

Just Energy Transition and Sustainable Industrial Policy in South Africa - Organised Labour's Experiences, Perceptions, and Recommendations

Primary segment of RE value chain



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Executive Summary

South Africa is already threatened economically and socially by high cases of joblessness and inequality and, therefore, securing a worker centred Just Energy Transition is paramount. Economic decisions or changes designed to minimise climate impacts will result in costs on workers and small businesses. What this research report does is that it documents trade union leaders' experiences and perceptions about the impacts of the Just Energy Transition at the ground level and in communities. By doing this, it elevates the workers' voice on how they are experiencing the transition and its impacts.

Consequently, the report then proposes potential solutions, merging sustainable industrial policy with the workers' voice to carve a sustainable pathway that will ensure social and economic benefits for those that will be impacted. It interrogates themes of joblessness, livelihood impacts, upskilling and reskilling, the role of government, and how sustainable industrial policy can merge these into solutions that promote inclusive economic development that serves as a safety net for workers.

The research highlights that whilst workers are not ultimately opposed to an energy transition, the uncertainty about job security makes them apprehensive.

A key takeaway from this study is that the transition should be worker-centred, and that there should be effective social dialogue to ensure the inclusion of labour in decision making. The findings of this research will be used to inform policy that is being developed in the country on renewable energy, from a trade union perspective.

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1. Introduction

The world is undergoing rapid energy transitions as a result of the climate change crisis. In 1992, countries convened around what is known as the United Nations Framework Convention (UNFCCC) on Climate Change to launch and sign the very first global agreement on climate change. The countries at the convention conceded that climate change and its adverse effects had become a great concern and threat to humankind, and that human activities had significantly contributed to increasing the atmospheric concentrations of greenhouse gases contributing to Climate change (UNFCCC, 1992). As a result of the UNFCCC the Conference of the Parties, now known as COP, was established as an annual conference for international discussions and debates around climate change. Since then, there have been other agreements such as the 1997 Kyoto Protocol, the 2009 Copenhagen Conference and the Paris Agreement, pushing for the transition from fossil power sources to renewable power sources.

These agreements have largely positioned the issue of climate change at the heart of global politics. In addition, these agreements have managed to bring countries to a consensus that there is a need to drastically reduce carbon dioxide emissions in order to combat climate change. The consensus is also fuelled by evident devastating weather changes that the world is experiencing such as droughts, floods, and higher temperatures in many parts of the world. The Paris Agreement in particular sets specific targets and requirements for all countries to reduce carbon emissions. Individual governments set targets, known as Nationally Determined Contributions (NDCs), to curb global average temperatures from rising. It is these ambitious targets that have largely contributed to the pressure for rapid energy transitions.

In relation to South Africa, the need to transition to renewable energy has also been fuelled by the current energy crisis that the country has been experiencing for over a decade now. Whilst there are numerous and different causes of South Africa's energy crisis, the main one has been the inability of ESKOM to meet the country's energy demands, largely as a result of the breakdowns of coal power plants. Consequently, the need to reduce the reliance on coal power energy has become one of government's priorities. Such a transition means that energy will no longer be generated using coal, rather it will be generated using natural sources such as wind, solar, and hydro. This shift from fossil fuels to green and clean energy sources is now known as the 'energy transition'.

There is a general consensus that the energy transition will not only have impact on the environment, but also on various aspects such as sustainable development (Dong F, 2022), technologies (Chen B, 2019), and the economy (Qiao W, 2021). In fact, for Klein (Klein, 2014), there are no ifs and buts; she argues that climate change changes everything, and warns that the world is now faced with two options: *'Allow climate disruption to change everything about our world, or change pretty much everything about our economy to avoid that fate'*. One thing is for sure - we cannot go back to using fossil fuel the way we have been using it so far.

2. Methodological Approach

The project had three dimensions. Firstly, it aimed to document trade union leaders' experiences on the Energy Transition in terms of socio-economic imperatives for workers and their communities. Secondly, it solicited union leaders' perspectives on how they would want to experience the transition to renewable energies, taking into consideration the country's sustainable industrial policy status and imperatives. Lastly, the project aimed to get perspectives from energy experts and workers in the coal sector regarding the role of government in supporting a 'Just' Energy Transition, and whether they believe the green job sector can create a significant number of jobs.

Research Design

The study applied a mixed methodology research approach with two distinctive but mutually supporting parts. Firstly, there were interviews of a purposefully selected sample of workers, trade union leaders, and experts in the energy sector. Secondly, a review of secondary information sources through desktop research was done.

Sampling Technique

This study required a representative sample of participants in the mining and energy sector. Therefore, a non-probability technique, namely purposive sampling, was employed. The intention of using this technique was to deliberately select participants based on their relevance, expertise, and knowledge concerning the research aim (Hassan, 2024).

Demographics

The sample size consisted of 23 respondents, of which 5 were females and 18 were males.

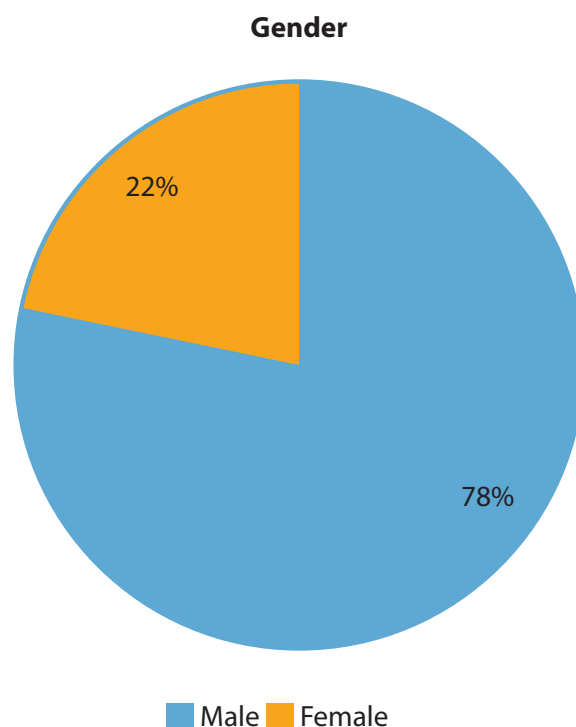


Figure 1: *Distribution of Gender Among the Respondents.*

Similarly, the majority of respondents (47.8%) were coal and energy workers, while 30.4% and 21.7% were trade union leaders and experts from the energy sector, respectively.

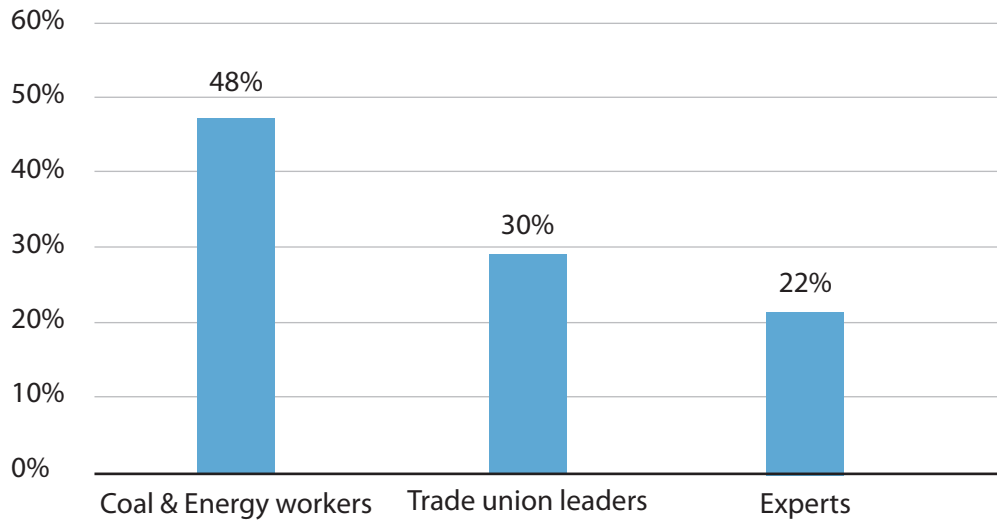


Figure 2: Distribution of Respondents According to their Roles

Data collection

To address the research objectives, data was collected through the following methods:

- Focus group interviews with trade union leaders, especially those in the energy and mining sectors.
- Virtual interviews with workers and experts from the energy and mining sectors.
- Desktop review of secondary data sources on Sustainable Industrial Policy and Just Energy Transition. The sources included reports from reputable institutions such as the United Nations Conference on Trade and Development (UNCTAD), and South Africa Renewable Energy Master Plan (SAREM), and the Localisation Support Fund (LSF).

