2017). Many scholars advocate for there to be a more explicit consideration for social justice when managing just transformations as “societal transformations at any scale are shaped by, and will shape, the distribution of wealth, opportunities, and privileges afforded to different social groups” (Bennett et al., 2019, p. 3). White males dominate jobs in the fossil fuel sector (Pollin & Callaci, 2019); therefore, narrow attempts to find solutions for a displaced fossil fuel workforce may exclude underrepresented groups (Rosemberg, 2010). Some literature suggests that solutions for displaced workers should also seek to provide opportunities for other groups facing employment barriers and strive toward gender and racial parity. This is particularly important in industries where there is uneven representation of groups in society which creates uneven distribution of benefits from transition solutions. For example, a study in the United States found that racialized persons were underrepresented in the solar energy sector (Mayer, 2018). This indicates there must be a concerted effort to address structural barriers and attract individuals to these sectors and professions, such as through affirmative action (Pollin & Callaci, 2019). An equity analysis of the coal transition in Canada notes that public investments should be aimed at the community level to extend the benefits of transition to marginalized groups and potentially create opportunities for women, Indigenous peoples, racialized and immigrant workers in these communities (Mertins-Kirkwood & Deshpande, 2019b).

An environmental justice analysis looking at the distribution of the harms of industrial development suggests that efforts to achieve a just transition could be an opportunity to address injustices experienced by marginalized communities. In the US, for example, energy production with higher pollution is typically found in socially deprived area with high levels of poverty and minority populations (McCauley et al., 2019). Just transition is an opportunity to address inequities caused by climate change, pollution, or environment degradation, given patterns of environmental racism (Newell & Mulvaney, 2013).

WHO IS RESPONSIBLE?

To determine whether outcomes are just, it is important to determine who is responsible for enacting a just transition. There is a general belief that governments have an ethical responsibility to support workers when the cause of transition is environmental regulations, policies, or government decisions (Pai, Harrison, & Zerriffi, 2020), particularly when looking at just transitions from a jobs-focused lens. In the

United States, residents blamed environmental policies as directly contributing to the decline of coal, a sentiment echoed by conservative politicians, although market forces also had an influence (Mayer, 2018). Responsibility for managing and implementing just transitions becomes less clear when transition is caused by climate change or market forces. However, in response to the COVID-19 impacts on the fossil fuel industry, the Canadian government provided funds for orphan well cleanup to support workers in the sector following mass layoffs (Government of Canada, 2020b). In an assessment of community responses to government intervention regarding coal transition in Australia, there was no difference in level of support for policies to support coal miners if the transition was caused by market or by environmental regulations (Mayer, 2018). It becomes even less clear when climate change is the reason behind transition. More research is needed on this topic as many industries are highly vulnerable to the impacts of climate change (Rosemberg, 2010).

Non-governmental actors have a role to play. For example, unions have been instrumental in ensuring fair distribution of workforce transitions (Healy & Barry, 2017). While tensions between environmentalists and unions have existed in the past (largely as a result of the ‘environment vs. jobs’ narrative), labour groups are now taking on new roles as advocates for environmental policies and see just transition as a vehicle for more equitable outcomes for workers (Stavis & Felli, 2014). Labour organizations have pointed to the role that industry must play in helping with priority hiring of displaced workers (Canadian Labour Congress, 2000).

Critically, the right composition of interests should be represented with adequate resources to fulfill responsibilities (Goddard & Farrelly, 2018). Ultimately, it is important to have legitimate processes to achieve a just transition and to ensure proper procedural justice, in which workers and unions are included in decision-making processes around transition measures and are involved in proactive industrial planning (Goddard & Farrelly, 2018).

CAN WE HAVE GREEN JOBS AND GOOD WORK?

Economists predict that there will be a net growth in jobs as a result of decarbonization, including in transport, construction, buildings, renewables, agriculture and technological development (International Trade Union Confederation, 2017a). A significant portion of workers will reach retirement age in the coming decades, and an estimated 85% of the fossil fuels jobs in the United States will be phased out through attrition (Pollin & Callaci, 2019). This will help displaced workers and new workers entering the workforce find jobs. However, green jobs created may not be located in the same regions as jobs lost. This can create challenges, as regions need replacement economic activities and workers are often deeply connected to their communities, as witnessed in the Canadian coal context (Government of Canada, 2019d). Opportunities in replacement sectors in the industry may not offer the same kind of long-term employment associated with fossil fuel sector jobs. For example, wind and solar energy systems can create temporary construction jobs, but this does not lead to the same kind of permanent employment in the surrounding communities as coal-fired electricity generation (Government of Canada, 2019d).

The element of good, decent work is also often left out of discussions around just transition. New jobs and opportunities for the displaced workforce, and newly created green jobs must consider the interests and priorities of workers; they should be high-quality, attractive to people who lose employment

in traditional industries, and they should maintain prevailing wage standards and labor agreements (Cha, 2017) . For example, veterans in the United States returning from the Cold War were enrolled in the Defence Reinvestment and Conversion Initiative and were placed in low-wage jobs that did not use skills from their defence career (Pollin & Callaci, 2019). Transitioning workers who have grown accustomed to jobs that offer generous compensation, stability and the ability to support their families and lifestyles should not involve replacing their previous jobs with precarious, minimum wage jobs. Furthermore, the loss of coal jobs in Alberta means the loss of many unionized jobs in a province with already low rates of unionization (Mertins-Kirkwood & Hussey, 2020b). Workers may not be interested in new opportunities available for them. Labour organizations have also noted that new jobs should consider and use workers' existing skills wherever possible (Alberta Federation of Labour, 2017; Canadian Labour Congress, 2000). Attention should also be paid to opportunities that address skills shortages in other industries (Rosemberg, 2010). For example, over half of construction workers will retire over the next decade (Mertins-Kirkwood & Deshpande, 2019b).

HOW IS POWER REDISTRIBUTED?

The political economy of fossil fuel-dependent regions influences the initiation, implementation and success of efforts to achieve a just transition. Large fossil fuel corporations often have great influence over government decision making by shaping energy policies and influencing energy transition options (Healy & Barry, 2017). In Australia, industry lobby groups were successful in halting government funding for sustainability and renewable energy investments, given their reliance on affordable and reliable coal-fired electricity (Goddard & Farrelly, 2018). In Canada, the Alberta Government was not legally required to compensate companies as part of the phase-out of coal, yet they negotiated Off Coal Agreements totalling \$1.36 billion with the three impacted power utilities so as not to dissuade investment in the region (Mertins-Kirkwood & Hussey, 2020b). This was also due to the Alberta Government's dependence on these private companies, as the electricity market was deregulated in 1995 (Mertins-Kirkwood & Hussey, 2020b). These negotiations reflect the political economy of the province's energy market which relies on a small number of private companies which provide an essential service, giving the companies leverage in these negotiations (Mertins-Kirkwood & Hussey, 2020b). The lasting effects of a neoliberal policy era have also meant that governments are less willing to oversee a just transition as energy production and consumption is often shared with or delegated to the private sector (Newell & Mulvaney, 2013a).

The power of the fossil fuel industry can influence the level of ambition of climate policies, as well as workers' perceptions of transition. The hegemony around fossil fuel extraction and its importance to the economy is often renewed and defended in communities and among workers (Evans & Phelan, 2016b). Some companies have drawn on the 'jobs vs. environment' narrative as a way to exploit the employment-related anxiety of workers who fear for their livelihoods (Goddard & Farrelly, 2018; Pai et al., 2020). Furthermore, a study found that corporate media perpetuated this narrative, privileging economic considerations when discussing coverage of pipeline controversies (Hackett & Adams, 2018a). In order for energy transitions to be 'just', carbon lock-in must be avoided as it is associated with several forms of injustice (Goddard & Farrelly, 2018; Healy & Barry, 2017). Divestment campaigns are noted in the just transition literature as a grassroots means to challenge, redistribute and rebalance power (Healy & Barry, 2017).

