Just Transition Planning for Fossil Fuel–Dependent Regions: A Framework for Economic Diversification

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Executive Summary

The planet has already warmed by over 1° C over pre-industrial levels and is causing severe weather events around the world. In 2022, there were at least 10 climate-related extreme weather events – from flooding and drought in China to Hurricane Ian in the United States – that caused over $3 billion worth of damage each. Continued emissions will warm the planet even further and will likely intensify extreme weather events. In order to keep global warming well below 2°C – a goal enshrined in the Paris agreement – coal, oil and gas will need to be phased out rapidly. But phasing out fossil fuels will also impact local and regional economies, as these industries provide jobs, revenues, and other services to local communities. To mitigate these impacts, policymakers and key stakeholders have argued for a just transition that is centered around economic diversification of fossil fuel dependent regions.

To gain a holistic understanding of how fossil fuel regions can diversify their economies, we conducted a global review of case studies of past economic diversification efforts in natural resource sectors. Overall, we reviewed 87 papers spanning case studies ranging from countries like Malaysia, Norway to local regions like Appalachia and Ruhr. Based on the review, we created a holistic framework of economic diversification. Our framework constitutes five key elements:

1. Institutionalize the diversification process;
2. Develop local infrastructure;
3. Identify specific sectors based on competence;
4. Mobilize finance for economic diversification; and,
5. Invest in human capital development

We further categorized each element into several actionable strategies undertaken for diversification.

As fossil-fuel regions decline, economic diversification to sustainable sectors will be at the heart of just transition planning. Our first of its kind framework will be a helpful starting point for key stakeholders including government officials, transition practitioners and task force members who are interested in pursuing economic diversification of fossil fuel regions.

1.0 Introduction

The Intergovernmental Panel on Climate Change's (IPCC) 1.5° C report states that keeping global warming below 1.5° C over pre-industrial levels (or even 2° C) requires rapid reduction in fossil fuel production and consumption. While meeting these targets would mean scaling up clean energy sources such as solar and wind, it would also mean phasing out fossil fuels such as coal, oil, and natural gas.

While innovation and deployment of low-carbon technology are required for transitioning the energy sector to low-carbon sources, any transition would also require just transition support for workers and communities in fossil fuel regions. Around the world, many regions are dependent on the fossil fuel sector for crucial socio-economic needs including jobs, government revenues, power generation, and community development. Several studies have suggested that economic diversification of fossil fuel regions is one of the core principles of just transition. Economic diversification is a strategy to mitigate the potential socio-economic impacts of a low carbon transition.[1]

Many consider economic diversification as a multifaceted development strategy for resource-rich countries dependent on a specific natural resource base.[2] It requires long-term strategic policy changes to expand exports or imports and domestic production.[3] Overall, it's a dynamic phenomenon to amplify a region's economic activities, trade, and government revenues.[3]

There is a rich body of literature focusing on economic diversification of national and regional economies. In this paper, we reviewed academic and non-academic papers (including official government and industry reports) on how resource-dependent economies around the world have diversified. We did this to synthesize key considerations for economic diversification, a major focus area of just transition away from fossil fuels. Our results will help key just transition practitioners within national and local governments understand where to target their efforts.

In the next section (2.0) we describe our research questions and methodology. In section (3.0) we discuss our framework consisting of five major elements for economic diversification and the underlying strategies adopted under each element. In the final section (4.0) we briefly summarize the findings of our paper.

2.0 Research Questions and Methodology

To understand past economic diversification strategies, we ask two research questions:

1. How have resource-rich economies around the world diversified their economies?
2. What are the key elements of the economic diversification process?

We followed a stepwise approach to identify research papers and synthesize relevant information to tease out key elements of economic diversification.