Data Analysis - Reliability and Validity

To validate the source findings, triangulated methods through content and document analysis. Noble and Heale (2019) indicate that research triangulation refers to the process that helps to increase the credibility and validity of research. In this study, triangulation involved cross-verifying information from multiple sources to enhance the reliability and validity of the data. The triangulation phase was crucial in mitigating bias and ensuring a robust analysis of the just energy transition and sustainable industrial policy.

In summary, grounding the work in sound qualitative research methods enabled the researchers to rigorously seek meaningful insights that elevated the quality of the work to be able to inform pertinent discussions in the country's ongoing energy debates. This work should enhance stakeholder knowledge of the perceptions of organised labour and inform the policy direction towards achieving an energy transition that is just.

3. The Role of Trade Unions in Energy Transition

For decades the trade unions have been at the forefront of protecting and improving workers' rights, and as the calls to transition to green and low carbon economy intensifies, trade unions are demanding a worker friendly Just Energy Transition. There is no doubt that the transition to low-carbon energy sources will have effects on communities that are heavily reliant on these forms of energy sources. As a result, there has been intense calls to ensure that this energy transition is fair and just, particularly to societies and communities most affected and dependent on resources that are to be phased out as a result of the transition. A concept known as Just Energy Transition (JET) has been developed by the labour movement to encapsulate collective tasks that are needed to manage the negative impacts of the transition in a fair and a just manner.

In 2013, the ILO (International Labour Organization) resolved to promote sustainable development, decent work, and green jobs; it then established the ILO Guidelines for a just transition towards environmentally sustainable economies and societies (ILO, 2024). And so, trade unions have played an important role in defining the concept of Just Transition - in particular introducing the 'Just transition' concept into the Paris COP 21 Agreement in 2015 (Thomas, 2021).

Whilst trade unions and their members are at the frontline of those who will be most affected, unions' interest in energy transitions are much broader. Important to trade unions is that the energy transition must be achieved in a fair and equitable manner for everyone involved and ensure that no one is left behind. The process should also provide opportunities for workers and communities to manage the disruption of livelihoods caused by the transition to renewable energy (Gambhir A, 2018). Specific to workers, such a transition must comprise of providing social protection for workers who will be affected, must promote social dialogue, and facilitate collective bargaining agreements with employers as a key platform for collaboration. One critical aspect of this transition is upskilling and reskilling workers to thrive in low-emitting industries and sectors. As a result, job creation should be an important aspect associated with the renewable energy uptake (Sooriyaarachchi et.al, 2015).

Despite what many think, trade unions have had an interest in environmental issues as well as the health and safety of workers. As early as 1888, the women and girls (known as Matchgirls) working in a match factory in London went on strike against chemicals and pollution in their workplace, and low pay. Around the 1960s and 1970s, some of the European trade union movements pushed and mobilized workers against occupational diseases and industrial pollution (Bécot, 2024), giving rise the perspective known as working-class environmentalism. In fact, (Goods & Ellem, 2024) argued that because the causes of climate change are profoundly rooted in 'work' and capitalism, workers' struggles at the shop floor as well as social production are inseparably interconnected to environmental justice. As such, trade union perspectives and experiences are critical if a just transition is to be achieved.

4. Contestations on the Job Creation Potential of Renewable Energy

Without a doubt, the job creation potential and effects of the energy transition to renewable energies are a contested space. Although the socio-economic benefits of renewable energy are gaining importance in the global debates (Wallasch A, 2014), there remains a significant gap in empirical evidence of employment effects, as well as how jobs are measured in Renewable Energy (RE). Studies that attempt to estimate or measure the job creation potential in the Renewable Energy sector use different tools and methods and often present these estimates in a highly aggregated manner, making comparison or application in other contexts impossible (Simas & Pacca, 2014).

In most discussions and studies about energy transition and job creation potential of RE, there is no consensus on how to measure, what to measure, and how to report jobs created and potential jobs. Some studies opt for Jobs per MW installed, value chain segment jobs per MW, person-year per MW, one-year jobs, among others. These measurements are thrown around as if they are commonly understood and shared. For instance, (Simas & Pacca, 2014) use persons-year equivalents ($p\text{-}y_{eq}$), whilst (Hondo & Moriizumi, 2017) opt for person-years per GWh, while (Llera, Scarpellini, Aranda, & Zabalza, 2013) use jobs per MW installed. (Lambert & Silva, 2012) argue that whilst it may be possible to convert different measurements to job ratios to allow for comparisons, the ratios do not provide information about when the jobs are created, particularly where jobs are not evenly distributed across the lifetime of the system and are most likely concentrated in the initial phases. More importantly, the ratios of jobs created hardly indicate whether jobs to be created are temporary jobs or permanent and stable jobs.

In addition, most of the literature on job creation potential of RE demonstrates that there is ample evidence available proving that renewable energy offers significant opportunities for job creation (Hanna R. H., 2024) (Bulavskaya T, 2018), (Ch Malamatenios C, 2016; Ch Malamatenios C, 2016), (Elfani M, 2011). Several of these studies advocate a rapid adoption of renewable energies, citing the positive employment effects such as direct, indirect and induced jobs along the value chains. For instance, (Khobai, Kolisi, Moyo, Anyikwa, & Dingela, 2019) examined the long-term and short-term impacts of renewable energy intake on unemployment in South Africa for the period of 1990-2014. Their study concluded that in the long-run, higher levels of renewable energy intake increase employment levels, and the opposite is true in the short-run. These findings are significant in the context of South Africa because of high levels of unemployment, poverty, and inequality.

However, (Sooriyaarachchi et.al, 2015) on the other hand, warn that whilst there will be new jobs created, a shift to renewable energy will also end certain jobs without direct replacement. In addition, (Sooriyaarachchi et.al, 2015) further caution that there could be higher job losses than anticipated due to higher prices of renewable energy that could result in consumers spending less and affecting other sectors indirectly. Using a mathematical model, (Baran, Szpor, & Witajewski-Baltvilks, 2020) studied how the phasing-out of coal is likely to affect mineworkers in Poland. Their study revealed that Polish coal miners find it difficult to secure employment in new jobs outside the mining sector because of their low education and high age, characteristics similar to SA coal miners. They argue that in addition, coal miners have job stability and earn higher wages, compared to other low-skilled jobs. As such, coal miners might resist the transition, thus creating a net loss of the labour force, despite the number of jobs created in RE. And so, such studies argue that an estimation of the job creation potential of renewable energy is inaccurate if it does not include the job losses, job losses due to both the replacement of coal and job losses resulting from

increased energy prices and reduced consumption of other goods and services (Lambert & Silva, 2012). Both these perspectives are valid and useful when understanding job creation potential of renewable energy.

As a result of inconsistencies in measuring job creation potential, in interpreting, analysing RE job data and employment effects, it becomes important to understand the breakdown of job creation potential in each category of the renewable energy value chain and the role that governments can play to foster an enabling environment for job creation (Sooriyaarachchi et.al, 2015), particularly because most of the studies' legitimacy is questionable. As an example, (Cameron & van der Zwaan, 2015) reviewed 70 studies and data sources published over the past decade on employment opportunities associated with the deployment of renewable energy technology. Their review revealed that besides the challenge of using different methods and approaches to estimate job creation, there is overwhelming incidents of copied and re-used results with only a few studies demonstrating original research.

Another point of contestation around the job creation potential of RE is whether occupations and jobs that will be affected can be catered for in the RE sector. There is no question about it, it is vital to understand which jobs and occupations are likely to be affected in order to prepare for the transition. Yet, data on the types of occupations that will be affected or jobs to be created is limited (Dominish, Briggs, Teske , & Mey, 2019).