IS THERE A ROBUST SOCIAL INFRASTRUCTURE?

A common theme in the literature is the need for more robust social infrastructure, greater state intervention and a departure from neoliberalism and austerity policy regimes. Just transition should lead to greater state intervention as neoliberal economics have been shown to fail to deliver just outcomes (McCauley & Heffron, 2018). Social protections could help reduce resistance to transition and ‘cushion’ its impacts by ensuring guaranteed access to income supports and training (Healy & Barry, 2017; Rosemberg, 2010). For example, diversification funding for rural, small town and single-industry reliant communities could create additional jobs and opportunities that displaced workers could seize. Similarly, addressing unique challenges faced by rural communities, such as a decline in government funded service provision, healthcare and housing issues, could strengthen local economies as a whole. A full employment economy, one where there is an abundance of decent jobs available for all people seeking work, would make it easier for workers to find and choose appropriate replacement jobs (Pollin & Callaci, 2019). Furthermore, access to social services, including mental health and health supports could help address some of the social impacts of transition (e.g., stress, mental illness, domestic violence, addictions) (Cooling, Lee, Daub, & Singer, 2015b; Government of Canada, 2019d).

HOW DOES COMMUNITY AND WORKER IDENTITY MATTER?

Worker identity and political beliefs can have a significant influence over receptiveness to climate action and transition (Mayer, 2018). Conservative political views in industrial regions have been shown to contribute resistance to decarbonization (Healy & Barry, 2017). Fossil fuel development has often been the source of economic stability and wealth in regions for hundreds of years, particularly in coal producing regions (Evans & Phelan, 2016b). There is a strong sense of belonging in the places where coal sector employees live and work, and these identities often form over generations (Pai et al., 2020). But it is important to avoid grouping workers in the resource-based, industrial, or fossil fuel sectors into a homogenous group, as there are distinct identities, characteristics and values of workers and communities in different sectors. In the oil and gas sector there are higher rates of labour mobility, the work is more seasonal and transitory, and workforce demographics are somewhat different when compared to coal. For example, oil and gas communities may rely more on long-distance labour commuting than on an ‘in house’ local workforce. Many workers from Atlantic Canada began commuting to Alberta to work in the oil and gas industry following the collapse of the cod fisheries. Pipeline construction in Canada also has impacts on surrounding communities, because of temporary work camps and/or an influx of temporary workers. These factors all shape beliefs about transition and willingness to think about change and transition, hence influencing the dialogue around ‘just transitions’. It is important to acknowledge this identity and strategically manage it, as “effective climate action isn’t likely to happen without a strong base among labour, and workers’ rights aren’t likely to flourish without people challenging the power of extractivist capital” (Hackett & Adams, 2018, p. 30).

Low-carbon transition and sustainability transitions can be seen as threatening this identity, as well as livelihoods. Lessons may potentially be honed from regions who have successfully redefined their economic identity, such as the Ruhr Valley in Germany where inhabitants were deeply connected to the steel and coal manufacturing in the region, but successfully shifted to a technology and service economy

(Alberta Federation of Labour, 2017). More research is needed to understand the influence ideology and political identity has over individuals' receptiveness to just transition measures (e.g., hesitation to accept 'government handouts'; political alignment incompatible with big government/welfare state). Workers' identity, political beliefs and values must be understood and not perceived as being dismissed in order to counter trends such as the rise of right-wing populism (Hackett & Adams, 2018b). Just transition measures must consider the context of the communities and people who depend on the sector.

POLICY LEARNING ACROSS SECTORS?

Gaps exist in the just transition literature on sustainability transitions as they are almost exclusively focused on fossil fuels. There are lessons to be learned in other natural resource sectors where significant transformations have taken place (e.g., fisheries, agriculture, forestry), as well as other emissions intensive, trade exposed industries or extraction and processing activities (e.g., automotive sector, mining). Most of the case studies pertaining to just transition have been in coal regions as there has been a global push to move away from coal, creating a momentum rendering coal uneconomic in many regions (Evans & Phelan, 2016b). However, examples can be drawn from other cases of industrial transition, such as the forest sector in British Columbia which frequently experiences change due to boom and bust cycles. The province has responded in the past with initiatives for displaced workers, such as Forest Renewal BC which was an initiative that sought to find new jobs for displaced forest sector workers in silviculture and environmental restoration (Cooling et al., 2015b). Furthermore, a case study of fisheries in British Columbia provides important lessons for understanding sound governance in transition management and integrating procedural justice considerations (Bennett et al., 2019). Other potential areas in Canada that have faced significant industry decline, change and transition are:

- Ontario's coal phase-out which took place between 2003 and 2014. Workers were redistributed amongst other facilities and locations managed by the provincial utility (Harris & Beck, 2015).
- The Atlantic Cod Fisheries which resulted in the collapse of many economies in the Maritime provinces (Milich, 1999).
- Chinook salmon fisheries on Vancouver Island which are at risk due to a number of factors including habitat destruction, harvest and the effects of climate change (Walters, English, Korman, & Hilborn, 2019).
- The decline of the forestry industry in BC resulting from restructured market access, declining competitiveness and other factors. There have been several targeted interventions for this sector throughout the years, such as Forest Renewal (Jackson & Curry, 2002).
- Cape Breton Island where coal sector workers were transitioned to call centre employment leading to a significant decrease in wages and negative social consequences.
- Tumbler Ridge BC attempts diversified from the coal mining sector (Halseth, Markey, Ryser, Hanlon, & Skinner, 2017).

WHEN AND FOR HOW LONG?

A critical part of achieving just outcomes is understanding the timing and duration required to allow workers and communities to absorb information, accept the new circumstances and prepare for the future. A framework for transitioning fossil-fuel dependent workers and regions in the United States suggests that a two-decade timeframe to achieve a 40% reduction in the oil and gas sectors and 60% reduction in coal is required to achieve climate targets (Pollin & Callaci, 2019). However, this is based on a steady rate of contraction and does not account for sudden economic shocks which have historically resulted in added challenges and stress for workers and communities (Pollin & Callaci, 2019). Long-term planning is essential to ensure governments and states enacting transition are avoiding unnecessary costs from inaction. In energy transitions, replacement technology should also be readily available to better respond to sudden shifts and transitions to facilitate continued, reliable energy access (Delina & Sovacool, 2018).

Both proactive and reactive policy supports are needed to help ensure just outcomes; proactive measures helping to maximize long term benefits, and reactive aimed at minimizing the harms of transition (Mertins-Kirkwood, 2018b). A transition managed proactively would involve more investments in the community and sustainable growth to create jobs and opportunities for both the displaced workforce and other groups in society (Mertins-Kirkwood, 2018b). Temporary supports that respond to immediate challenges are still needed in combination with a proactive approach. More research is needed on proactive transition management as there are few examples internationally. One of the critical factors that hinders governments' ability to manage transition proactively is the nature of electoral cycles, as priorities and policies often change with a change of government (Hackett & Adams, 2018b). Multi-partisan support for just transition and low-carbon approaches need to be secured so that initiatives designed to help communities prepare over the long term will survive a change of government (Goddard & Farrelly, 2018).

COMPREHENSIVE, MULTI-SCALAR AND INTEGRATED APPROACHES ARE NEEDED

In order to achieve a just transition, the question of 'justice for whom' must be central to avoid leaning too heavily on jobs-focused, environment-focused or society-focused solutions. A 'just outcome' is different for different groups and stakeholders. More effort must be put into ensuring policies and programs aimed at achieving a just transition have the greatest impact and benefit the widest cross-section of people and address unique challenges. There is also a need to actively and purposefully draw from and incorporate other kinds of justice (e.g., social, environmental, climate, and ecological) to develop a comprehensive just transition plan. Gaps in the knowledge base reveal that important factors such as the scale at which transitions take place and the degree of intervention must be considered (e.g., active, passive, transformative, minimalist) (Goddard & Farrelly, 2018). A vision for a just transition is one where the move to a zero-carbon economy leads to "a future where all jobs are green and decent, emissions are at net zero, poverty is eradicated, and communities thriving and resilient" (International Trade Union Confederation, 2017b).

