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Framework development for ‘just transition’ in coal producing jurisdictions**Authors:** Kieran Harrahill & Owen Douglas***Address:** School of Architecture, Planning & Environmental Policy, Planning & Environmental Policy Building, **University College Dublin**, Richview Campus, Belfield, Dublin 4, Ireland.*Corresponding Author: owen.douglas@ucd.ie**Abstract**

The rhetoric of the ‘just transition’ lies at the heart of energy and development policies internationally. In this context, it is crucial that communities dependent on fossil fuel extraction and production for employment do not become ‘victims’ of the decarbonisation process. This paper involves a theoretically and conceptually grounded comparative analysis of policy measures that have been introduced in three first world jurisdictions which have been dependent on coal for employment – North Rhine-Westphalia in Germany, Alberta in Canada and Victoria in Australia. In so doing, measures which have successfully ameliorated the socio-economic well-being of coal dependent communities are identified and a framework for successful just transition is proposed. Recognising, but notwithstanding, inherent power dynamics, the framework identifies an important role for government in assisting workers and communities in navigating the transition process and in supporting new and emerging low-carbon industries in the context of ‘strong’ sustainable development.

Keywords: decarbonisation; sustainable development; social justice; communities; politics; power**1.0 Introduction**

Energy policy incentives increasingly favour low-emission choices. As part of the international trend of decarbonisation, transitions away from coal production have been recorded in multiple jurisdictions across the globe (see for e.g. Vriens, 2018, Wiseman et al., 2017, Galgóczi, 2014). In this context, the OECD has recognised that “communities specialised in high emission activities will be affected, as local jobs may decline or be eliminated” (OECD, 2017 p.239). Recent research has identified negative implications of such transitions for coal mining communities, ranging from damaging socio-economic repercussions (Synder, 2018), to cultural consequences such as the loss of embedded local identity (Della Bosca and Gillespie, 2018). As a means to mitigate the negative impacts that such structural adjustments might have on affected societies, the idea of the ‘just transition’ has emerged (Kumar, et al., 2016 p.6). The stated aim of the ‘just transition’ is to ensure that policies which are environmentally beneficial do not cause

undue harm to the social or economic well-being of those who are, or have traditionally been, dependent on the fossil fuel sector (Robins, et al., 2018).

Support for the 'just transition' was included in the outcome declaration of the Rio+20 Earth Summit in 2012, with an emphasis on the need to create 'programmes to help workers adjust to changing labour market conditions' (Stavis & Felli, 2014 p.33). Furthermore, the Paris Climate Agreement identified the imperative for just transition as an essential element of climate action (Doorey, 2017). Despite the overwhelmingly positive rhetoric of the 'just transition' within policy discourses, recent studies have identified substantial challenges in the implementation of the 'just transition' process. It is on this basis that this paper seeks to identify critical success factors in the form of policy measures which might overcome the key challenges to the achievement of the just transition. First, we identify the key challenges associated with the 'just transition' approach, both conceptual and practical. Second, we employ three international case studies to assess varying approaches to energy transition from a just transition perspective. To operationalise this, four factors based on indicators set-out by the European Trade Union Institute are employed to identify critical 'just transition' success factors in the case study jurisdictions. Finally, based on the analysis, we propose an internationally applicable evidence informed framework for the implementation of a community focused 'just transition' for jurisdictions dependent on coal.

2.0 Challenges for the 'just transition'

In the simplest of terms, 'just transition' seeks to synthesise environmental, labour and social justice frames by advocating policies which are based on 'just sustainability' (Christmas & Robinson, 2015). The concept seeks to address social concerns and inequities which emerge 'from efforts to overcome environmental problems' (Snell, 2018 p.550) and deliver economic, environmental and social gains for localities previously dependent on 'dirty' industries (Robins, et al., 2018 p.2). Beyond the generality of this first level of meaning however - as is the case with 'sustainability' and notions of 'just sustainability' (Owens & Cowell, 2002) - differing conceptions of the just transition are possible, incorporating different visions of a 'sustainable society' and the means of achieving it. Furthermore, prevailing political structures and power dynamics act to influence structural change. The differentiation of 'weak' and 'strong' sustainable development is a useful means by which to demonstrate contrasting visions of the 'sustainable society' and in turn, the potential means by which to transition to it.

2.1 Weak sustainable development and the 'just transition'

Weak sustainable development derives from ecological economics by focusing on different forms of capital that contribute to production and hence the generation of profit and wealth (Rydin, 2010). These include natural/environmental capital, human-made physical/financial capital, human capital and social capital which can be freely substituted for one another (Neumayer,

2003). With the possibility of ‘trade-offs’, what is important is that the overall stock of capital grows or stays the same. Adopting a weak sustainability perspective is politically attractive because it offers the prospect of continuing with patterns of economic activity which approximate ‘business-as-usual’. Such a weak sustainability approach underpins much current thinking on achieving sustainable development and is closely aligned with what can be referred to as ‘passive’ transition approaches, whereby transitions away from fossil fuel production are perceived as a natural outcome of political-economic forces and technological change (Goods, 2013).

Questioning the merits of the ‘weak sustainability’ philosophy, Stevis and Felli highlight how ‘environmental policies could and would have conjunctural impacts under a liberal capitalist system that shifts negative externalities to workers and communities’ (Stevis & Felli, 2014 p.32). Indeed, as argued by Morgenstern et al. (2002 p.412), “environmental policies involve economic costs that are unevenly borne by individuals and industries across the economy”. While the low-carbon economy may improve the physical health of people working in jobs which are unhealthy and exploitative (Stevis & Felli, 2014), it may also augment perceptions of disparity (Goods, 2013) whereby environmental regulation disproportionately impacts blue-collar workers in a negative manner (Chen, 2017). As argued by Marcuse (1998), programmes and policies can be sustainable and socially just, but unfortunately, they can be sustainable and unjust since sustainability, when weakly defined, and social justice do not necessarily go hand in hand. Ecological modernisation can be categorised as weak sustainable development since it assumes that ‘existing political, economic, and social institutions can internalize the care for the environment’ (Hajer, 1995 p. 25) while remaining silent on issues of social justice. This response ‘explicitly seeks to harness the power of the capitalist market in order to deliver environmentally beneficial outcomes’ (Stevis & Felli, 2014 p.35) with no consideration of social justice. Indeed, capitalist power can ‘enforce and enable or resist and prevent’ a particular outcome such as social justice by keeping them ‘off the agenda’ (Avelino & Rotmans, 2009 p.555, 547). Transition contestations result in dominant actors deploying ‘all the tools at their disposal to preserve their position’ (Meadowcroft, 2016 p.11). The ability of dominant actors in the fields of business or governance to control the discourse surrounding an issue can ensure that their viewpoints are presented as the best solution to an issue.