And lastly, there is growing concern that the energy transitions have not addressed embedded gender biases and stereotypes in the energy and mining sectors. When it comes to energy poverty and climate crisis, there is substantial research that shows that it is not gender neutral; women bear most of the cost of lack of energy access, and when it comes to employment women face more barriers to finding jobs than men. A study by (IRENA, 2014) found that whilst globally women account for 32% of the renewable energy workforce, still significant imbalances remain, in terms of energy access in communities. (Fakier, 2018) found the exclusion of African women from environmental policy to be a factor in increasing the carbon load in South Africa, and that it impacts negatively on domestic labour and expenses. It is, therefore, important that women have equal opportunities to renewable energy industry growth. As a result of these contestations, there has been a push for governments to actively integrate gender in climate change policies as well as renewable energy industrial policies.

5. Transition to Renewable Energy and Industrial Policy

Due to the socio-economic benefits of the adoption and deployment of RE technologies, and in particular the growing financial investments towards the transitions, many governments have developed an appetite to move from just being consumers of RE technologies to being builders of RE domestic industries (Nahm , 2023). As a result, there has been increased interest among governments in reviewing and introducing policies that offer the possibility of supporting growth and employment in these new industries. Industrial policy is one of the tools that governments can use to promote growth and development of new industries such as renewable energy (Carbaugh & St.Brown, 2012).

Industrial policy took centre stage in the world economic and political affairs, particularly after four East Asian countries underwent rapid industrialization. Now known as the four Asian Tigers - Hong Kong, Singapore, South Korea, and Taiwan - these economies went from poor to developed countries in just four decades. As such, a great deal of research effort and debate on industrial

policy have revolved around the Asian Tiger experience; in particular, whether industrial policy was the secret ingredient in their industrialisation success, and whether other countries can achieve similar economic success if they replicated the same strategies (Lall, 1996) (Stiglitz, 1996) (Hauge, 2019). Recently, there has been a growing interest to better link the energy transition objectives and ambitions with industrialisation and job creation through industrial policy. (Morris, Robbins, Hansen, U.E, & Nygaard, 2020) argue that sectors such a manufacturing present renewable energy economic opportunities, such as localisation. This calls for deeper appreciation of how renewable energy production systems work in the global value chain. From a policy perspective, such state led interventions associated with the support of growth of particular sectors are called industrial policy. In order to understand how industrial policy can be used to foster and promote job creation, it is important to understand Renewable Energy value chains. (Eicke L, 2022) for example, points out that it is important to understand renewable energy's global value chains alongside the industrial policy in order to understand the potential for job creation.

Moreover, it is worth noting that the increase in demand and deployment of renewable energy has led to a rise in green innovation and investment dominated by developed countries (Shen, Ayele, & Worako, The political economy of green industrial policy in Africa: Unpacking the, 2023). The authors warn that the rise in green innovation and investments prompt developing countries to nurture green technology and industrial capacity as a matter of urgency; otherwise, they face the risk of being completely shut out of the global green and renewable value chains and divisions of labour. An industrial policy is normally used by governments to correct such market failures by granting subsidies to producers and consumers (Carbaugh & St.Brown, 2012), thus enabling developing countries to infiltrate the global renewable chain.

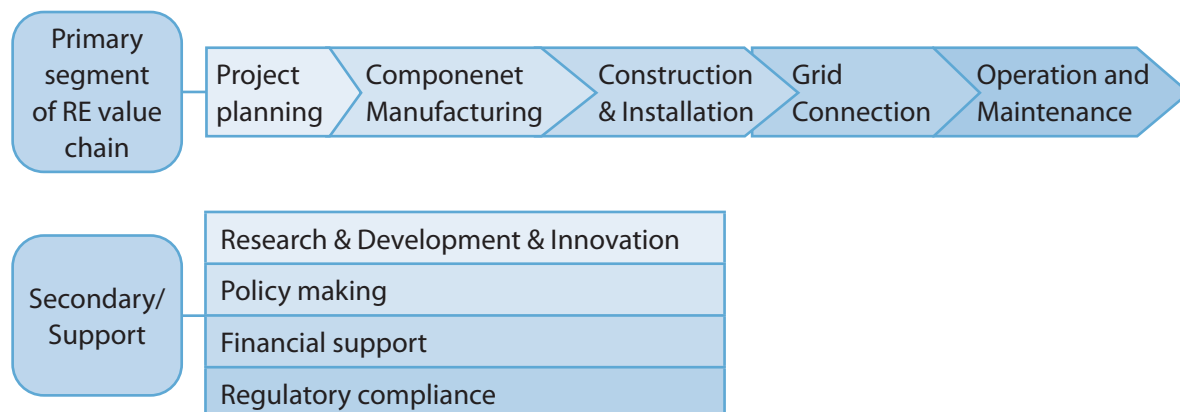
6. Renewable Energy Global Value chain

Value chains lay out all the activities and tasks needed to produce the final product or service from start to finish. For (Levin & Makgetla), value chains provide a useful conceptual framework for industrial policy, because they help in creating a plan for identifying opportunities arising out of sectors or industries as well as the constraints that may hinder growth at different phases of production. But these processes and systems of production have also undergone their own transition and revolution, in that value chains have become much more multifaceted than before. In the past, all the activities needed for creating a product or service from the start to its delivery to the market would take place in one firm or country. However, advancements in technology, decreasing transport costs, and information systems have enabled businesses to work together across borders, designing, producing, and assembling parts wherever it is most cost-effective, thus, creating a global value chain (GVC).

In GVC, the activities and functions are spread among numerous firms across the world, where lead firms operate at the particular position along the chain, directing and framing activities, influencing other actors and firms' standards as well as prices along the chain (Ponte, Gereffi, & Raj-Reichert, 2019). Similar to other industries, production and trade in the Renewable Energy industry are organised in GVCs, where the end product is often a result of manufacturing and assembly in several countries, with each step in the process adding value to the end product.

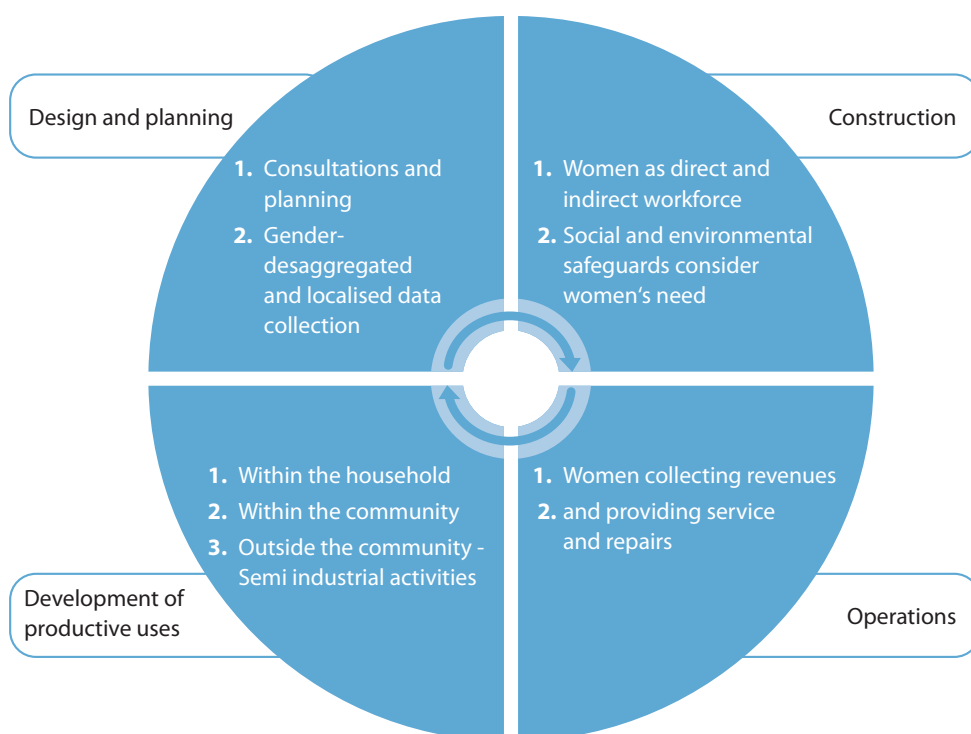
Value chains comprise both primary and secondary support activities. Each activity is critical for the effective running and operation of a renewable energy company. Literature broadly categorizes primary activities of renewable energy value chains across the six main segments, namely:

Project Planning, Manufacturing, Installation, Grid Connection, Operation, and Maintenance (Sooriyaarachchi et.al, 2015) as per the figure below.