KNOWLEDGE MOBILIZATION ACTIVITIES

Knowledge mobilization activities have focussed to date on disseminating and peer-reviewing research results with academic experts and sharing findings with students. Future knowledge mobilization activities will focus on disseminating results and convening dialogues with policy makers and community members.

To date this research has been shared at:

- The *International Institute of Administrative Science (IIAS) 2020 Conference Public Governance for Climate Change*, December 15-18, 2020 (virtual conference);
- At a public webinar series of the *Institute for Integrated Energy Systems Seminar*, University of Victoria, January 15, 2021, and;
- In a teaching video/presentation produced for an undergraduate Civics Engineering course at UVic (CIVE 315: Environmental Policy, 2021).

The literature review has been published as a forthcoming chapter (“Just transitions”) in Robert Brears ed., *Palgrave Encyclopaedia on Regional and Urban Futures*, Palgrave Macmillan. Additional peer reviewed submissions (open access) and policy publications are being prepared alongside communications tools (e.g., ATTN video). This SSHRC Report and Evidence Brief will be disseminated through the School of Public Administration and Institute for Integrated Energy system’s websites at UVic and on Academia.edu.

This research has been accepted for presentation at the following forthcoming conferences: the *Canadian Society for Ecological Economics (CANSEE, May 2021)*; *Canadian Political Science Association (CPSA, June 2021)*; the *European Consortium for Policy Research (September 2021)*. It will also be shared at an upcoming online public dialogue series of the *Community Social Planning Council of Greater Victoria*.

This research has focussed on understanding the range of national, regional and in the case of the EU, supranational policy instruments that are being presently used by governments to implement just transitions goals. In an effort to continue this dialogue with a focus on policy implementation and comparative policy learning, additional Knowledge Mobilization activities for this project are planned. Dr. Krawchenko is presently preparing a grant application with the University of Alberta’s Parkland Institute to convene a day-long conference in Alberta on implementing just transition policies with key stakeholders and decision makers, including experts from the leading practices identified internationally.

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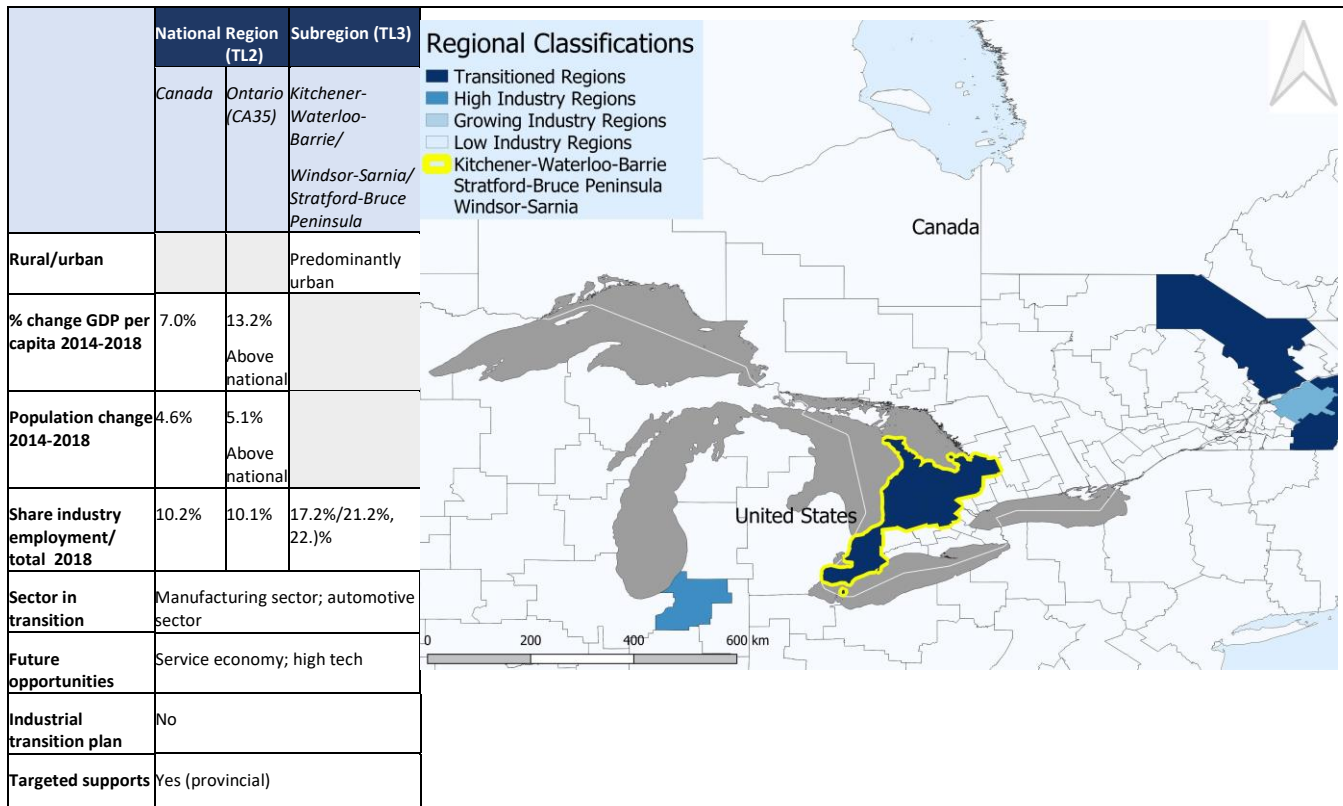
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APPENDIX – REGIONAL PROFILES

1. ONTARIO, CANADA: RESPONDING TO INDUSTRIAL DECLINE THROUGH REGIONALLY TARGETED PROGRAMS



Note: Corresponding territorial codes are: CA3540N: Kitchener-Waterloo-Barrie, ON; CA3570N: Windsor-Sarnia, ON; CA3580N: Stratford-Bruce Peninsula, ON

Ontario is the most populated region in Canada and has the highest GDP of all provinces and territories. While Ontario's economy as a whole is diverse, certain sub-regions have unique specializations. Southwestern Ontario is known as a manufacturing, automotive, agriculture and high-tech centre. Three of southwestern Ontario's sub-regions, Kitchener-Waterloo-Barrie, Windsor-Sarnia and Stratford-Bruce Peninsula are experiencing economic transition. Industrial employment has significantly declined, particularly in the manufacturing sector which is highly influenced by changes in the American dollar and the cost of labour (Tiessen, 2014). Southwestern Ontario faced a pronounced decline between 2012 and 2013 when many manufacturing plants closed. It is presently shifting towards a more service-based economy where there are opportunities to be seized as a result of steady population growth.

The Government of Canada has several plans in place that could support transitioning regions such as southwestern Ontario. The *Pan-Canadian Framework on Clean Growth and Climate Change* guides low-carbon transition and identifies areas of economic potential in realizing national climate commitments. The *Innovation and Skills Plan* also identifies six potential growth areas to capitalize on

innovation opportunities, including advanced manufacturing and clean technology. Additionally, the *Future Skills Centre*, a government-run entity, has a mandate to conduct research and collaborate with key stakeholders to help Canadians prepare for jobs of the future and address workforce challenges at the community level. These policies signify an interest in moving toward new forms of development, merging the dual goals of growing the economy and protecting the environment.

Uniquely, the Government of Canada has engaged with the idea of just transition through its *Just Transition Task Force for Canadian Coal Power Workers and Communities*. However, this is narrowly focused on the coal and energy sectors, hence limiting the potential application of the task force's work in other declining sectors such as the manufacturing sector. Certain instruments also highlight the importance of proactive program design. The Government of Canada's new *Canada Training Benefit* provides partial coverage of training costs for workers while they are still employed. While this does not directly address industrial transition, a proactive approach to training creates the potential to build more preparedness and resiliency in the workforce before transition unfolds. This could equip workers with skill sets that would increase transferability to other jobs.