Within the field of transition studies, the relationship between the dominant forms of energy and economic growth affords ‘large providers of energy a degree of structural power in state decision-making which they have exercised repeatedly in climate change politics’, thus hampering the potential for a prompt transition away from fossil fuels (Johnstone & Newell, 2018 p.78) and perpetuating the weak sustainable development approach. The strength of dominant actors or institutions is reinforced by legal means, which, according to Johnstone & Newell, assist in the reinforcement of dominant class interests: ‘the law then as a means of managing and steering

transitions is not neutral, a mere tool of regulation, but rather embodies and reinforces particular class interests' (Johnstone & Newell, 2018 p.78). In this context, weak sustainable development and 'passive' transition are dominant.

2.2 Strong sustainable development and the 'just transition'

Strong sustainable development is based on the premise that it is not appropriate to substitute different forms of capital given the uniqueness and irreplaceability of environmental (Pearce & Turner, 1990) and social structures. Given the predominance of 'weak sustainability' in traditional policy discourses, strong sustainability, and in turn the just transition, requires a breakaway from current practices in terms of economic approaches and ownership of resources since 'it is through coalitions and relations with state institutions that incumbency is maintained and radical transitions are inhibited' (Johnstone & Newell, 2018 p.75). Strong sustainable development requires 'transformative transition' which engages a 'different growth path and new ways of producing and consuming' (Goods, 2013 p.17). While it is apparent that the strength of dominant actors makes it difficult to reduce their dominance in society and energy production, Kern and Rogge argue that 'the whole idea of transition policies is to shift political power away from incumbents and enable institutional change favourable to niches' (Kern & Rogge, 2018 p.17). When new 'niche groups' coalesce, they 'represent a force capable of offering a significant counter-weight to their mutual adversaries ... capable of bringing about dramatic social change' (Obach, 2004 p.301). This form of 'just transition' would potentially see the state intervene more actively in the political economy to create jobs in 'green' sectors alongside the absorption of carbon capitalism's negative social externalities (Healy & Barry, 2017 p.455).

Under strong sustainability, 'democratic planning' of the economy is advocated, as well as the socialisation of technology production and development, and the 'democratic control and public ownership of remaining fossil fuel supplies' (Stavis & Felli, 2014 p.38). On this basis, Goods argues that 'the current political economic system is incapable of achieving the changes required to deal with the environmental challenge and must be opposed' (Goods, 2013 p.17). Baer (2016) identifies the challenges that this approach would pose to the power of the existing coal-industry/state nexus (Baer, 2016). The state would need to provide welfare and adequate compensation for people and communities that have been marginalised or negatively impacted by a low carbon energy transition (Healy & Barry, 2017). Even wholesale nationalisation within the coal industries is not without precedent. Phillips highlights how the nationalisation of the British coal industry resulted in investment that would have been unlikely under existing private ownership' alongside enhanced conditions for workers (Phillips, 2013).

3.0 Policy responses for the ‘just transition’

Recent international policy developments have identified the need for more appropriate policy responses. In September 2015, UN member states adopted a set of 17 Sustainable Development Goals (SDGs) to end poverty, protect the planet, and ensure prosperity for all as part of a new sustainable development agenda. While not advocating a breakaway from existing economic and political systems, the 2030 Agenda identified roles for governments, the private sector, civil society and citizens in achieving sustainable development. The Agenda emphasised the need for the harmonisation of three core elements: economic growth, social inclusion and environmental protection for the achievement of Sustainable Development. In order to achieve such harmonisation, the three underlying principles of ‘universality’, ‘indivisibility’ and ‘transformation’ were identified. That is, unlike ‘weak’ sustainability perspectives, policies must strive to be universal, they cannot be positioned in a hierarchical or prioritisation order and they must transform current challenges (including just transition) into opportunities for the 5Ps (peace, people, planet, prosperity and partnership).

While such policy developments would seem to provide the basis for transitions to ‘strong sustainability’, it must be recognised that international environmental agreements have previously failed to make positive impacts on global environmental practices. Furthermore, it has been argued that the overarching focus on vague interpretations of ‘sustainability’ means that traditional ideals of ‘social justice’ or ‘balancing’ market and social interests in the ‘public good’ are neglected (Gunder and Hillier, 2009). That is, instead of ‘social justice’, dominant economic actors are driven by institutional and market imperatives of competition, growth and globalisation - the very causative factors of capital generating inequality, exploitation and degradation of peoples and environments (Barry and Paterson, 2004, Keil, 2007).

There is a clear need to address the key political economy questions of ‘who wins, who loses, how and why’ in terms of the social costs of decarbonising energy sources and economies (Newell et al., 2011). Notwithstanding this, there is also a need to develop strategies and frameworks which can inform policy to influence the implementation of appropriate measures which can deliver viable economic and social futures for populations in regions which have been reliant on fossil fuel extraction and production. As stated by Sartor (2018, p.35), ‘coal transitions can be implemented in a way that is highly coherent with other crucial socio-economic objectives...they can support stable economic growth, innovative industrial development and high levels of employment’ (Sartor, 2018 p.35). However, without appropriate reassurances regarding their economic and social survival, coal dependent communities may resist rapid decarbonisation (Healy & Barry, 2017) and the strong cultural affiliation that extractive industries can engender

in host communities (termed variously “addiction” or “cognitive lock-in”) can significantly limit the scope of transition planning (Haggerty, *et al.*, 2018).

Given these dynamics, for governments to confront climate change, and use law as a means to facilitate a transition away from a high carbon economy, they will need public support (Doorey, 2017). Such support is unlikely to be forthcoming unless policies are in place to protect families and communities who may be adversely affected during the transition. This basic observation is at the root of the just transition movement and policy platform (Doorey, 2017) and forms the basis of what is required if the challenges of reducing environmentally degrading practices and enhancing the conditions of workers are to be jointly accomplished.