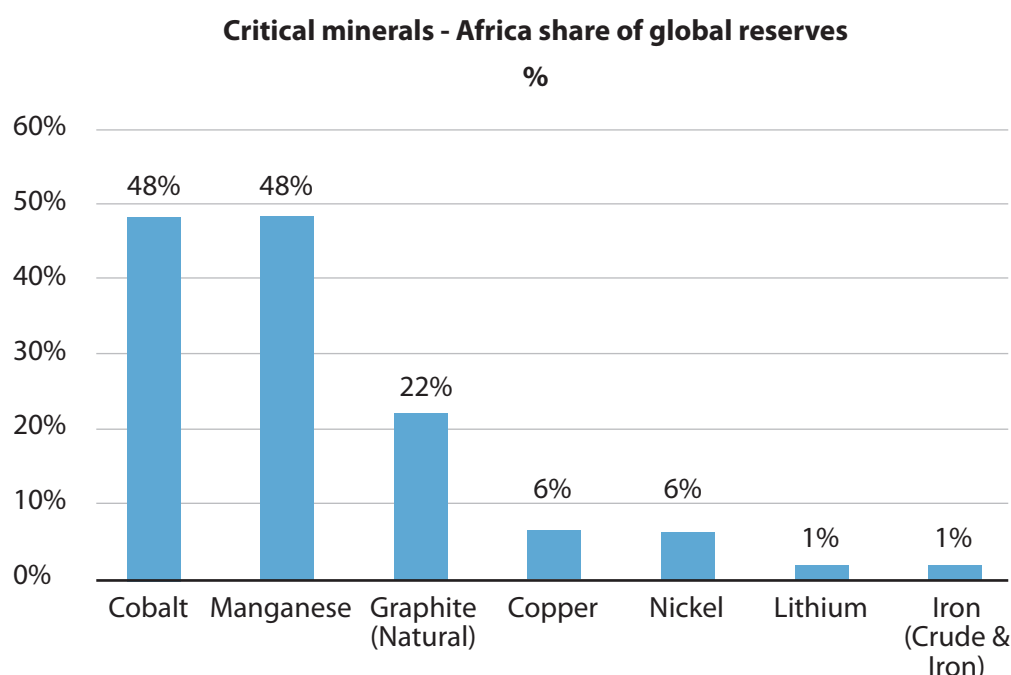
Source: adapted IRENA 2014

In addition, each activity or segment of the chain offers different types of economic benefits and different types of jobs, because value-add is different in each segment of the chain. For instance, (Eicke & Weko, 2022) argue that in the renewable energy value chain, support segments such as research and innovation, and product development and design are commonly the most profitable segments of the chain, whilst manufacturing ranges in the middle, and resource extraction is the least profitable segment. As a result, position in the value chain is highly important if countries are to reap the benefits of participating in GVC. It is also important to note that different renewable energy technologies have different types of jobs along the value chain. Specific to women, there are several opportunities for women along the renewable energy value chain, as per the figure below:



Source: IRENA (adopted from Bogle and Rodriguez 2017)

Another reason GVCs have gained prominence globally is how they have changed trade processes and policies. There is enough evidence showing that trade policies can contribute and shape RE industries along the GVCs and supply chains as a way of boosting domestic manufacturing. For instance, one way for countries to become incorporated into world trade is by opting for specific tasks involved in the production process and joining existing value chains, instead of building whole chains by themselves (Bruhn , 2014). According to the (UNCTAD, 2021), there are numerous opportunities in the development of RE frontier technologies, estimated at about US\$9.5 trillion dollars as a result of significant increase in trade of RE technologies in the last decade. Yet, developing economies are not ceasing these opportunities. For example, Africa has an abundance of minerals and metals needed for these technologies as per the figure below:



Yet despite this, commodity dependence remains a critical challenge for Africa, where developing countries export raw materials and import the finished technologies. Looking at the RE technologies GVCs as a whole, there are numerous places or segments in which developing countries can infiltrate the chain; yet because of commodity dependence, developing countries are usually concentrated upstream of the chain; yet, there is evidence proving that the value of these exports increases downstream (Bruhn , 2014). As a result, African countries need to move from export of raw materials to adding value and moving downstream of the GVC and linking this with other sectors of the economy.

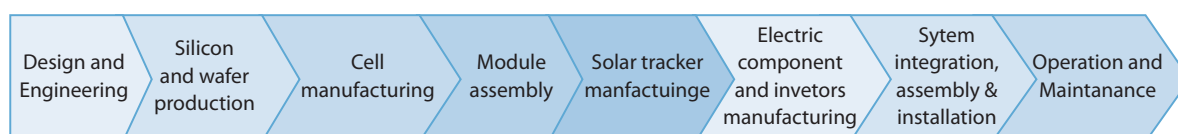
7. Job creation Potential of Renewable Energy Regime

There is consensus in literature when it comes to defining the jobs created concept; there is no single agreed definition of what constitutes a job. In 1999 the ILO provided an overarching definition of the concept of decent work as part of its decent work agenda and sustainable development programme that would guide what constitutes a 'job' or 'work' (ILO, 2024). Yet, despite this, the concept is still open to various interpretations. To make matters worse, concepts such as jobs, employment, work, and quality work are often used interchangeably, adding to definitional complexity (Dobbinsa, Caob, Greena, Johnstoneb , & Foster, 2014). This complexity poses serious

challenges in understanding the job creation potential of RE, as some of the jobs created along the RE value chain are temporary jobs.

Indeed, the energy transition has an opportunity to create new employment, and better jobs in areas that are critical to climate change mitigation, adoption, and resilience. According to (IRENA, 2014), whilst there were only 7.3million RE jobs globally in 2012, the number has increased significantly to about 13.7 million in 2022. In the last decade, there have been several studies attempting to quantify socio-economic benefits and the job creation potential of RE sectors. For instance, (Bulavskaya T, 2018) studied the potential short and long-term macro-economic effects of renewable energy in the Netherlands using what they termed Three ME is a CGEM (Computable General Equilibrium Model). The model assessed the interaction and feedback between supply of and demand for energy. They found that renewable energy has the potential for stimulating growth and jobs for the Dutch economy, and that an additional 0.85% of GDP would be created by 2030. Using a different model known as 'the Renewable Energy-Focused Input-Output' (REFIO) (Hondo & Moriizumi, 2017) also estimated the indirect employment creation potential in the supply chain of each technology. They concluded that the employment effects are the same among the technologies considered, and that employment opportunities created over the life cycle vary from 1.04 to 5.04 person-years per GWh, depending on the type of technology. These studies highlight the importance of understanding job creation opportunities not only in different technologies but also along the value chain.

In the last few years renewable energy, particularly solar and wind power, has increased significantly in South Africa, presenting opportunities for increased job creation. The potential for job creation in renewable energy is largely driven by the increased demand for RE technologies. Accordingly, the increase in demand has also meant that there is a need for a skilled workforce to install, maintain, and operate these systems. The RE sector presents employment opportunities across a wide range of fields, including engineering, project management, sales, installation, and maintenance. Along the RE GVC, (Hanna, Heptonstall, & Gross, 2023) found that for most RE technologies there is a higher level of manufacturing job creation per GW. However, the potential of high employment factors for manufacturing is largely dependent on the presence of a renewables manufacturing base in the country. For instance, regarding the solar PV module manufacturing, there are numerous job creation opportunities along the value chain as per the figure below, starting with raw materials such as silicon to the assembly of the solar panels.



Source: (Llera, Scarpellini, Aranda, & Zabalza, 2013)

(Llera, Scarpellini, Aranda, & Zabalza, 2013) provided a detailed estimation of job creation from renewable energy deployment through a value-chain approach, and found that in 2010, PV manufacturing provided 29.5 full-time direct jobs for a whole year's work. In addition, the study revealed that there is high job creation potential for manufacturing, but only if the local industry has a strong presence such that all the generated jobs can be local, resulting in high employment/MW ratio. The study provided details of needed jobs for the installation of 1 MWp according to the stage in the value chain and professional skill, as shown in the table below.