The majority of the Ontario Government's policies apply across the entire province; however, there are several programs specific to individual regions, such as the *Southwestern Ontario Development Fund*. This Fund provides project support for the region and has the potential to mitigate or counterbalance negative impacts of industry decline. The Ontario Government also has instruments targeted towards specific sectors, such as the *Ontario Automotive Sector Strategy* which includes measures to address impacts from falling automotive production. Furthermore, the *Second Career Program* provides laid-off manufacturing sector workers improved access to skills training and financial support, demonstrating a timely approach to address the impacts of decline. These programs signify the Ontario Government's willingness to provide targeted transition support, creating a responsive policy environment to industry decline in southwestern Ontario.

In this particular case, the Ontario Government is predominately leading the industrial transition response. At the same time, forward-looking workforce development and low-carbon transition strategies at the federal level are an essential element of change management. While the current federal government has noted compatibilities between clean growth and job creation, there is no consensus among the provincial governments on an approach to climate change and clean growth. Ontario is one of few jurisdictions not listed as a signatory to the *Pan-Canadian Framework on Clean Growth and Climate Change*, thus relinquishing their access to the *Low Carbon Economy Fund*, a \$2 billion funding program for emissions-reductions projects and initiatives. This creates challenges for policy coherence between federal and provincial governments, as the Ontario Government's economic vision is not in line with the Government of Canada's emphasis on low-carbon transition, making it more difficult for Canada to achieve its emissions reductions targets.

2. GRAND-EST, FRANCE: SEIZING GREEN OPPORTUNITIES AND HONING THE POTENTIAL OF A BIOECONOMY

	National	Region (TL2)	Subregion (TL3)	Regional Classifications <ul style="list-style-type: none"> ■ Transitioned Regions ■ High Industry Regions ■ Growing Industry Regions ■ Low Industry Regions ■ Vosges
	France	Grand Est (FRF)	Vosges (FRF34)	
Rural/urban typology			Predominantly rural region, remote	
% change GDP per capita 2014-2018*	6.4%	0.8% Below national	-8.1% Below national	
Population change 2014-2018	0.985%	-0.5% Below national	2.5% Above national	
Net Interregional mobility		-9808	-1660	
Share industry employment out of total 2018	10.2%	13.5%	17.3%	
Sector in transition	Agriculture sector; forest sector			
Future opportunities	Bioeconomy; tourism			
Industrial transition plan	Yes			
Targeted supports	No			

*Or most recently available year

Grand Est is the second largest industrial area in France. The region's territory is 94% rural, housing 51% of the population (Grand Est, 2020b). Most of the region's land is dedicated to agriculture and forestry production, both critical to the economy (Grand Est, 2020a). Significant changes in employment in forestry and agriculture have prompted the region to explore the potential of the bioeconomy and to increase innovation as a way to balance economic decline. Efforts to develop the region are also influenced by national climate commitments.

Addressing climate change is a top priority for the Government of France. The *National Low Carbon Strategy*, the *Energy Transition Law for Green Growth* and the *National Ecological Transition Strategy Toward Sustainable Development* are the guiding documents establishing economic and environmental objectives. There are also complementary research and innovation plans, governance mechanisms, regional planning strategies and specific funds for industrial and rural areas to promote low-carbon transition.

Leveraging the economic potential of the low-carbon transition is also a key focus for the national government. For example, the economic strategy, the *Big Investment Plan*, aims to achieve carbon neutrality, increase renewable energy production capacity, enhance skills and employment, strengthen innovation and competitiveness and build the digital state. This plan spans several policy areas demonstrating smart integration of environmental, economic and employment objectives. In addition to

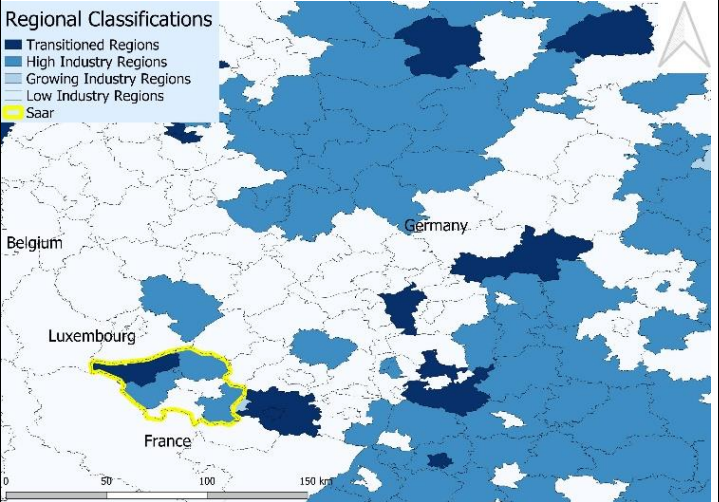
forward-looking strategies, the Government of France also provides responsive human resource planning support to companies facing the impacts of rapid economic shifts through the *Support for Economic Change* program.

The Grand Est Regional Council's priorities are centred on increasing regional competitiveness. The *Be EST Regional Plan for Economic Development, Innovation and Internationalization* includes measures to help companies proactively manage a change in the areas of innovation, transition, employment and entrepreneurship. The *Regional Planning, Sustainable Development and Equality Plan* simultaneously seeks to address social issues in the region. Targeted strategies for the bioeconomy, agriculture and tourism are also present to complement broader economic goals. As most of the region is rural, the Grand Est Regional Council established the *Pact for Rurality* which aims to enhance, diversify and promote place-based assets. Strengthening rural areas is in the interest of the entire region, given their significant contributions to the economy. The region has also undertaken significant planning in the area of skills and employment as evidenced through the *Performance Grand Est Strategy*, the *Skills Investment Plan* and the *Regional Strategy for Higher Education, Research and Innovation*.

The Regional Council of Grand Est and the Government of France share the common goal of promoting low-carbon transition. For example, the multi-jurisdictional *Climaxion* program aims to accelerate transition through investments in green buildings, renewables and the circular economy. This case also demonstrates a best practice for policy in transitioning regions as environmental objectives are woven into most other national strategies. This is crucially important when tackling a major challenge such as climate change, which spans across several policy areas. There are also natural synergies in the objectives of increasing renewable energy production and growing the bioeconomy. Forestry and agriculture sectors in Grand Est support this new economic opportunity, creating a bridge between traditional and modern sectors.

The Grand Est region is positioned for success in its economic transition as the national and regional governments have enacted strategies to manage change and leverage green opportunities and regional strengths. The Grand Est Regional Council's economic, regional and workforce development plans suggest there is a strong vision in place to sustain and grow prosperity. Depending on the nature of the transition's employment impacts, additional responsive measures and community-oriented supports could enhance the approach.

3. SAARLAND, GERMANY: MULTI-JURISDICTIONAL TARGETED SUPPORTS FOR A SMOOTH ENERGY TRANSITION

	National	Region (TL2)	Subregion (NOG)	Regional Classifications 
	Germany	Saarland (DEC)	Saar (DECA)	
Rural/urban typology				
% change GDP per capita 2014-2018*	8.2%	1.4%	1.8%	
		Below national	Below national	
Population change 2014-2018	2.38%	0.2%	0.2%	
		Below national	Below national	
Net Interregional mobility		-2190	11,813	
Share industry employment out of total 2018	18.5%	21.2%	21.2%	
Sector in transition	Energy (coal); steel manufacturing			
Future opportunities	Auto sector; Information technology; service sector			
Industrial transition plan	Yes			
Targeted supports	Yes			

*Or most recently available year

Saarland is a small state located in southeast Germany. The state has been actively transitioning for several decades, moving from a coal-based economy to one focused on IT, services and the auto sector (European Commission, 2020d). While 80,000 jobs were lost through redundancy programs in coal mines and steel factories from the 1960's onward, the subsequent industrial transformation created 116,000 new jobs (Saarland State Government, 2020). This could partly be attributed to the revival of the steel industry to facilitate the growth of auto manufacturing, thus allowing the state to partially maintain its industrial structure. Federal and state government commitments to transforming the energy sector are also likely to spur job creation.