Workers have often been presented as the public face of opposition to environmental protection (Vachon & Brecher, 2016). However, research has shown that workers in ‘dirty’ industries tend to support environmentally friendly policy measures once their immediate interests are not adversely affected by those policies (Vachon & Brecher, 2016, Chen, 2017). That is, they are not averse to pro-environmental policies, but rather the perceived social and economic implications which may accompany them. Indeed, environmental protection and the move towards the low-carbon economy has the potential to create employment just as much as it can cause unemployment (Morgenstern, *et al.*, 2002; Pociovălișteanu, *et al.*, 2015; Ernst & Young, 2014 p.67), since it provides security to those in uncertain sectors. Policy must therefore find a means of reducing environmental degradation while maintaining the socio-economic well-being and health of individuals.

4.0 Methodology

As discussed by Healy & Barry (2017), job creation is a poor proxy for a just transition. The kind of jobs, how secure they are, how long they last, and related forms of community resilience and innovation in the face of dynamic energy markets are much more meaningful. Alternative jobs may provide workers with lower wages and lower levels of responsibility, resulting in workers losing their ‘professional pride, socio-economic status, and personal identity’ (Caldecott, *et al.*, 2018 p.13). With a view to identifying critical success factors, three case studies were first selected to examine transition approaches in three first world jurisdictions whose approaches to policymaking for the coal industry differ substantially.

First, North Rhine-Westphalia in Germany is a jurisdiction characterised by a corporatist approach to policy making. Corporatism is the process of policy-making whereby policy is formulated between employees and employers and often contains state input (Abraham, 2017 p.220). The region has been referred to as ‘the land of coal and steel’ due to the historical significance of these industries (Kumar, *et al.*, 2016 p.13). While having previously experienced structural adjustments during the 1960s and 1970s (Campbell & Coenen, 2017), the ‘2007 Hard

Coal Financing Act' stipulates that Germany's remaining eight hard coal mines were to be shut down by 2018' (Galgóczi, 2014), seven of which are located in North Rhine-Westphalia (Galgóczi, 2014 p. 222-223).

Second, the province of Alberta in Canada accounts for 65% of Canada's total coal capacity (Littlecott & Schwartzkopff, 2015 p.9). In the face of moves towards decarbonisation at the national policy level, Alberta is characterised by privately owned coal plants and strong public support for the energy sector. As such, it has many challenges to overcome in designing an effective coal phase-out (Vriens, 2018). The province's coal industry has been identified as the primary reason for Canada not meeting its greenhouse gas commitments (Leach, *et al.*, 2015 p.23). The election of the centre-left New Democratic Party has brought the issues of decarbonisation to the forefront of Albertan politics for the first time. Indeed, Alberta differs from the other case studies in that it has not undergone major structural adjustments in the past.

Third, the state of Victoria in Australia is home to the world's second largest deposit of brown coal (The Green Institute, 2016). Past policy decisions coupled with a lack of policy supports have caused significant socio-economic problems in parts of Victoria dependent on coal for employment (Environment Victoria, 2016 p.19). The case of Victoria also illustrates the difficulties associated with a federal system of government, particularly when national and state-level policies are mismatched.

The initial phase of the study involved the identification and collation of relevant academic and grey literature pertaining to the environmental and socio-economic impacts of decarbonisation in the case study jurisdictions published since 2007, the year of the Hard Coal Financing Act. The 2007 Act represents what Kumar *et al.* define as 'the socially acceptable end of subsidies' for the coal industry (Kumar, *et al.*, 2016 p.15), both in Germany and internationally. Similarly, Herpich *et al.* demonstrate how the concept of 'social compatibility' was central 'in the negotiations regarding the end date of the subsidies' (Herpich, *et al.*, 2019 p.19). Relevant literature was attained using literature databases including Web of Science and Scopus. Key words relating to the concepts of 'just transition', 'environmental justice' and 'employment' alongside the word 'coal' and the place names of the three case studies were searched. Furthermore, searches were applied to the websites of relevant bodies such as governments, unions and environmental NGOs. Subsequently, analysis of the found literature was undertaken followed by the synthesis of related papers and associated themes. More specifically, the strengths and flaws of policies relating to the concept of just transition in the context of the coal industry in each jurisdiction were identified.

In order to evaluate the potential effectiveness of policies implemented in the respective case studies, factors based on the indicators of a just transition identified by the European Trade Union Institute (ETUI) were employed to qualify the success or failure of policy measures taken

(Abraham, 2017). The ETUI is the independent research and training centre of the European Trade Union Confederation (ETUC) which itself affiliates European trade unions into a single European umbrella organisation. At its core is the welfare and representation of its members, and this is clearly its key focus as regards energy transitions. According to the ETUI, a just transition is characterised by social dialogue; re-employability; re-training, and; a central role for the welfare state.

In assessing ‘social dialogue’, we seek to understand whether the transition process is or has been one where those in the dominant positions (employers/central government) dictate the process of decarbonisation or whether those who depend upon coal (workers/local government) are influential within the process. For ‘re-employability’, we evaluate the nature of jobs (if any) created to substitute coal production. Access to re-training is assessed in each jurisdiction to explore if and how displaced workers are assisted in preparing for re-employment. The degree to which there is a welfare state in place is then assessed in terms of the payment of compensation to workers as well as the willingness of government to invest in workers and communities. To demonstrate the differing approaches jurisdictions have taken, and the impacts these policy measures have had, a factor matrix is developed. This matrix sets out the response of each jurisdiction to the four factors and informs the development of a framework for ‘just transition’. In order to differentiate between approaches to transition taken before and after environmental policy became a core justification for transition, ‘pre-environmental policy transition’ and ‘environmental policy transition’ phases are assessed for North Rhine-Westphalia and Victoria. Only the latter is considered for Alberta since no pre-environmental policy transition occurred in that jurisdiction.