First, we identified relevant reports and research papers using thematic google searches and bibliographic graphing tools. Next, we screened the papers for summaries and abstract to remove duplicates and articles not relevant to the research questions. In the end, we reviewed a total of 87 papers to get a comprehensive understanding of different elements of economic diversification and the tactics utilized in resource-rich regions. We used inductive coding to derive the main elements for the framework. We organized the papers on excel and then coded the major findings of the paper into broad themes. We repeated this process for all papers, until we had a broad range of themes. Based on these themes, we derived the five major elements for the framework. Overall, these papers cover examples of countries from six global regions: Africa, the Persian Gulf and Middle East, Central Asian Regional Economic Cooperation, Southeast Asia, the European Union, and Latin America. We also considered papers that focused on economic diversification of regional economies such as Appalachia and Ruhr.

The overall objective of this paper is to provide a framework of key elements that can guide the economic diversification process in fossil fuel regions. However, given the nature of the work, our study has certain limitations. First, the framework put forth in this paper is aimed to provide a starting point to the discourse on economic diversification for fossil-fuel regions. It is derived from an extensive and inductive literature review of selected papers only and does not consider other quantitative or qualitative research methods. Second, given the political nature of diversification, we have limited the scope of research by not delving into the political factors that drive the diversification process.

3.0 Results

3.1 Types of economic diversification

Places undergo two types of diversification: vertical and/or horizontal.

- **Vertical diversification** happens when there is an addition of new processes or products within key sectors of a region. It extends the current production line by adding output from primary activity as input for secondary or tertiary activities.[2] For example, several Gulf countries made a shift from primary dependence on crude oil exports to the manufacturing of petroleum-based plastic and chemical products.

- **Horizontal diversification** is the introduction of new products and economic activities in a region. It involves the targeted expansion of priority sectors that have the potential to create more stable and sustainable markets.[4] A classic case of horizontal diversification is Malaysia's diversification away from agriculture-based resources (e.g., rubber and tin) to manufacturing (e.g., electrical, and electronic exports).

Chile's economic development demonstrates a successful combination of both vertical and horizontal diversification. Chile followed a two-track diversification strategy to expand from copper, its key export product. The country diversified both within the copper industry (e.g., improving quality of copper extraction, increasing value-added products and complementary services), and beyond it (e.g., development of fisheries, exporting more agriculture-based crops).

3.2 Framework for economic diversification pathways

We categorize economic diversification themes emerging from the literature into five key elements (See Table 1 below). We define these elements as main components that should be considered while designing a policy for economic diversification of a resource-rich region. For each element, we include strategies used to diversify across regions. Strategies are actionable policies adopted to enhance socio-economic parameters, thereby increasing economic growth. This allowed us to create a framework for economic diversification pathways.

Table 1: Framework for understanding global economic diversification pathways

This framework was created based on a review of 87 papers on diversification of economies around the world.

Elements	Strategy	Region/country example
Institutionalize the diversification process	1. Include economic diversification in national or regional plans 2. Establish statutory boards and departments for policy management and implementation 3. Include stakeholder consultation in diversification plans	Malaysia, Brunei, Oman, Saudi Arabia, Norway, Ruhr

Elements	Strategy	Region/country example
Develop local infrastructure	1. Develop hard investment infrastructure 2. Develop social infrastructure	Dubai, Russia, Mongolia, Ruhr
Identify specific sectors based on competence	1. Assess manufacturing sectors as options 2. Develop value chains within identified sectors 3. Enhance ease of doing business and competition	Malaysia, Indonesia, Brunei
Mobilize finance for economic diversification	1. Mobilize internal funds for diversification 2. Increase foreign direct investments (FDI)	Appalachia, Dubai, Dominican Republic
Invest in human capital development	1. Invest in education and developing skills in non-resource sector jobs	Canada, Malaysia, Indonesia, Appalachia, Malawi

3.2.1 Institutionalize the diversification process

Economic diversification is a strategic decision to create new sectors and products or expand the pre-existing ones. In order to make this economic shift, it is pertinent to institutionalize the diversification process. These would include making diversification part of national or regional plans, creating policy management and implementation boards and regular consultations with key stakeholders.