More recently, the Government of Germany's commitments to coal phase-out and industry decarbonization in the *Climate Action Program 2030* have initiated greater industrial decline. The Program commits to collaborating with impacted states, including Saarland, and providing additional funding to them through the *Structural Development Act*. The *Joint Federal/Länder Task Force for the Improvement of Regional Economic Structures* has also been established to support lignite-mining regions by identifying investment opportunities through research.

Commitment to industrial and energy transition is cross-referenced in the *Economic Policy* which commits to strengthen SMEs and the industrial sector through transition, as well as the *Social Market Economy Strategy*, which emphasizes economic success, social security and mitigation of additional costs to energy consumers and businesses in the transition. The Government of Germany has also taken a proactive approach to workforce planning, acknowledging that securing a sufficient supply of skilled

labour becomes increasingly important as demographic shifts unfold. The country's *Skilled Professionals for Germany & Skilled Labour Strategy* and *National Skills Strategy* aim to improve employment rates through preventative actions such as dual training, upskilling and career transition.

The Saarland State Government has also demonstrated transition leadership through providing *Industrial Policy Guidelines* to help industry maintain competitiveness and better manage energy and digital transformations. As the energy sector is central to transition, the Saarland State Government has echoed national commitments to increase renewable energy through implementing a community-directed energy transition funding program and establishing guidelines to support local emissions reductions. The *State Initiative for Energy Innovation Saar (LIESA)* also supports energy transition through convening technology and innovation-driven experts to determine how to transition in a decentralized and intelligent manner.

The Saarland State Government also has active labour market policies and social programs in place, such as the *Saar Future Alliance for Skilled Workers* program which aims to fill labour gaps, make income security and employment promotion programs more available and provide social services aimed at increasing equality, protection and inclusion. Uniquely, the state is a member of the *Guard Rails of the Alliance of Steel Countries*, which is in place to ensure that the sustainable restructuring of steel industries, climate protection, employment and industrial policies are not in competition with one another. This is one of the only groups of its kind and it provides a forum for stakeholders to discuss the challenges and nuances of industrial transition which could be used to inform policy development.

The German Government and State Government of Saarland have voiced clear commitment to change. Information about transition is communicated openly and transparently and is a key policy focus at both levels, suggesting a strong policy coherence. Together they have enacted future-oriented employment initiatives and energy transition initiatives that span across numerous policy areas and show a high level of planning and integration. Targeted industrial transition approaches (e.g., *Federal/Länder Task for the Improvement of Regional Economic Structures*) are critical addressing the challenge of coal dependence. Furthermore, one of the key instruments also takes the form of an Act (i.e., *Structural Development Act*), suggesting greater longevity and staying power across changes in government.

4. WESTERN MACEDONIA, GREECE: COAL TRANSITION SUPPORTED BY EU STRUCTURAL FUNDING

	National	Region (TL2)	Subregion (TL3)	Regional Classifications
	Greece	Western Macedonia (EL53)	Kastoria (EL532)	
Rural/urban typology			Intermediate region, remote	
% change GDP per capita 2014-2018*	2.8%	-13% Below national	-5.8% Below national	
Population change 2014-2018	1.5%	-3.4% Below national	-4.3% Below national	
Net Interregional mobility				
Share industry employment out of total 2018	9.4%	17.1%	17.5%	
Sector in transition	Energy (coal)			
Future opportunities	Diversification (SME's)			
Industrial transition plan	Yes			
Targeted supports	Yes			

*Or most recently available year

Western Macedonia is a mountainous region in Greece with a widely dispersed population. Lignite coal mining and electric power production have been the cornerstone of industrial development in the region for decades and there is still a high degree of coal dependence. Approximately 30% of Greece's electricity is still generated from coal (Mantzaris, 2018). Given the decarbonisation commitments of Greece and the EU, the region is transitioning away from coal toward more sustainable forms of development. There is a vested international interest in Western Macedonia's transition to better understand lessons and best practices for other coal regions.

Greece's economic strategy is focused on growth and development. The *Greece Growth Strategy for the Future* promises to increase investment, create jobs, support entrepreneurship and enhance the welfare state. Language in this strategy indicates the need to move toward a fair, sustainable and inclusive economic model fostering social and regional cohesion, suggesting that elements of a just transition are considered in a broad sense. The Government of Greece also has initiatives such as the *New Economy Development Fund* to develop venture capital funds focused on SMEs, and a *National Development Program* to support regional planning through project financing and regional and sector-specific programs. Both of these strategies aim to diversify the Greek economy away from industrial dependence. There are also specialized programs promoting employment such as the *Local Action Plans for Employment* and the *Local Actions of Social Inclusion for Vulnerable Groups*, which are both designed to create jobs in the tens of thousands.

The Government of Greece also released a 2020 *Just Transition Development Plan of Lignite Areas* which entailed community consultations and a call for proposals for project development to boost economic development in areas impacted by coal transition (SDAM, 2020). While this would appear to be a top-down plan in many respects, it is notable in the way in which it addresses the need for a coherent spatial management plan for lignite areas—these are vast land assets whose effective management will be critical to the region’s future development. It is described as a top priority in the plan. The national *Green Fund for De-lignification* also provides financing for key projects to help transition away from coal. While there is evidence to indicate low carbon transition is a priority, the country’s current energy policy includes constructing new oil and gas pipelines.

The Western Macedonia Regional Council’s *Operational Program of the Region of Western Macedonia* is a multisectoral program serving as the main development and spatial planning tool that takes local priorities into account. Regional plans and policies are mainly supported through European Union funding, such as the *Bridges Program*, *European Life Program*, *Operational Programme Competitiveness, Entrepreneurship and Innovation (EPAnEK)* and *LEADER program*. Together, these programs provide support for Western Macedonia to realize its goals of diversification, SME and entrepreneurial growth, climate action and innovation. Western Macedonia is also one of three regions targeted for the European Climate Initiative’s *Just Transition in South-Eastern Europe* program dedicated to establishing tailored solutions to economic transformation in coal regions.

Based on the distribution of instruments, the Government of Greece has taken on most responsibilities for transition, including targeted supports for coal regions. Responsive measures for workers and communities in coal regions and proactive labour market development plans would position the region for greater transition success. While plans such as the *Greece Growth Strategy* encompass environmental, social and economic considerations, a sound implementation plan must accompany this strategy for these goals to materialize. Furthermore, economic development opportunities could be more strategically oriented towards low-carbon and digital transformation to remain competitive in the global economy.

5. PIEDMONT, ITALY: SMART SPECIALISATION AND INDUSTRY 4.0

	National	Region (TL2)	Subregion (TL3)	Regional Classifications
	<i>Italy</i>	<i>Piemonte/Piedmont (ITC1)</i>	<i>Turin (ITC11)</i>	
Rural/urban typology			Predominantly urban region	
% change GDP per capita 2014-2018*	4.6%	5.2% Above national	4.9% Above national	
Population change 2014-2018	-0.6%	-1.5% Below national	-1.3% Below national	
Net Interregional mobility		3734	2074	
Share industry employment out of total 2018	16.8%	21.1%	24.5%	
Sector in transition	Automotive			
Future opportunities	Service sector; information technology and telecommunication			
Industrial transition plan	Yes			
Targeted supports	Yes			

*Or most recently available year

The Piedmont region in northwestern Italy is home to several major industrial centres. Traditionally Piedmont specialized as an automotive region, but new specializations have been emerging in information technology and telecommunications (European Commission, 2020c). With a focus on innovation, the region is diversifying its economy through policy instruments designed to increase competitiveness, support businesses and modernize industry. Piedmont was also selected for the European Commission's *Pilot Actions on Regional Transition Program* to better understand how global trends in industrial modernization impact the region and to identify policy responses.