5.0 Transition evaluation

5.1 Social dialogue

In assessing the role of co-determination in the just transition process, key factors include the ability of workers or workers’ representatives to influence the process. In corporatist North Rhine-Westphalia, the supervisory boards of enterprises in the coal and steel industry with more than 1,000 employees are required to comprise 50 per cent employer and 50 per cent employee delegates (Galgóczy, 2014). Forcing a consensus through social dialogue has facilitated the gradual reduction and near elimination of hard coal mining without major social or political upheavals (Schulz & Schwartzkopff, 2016). By giving workers a voice which is largely equal to that of industrialists, policy makers have managed to overcome difficulties that would have been faced by local communities as regards the loss of traditional industries. Communities are included in the process which acts to legitimise political decisions. As Abraham articulates, “without corporatist processes like codetermination and a rationalized, semi-public coal industry, the

miners' objections to the phase out of underground mining may have gone unanswered" (Abraham, 2017 p.230).

In Alberta, social dialogue is less well established. While unions have played an active role in securing compensation for workers, low levels of dialogue with communities and poorly defined structures have resulted in distrust towards decarbonisation processes and have potentially weakened the possibility for a just transition towards strong sustainability. Dialogue between unions and government did inform the design of the government's just transition programme (Vriens, 2018 p.v). Indeed, this programme was developed in collaboration with environmental organisations. While the inclusion of workers in the negotiation process represented progress, the failure to effectively include local communities has been criticised. An insight into this failing is illustrated in the following quote from a local newspaper:

'First, announce you're going to shut down an industry that will affect livelihoods in communities across the province. Next, promise to help them with the transition, but offer scant details. Set up a task force to examine the issue and have it run behind schedule' (Varcoe, 2017).

Not only do such failings leave communities economically worse-off, they potentially embolden figures who are opposed to decarbonisation. The lack of social dialogue can act to promote the narratives of pro-fossil fuel organisations who argue that the positive impacts of environmental policy come at the expense of blue-collar workers. Advocacy for the reversal of the carbon tax and "clean coal" by conservatives in Alberta are examples of this (Vriens, 2018).

The case of Victoria is similar to Alberta as regards social dialogue. Unlike North Rhine-Westphalia, the coal industry in both jurisdictions is privately owned and guided by liberal market economics. This system benefits the holders of capital rather than those who supply their labour. Within Victoria there is the added dimension that many coal plants are operated by multinational organisations. The case of the Hazelwood coal mine illustrates how these organisations can make market decisions, without considering the fallout for workers or communities. This mine was closed with a short lead-time and minimal consultation with unions or government (Wiseman, *et al.*, 2017). The lack of preparation for coal mine closure can hamper the effectiveness of measures put in place alongside the 'societal acceptance of assistance provided' (Jotzo, *et al.*, 2018 p.28). Due to the lack of corporatism as an arena for social dialogue, approaches to economic adjustment were reactive, characterised by short-term responses to political pressure in the immediate aftermath of industry closure announcements. As Snell and Fairbrother (2012) outline, while unions were able to secure adjustment packages for workers who lost their jobs, they could do little to secure a viable future for workers and communities.

Social dialogue has been identified as an important tool for anticipating and managing the effects of decarbonisation on workers and employers (International Labour Organisation, 2016). 'Employees want to be heard, in good faith, early in the process, and be given a chance to participate meaningfully in the decision-making process that concerns their future' (Sartor, 2018 p.27). It would appear that support for a just transition can be best achieved by including workers and communities in the transition process.

5.2 The role of local government

During the reorganisation of the coal industry- for economic rather than environmental reasons between 1980 and 1984 - the state government of North Rhine-Westphalia was responsible for the planning and implementation of the Ruhr Action Programme (Schulz & Schwartzkopff, 2016). This programme sought the development of a 'Modern Structural Policy for the Ruhr area' (Dahlbeck & Gärtner, 2019 p.40). With a budget of DM 6.9 billion, projects within this action programme included 'town planning, cultural policy, environmental protection and infrastructure' (Müller, *et al.*, 2005 p.100). During this period, the local government did not actively include local actors in the process (Schulz & Schwartzkopff, 2016). In an era when environmental policy was in its embryotic stages, the state government continued in its attempts to modernise and revive the ailing coal industry, rather than focusing on economic diversification (Schulz & Schwartzkopff, 2016). As an example of 'weak' sustainable development, the learning from this 'failed' experience has strongly informed the approach of the regional government in more recent decarbonisation processes. Underpinned by the Hard Coal Financing Act of 2007, central and local government have successfully worked alongside employer and employee representatives to negotiate an agreement to end subsidised hard coal mining (Schulz & Schwartzkopff, 2016). This illustrates successful economic diversification in a mining-dependent jurisdiction with active management by federal and regional government (Galgóczy, 2014 p.218).

The provincial government of Alberta has been central in the move away from coal production. However, it has failed to communicate effectively with communities. Union representatives have lauded the Albertan government's plan for assisting retiring workers and re-training those remaining in employment (Vriens, 2018). However, government action has been criticised for being 'sluggish' (Cattaneo, 2016). Furthermore, negotiations were divided between two ministries, meaning that communities were not given the opportunity to advocate for themselves in negotiations with power companies. This division meant that the power companies avoided the need to pay substantial compensation to workers affected by the transition. As such, the private companies who had profited immensely from coal production could avoid any responsibility in assisting jurisdictions in the decarbonisation process. With most of the efforts to transition coming from local government, details on support from the federal government are 'still forthcoming'

(Vriens, 2018). This case highlights the difficulties associated with national and local government collaboration and the need for local government to place local communities at the forefront of the dialogue. It also highlights the importance of meaningful dialogue between local and national government. Failure to do so places substantial financial constraints on local government.

Similar to North Rhine-Westphalia, the government of Victoria had previous experience of dealing with economic fallout from restructuring of the coal industry in the 1990s. In this case, restructuring was focused around the privatisation of the electricity sector, a distinctly liberal economic philosophy. One of the key criticisms, including from the government's own inquiry into the privatisation programme, was the failure to provide adequate assistance to the region when thousands of workers were made redundant (Snell, 2018). Similar to Alberta, the government of Victoria was affected by the division of power between local and national government. It was met by a hostile national government, with the Federal Minister for the Environment claiming that the main private energy company was "driven out of town" by the pro-environmental policies of the Victorian government which he labelled "an ideological approach" that "traded away blue-collar jobs in the regions to win green votes in the city" (Wiseman *et al.*, 2017 p.34). Despite these challenges from central government, the Victorian government succeeded in achieving a feasible outcome for communities. The union representing coal workers praised the Labor led government as having 'filled the Federal Government's leadership vacuum and come up with a workable plan' (Wiseman *et al.*, 2017 p.23). That is, the Victorian state government positively influenced the outcome of workers and communities.