Include economic diversification in national or regional plans

Global literature shows that a fundamental step towards diversification is inclusion of diversification strategies in the country's national plans or annual vision documents. For example, the Ninth Malaysia Plan (2006-2010) put forth the government's intention to develop value chains in the agriculture sector.[5] It also sought to expand the value chains in the existing manufacturing sector. This consequently led to the development of palm oil (now a major export product) derivatives, oleochemical technologies, and pharmaceutical products from the agriculture sector, as well as a steady increase in the manufacturing of electronics and electricals.[5] Similarly, the Government of Brunei integrated into its ninth national development plan the expansion of small and medium enterprises (SMEs) beyond the oil sector.[6] The policy shift played a significant role in orienting the businesses to seek opportunities in the global market.

A classic case of institutionalization is the structural transformation of the coal-rich Ruhr region in Germany. Clear narratives and structural policies based on national development goals helped transform the region from coal to a knowledge-based economy. The restructuring policy for Ruhr was followed in different phases with objectives to successfully develop the region. For example, in 1989 the focus of government policy was ecological reconstruction of the region, but by 2010 the vision shifted to promoting green energy and the knowledge economy.[7]

Establish statutory boards and departments for policy management and implementation

In order to make the policy framework effective, institutional set-ups such as statutory bodies, management boards and the like are important to streamline important policy decisions. For example, Brunei Economic Development Board is a statutory board established in November 2001 to diversify the economy towards achieving the Brunei Vision 2035.[6] It plays a strategic role in diversifying the economy by promoting Brunei as a preferred investment destination for five priority areas, namely, oil and gas, manufacturing, food, tourism and information and communication technology. Similarly, Western Economic

Diversification Canada (WD) is a federal department that seeks to diversify and promote development plans, foster competitive businesses, and help communities grow in Western regions of Canada. WD runs several programs through grants and loans. It makes strategic investment in projects that support innovation, business development and community growth.

Include stakeholder consultation in diversification plans

Engagement of relevant stakeholders is critical for any diversification plan. A well-planned stakeholder consultation policy allows fair decision-making. For example, while planning for effective use of oil revenues in Norway, the government consulted a range of ministries, including the ministries of finance and oil. The government also appointed a committee of economists and politicians, among others to deliberate on oil operations.[8] Similarly, the German Coal Commission was a multi-stakeholder group established in 2018 to build consensus to phase out coal and promote just transition. Therefore, having a consultation policy for planning for diversification is pivotal for making the process just and inclusive.

3.2.2 Develop local infrastructure

Diversification requires investment from companies. Companies are more likely to invest in regions with infrastructure that supports their businesses, such as ports, roads, and investment zones among others. Moreover, having good social infrastructure such as roads, schools and hospitals is attractive for companies to decide their place of investment. If a place has good social infrastructure, company executives are likely to move to that place. This is particularly important for natural resource-rich regions in South Asia and Africa, which have poor infrastructure that negatively impacts quality of life.

Develop hard investment infrastructure

Infrastructure development forms the backbone for economic growth and facilitates trade by developing channels for global and regional market access and reducing transportation costs. Diversification of resource-based economies requires creating key physical infrastructure, thereby creating a platform for investments. In the case of Dubai, efforts to diversify include development of the Port of Jebel Ali, creation of extensive real-estate complexes for the tourism industry and establishment of 'free zones' or enterprise zones throughout the city to enable the ease of doing business.[3] Similarly, in the case of Ruhr, improved connectivity to other cities prevented migration of workers and increased investment of new industries.[9]

Case studies have shown that poor physical infrastructure in resource-rich countries inhibits diversification and reduces competitiveness. Analysis of Mongolia's infrastructure suggests that in recent years the country's cashmere wool industry (second largest in the world) has suffered due to a lack of infrastructure.[10] The wool industry plays a significant role in diversifying the country's economy by offering higher value goods compared to other agricultural products. The industry underperformed relative to its comparative advantage due to lack of economic corridors that link herders with international markets, poor transport connectivity, and efficient logistics and storage. However, with investments in approximately 38 cashmere-producing facilities, producers have strengthened their market and product capabilities.[11]

Develop social infrastructure

Investment in social infrastructure such as education, housing, health etc. is a key driver of economic restructuring. In the case of Ruhr, the establishment of universities in the 1960s played a pivotal role in facilitating innovation programs. Investment in education also created high-wage jobs in new sectors.