The Government of Italy's industrial transition plan is centred on innovation. The plan, *Transition 4.0*, supports investments in innovative and green industries and subsequent workforce planning needs, such as tax credits for training. Innovation is also a key focus of the *National Fund* which aims to increase financial resources for innovative companies, start-ups and SMEs. The *Integrated National Plan for Energy and Climate 2030* also aims to achieve greater innovation and competitiveness, as well as to achieve decarbonization, greater energy efficiency and research.

The Piedmont Regional Government has measures in place to support technological change in industry. Policies such as the *S3 Smart Specialization Strategy* aim to adapt industry to change using research and innovation as a way to reinvigorate the region. The goal of the *Smart Factory Technology Program* is to grow manufacturing and advance innovative technologies. Rather than moving beyond its industrial tradition, the region's economic foundation would remain intact but become more competitive using this policy approach.

The Piedmont Regional Government also has responsive programs for workers and communities such as the *Official Plan for Infrastructural Interventions in the Territory*, which prioritizes investments to expand broadband internet in areas in need. *Social Shock Absorbers* is another responsive income protection program for employees of companies in crisis. Uniquely, the region also offers programs, services and resources aimed at guaranteeing social protection, equal opportunities and inclusion, including the *We Care Regional Strategy* – a social innovation program. Ensuring a strong social infrastructure is critically important for communities facing change and decline and is a policy area often overlooked in transition planning.

Between national and regional instruments, Piedmont is well positioned to respond to the challenges of industrial transition. Policy areas and jurisdictional approaches share the common goals of innovation and renewal. The *Transition 4.0* program suggests that economic transition should be more actively managed to mitigate the potentially adverse effects of a free market decline. However, the policy's national scale may overlook distinct regional needs in areas experiencing rapid change. At the regional level, *Social Shock Absorbers* and the *Official Plan for Infrastructural Interventions on the Territory* both have the potential to be deployed to support workers and communities impacted by the decline of the automotive sector in Piedmont. Sustainability considerations are also evident as many policies, particularly at the national level, are pursuing clean growth alongside economic transformation.

6. INCHEON, CAPITAL REGION, KOREA: FROM INDUSTRIAL ROOTS TO A KNOWLEDGE-BASED ECONOMY AND A GREEN NEW DEAL

	National	Region (TL2)	Subregion (TL3)	Regional Classifications
	Korea	Capital Region (KR01)	Incheon (KR012)	
Rural/urban typology			Predominantly urban region	
% change GDP per capita 2014-2018*	8.8%	18.4%	10.6%	
		Above national	Above national	
Population change 2014-2018	1.8%	-1.8%	2.7%	
		Below national	Above national	
Net Interregional mobility		59,797	-67	
Share industry employment out of total 2018	17.5%	16.0%	22.7%	
Sector in transition	Manufacturing			
Future opportunities	Knowledge economy			
Industrial transition plan	Yes (national)			
Targeted supports	No			

*Or most recently available year

The Capital Region of Korea is a highly urban environment which has traditionally been reliant on its manufacturing base. Sub-regions like Incheon Metropolitan City² are moving towards a knowledge-based economy in response to industrial decline. Incheon is also one of few sub-national governments to have joined the Powering Past Coal Agreement in response to air pollution in the Capital Region (McCurry, 2019).

The Government of South Korea has made a concerted effort to respond to major structural changes that are unfolding in the country, including the fourth industrial revolution. Rather than creating disparate policies which each address a different area, the *Korean New Deal: A National Strategy for a Great Transformation* encompasses a climate strategy (i.e., a green new deal) including a commitment to a coal phase out, a digitization strategy (i.e., a digital new deal) and measures to strengthen the employment and social safety net. The plan includes ambitious objectives and funding allocations to enable industrial and technological innovation accompanied by inclusive growth. Other policies and reports supplement this work, such as the *Finding a Path to a Future Job* analysis and the *Innovation and Growth Engine* which outlines growth areas (e.g., investments in SME's; transforming the industrial base).

² There is no administration for the Capital Region, thus the sub-region of Incheon Metropolitan City at the TL3 level will be examined for the purposes of this study.

Incheon Metropolitan Council has secured significant industrial investment from the creation of the *Incheon Free Economic Zone*, which improves business and residential conditions for foreign investment companies by relaxing regulations. Through the designation of the 'free economic zone', the Council hopes to attract investments in business, logistics, high tech, healthcare, medicine, education, tourism and culture. There are significant capital infrastructure projects in the *Development Plan* for the three regions of the Incheon Free Economic Zone, including Songdo International City, Yeongjong International City and Cheongna International City. Incheon is also a recipient of the *Green Climate Fund*, established by advanced economies to help developing economies minimize social and economic losses stemming from climate change, adapt to new environmental conditions and reduce global GHG emissions.

The Government of South Korea's *Korean New Deal* demonstrates a dedicated commitment to managing industrial transformation in ways that shape the country's economic, social and environmental trajectories. The growth areas identified set ambitions for a more advanced economy centred on digital and technological transformation. However, there is little alignment between the national and regional approaches to economic transformation. The free-market focus demonstrated by the Incheon Metropolitan Council suggests it is primarily concerned with immediate needs, rather than securing long term sustainable growth. While the *Incheon Free Economic Zone's* focus on foreign investment could have positive economic benefits, there is a risk that this creates dependence on international entities. Relaxing regulations to spur economic growth could also result in unjust or detrimental environmental impacts because of reduced oversight. There are virtually no other policies in place to support workers or communities in Incheon. While the city is a recipient of the *Green Climate Fund*, it is unclear how environmental targets will be reached or considered against economic objectives.

7. BAY OF PLENTY, NEW ZEALAND: IDENTIFYING AND DEVELOPING GROWTH CLUSTERS FOR INCLUSIVE PROSPERITY

	National	Region (TL2)	Subregion (TL3)	Regional Classifications <ul style="list-style-type: none"> ■ Transitioned Regions ■ High Industry Regions ■ Growing Industry Regions ■ Low Industry Regions ■ Bay of Plenty Region
	New Zealand	Bay of Plenty Region (NZ014)	Bay of Plenty Region (NZ014)	
Rural/urban typology			Intermediate region	
% change GDP per capita 2014-2018*	10.7%	22.2%	Above national	
Population change 2014-2018	7.4%	12.6%	Above national	
Net Interregional mobility		17,451	17,451	
Share industry employment out of total 2018	11.3%	9.8%	9.8%	
Sector in transition	Forestry sector; manufacturing			
Future opportunities	Renewable energy			
Industrial transition plan	Yes (national)			
Targeted supports	Yes (national)			

*Or most recently available year

The Bay of Plenty region in New Zealand is an important timber growing and processing area. The forest industry is the top contributor to regional GDP. However, its vitality has been threatened by global economic shifts, regulatory uncertainty, land prices and reliance on a small sector base (Bay of Plenty Regional Council, 2019). The manufacturing sector employs the most workers in the Bay of Plenty and is also experiencing low growth (Bay of Plenty Regional Council, 2019). To shift its economic focus, the Government of New Zealand and the Bay of Plenty Regional Council are looking to renewable energy and tourism.

Green transition is a key focus for the Government of New Zealand, which has voiced a strong commitment to climate action. The national government has explicitly recognized the social implications of a low-carbon transition and has designated policy measures to minimize harms and maximize social and economic benefits. Specifically, the notions of justice and inclusion are central to the country's *Climate Change Program*, which includes a *Transition Hub* with a mandate to provide advice on low-carbon transition. The Government of New Zealand has also established a *Just Transition Unit* to research the impacts of major climate change policy decisions on households, communities and industries.

There is sound integration of environmental concerns at the national level in other policy areas, including the *Economic Plan* which identifies key actions to transition the economy toward sustainable and inclusive growth. The Government of New Zealand also has targeted measures to increase innovation and productivity across key sectors through tailored *Industry Policies*, including forestry and wood

processing. An *Employment Strategy* complements the government's economic vision by facilitating a labour market shift aligned with the industrial transition.