Jobs/MW	Managers	Technical consultants	Salesmen	Installers	Operators	Maintenance staff	Administrative staff	Total jobs
Projects/studies	0.08	0.17	0.03				0.05	0.33
Silicon	0.05				0.80		0.13	0.98
Cells	1.01	0.50			0.70		0.20	2.41
Module assembly	2.01	1.01			4.02		2.01	9.05
Solar tracker	0.97	1.04	0.84		2.55		0.97	6.37
Elect. components and inverters	0.68		0.45		0.82		0.65	2.60
Installation	1.06	1.35	0.67	2.31			0.67	6.06
Operation	0.30	0.35	0.21			0.47	0.32	1.65
Total	6.16	4.41	2.20	2.31	8.90	0.47	5	

Interestingly, South Africa has high quality silicon which used to be produced by Ferroglobe, the largest Western producer of silicon metal. According to (DMRE, 2004), Ferroglobe's South Africa silicon plant, located in the city of Polokwane, has the capacity to produce 51,000 tonnes a year. Reopening the plant would, in addition to forming solar panel manufacturing plants and related facilities in South Africa, offer job creation opportunities. In addition, establishing such industries reduces the cost associated with importing solar equipment, and will foster an environment for business growth due to knowledge and technology. Similar findings were reported by (Simas & Pacca, 2014) in their assessment of employment in renewable energy technologies for wind power in Brazil. Their study found that there were 13.5 persons-year created for each MW installed between manufacture and first year of operation of a wind power plant, and 24.5 persons-year created over the wind farm lifetime.

Countries such as China have proven that local manufacturing can lead to job creation and increased exports, thus significantly contributing to economic growth. Yet, it is equally important to note that global competition on manufacturing these products is intense, with China dominating the scene particularly because of its ability to supply at cheap prices, making it difficult for other countries' manufacturers to compete. (Usman, et al., 2024) explored the challenges and opportunities associated with the adoption of renewable energy technologies in manufacturing. Their review found that the high capital investment required for solar panels, wind turbines, and biomass energy systems can be prohibitive for many manufacturers, particularly small and medium-sized enterprises. Their study concluded that integration of renewable energy into the manufacturing industry was highly depended on a combination of innovative technologies, strategic planning, and policy support. In their investigation on how the establishment and development of new RE industrial value chains can foster and boost South African economic growth,

(Barnes, et al., 2023) recommend three important interventions government needs to do. First, the SA government needs to put in place interventions that promote consistent RE demand, which will give confidence to local manufacturers. Secondly, the government needs to protect the local market, enforcing policies that favour local manufacturers and enabling them to grow the local RE manufacturing industry. Lastly, to grow the RE manufacturing industry the authors recommend that government needs to promote and boost competitiveness of local manufacturing; this may happen through developing a forum to link OEMs and local manufacturers. For (Ettmayr & Lloyd, 2017), it is important for South Africa to consider providing improved market conditions as well as monitoring and evaluation, and place more effort on R&D and innovation, as well as establishing manufacturing clusters, thus enabling local manufacturers to compete globally without false advantages created by protectionist measures. They argue that the jobs created this way will be more sustainable.

8. Overview of SA Renewable Energy Sector

The South African renewable energy industry is fairly new, yet is the largest renewable energy capacity in Africa, as of 2023 (Statista, 2024). What makes South Africa's renewable energy journey an interesting case amongst African countries is its active, state-driven renewable energy industrial strategy and renewable energy master plan, aimed at attracting private sector investments whilst creating new green industries and creating much needed jobs.

As a response to growing environmental challenges associated with coal energy sources and the SA's energy crisis, in 2010 the government introduced the Integrated Resource Plan (IRP) which proposed an energy mix to meet electricity needs of the country over a period of 20 years. The plan paved way for the adoption of renewable energy through the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP). The objective was to achieve a target of adding 17,800 MW of RE to the energy mix by 2030, and by attracting private investment into the country's energy transition focusing on three main areas, namely: lowering of carbon emissions; improvement in generating capacity, and prospects for economic development (Akinbami O, 2021).

Whilst coal is still a major source of energy in South Africa, renewable energy adoption has steadily increased over the years. Currently, 8.8% of South Africa's energy is generated from renewable energy. By 2023, at least 123 renewable energy projects had been awarded to the private sector, and the private sector had committed an investment of about R256 billion to the REIPPPP (Evans J and Ngcuka, 2023). Various researchers (Eberhard & Naude, THE SOUTH AFRICAN RENEWABLE ENERGY IPP PROCUREMENT PROGRAMME Review, Lessons Learned & Proposals to Reduce Transaction Cost, 2017) (Herbst, 2015) (Cape-Ducluzeau, 2015) (Walwyn DR, 2015) have praised REIPPPP and found that it has had positive outcomes, attracting more investment than in the rest of Sub-Saharan Africa over the past two decades. Bid tariffs have also fallen sharply over the course of the programme. The REIPPPP as an instrument of industrial policy has specific requirements such as local ownership, local content, and economic development requirements which renewable energy developers have to comply with. The idea is to deepen localization of renewable energy, so as to foster creation of job opportunities. In addition, because of the apartheid legacy, the government has committed to transforming the economy by promoting greater participation of black people in ownership, management, and skills development through a regulatory framework named Broad-Based Black Economic Empowerment (B-BBEE). And so, the RE sector in SA is linked to B-BBEE, where renewable energy companies are required to establish trusts that hold

shares on behalf of historically disadvantaged communities and beneficiaries.

Some studies were quick to point out that REIPPPP would not be able to meet its socio-economic targets because of the proportion of foreign ownership of RE projects, and the low level of local ownership and of community ownership (Project 90 by 2030, 2018) (Cassim A, 2023). For (Eberhard, 2014) the programme has both successes and weaknesses, with shortcomings arising due to over-estimation of the size and readiness of the local renewable energy market, high transactional costs for government and bidders, as well as failure to monitor the industrial policy mechanisms of REIPPPP. Yet it is also true that through the IPPs more investment came into South Africa more than into the rest of Sub-Saharan Africa and, overtime, bid tariffs decreased significantly resulting in low price grid-connected renewable energy projects in the world (Eberhard & Naude, 2017). Despite these differing views on REIPPPP, one thing that is unanimously agreed on – and that is the need for South Africa to seize the energy transition opportunity to drive industrialization in the renewable energy value chain in order to benefit from the process of energy transition, particularly the potential for job creation.

Thus, understanding how industrial policy can stimulate renewable energy job creation potential is of utmost importance, especially because the type of jobs required in renewable energy industries are closely related to the value chain and activities involved (Sooriyaarachchi et.al, 2015).

9. SA Renewable Energy Industrial Policy

Besides the REIPPPP, another interesting feature about South Africa's renewable energy journey is the South Africa Renewable Energy Master Plan (SAREM). SAREM is a very vigorous industrialisation plan for the renewable energy value chain aimed at creating at least 36,500 jobs by 2030 through localizing 70% of the components and 90% of Balance of Plant (all the supporting components and auxiliary systems of a power), and Operations and Maintenance in the wind and solar PV value chains, combined with battery energy storage (SAREM, 2022). Despite capacity problems, the South African government through SAREM is clear that its aim is to drive industrialisation through a localisation and manufacturing strategy. This is no surprise as the majority of highly industrialized countries have done so by improving and developing their manufacturing base. For instance, (Szirmai & Verspagen, 2015) studied the role of manufacturing in economic growth in of 88 countries for the period 1950–2005. They found that there was a direct positive effect of manufacturing on growth for the 1970–1990 period. Also, with regards to renewable energy, the rapid rise in China's renewable energy manufacturing industry, particularly of wind power technologies, is seen as the result of active industrial policies of the Chinese government.

Whilst there has been wide spread acceptance of SAREM as an industrialization plan, there has also been some criticism that the plan is driven by a market-led import approach and does not make reference and recommendations on the REIPPPP's poor performance and existing local content rules in terms of monitoring and compliance (Institute for Economic Justice, 2022). For that reason, there is speculation that SAREM might have similar shortcomings as the REIPPPP, especially regarding the support of local markets for job creation.