In many areas, abandoned coal mines are repurposed into affordable housing. For example, the National Coal Programme was mandated to convert contaminated and abandoned mines across the UK into housing and commercial areas. The program covered over hundred sites across seven regions. These sites were brought under the control of the government so that high potential economic sites could subsidize lower economic potential areas.[7]

3.2.3 Identify specific sectors based on competence

Successful stories of economic diversification involve regions clearly identifying competitive sectors for both horizontal and vertical diversification. In this vein, the International Trade Centre's export potential indicator and product diversification indicator provide an important toolkit for helping countries identify sectors that can be explored and developed for diversification purposes. Brunei's ninth national development plan (2007-2012) identified five new, non-oil sectors for the growth of small and medium enterprises. These sectors included halal products, financial services, logistics and transportation, information communication technology, and hospitality and tourism. After identifying new sectors, the country tried to attract investments in both horizontal and vertical value chains for new sectors.[6]

Many regions around the world have identified the manufacturing and service sectors as an anchor industry for diversification. In addition, policymakers in these regions have focused on value-chain development within the resource industry and general ease of doing business for attracting new industries.

Assess manufacturing sectors as options

The manufacturing sector has been a foundation for diversification of several resource-rich countries. Indonesia's strategic move towards low-wage manufacturing in the 1980s transformed the country and led to a shift from agriculture to industry. It helped reduce the extractive industry's share of Indonesia's GDP from 50% to 25%.[12]

Similarly, in Malaysia, manufacturing of palm oil derivatives is now a dominant source of agriculture export. The government's constant push towards expansion of the manufacturing sector has led to exponential growth in the sector. In 2005, agricultural exports contributed to only about 10% of the country's GDP.[5] The Malaysian government has since identified new sectors for advanced manufacturing such as robotics, nano-processing, smart sensors, and high-technology packing. Malaysia's third industrial plan also focuses on the aerospace and ship-building industries alongside complementary services such as maintenance and repair.[5]

Develop value chains within the identified sectors

For sectors that the region has identified for diversification, it is pertinent to identify value options for value chain development. Such diversification increases income levels and employment opportunities for people and communities. Several studies show that high-value-added products lead to more sophisticated exports. In the context of Gulf countries, moving from production of oil to other activities such as refining not only diversified the product and generated national income, but it also generated employment. Similarly, Malaysia's strategic shift to expansion of palm oil derivatives and pharmaceuticals added more high-value products to its exports.

Enhance ease of doing business

Participation of the private sector is pivotal for diversification. Private sector is most attracted to places where they get tax benefits and easy access to land, among others. Moreover, places with fewer bureaucratic hassles for clearances and operations are also attractive places for the private sector. Our review shows that places that have successfully diversified have created an enabling environment for firms to operate and innovate. For example, i-Centers have been established in Brunei to assist ICT-related SMEs. There is also a proposed 'Business Opportunity Center' to promote non-natural-resource sector SMEs in the country.[10]

3.2.4 Mobilize finance for economic diversification

Developing financial capabilities is indispensable for economic diversification. Our review shows that when a resource-rich sector is still booming, governments have used revenues from the sector to create a fund to back diversification efforts. This kind of fund has been used to fund pilot projects and create infrastructure for investments. In parallel, governments have also attracted foreign direct investments (FDI) to increase government revenues. The combination of both have led to an overall diversification of the economy.