The Bay of Plenty Regional Council leverages region-specific opportunities and challenges through its *Regional Economic Development Strategy*. The objectives are to attract businesses to the region, address skills shortages in industry, make commercial land available for industrial parks, increase tertiary education and support key industry clusters. This indicates comprehensive coverage of critical transition policy areas in a single plan. Both the *Annual Plan* and the *Bay of Connections Growth Strategy* outline action plans for ensuring priority projects are funded and key sectors are supported.

The Bay of Plenty Regional Council has also made financing available to local governments with flexible parameters to address unique local needs through the *Community Initiatives Fund*. The region also has strong partnerships with iwi and Māori peoples and a commitment to inclusion in their policy framework. The *Hapū/Iwi Resource Management Plan* outlines resource management issues important to local Indigenous peoples, which are then taken into account by council through legislative requirements. The inclusion of Indigenous peoples in decision making, particularly in areas regarding resource development, is noted as critical in just transition literature.

Between national and regional government policy instruments, the Bay of Plenty represents a positive example of a region on a path toward inclusive, sustainable economic growth. What is missing from this approach are supportive responsive policy measures to directly address the impacts of employment decline in manufacturing and forestry. However, the presence of the national *Employment Strategy* suggests concrete employment programs may be available in the future for workers adjusting to the transition. Economic initiatives at both the regional and national level suggest the potential to spur job creation and create economic growth through the shift to the low-carbon economy, which in turn could also benefit displaced workers (e.g., *Transition Hub*; *Regional Economic Development Strategy*). The existence of the Just Transition Unit is one of the first governance mechanisms of its kind. Internal government capacity supporting the pursuit of a just transition could be imperative to the country's transition success.

8. BASQUE COUNTRY, SPAIN: REINVENTING A MANUFACTURING BASE THROUGH TARGETED SUPPORT, DIVERSIFICATION AND DIGITIZATION

	National	Region (TL2)	Subregion (TL3)	Regional Classifications
	Spain	Spain/ Basque Country (País Vasco) (ES21)	Gipuzkoa (ES212)	
Rural/urban typology			Predominantly urban	
% change GDP per capita 2014-2018*	12.67%	11.3% Below national	9.94% Below national	
Population change 2014-2018	0.68%	0.35% Below national	0.63% Below national	
Net interregional mobility		-9	-144	
Share industry employment out of total 2018	11.3%	18.8%	22.48%	
Sector in transition	Automotive, manufacturing			
Future opportunities	Advanced manufacturing (e.g., aeronautics, machinery, energy); agriculture; service sector			
Industrial transition plan	Yes			
Targeted supports	Yes			

*Or most recently available year

Basque Country is an industrial region in Spain that relies heavily on its steel and automotive sectors and is highly integrated into the global economy. In 2008, Spain faced significant impacts from the global financial crisis. These impacts were felt acutely in regions, creating structural shifts in industrial regions (European Commission, 2020a). For example, 75.8% of workers in Basque Country are currently employed in the service sector compared to 47.4% in 1982 (La Moncloa, 2019). Despite these shifts, more advanced industrial activities in machinery, aeronautics and energy are deemed to have strong economic growth potential.

To respond to the impacts of the financial crisis, long-term economic transition and intraregional inequalities, the Government of Spain has implemented structural reforms and targeted supports to reduce income disparities. Regional development, digitization and economic growth are key priorities. The public entity, *Red.es*, is responsible for deploying initiatives such as the *5G National Plan*, the *Smart Territories Strategy*, and the expansion of broadband coverage and support for SME's. The economic shift in Spain has also affected the energy sector. National *Just Transition Agreements* with territories experiencing coal mine, generating station and nuclear power plant closures demonstrate the country's sensitivity to disruptive economic change. Furthermore, the *Strategic Plan of Comprehensive Support to the Automotive Sector*, which aims to promote job creation, sustainability and industrial innovation, could support auto manufacturing regions such as Basque Country.

At the regional level, the Basque Government is reimagining its approach to industrial production. Plans such as the *Science, Technology, and Innovation Plan* and the *Industrialization Plan* outline ways to

stimulate economic growth and employment in industry through diversifying products and value-added manufacturing. There are also initiatives in the region to explore growth opportunities in the food and agricultural sector. The region also has forward-facing policies to support workers such as the *Vocational Training Plan*, which establishes a training model to ensure worker readiness for digital transformation and globalization. In addition, the region provides support to SMEs experiencing financial difficulties through the *New Focus 2020 Program: Aid for restructuring and boosting companies in crisis*, demonstrating its capacity to enact responsive measures.

Together, the regional and national policy instruments in place cover the key areas necessary to facilitate a successful industrial transition. Areas for growth have been identified nationally (e.g., digitization) and regionally (e.g., diversification), training is being adapted to look at future demand, and disadvantaged areas and sectors are supported. This case study is one of only a few with specific measures in place to support a struggling industry (i.e., automotive sector support plan). While climate and energy plans exist at the regional level, there is little to suggest climate change and low-carbon transition considerations have been integrated with the approach to economic revival. There is an opportunity for the national *Just Transition Agreements* to be expanded beyond the energy sector to support regions experiencing decline in other sectors and to realize opportunities in the low-carbon economy.

9. KALMAR, SMÅLAND WITH ISLANDS, SWEDEN: FOCUS ON SMART INDUSTRY

	National	Region (TL2)	Subregion (TL3)	Regional Classifications
	Sweden	Småland with Islands (SE21)	Kalmar County (SE213)	
Rural/urban typology			Predominantly rural region, remote	
% change GDP per capita 2014-2018*	12.0%	15.8%	7.4%	
Population change 2014-2018	4.9%	4.6%	4.0%	
Net Interregional mobility		-796	-573	
Share industry employment out of total 2018	12.5%	21.2%	19.4%	
Sector in transition	Forestry sector; manufacturing			
Future opportunities	Culture; business development; SMEs; innovation			
Industrial transition plan	Yes (national)			
Targeted supports	Yes (national)			

*Or most recently available year

Småland and the Islands is a National Area in Sweden with historically strong forestry and manufacturing sectors. Counties within the National Area such as Kalmar³ are experiencing industrial decline. Efforts to renew the economy have been concentrated on strengthening cultural development, business growth and innovation. There are also efforts to achieve sustainability, improve technology and increase labour market participation through key policy instruments.

At the national level, the Swedish government has implemented measures such as the *Smart Industry* strategy to promote new industrialization in Sweden and to advance the transition toward 'Industry 4.0'. This strategy encompasses other important areas such as digitization, increasing sustainable modes of production and boosting skill development. Given the economic importance of the forest sector, the *National Forest Program* is also in place to reimagine forest sector management, grow the bioeconomy, promote conservation and increase product innovation, all while considering climate change impacts. Regions are supported through the *National Strategy for Sustainable Regional Growth and Attractiveness*, which aims to address societal challenges (e.g., climate change and social cohesion), and enhance skills upgrading.