When attempting to understand and assess the possible job creation along the renewable energy value chain, it is critical to appreciate the relationship between GVC participation and trade and industrial policies. Various scholars, particularly those interested in international trade, have given insight on the interrelation between industrial policies and GVC participation (Bulavskaya T, 2018) (Eicke & Weko, 2022) (Morris, Robbins, Hansen, U.E, & Nygaard, 2020) (Zhang, Andrews-Speed,

Zhao, & He, 2013). The connection between GVC and industrial policy is immensely important because industrial policy can be targeted at specific activities along the GVC that may offer better benefits to the economy. For example, in China, the incorporation of renewable energy policy and renewable energy industrial policy played a huge role in the development of the sector. Specific to industrial policy for renewable energy, the Chinese government provided considerable policy support; a specific fund was created to support Chinese manufacturing companies' innovation and R&D in manufacturing renewable power machines and equipment. In addition, China introduced import tax exemptions for foreign made parts needed to develop the local market and forced renewable energy developers to source a share of equipment from local suppliers (Zhang, Andrews-Speed, Zhao, & He, 2013). In this way, the Chinese government gave precedence to developing the local renewable energy manufacturing industry.

Participating in the GVC brings along many economic benefits. For instance, in their analysis on GVC and Development, the (UNCTAD, 2013) found that countries which had the highest GVC participation growth also had an increase of two percentage points higher in Gross Domestic Product (GDP) per capita, indicating a positive relationship between GVC participation and GDP per capita growth. And so, there has been heightened interest among scholars regarding the relationship between industrial policies and GVC participation. The interest has also sparked debate on whether there is a need of a new way of developing and formulating industrial policies (different from those implemented by the Asian Tigers) that can foster economic growth for developing countries (Hauge, 2019). Several of these scholars agree that industrial policies for today must move away from outdated policies such as Import Substitution Industrialization (ISI) - a trade and economic policy that promotes replacing foreign imports with domestic production; and Export-oriented Industrialisation (EOI) - a policy that promotes export of goods and discourages sale of goods on the domestic market (Hauge, 2019) (Ponte, Gereffi, & Raj-Reichert, 2019). From the GVC perspective, this approach is problematic as production systems are now fragmented across the world and not restricted to one location. To participate successfully in the GVC, firms need to have access to cost-effective imports and be able to move up the value chain of a particular product.

In addition, the traditional industrial policies tended to foster an environment in which firms could move from low to high value-added sectors, like a move from the commodities sector to the manufacturing sector. However, the GVC focuses on moving from low to high value-added activities (as opposed to sectors) with firms focusing on a particular task and on stages of production, rather than producing the whole product. For developing countries, the GVCs offers an opportunity for industrial development and can facilitate value-adding activities and a move up the value chain (Ponte, Gereffi, & Raj-Reichert, 2019). Although not the most profitable segment of the chain compared to research and innovation, manufacturing presents significant benefits, particularly for developing countries who wish to enter the renewable energy GVC. Besides manufacturing having high employment effects, firms and countries that are active in this segment have great opportunity to move up the chain to higher value-added activities, a process commonly known as upgrading (Eicke & Weko, 2022). However, moving up the value chain requires serious policy interventions and support; in fact, the (World Bank Group, 2014) warned that in order to benefit from value chain participation, it is essential to put in place the right trade and investment policies.

And so, the on-going energy transition is pushing the South African government and policy makers to assess which segments of the value chain offer profitable opportunities for local firms. This is extremely important since China has taken the lead as a renewable energy technologies power market in the world, relating to both manufacturing and installed capacity especially in solar PV

(Zhang, Andrews-Speed, Zhao, & He, 2013). Whilst China is leading in the manufacturing of solar inputs such as polysilicon, ingots, or wafers, research shows that there are still opportunities to expand manufacturing of PV modules and key system components in the case of solar PV (USAID and Power Africa, 2022). This is because there is no single country leading the manufacturing of PV modules and other different solar components, such as inverters, trackers, mounting structures, and electrical cables. Yet, for (Mazzocco, 2024), although there is a hype about promoting manufacturing due to its job creation potential, it is also important to note that automation could affect the long-term renewable energy manufacturing employment effects, and so labour-protecting measures need to be in place.

Localisation as part of the industrial policy in renewable energy industry is gaining prominence, particularly because of China success in becoming the leading manufacturer of renewable energy technologies globally. Countries like the U.S have introduced a similar policy called Inflation Reduction Act (IRA), which is a combination of tax credits and location- and ownership-specific requirements (Mazzocco, 2024). Yet despite its objectives of creating new jobs by promoting manufacturing, it has also created challenges amongst U.S trading partners, as it is a type of protectionism policy likely to increase costs. For (Mazzocco, 2024), U.S local companies have found themselves caught between a rock and hard place in that they lose subsidies if they use inputs from China, and the challenges of securing alternative suppliers of those inputs within time, whilst competing against global prices set by Chinese firms benefiting from economies of scale.

For South Africa, participation in GVCs and localisation are seen as key to pulling SA onto the ladder of industrial development. In particular, SAREM prioritises export credits for renewable energy components as a primary channel for supporting local manufacturing competition. Yet the (Institute for Economic Justice, 2022) argues that the priority should be on understanding the trade challenges impacting locally manufactured goods and services. For instance, in South Africa, there is potential for a solid local market for towers and components such as steel plates and secondary steel components, only if locally produced towers deployed in the projects and AC/DC cables and centralised inverters (and transformers) offer potential as well (Localisation Support Fund, 2023).

The local content component has been a critical and contested one in the implementation of REIPPPP, with several studies having found that jobs created in these areas were mostly short-term and unsustainable, and companies did not grow to become nationally and globally competitive renewable energy components manufacturers. Additionally, the absence of production factors as well as the weak local supply chain also affected local market potential to grow. This was largely because of the low and unpredictable demand for renewable energy, competition from Chinese firms, and unsupportive trade and industrial policy (USAID and Power Africa, 2022). And so, as soon as demand decreased, local companies and activities closed. However, the impression is that as the transition progresses, the demand for renewable energy will increase, thereby creating an environment where renewable energy developers and companies can enjoy the much-needed skills development, and economic development.

There are several challenges that the SA government needs to address in order to make the RE manufacturing industry more competitive, and to improve its developmental outcomes. First, local manufactures need support in relation to access to raw materials; to balance the impact of this, import tariffs must be applied to strategic components (Institute for Economic Justice, 2022). Secondly, the availability of both soft and technical skills is a big challenge; according to (IRENA, 2014), the most sought-after skills when it comes to renewable energy are those learnt through a

background in Science, Technology, Engineering, and Maths (STEM). This remains a big challenge in SA. However, with an active policy, it is a challenge that companies can handle through training, and through the use of training institutes that focus more on those skills. Thirdly, the government has to ensure that local content is the main requirement for developers and should put in place mechanisms to monitor compliance in this regard. In addition, the government needs to develop other mechanisms in which demand and supply is managed, whilst stimulating production.

10. Labour's Concerns, Experience, and Recommendations on Energy Transition and Sustainable Industrial Policy

Without a doubt, the Just Energy Transition is about anticipating change, but it is also about creating new decent jobs. Enough evidence exists that shows that the energy transition has an opportunity to create jobs, and that is where green skills and green jobs come in. Yet it is also important to recognize that it is not only the fossil-related industries that need to change. It is also about transforming and greening the work that people do in all sectors and at all levels. More importantly, as (Klein, 2014) argues, climate change is a direct consequence of capitalism, and it offers the world an opportunity to correct an economic system that has been failing in many ways. As such, for workers, the only way the transition will work is if it is just and fair and is centred around correcting injustices created by capitalism. For instance, there are concerns and valid questions about whether new jobs will be created right away, or whether people will have to wait; whether there will be a gap as jobs are transformed, and whether there are any guarantees that workers who lose their jobs will be absorbed in new industries. In their study investigating US energy workers' views on how they would be affected by energy transition, (Sicotte, Joyce, & Hesse, 2022) discovered that workers were concerned about the transition disrupting their present relatively secure employment, viewing it as a source of job losses, or as a source of low-paying, low-skill, temporary jobs. In addition, some workers such as boilermakers had fears about the mismatch of skills they would face if fossil fuels were phased out.

According to a (IRENA, 2023) report on labour and employer perspectives on the energy transition, jobs created may not match the jobs lost in other sectors. The report warns that at least 12 million fossil fuel jobs will be lost, creating challenges for affected workers, communities, and businesses. First, jobs are not necessarily created at the same time or scale as the loss of employment. Secondly, new jobs might not be created in the same communities and regions where losses would have occurred. Lastly, the skills associated with threatened jobs may not always match those required by emerging jobs.