This analysis demonstrates that the input of local government can influence the level of support policy decisions gain and their level of success in implementation. In particular, the German model places workers in a position of influence which can lead to a more seamless transition.

5.3 Re-employability

Whether workers remain dependent on traditional employment in the coal sector or new forms of employment very much depends on regional economic strategies. The transition from coal which North Rhine-Westphalia has undergone can be divided into phases of re-industrialisation and neo-industrialisation. Re-industrialisation involves supporting declining sectors such as the coal industry (Schulz & Schwartzkopff, 2016). During the mid-1980s substantial investment was made to modernise coal mining (Schulz & Schwartzkopff, 2016). This measure increased the jurisdiction's dependence on coal (Rosemberg, 2017). However, the more recent transition was motivated by environmental protection, as much as economic viability. Referred to as neo-industrialisation, this involved the diversification of the types of industry (Galgóczy, 2014). Central to this was a bottom-up approach involving co-operation between different actors – workers, communities, employers and government (Campbell & Coenen, 2010).

North Rhine-Westphalia has thereby become a leader in new energy technologies (Kumar, *et al.*, 2016). By 2009, approximately 24,000 employees in 3,400 companies worked in the renewables sector, generating about €7 billion in revenue (Kumar, *et al.*, 2016 p.17). It is clear from this example that the move towards renewable energy has the potential to create jobs for workers and associated benefits for communities. That is, when provided with adequate supports and resources, jurisdictions can diversify their economy in a manner which is economically, socially and environmentally beneficial, both for communities and for the energy sector.

Aspects of both re-industrialisation and neo-industrialisation are at play in Alberta. The provincial government is currently attempting to double renewable energy output with renewable energy generation expected to leverage CA\$10.5 billion of private investment, creating 7,200 jobs (Alberta Federation of Labour, 2017). As outlined by Eco Canada's 'Green Jobs Map' there are several ways coal workers can be seen to contribute to the 'green economy'. Within this document, white collar workers are identified as key actors in the design of production systems which require fewer resources. New areas of employment for workers in the manual labour sector are outlined. These include the construction of green buildings and employment in the green energy sector (Eco Canada, 2012). Despite such developments, Alberta's move away from coal does not signify a shift towards decarbonisation. Instead, it is characterised by a transition towards other fossil fuels with the Alberta government lobbying for a favourable coal-to-gas regulatory framework (Vriens, 2018 p.v). While increasing the role of gas may bring economic benefits, it fails to satisfy the environmental aspect of the just transition concept, or indeed strong sustainability.

In the state of Victoria, the dominance of the coal industry has hindered the transition towards a lower-carbon economy (Baer, 2016). Indeed, the privatisation of electricity provision reversed earlier initiatives in developing renewables, 'in particular solar power, during the 1970s and 1980s when these crucial utilities were publicly owned' (Baer, 2016 p.201). To reduce reliance on the coal sector, a 'special economic zone' which provides financial incentives for new businesses including exemptions from fees and taxes has been established (Snell, 2018). The Australian Council of Trade Unions (2016) supports the allocation of jobs in this zone for local residents, rather than external contractors. Furthermore, the Earthworker Cooperative - a worker-owned solar hot water manufacturing factory - has been established (Wiseman *et al.*, 2017 p.25) through cooperation between unions and environmentalists. This approach has the potential to dilute the concentration of wealth and power within the state (Wattchow, 2016 p.23). This initiative could act as an example of how local communities can maintain employment, act in a sustainable manner and maintain local economic activity.

As jurisdictions decarbonise, a just transition clearly requires that those displaced due to the de-intensification of the coal industry find new employment which affords them the same or a better standard of living. The policy measures taken in North Rhine-Westphalia have succeeded in diversifying the economy and establishing and encouraging the establishment of more environmentally-friendly industry. The economies of Alberta and Victoria maintain a level of dependence on fossil fuels. Despite this, it is important that communities are supported continually as new industries develop.

5.4 Re-training

Re-training for workers from a primarily low-skill base has been identified by the ETUI as vital for workers to have the necessary skills to work outside of ‘dirty’ industries. In North Rhine-Westphalia, such policy measures have seen vocational training centres in the Ruhr reaching placement rates of 80 percent (Rosemberg, 2017). The associated training programme targets a number of different sectors including ‘mechanical, electrical and computer engineering training, for trades in carpentry and plumbing and a training programme for business and technology’ (Galgóczi, 2014 p.236).

The success of the vocational training system in North Rhine-Westphalia can be attributed to the emphasis placed on re-training the younger workforce for successful relocation (G20, 2017 p.21). There is also a substantial emphasis on third level education. During the economic restructuring of the 1980s, new investment in universities and higher educational institutions was considered essential in attracting coal workers for the benefit of their children (Kumar, et al., 2016). Prior to this, the dominant mantra in the region was ‘what we need in the Ruhr are muscles, not brains’ (Galgóczi, 2014 p.225), reflecting the cognitive and institutional lock-in which dominated the structural adjustment of the coal industry during the 1970s. The establishment of one of Germany’s largest university campuses in the province with highly specialised, internationally successful growth centres in multiple sectors has acted to halt population decline and fuel economic growth outside the coal sector (Schulz & Schwartzkopff, 2016).

Given that Alberta’s transition from coal is a relatively recent phenomenon, the degree to which re-training can be measured is limited. However, it does appear that the provincial government has taken a proactive approach to re-training. ‘The Coal and Electricity Transition Tuition Voucher’ provides workers with a maximum of CA\$12,000 to pursue post-secondary education to train for new careers’ (Alberta Government, n.d.). This voucher can be used for credit courses in certificate, diploma or degree (undergraduate or graduate) programs in the areas of full-time, part-time and open studies, apprenticeship technical training and pre-employment programs (Alberta Government, n.d.).