Mobilize internal funds for diversification

Across countries, efforts have been made to mobilize funds for economic diversification. Norway's Government Pension Fund Global (GPFG) is a classic example of successful financial resource mobilization. Established in the 1990s, GPFG manages the revenues from oil exports. A spending cap of 3% of the total fund limits the amount that can be transferred from the fund to Norway's budget. The fund is used for investing surplus oil funds and holds a portfolio of real estate and other fixed-income investments.[13]

Another example is the Appalachian funder's network that was created in 2010. The fund is used for long-term strategic investment in the region. In 2015 it allocated approximately $450,000 to help coal-impacted communities for economic transition.[14] The government of Brunei allocated B$742 million to promote establishment of non-oil sector SMEs.[6] The government of Chile also established the competitiveness and innovation fund in 2005 by levying mining activities and other developed sectors.[15]

Increase foreign direct investments

Several studies have shown positive linkages between FDI and export diversification. The possibility of FDI is enhanced with access to better infrastructure and fiscal incentive. The Dubai model is a successful example of providing incentives to attract FDI. These incentives include efficient bureaucracy, low tariffs, and high-tech infrastructure, among others. FDI played an important role in diversifying the Dominican Republic. In the early 2000s, the government realized that FDI could help in the structural transformation of the country. Therefore, it invested in the country's infrastructure, offered tax exemptions, and improved the overall transparency in administration to attract foreign businesses.[16]

3.2.5 Invest in human capital development

Several studies underscore the role of investing in human capital for economic diversification. Its importance derives from two reasons: first, human capital is a crucial input in research and development, and it increases productivity;[15] second, it allows economies to alter the patterns of specialization from primary to more knowledge-intensive manufactured commodities.[10] Examples from around the world show that investing in education and developing skills in non-natural-resource sectors are important human capital strategies for diversification.

Invest in education and developing skills in non-resource sector jobs

Skill development in different sectors is a crucial strategy for diversification. It is often seen that investment in human capital in resource-rich regions is limited. Many studies show that investing in education, capacity building and developing skills in non-resource sectors are effective human capital strategies for diversification. For example, Norway had a successful diversification trajectory because of its relatively high-level of education in the late 1960s. The government has constantly focused on education to diversify the economy and foster inclusive growth. It promotes Science, Technology, Engineering and Mathematics (STEM) subjects, along with vocational and entrepreneurial skills. Between 1970-1985, the Norwegian government invested up to seven percentage points of GDP on human capital and infrastructure.[13]

Creating skills in other sectors fosters innovation converts knowledge into wealth. Diversification strategies that focus on building such economies not only create new non-natural-resource sectors but also upskills the workforce. In this context, the International Labour Organization's (ILO) Skills for Trade and Economic Diversification (STED) program is a technical assistance tool developed to guide the member countries in meeting the skill needs in potential tradeable sectors.[17] The STED framework uses a stage-wise approach to select the potential sectors: (a) identify the skills needed for the sector in the future; (b) assess the number of workers required in the sector by skill type; (c) assess the current and future skill gap; and (d) propose recommendations. The framework has been used to provide recommendations on skilling for many non-resources sectors jobs globally. For example, based on the STED framework, Malawi developed a Work-Integrated Learning (WIL) program for the horticulture sector. The WIL program targets graduates, and young entrepreneurs interested in horticulture business and gives them hands-on work-based training courses.[18]

4.0 Conclusion

As the energy transition accelerates, the need for just transition to ensure minimal disruption for workers and communities in the fossil fuel sector is becoming an imperative. A key policy action to successfully navigate transition is the economic diversification of fossil fuel-dependent economies to non-fossil fuel sectors. As the adoption of low-carbon energy grows globally, past experiences of diversification offer lessons to policymakers and other key stakeholders in fossil fuel-dependent regions. In this paper, we reviewed literature on economic diversification from around the world and created a framework for economic diversification. The framework entails that there are five key economic diversification elements: institutionalizing the diversification process; developing local Infrastructure; identifying specific sectors based on competence; mobilizing finance for diversification; and investing in human capital development. Each of these elements have multiple strategies for implementation.

Economic diversification is not an easy process, it encompasses a host of actors including communities, politicians, government officials and external funders. It is often a political decision for a structural transformation of the economy. As several regional governments, bodies like the just transition task forces and other key stakeholders plan economic diversification away from fossil fuels, our framework can act as a guide for initial thinking on the topic.

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