11. Findings

Workers' Perceptions of the Just Energy Transition

A worker-driven energy transition is key. This study canvassed the views of workers in the energy sector on whom the transition is likely to have an adverse impact, especially in relation to the closure of power stations and the consequent loss of jobs. To solicit the views of the workers in affected sectors, SATRI conducted a study which had two components.

The first part was a series of individual virtual interviews held mainly with worker leaders from trade unions, and some experts who work on climate, energy, and just transitions. The other was a

focus group discussion of coal and energy workers in Mpumalanga Province. There was a total of 82% male respondents and 18% female respondents. The majority of the respondents (78%) were workers as it was important to truly understand how they foresee the transition impacting them, as well as to encourage them to articulate possible interventions.

This project sought to get views from workers and some experts on their general understanding of the concept of the Just Energy Transition, as well as their perceptions of how the energy transition has affected workers and communities, and how it would affect them in the future. The project also sought to hear what solutions they could propose to navigate the energy transition better. The questionnaire had similar questions for both individual and focus group discussions so as to solicit as many views as possible on issues that strongly affect workers.

The respondents were guided to share their views not only on the potential negative impacts of the energy transition, but also on the role that government can play in fostering industrial policy to ensure that the transition is just. This included speaking on value chains of renewable energies, and how a manufacturing sector can be aided by government through effective policy and legislation in the country to create significant opportunities out of the transition. Manufacturing, it is believed, has the potential to create jobs that are more decent and sustainable as per the ILO's Decent Work Agenda.

Thematic analysis (TA) was used in this research as it sought to highlight emerging themes from the data. The following themes came out very clearly from this research: job losses, impacts on livelihood, lack of social dialogue, issues of education and skills, and the role of government. These will be discussed below as they illuminate organized labour's apprehensions about transitioning to alternative energy sources.

Emerging Themes from Workers' Perceptions on a Just Energy Transition

1. Job Losses and Impacts on Livelihoods

Applying a qualitative research approach, it was important that this research upheld the perceptions and lived experiences of the workers as valid scientific knowledge. Thus, one of the key objectives of this study was to gauge and unearth different interpretations of the Just Energy Transition concept. The understanding of the energy transition differed among the respondents. Even though all the respondents interviewed exhibited having encountered the just energy transition concept, they ascribed various meanings to this term. The prevailing interpretation was that it entailed the adoption of renewable or clean energy sources which would ultimately lead to job losses. In defining the transition as a process, one respondent said this:

"The transition from one source of energy that is high in carbon emission to a source of energy that is low in carbon emission." (Interview with shop steward, 2024, Mpumalanga)

From the vignette above, decarbonising the energy system is well articulated because the respondents are shop stewards, worker leaders at branch and regional levels who have had the chance to engage in debates on this issue in one way or the other. These worker leaders express the need not to limit the meaning of the just energy transition to the 'move from coal to clean energy sources', but also to consider the important question about the impact that this transition will have on occupations and skills - as one respondent put it:

"Currently, the energy transition is not being 'just' for the workers in terms of the reskilling and re-mapping of new jobs. Energy will not create stable permanent jobs. Permanent jobs will be replaced by temporary jobs. My understanding of green jobs is that those are tempo-

rary jobs arising in the construction of solar panels. In the long run, most of the green jobs will require less manpower. Going to the green energy sector will exacerbate the unemployment rate in South Africa.” (Interview with shop steward, 2024, KZN)

What emerges is an understanding of the transition as a process, but also an understanding of its consequences/impact. The concern with the impact of the transition with jobs was widely shared among our respondents who made reference to the experiences of those who lost their jobs at the closure of the Komati Power Station. As shown in the following citations, they expressed concerns related to job insecurity and how livelihoods would be negatively impacted. These quotations indicate that the workers could not reference their own experiences, because they had not experienced the transition, but used Komati to underpin their concerns about job losses.

“Komati Power Station was closed because of energy transition, and more power stations were planned to be closed. There was no need for this power station to be closed. People’s jobs were negatively affected there.” (Interview with shop steward, 2024, Mpumalanga)

“People died because of the closure of the Komati Power Station. Others got divorced, some benefited from others.” (Focus group interview, 2024, Mpumalanga)

The quotations above indicate a concern among workers about the transition being done without due consideration for the welfare of the workers. The need for a serious concern about the socio-economic impact that the transition has on the workers, their families, and communities emerges. As a widely discussed issue, the closure of Komati is the perfect test case for how not to transition. The findings of this study poignantly illustrate that the interest of workers is not so much to oppose the transition, but to support the kind of a transition which would guarantee social protection for themselves and their communities.

The concern is not only confined to job losses but includes concerns about the job creation potential of the alternative sectors. This concern emerges from the current contestations regarding the job creation potential of the renewable energy sector. The key question on this issue relates, *inter alia*, to how to measure, what to measure, and how to report potential and jobs created. For example, among our respondents, if one were to transition, the expectation is to obtain a job similar to the one they currently hold or even better. However, this is not the experience of workers on the ground.

Another worker boldly and powerfully stated:

“The government should protect people’s livelihoods and jobs in the transition. The government should do more research on the future of work, new skills and the type of energy development for the future.” (Interview with regional leader, 2024, Mpumalanga)

These sentiments highlight organized labour’s apprehension about transitioning to alternative energy sources. The role of industrial policy then becomes crucial in fostering inclusive economic development by prioritizing the creation of jobs that will ensure that coal workers are not left behind.

2. Education and Skills Development

If proposals on the transition are to be organically developed, the workers themselves should have an appreciation of the alternatives that exist for their transition. In the absence of such an understanding, there will be a reluctance to embrace the transition, as it would be largely perceived through the lens of negativity rather than possibilities. Workers were asked if they are aware of the

different types of renewable energy sources. The key objective of canvassing this issue was so as to gauge how familiar workers are with the operation and job creation potential of the proposed alternative renewable energy sector. It was also to understand if they believed that they had the necessary skilling required to transition to the clean energy sector.

Firstly, workers were able to distinguish between the different types of renewable energy sources: solar, wind, hydro, and nuclear. There was differentiation in the understanding of the possibilities in the transition, based on level of education and skills. For instance, semi to highly skilled individuals emphasized the point that their technical skills are generic and that if one were to transition from coal to platinum mining or electricity generation using other (renewable) sources for instance, there will be no fundamental need for retraining, save for upskilling. Some were able to caution that it is not all sectors in the renewable energy space that could be transitioned to, nor offer decent and stable employment. Others were able to articulate that their skillsets allow them to transfer to a diverse range of industries, as articulated in the excerpts below.

“My current position is AFP Services Manager (acting). I am employed as Senior Supervisor Technical. My skills can also be used in the renewable sector because I am in a leadership role. I could work in a coal power station, and as well as a miner. I could also work in the metal sector and mining. I have technical and non-technical skills.” (interview with energy sector coordinator, 2024, Western Cape)

Another worker stated:

“Currently working as a mechanical fitter – maintaining mechanical devices within the coal thermal power station. If coal power stations are converted to green energy, then as much as my current skills might be relevant, an upskilling would be necessary for one to work on installation and maintenance. Also, my skillset can be transferable to various industries outside the value chain of energy, such as agriculture, construction, manufacturing and mechanical maintenance.” (Interview with youth shop steward, 2024, Mpumalanga)

Another respondent echoed similar sentiments and said:

“I am currently working as an Electrical Technician, sectors such as gas, nuclear and biomass are the mainstream opportunities for reskilling an electrical technician; however, solar and turbines offer nothing for someone in that position.” (Interview with youth regional chairperson, 2024, Mpumalanga)

What these perceptions about the possibilities of the transition do is that they reveal the workers' perception of whether they have the skills and competencies needed, or whether they will need to retrain or just upskill. It is imperative that the youth voice comes through strongly in these interviews, as the youth are at the heart of the energy transition discussions - especially where reskilling and upskilling are concerned.