In Victoria - as is the case with most jurisdictions dependent on coal - 'workers are aware of the problems of out of date or minimal qualifications' (Fairbrother, *et al.*, 2012 p.5). Within the Latrobe Valley, the Hi-Tech Precinct provides educational support to students in the region (Investor Group on Climate Change, 2017). The core purpose of this precinct is to align industry and educational interests to support the development of a technology hub. Furthermore, the 'Victorian Training Guarantee makes vocational education and training more accessible to people who do not have a post-school qualification, or who want to gain a higher-level qualification than they already hold' (Fairbrother, *et al.*, 2012 p.25). This initiative facilitates workers in transitioning to alternative employment outside of the coal sector.

In summary, each of the cases have, to some extent, taken a proactive approach to re-training, emphasising the importance of assisting workers and communities in adapting to life after coal. The financial support put in place ensures that re-training those dependent on coal does not result in an additional burden being placed on those facing redundancy.

5.5 Role for the welfare state

That the state provides assistance to those who fall into unemployment is a further criterion set out by the ETUI for a just transition. Since the 1980s, the role of compensation in North Rhine-Westphalia has liberalised substantially. During the economic restructuring of this jurisdiction, 'adjustment money' was provided to coal miners over the age of 50 who lost their jobs. A further adjustment allowance included opportunities for training, as well as reimbursement of travel and relocation costs (Schulz & Schwartzkopff, 2016). During the transition which commenced in 2007, the 'adjustment allowance' was discontinued (Schulz & Schwartzkopff, 2016 p.11), thereby reducing state assistance provided to coal workers.

The Albertan approach to individual compensation was highly proactive with the centre-left NDP government announcing 'a CAD 40 million Coal Workforce Transition Fund to provide income support to both coal and power workers transitioning to new jobs or retirement' (Vriens, 2018 p.20). Under this scheme, workers receive up to 75% of their previous weekly earnings until they're eligible for employer pension. 'The fund also offers pension bridging, relocation assistance for workers who have to move to gain employment, tuition and retraining assistance, and career counselling' (Vriens, 2018 p.20). Such measures have considerably enhanced the ability of workers to reduce their reliance on 'dirty' industries for employment.

In Victoria, the federal government announced A\$43 million worth of measures to facilitate the transition away from coal. However, only A\$3m of this was designated to provide assistance to affected workers (Maher, n.d.). This clearly highlights the conservative government's prioritisation of support for capital interests over labour and worker interests. The state government of Victoria on the other hand took a more proactive approach as regards workers

compensation, ‘announcing A\$22m in immediate assistance to the workforce, and then around a quarter of a billion dollars in longer term measures, including infrastructure investment in the region’ (Maher, n.d.). Financial and emotional counselling alongside education and training programs were key elements of this plan (Wiseman *et al.*, 2017 p.20). This policy measure also supported the identification of new business opportunities and established a ‘Worker Transition Centre’ (Wiseman *et al.*, 2017 p.20).

Spencer *et al.* argue that although compensatory policies help to smooth the political economy of coal sector transition in the short-term, their effectiveness in the long term is weak (2018). Considering all three cases, it would appear that compensation for workers is more likely to achieve optimal outcomes when provided in a proactive manner. That is, actively assisting workers to re-enter employment in industries which do not degrade the environment. Indeed, this is central to the European Trade Union Institute’s definition of a just transition (Abraham, 2017). Given the discontinuation of the ‘adjustment allowance’, this is one of few factors where North Rhine-Westphalia has moved in an unfavourable direction. This may be explained by the advancement of a less interventionist economic approach. The provision of assistance in finding new employment in addition to compensation payments in Alberta and Victoria has clearly contributed to a more just transition.

5.6 Investment in infrastructure

Infrastructure refers to ‘structures built or developed for human occupation, use and enjoyment’ (Climate Change Bill 2016 p.5). Kumar *et al.* highlight how policy decisions need ‘to enable effective investment in clean infrastructure and a managed, fair and just transition away from climate polluting means of production and consumption’ (Kumar, *et al.*, 2016 p.25). Investment in infrastructure may entail ‘universal infrastructure such as ‘transport (road, rail, air, and water), communications, education facilities’ (Investor Group on Climate Change., 2017 p.37) alongside more tailored infrastructure to support SMEs and start-ups, thus offsetting a lack of sufficient capacity and resources (Schulz & Schwartzkopff, 2016). Whether the state invests directly in infrastructure or whether the private sector does so by means of liberalisation and deregulation is a further consideration as regards the facilitation of a just transition. During peak coal production, the state government of North Rhine-Westphalia adopted a series of innovative and experimental investments in infrastructure and services in an attempt to inject new life into new towns which had sprung up around countless local coalfields and as a result of cheap energy availability (Kumar, *et al.*, 2016). Central to this was the improvement of transport links, with associated socio-economic and environmental benefits. While still an active policy measure, the preservation of such infrastructure may be put at risk during a coal phase-out given the effect that economic restructuring might have on municipal budgets (Schulz & Schwartzkopff, 2016).

In Alberta, there has been less of an emphasis on investment in infrastructure compared to individual compensation measures. A liberal market approach and the prevalence of other fossil fuels in the jurisdiction (i.e. natural gas) may explain this to some extent. In Alberta, trade unions have been clear in their support for ‘building renovation and maintenance programs that contribute to climate protection and sustainable development’ (Leach, *et al.*, 2015 p.26). Ensuring that local communities can move beyond ‘dirty’ industry in all of its forms clearly requires further investment.

Investment in infrastructure has been integral to the transition away from coal in Victoria. The response to the move away from coal was ‘the largest regional development package ever announced by a Victorian government’ (Wiseman *et al.*, 2017 p.6). Funding is primarily focused on accessibility in the form of development or upgrading of roads and rail alongside investment in community infrastructure such as sports and recreational facilities (Investor Group on Climate Change, 2017 p.36). As with most of the ETUI criteria, national and local government policy has been incongruent. The national government’s A\$43 million regional support package was an attempt to attain credibility in the debate over energy transition and criticise the ruling Labor Party at the state level (Wiseman *et al.*, 2017 p.23). This illustrates how a community’s ability to decarbonise may be affected by political motivations which put political advantage before the needs of workers. By investing in infrastructure, local governments can ensure that these localities do not become synonymous with coal, pollution and socio-economic problems (Tomaney & Somerville, 2010).