A national labour market strategy is absent; however, skill development is included as a part of both the *Smart Industry Strategy* and the *Regional Growth and Attractiveness* strategy. Similarly, climate considerations are integrated into planning in other key policy areas, complementing the country's

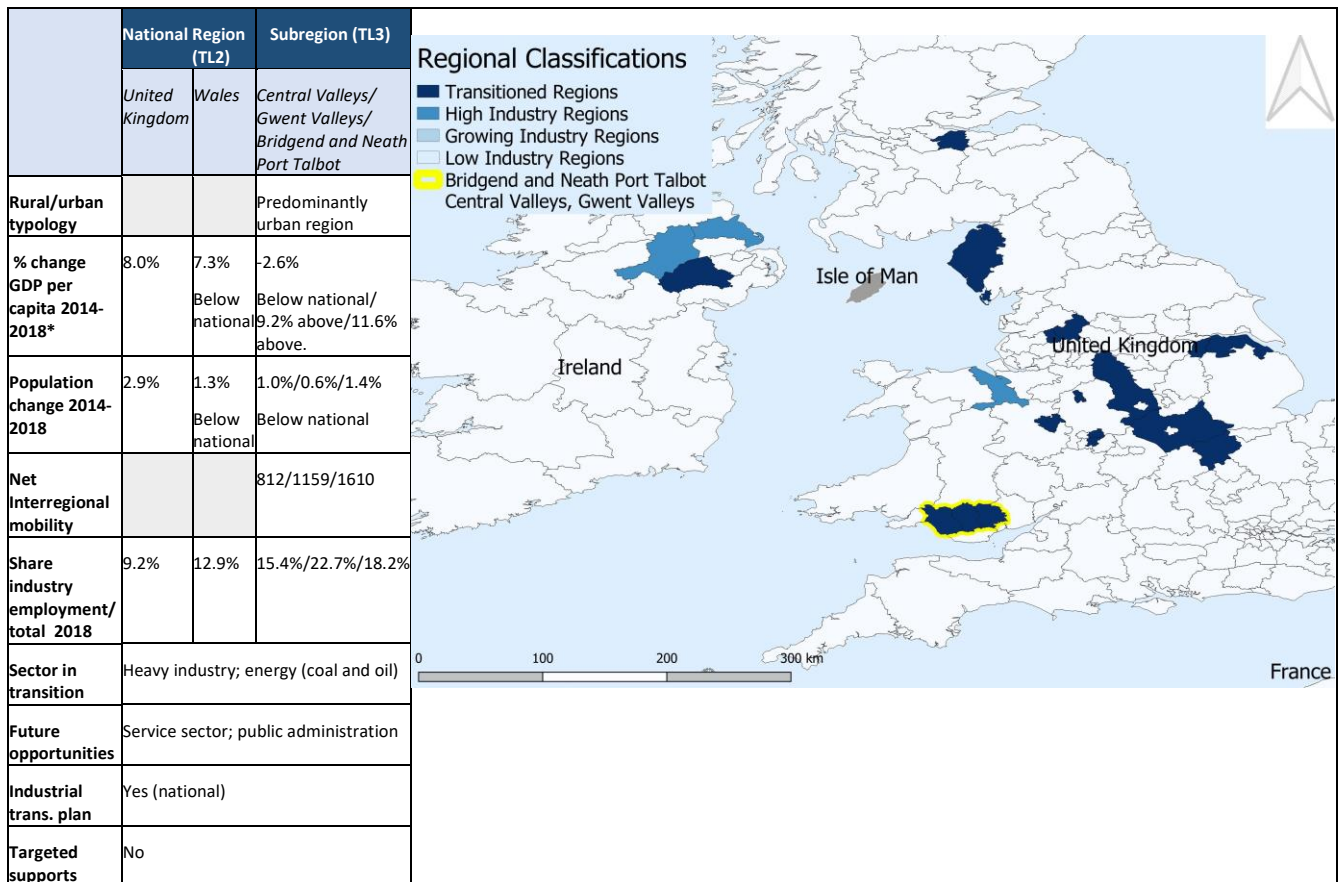
³ Given that there is no administration for the National Area of Småland and the Islands, this case study focuses on the activities and priorities of Kalmar County at the TL3 level.

Swedish Climate Policy Framework. The *Smart Industry* and *National Forestry* strategies also showcase the government's commitment to a thoughtfully managed industrial transition. While these are broad in scope, they are likely to benefit these sectors in Småland and the Islands, as they are imperative to its regional economy.

Kalmar's planning is guided by a *Regional Plan*, a *Regional Development Strategy* and an *Innovation Strategy*. Each of these policies is founded in achieving UN Sustainable Development Goals. Business, culture, tourism, rural development and SME's are seen as areas with the greatest growth potential and are supported through funding, administrative support and project development tools provided through Kalmar County Government programs. Given the importance of sustainability transitions, businesses have access to business plan support to help them comply with environmental legislation requirements. Infrastructure projects in the county are focused on improving digital connectedness, broadband expansion, transportation and health, indicating a clear transition from an industrial-based to a service-based economy.

The priorities of Kalmar County are clearly defined, but concrete funding programs are not clearly identifiable. The Kalmar County Government also does not explicitly acknowledge economic shifts despite employment change clearly unfolding, and thus local worker, community and sector support programs have not been implemented. While the region is championing its own economic development, most of the necessary instruments for regions in transition are set at the national level (i.e., regional and rural development; workforce transition; sector-specific strategies). Structural funding from the EU for the larger area of Småland and the Islands may address more local economic concerns and may have a more meaningful impact, despite the fact that there is no administration for the National Area.

10. WALES, UNITED KINGDOM: DECARBONISING THE VAST POWER AND INDUSTRY SECTORS



Note: Territorial codes: UKL15: Central Valleys; UKL16: Gwent Valleys; UKL17: Bridgend and Neath Port Talbot

Wales is a devolved administration in the United Kingdom traditionally reliant on agriculture, coal, oil and heavy manufacturing. Employment has declined in heavy manufacturing, while employment in the service sector, including public sector employment in health and education, has increased. Southern Wales, including the sub-regions of Central Valleys, Gwent Valleys, and Bridgend and Neath Port Talbot, has experienced significant downturn in the coal mining sector.

As several regions in the United Kingdom are experiencing industrial shifts, it is fitting that the national government has enacted an *Industrial Strategy* to boost productivity, earning power and community prosperity. The strategy includes a *Challenge Fund for Research and Innovation*, which aims to bring researchers and businesses together to address major industrial and societal challenges and opportunities. The Government of the United Kingdom also has a *National Retraining Scheme* to encourage retraining and multi-skilling, as well as preparedness for economic change caused by automation. At the community level, the UK's *Local Industrial Strategies* support municipal industrial planning and the *UK Shared Prosperity Fund* (replacing EU structural funding post-Brexit) provides economic, business and community development support.

In addition to industrial and economic planning for the United Kingdom, the Welsh Government has enacted a forward-looking economic plan, *Prosperity for All*, that includes specific funds for regional development and key sector supports. A *National Development Framework* is also in place outlining a long-term strategic framework to help determine where and how nationally significant developments should take place. The Welsh Government also has measures to move the economy forward through innovation (*Innovation Wales*), digitization (*Digital Wales*), infrastructure investments (*Wales Infrastructure Investment Plan*) and by providing information, tools and guidance for regional and local business development. Social development and employment are supported in Wales through a *Social Enterprise Action Plan*, an *Employability Plan*, employment and training supports and an *Equality Planning Strategy*.

Uniquely, Wales has adopted the *Future Generations Act* in 2015 and established a Future Generations Commissioner tasked with considering the long-term impact of government decisions and to prevent persistent problems such as poverty, health inequalities and climate change. The Future Generations Commissioner includes a just transition as an area of focus in annual reporting (Future Generations Commissioner of Wales, 2020). In 2019 the Welsh Government also committed to establishing a Climate Justice Advisory Group.

Both the Welsh Government and the Government of the United Kingdom have initiatives in place to support workers, increase innovation and boost the economy. The *National Retraining Scheme* is an important initiative for workers potentially displaced by industrial transition, as a proactive approach to workforce development has the potential to increase resiliency and preparedness for economic change. The number and scope of programs implemented by the Welsh Government also suggests a more social democratic approach that is highly engaged in matters such as industrial transition. However, there are no specific measures in place to respond to the pertinent decline in the Welsh mining sector despite the fact they are signatory to the Powering Past Coal Agreement.

Existing programs could potentially be adjusted in design to assist mining regions such as the Central Valley, Gwent Valley, and Bridgend and Neath Port Talbot regions. The *National Development Framework* could be leveraged by prioritizing development projects in regions facing transition. Establishing climate and energy priorities that target development in these areas could offer an opportunity to address low-carbon transition in a way that creates a just transition for mining regions and mitigates the adverse effects of industrial decline.