Here, too, it is imperative to distinguish between the perceptions on core skills, soft skills, and transversal skills, etc. What emerges, however, is that skills are narrowly defined in respect of what the workers currently do in the energy sector. For example, coal sector workers were not as confident that they could easily be reskilled in order to fit into the renewable energy sector. This calls for enhanced policy coordination, coupled with strong social dialogue, to assess what other economic opportunities are available outside the energy sector to accommodate all workers that will be impacted by the transition.

3. Lack of Social Dialogue

Social dialogue is the most important pillar of the Decent Work Agenda because in order to achieve the other three pillars - social protection, employment protection, and creation and rights at work - social dialogue amongst actors needs to take place. It ensures inclusivity and fairness through consensus building on key issues that affect stakeholders. When speaking to workers about the Komati transition process, they apportion the blame for Komati's failure to the government which 'did not allow for [sufficient] public participation/consultation'. As indicated in the literature, 'a transition must promote social dialogue and collective bargaining agreements with employers...' (Gambhir, 2018) thus making social dialogue integral to the transition, in that it brings different constituencies to the table and enables them to articulate their interests. As one worker put it:

"Government did not allow for public participation/consultation before closing down the Komati as per Section 59 of the Constitution of the RSA. Government is not complying." (Focus group interview, 2024, Mpumalanga)

The above citation also highlights worker knowledge on the importance of consultation processes in aiding equitable and socially acceptable transitions. Noteworthy is that transformation is a process that takes time, and in order for it to result in long-term stability, it should be fuelled by constant collaboration amongst actors. It also shows that lack of consultation has the tendency to result in unfortunate and dire consequences for mainly the 'at risk' groups in the transition, which in this case are workers and communities.

4. Mental Health

One recurring theme that kept being elevated when respondents were asked about the impact of the transition on communities and workers themselves was that of mental health. Though workers could not speak from their own experiences, they spoke from what they had observed happening to their peers at Komati Power Station. Job losses not only impacted on direct jobs but also on indirect jobs where value chains surrounding the power station started losing economic activity due to the closure. The loss of a major local employer can cause psychological distress in a community, especially in a province like Mpumalanga where the coal value chain has been the backbone of the economy for decades. Workers were able to articulate the impact of the transition on communities very well, as indicated below. One respondent said:

"People died because of the closure of the Komati Power Station. Others got divorced, some benefited from others." (Interview with branch leader, 2024, Mpumalanga)

Another respondent in a focus group interview in Mpumalanga (2024) shared similar sentiments, stating:

"Yes, some people died, houses were repossessed, and people's mental health was at risk."

These are strong expressions of people's lived reality when their livelihood is threatened or taken away with no immediate or short-term alternative. Respondents expressed fear of the future, as there are many uncertainties about the proposed transition. These fears propel workers to then start articulating the perceived role that government and employers can play towards placing safeguards against the risks of the transition. These articulations assist in helping shape sustainable industrial policy.

5. Just Transition and Sustainable Industrial Policy

Having highlighted and articulated worker's concerns, it is important that sustainable industrial policy should be able to integrate a variety of strategies to ensure that social, environmental, and economic benefits are equitably distributed across society. Part of achieving this is ensuring that the role of various stakeholders, especially government, in carrying out inclusive sustainable development is articulated.

This research sought the opinions of workers on the role that government could play to allay their fears on the looming job losses as a result of transitioning from coal to alternative energy sources. In ensuring that no one is left behind, the study started interrogating potential safety nets that the government could provide, which led to an examination of economic diversification and localisation options to take advantage of in this anticipated green sector.

The main aim of this was to see how the anticipated social inequalities could be addressed, along with seeking to achieve environmental goals. It was important to see if those most impacted would be able to benefit from clean energy solutions, through formulating and implementing policies that directly benefit the workers and communities that would be disadvantaged by the transition. It was important to hear the workers' voice on the role that the government could play.

Expectations about the role that government could play in ensuring that displaced workers and communities are not left behind became visible. Below are the opinions of some workers on the government role:

"The government should invest more in education around technology and engineering (reform the education system)." (Branch chairperson, 2024, Mpumalanga)

"The government must do localisation of skills when the transition is taking place. The skills must be localised. Build skills where the projects are. Skills from overseas must be transferred to the local people. The government must come with regulations to regulate skill transfer." (Energy sector coordinator, 2024, Western Cape)

One of the first and recurrent articulations on how government could foster sustainable industrial policy was emphasis on investing in skills education and training for the new technologies that are to come from transitioning. The ILO (2022) enunciates the importance of this by stating that a Just Transition 'requires that education and training are considered essential for all individuals at all stages of their lives; they contribute in reaping the job creation benefits, and minimise the burdens of transition to carbon neutrality'. The role of the government is to ensure that it creates a conducive environment for industrialisation to thrive; in this way, those that are skilled will be guaranteed job opportunities that will emerge from a manufacturing sector propelled by the transition.

This speaks largely to promoting localisation opportunities in the production of wind turbines or solar panels, as transitioning has created that demand.

The research then put forth the role that industrial policy could play in achieving some of these recommendations that emerged through the various themes as follows:

- a) Provide preferential financing only to local companies.
- b) Introduce tax rebates and tax incentives to assist manufacturing companies.
- c) Introduce local content laws, and procurement for developers with preference for South African owned and controlled companies.,

d) Introduce subsidies for renewable energy equipment producers.

These suggestions would result in less dependence on external sources, while encouraging local economic opportunities which will result in more decent and sustainable jobs as defined within the parameters of a Just Energy Transition.

Another important aspect was workers' sentiments towards coal. Workers were not opposed to the transition but expressed that coal usage should not come to a halt as a result of transitioning to alternative energy sources. One worker put it as follows:

"The government should allow the green energy to work concurrently with the fossil energy and not try to move away from fossil energy. They must introduce green energy gradually and not be harsh." (Interview with branch leader, 2024, Mpumalanga)

It is rather evident that workers are aware that the government possesses the power and political will to drive the transition in the manner that they want. The pace of the transition remains an important aspect that the government should consider in relation to the working class. By managing the pace of the transition, they are also able to manage the consequences of the transition. Governments can shape industrial policy in a manner that can foster industrial growth, achieve social equality, as well as lead to innovation in a way that aligns with the demands of a Just Energy Transition. The government, along with various stakeholders, should integrate a diverse range of strategies that will enhance inclusive economic development, foster new opportunities in the green sector, while ensuring protection of livelihoods.

6. Conclusion and Considerations

In conclusion, multi stakeholder collaboration remains central towards achieving a truly just transition for workers, fostered by social industrial policy. To achieve this will require creation of synergies amongst actors to agree on certain objectives which have come out of the research. These include:

Social Dialogue: which remains a central pillar to achieving a just transition which includes cross sectoral collaboration and encourages use of shared knowledge amongst stakeholders of different industries so as to adopt inclusive best practices. Workers' voices should not be left out in key decision-making processes, especially when formulating industrial policies.

Policymaking: the role of government becomes central in ensuring that worker-friendly policies that ensure adequate protection measures are put in place for those impacted. This includes fostering a conducive environment for the 'green' industry to thrive and ensuring that there are adequate economic diversification opportunities.

Upskilling and Reskilling: should be prioritised for workers in high carbon sectors who are most likely to be impacted by the shifts in energy generation. This should entail collaboration with educational training institutions to provide targeted education towards alternative economic opportunities. These trainings should be subsidised and ideally be 'on the job' trainings to ensure workers are not reskilled for unemployment.

Social Protection: should be carefully considered for displaced workers and communities in the affected sectors and should consider protection such as decent early retirement packages, and other alternatives of financial security to cushion workers during the transition period.

Investment: governments, employers, and industry actors all have a role to play in fostering an environment that will attract funding for the transition in order to achieve all the necessary workers' demands.

Protection of Labour Rights and Standards: trade unions should still be able to maintain their collective bargaining ability in the proposed new sectors of the transition by ensuring that they advocate for workers' rights in the same way they did in traditional sectors.

In conclusion, trade unions are aware of the impact of transitioning due to the climate emergency that requires achieving lowered carbon emissions. This, however, does not imply that decarbonisation should narrowly focus on environmental sustainability alone, but that it safeguards workers and the communities from which they stem. This means that adequate social protection should effectively guide a transition for the most-at-risk groups. Trade unions, as the originators of the Just Energy Transition concept, still have a pivotal role to play in ensuring that they continuously make demands that align with sustainable industrial policy.

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