‘In order to ensure that structural change occurs in an orderly, socially responsible and timely manner, workers and jurisdictions will require coordinated assistance’ (Agora Energiewende, 2016 p.39). Having evaluated these three cases, the adoption of an expansionist approach - whereby investment is put in place to enhance accessibility as well as the desirability of industry to locate in jurisdictions previously dependent on fossil fuels - would appear to be the most appropriate for achievement of a just transition. Both North Rhine-Westphalia and Victoria have taken proactive approaches towards infrastructure provision. An expansionist approach ensures that policy decisions are driven by the best interests of workers and communities, rather than primarily focussing on economic growth. In Alberta, the lack of investment in infrastructure may signal an indirect attempt to move those dependent on coal towards natural gas. In this case, economic efficiency is elevated above social and ecological efficiencies, meaning concerns with the production of capital take precedence over the re/production of life’ (Marley & Fox, 2014). While this approach may help to maintain employment, it will preserve a dependence on the holders of capital while continuing the creation of carbon emissions.

6.0 Developing a framework for ‘just transition’

Based on the preceding analysis, a matrix has been developed to categorise the approach to transition employed in each case study jurisdiction according to the criteria set out by the ETUI - See Table 1. Employing a ‘traffic light’ system, cells highlighted in green represent measures which have positively influenced just transition outcomes. Cells highlighted in amber characterise policy measure which have had mixed results, while cells shaded in red identify policy measures which have failed to enhance the well-being of workers and communities in the transition process. The designation ‘N/A’ indicates that a given criteria was not addressed in the given jurisdiction. Rows entitled ‘Pre-Environmental Policy Transition’ represent the undertaking of structural adjustment prior to environmental policy becoming a core cause for the need to a transition away from coal (i.e. North Rhine-Westphalia in the 1960s/70s and Victoria in the 1990s). As highlighted above, given that Alberta had not experienced a move away from coal prior to the recent shift, no pre-environmental policy section is included for this case. Rows entitled ‘Environmental Policy Transition’ illustrate findings relating to coal transitions which occurred after the 2007 Hard Coal Financing Act (all three case studies).

Jurisdiction	Social Dialogue	Re-employability	Re-training	Role of the welfare state
North Rhine-Westphalia <i>Pre-Environmental Policy Transition</i>	State government responsible for the Ruhr Action Programme. Slow to integrate local actors into the policy process. (Mixed outcomes)	Firmly re-industrialisation. Strengthened dependency on coal. (Negative outcomes)	Guided by the philosophy of ‘muscles not brains’ Investment in third level education assisted in diversifying industry away from coal. (Mixed outcomes)	‘Adjustment money’ provided to coal miners who lost their jobs after the age of 50. ‘Adjustment allowance’ provided support for training and relocation costs. (Positive outcomes)
North Rhine-Westphalia <i>Environmental Policy Transition</i>	Highly coordinated approach. Agreements between workers and employers lead to positive outcomes for communities. National and local government collaboration to establish process of transition from coal.	Neo-industrialisation. Emphasis placed on a bottom-up approach. Jurisdiction now a leader in energy technologies and energy consulting. (Positive outcomes)	Highly successful: placement rate of 80 percent. Emphasis on re-training for re-location. Provision of wide-ranging education and training courses. (Positive outcomes)	Adjustment allowance discontinued. May make financing re-training more difficult at an individual level. Improved transport links. (Mixed outcomes)

	(Positive outcomes)			
<p>Alberta</p> <p><i>Environmental Policy Transition</i></p>	<p>Positive dialogue with workers.</p> <p>Serious failings with community dialogue. May hinder support for policies which enhance the environment in the future.</p> <p>Union praise of local government response. Action hindered by divergence in interest between local and national government. Failed to have one single approach to ensuring transition. (Mixed outcomes)</p>	<p>Emphasis placed on green economy at a blue-collar and white-collar level.</p> <p>Government highly supportive of move towards natural gas. (Negative outcomes)</p>	<p>Limited. Finance provided for post-secondary education training for new careers. (Mixed outcomes)</p>	<p>Workers receive up to 75% of their previous weekly earnings until they are eligible for employer pension.</p> <p>May represent a more liberal and individualistic approach to government spending in the face of structural adjustment.</p> <p>Funding provided for pension bridging, relocation assistance, tuition and retraining assistance and career counselling. (Mixed outcomes)</p>
<p>Victoria</p> <p><i>Pre-Environmental Policy Transition</i></p>	<p>Process of privatisation in the 1990s.</p> <p>Failed to provide adequate assistance to the jurisdiction. (Negative outcomes)</p>	N/A	N/A	<p>Poorly undertaken. ‘General disillusionment’ Failed to improve social and economic conditions. (Negative outcomes)</p>
<p>Victoria</p> <p><i>Environmental Policy Transition</i></p>	<p>A lack of social-dialogue resulted in short-term response in the immediate aftermath of industry closure.</p> <p>Contrasting stances between local and national government. Local government</p>	<p>Use of liberal economic policies i.e. tax cuts to increase industry.</p> <p>Community-led projects such as the ‘Earthworker Cooperative’ offer a viable alternative to dirty industry and a more socially just form of ownership.</p>	<p>Proactive ‘Hi-Tech Precinct’ seeks to align industry and educational interests to support the development of a technology hub.</p> <p>‘Victorian Training Guarantee’ enhances accessibility to vocational</p>	<p>State government operated proactively. A\$22m in immediate assistance to the workforce. Financial and emotional counselling alongside education and training programs. National government provided limited support e.g. counselling and advice on job seeking.</p>

	praised by union for leading the process of transition in a positive manner. (Mixed outcomes)	(Mixed outcomes)	education and training. (Positive outcomes)	Development and upgrading of roads and rail alongside investment in community infrastructure. Proactive in revitalising areas dependent on coal through investing in public housing and urban renewal as well as supporting new industry. (Positive outcomes)
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Table 1: Factor matrix for transitions in three jurisdictions - To be reproduced in colour on the Web and in black-and-white in print.

Based on the preceding analysis, Figure 1 provides a framework to facilitate a ‘just transition’ from coal production which is economically, environmentally and socially viable. The measures taken can be divided into two phases – ‘pre-transition’ and the ‘transition phase’. For each element, an example from the preceding analysis is included to illustrate the potential benefits of each action and demonstrates how the generalised framework can be used to inform action/policy initiatives in any given context. These example further illustrate the interdependency between each element and across phases.

Pre-Transition Phase	Transition Phase
<p>Establish a timeline for decarbonisation using social dialogue (to include workers, local communities, industry and government at all levels).</p> <p>e.g. Timeline developed for the administration of state aid for the closure of hard coal mines in Germany.</p>	<p>Provide compensation to workers who have been dependent on coal for a living and facilitate re-training for the re-employment of active workers.</p> <p>e.g. Victorian government provided A\$22m in immediate assistance to the workforce. e.g. The ‘Coal and Electricity Transition Tuition Voucher’ in Alberta provides funding for workers to pursue post-secondary education.</p>
<p>Formulate plans for new low-carbon industries post-decarbonisation using social dialogue.</p>	<p>Provide financial incentives to low carbon industries and support existing industries in transitioning to low-carbon alternatives.</p>

<p>e.g. Social-dialogue in North Rhine-Westphalia resulted in bottom-up regional development coalitions which provided the foundation for diversifying away from coal.</p> <p>e.g. The inclusion of worker representatives in negotiations ensured that coal-mining regions in Germany have undergone smoother transitions compared to other areas.</p>	<p>e.g. The State government established Victoria’s first ‘special economic zone’ in the Latrobe Valley which provides financial incentives for new businesses including exemptions from state and local fees and charges for property purchases and business expansions and tax deductions for those creating jobs for former workers.</p>
<p>Invest in community, communications and transportation infrastructure to support new jobs.</p> <p>e.g. Largescale funding in Victoria focused on accessibility in the form of development or upgrading of roads and rail alongside investment in community infrastructure such as sports and recreational facilities.</p>	

Figure 1: Framework for attaining a just transition in coal-dependent jurisdictions

The *pre-transition phase* either coincides with a state of coal –dependency, or comes immediately after it. This phase includes the formulation of plans and timelines for decarbonisation in addition to investment in community, communication and transportation infrastructures. The *transition phase* coincides with the enacted transition, whereby coal extraction and production is wound down and workers are compensated and or re-trained for employment in new low-carbon industries. That is, workers at or nearing retirement age are compensated and active workers are re-trained for new roles in new industries or employment sectors. Such re-training can be undertaken in collaboration with industry which itself should be attracted by means of incentive. During this phase, jurisdictions should continue to invest in community, communications and transportation infrastructure to support and attract new low-carbon industry and employment sources and facilitate ‘dirty’ industries to transition to low-carbon alternatives.

7.0 Conclusion and policy implications

As developed societies transition towards low-carbon futures, it is vital that those who have traditionally worked in the fossil fuel sector are not negatively affected. The ‘just transition’ concept places workers and communities at the forefront of the decarbonisation process by highlighting the need for proactive policy measures that support workers through the transition and beyond. The analysis undertaken in this paper has clearly demonstrated that the just transition

is not a predetermined track, but instead depends on the economic, social and environmental outlook of any given jurisdiction.

With a view to operationalising just transition towards a low-carbon society characterised by 'strong' sustainability, those dependent on dirty industries must be proactively supported. In order to achieve this, this paper proposes a general framework for the implementation of a just transition which includes worker and community representation, economic and social support for workers and communities and a strongly interventionist form of governance, both local and national. Implementing such measures can assist jurisdictions which are dependent on coal to move towards cleaner and more sustainable industry in a manner which mitigates negative impacts on community viability and economic prosperity in former coal dependant jurisdictions.

While the just transition offers some hope for workers, more equitable outcomes are by no means guaranteed. With decarbonisation at the forefront of the 'next round of capitalist growth' (Weller, 2012), energy policy and commercial decisions may well be driven by macro-economic imperative rather than the socio-economic wellbeing of former coal workers and communities. It would appear that such outcomes persist, despite the prominence of the 'just transition' in policy discourses. Such dualities are perhaps unsurprising given that, in a neoliberal context, direct control over energy production is often either shared with or delegated to the private sector, meaning that governmental and global bodies responsible for the energy sector have little power to reconcile energy injustice and climate justice simultaneously (Newell and Mulvaney, 2013). The strength of private interests within energy policy represents a major barrier to transitioning towards a more just and sustainable society. As stated by Johnstone & Newell (2018 p.74), 'efforts to instigate sustainability transitions do not proceed at the pace and in the manner planned for because incumbent fossil fuel companies and other actors have captured the terms of debate about how best to manage the transition to a low carbon economy'.

A solution to breaking the relationship between the symbiosis of the power of capital and state power may lie in securing 'the democratization of energy needed (i.e. social, rather than, private-for-profit control over energy-systems) to avert social, ecological and geopolitical calamities in the coming decades' (Huber, 2009 p.113). As has been highlighted within this study, the ability of elite actors to dictate public discourse can result in actors with less power in societies such as workers and communities undertaking actions which may not be in their best interests. Ultimately, context plays a decisive role in attaining a just transition towards strong sustainability. One of the deciding factors for this will be the degree of connection between the state, capital and other actors, most notably the representatives of labour.

Notwithstanding dominant political and power dynamics, it is intended that this analysis and the general framework proposed will, informed by international experiences, assist policymakers in

i) devising evidence-based policy measures which can positively influence the decarbonisation process, particularly in terms of actions and outcomes for the well-being of affected populations, and ii) plotting policy paths towards strong sustainability. Indeed, while the empirical focus of the paper was on the coal sector, the analysis may also be relevant to decarbonisation in jurisdictions which have traditionally produced other fossil fuels.

While providing insights for the just transition process in heterogeneous policy contexts, the empirical focus of this paper was limited to three case study jurisdictions in developed societies. Given that some of the fastest growing developing nations are heavily dependent on coal, studies of framework development for just transitions in these contexts would be worthwhile. Similarly, consideration of a wider range of factors would be beneficial. Specifically, analysis of potential income differentials pre- and post-transition would be a useful factor to determine the quality of jobs generated. A further focus for research might involve the testing and enhancement of our proposed framework and applying qualitative techniques to assess and incorporate the views of key actors in terms of the application of the framework in real-world scenarios. Such application and testing would assist in refining this framework to ensure that jurisdictions dependent on coal can decarbonise while maintaining or enhancing the well-being of affected communities.

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