

Case studies from transition processes in coal dependent communities



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The Institute for Sustainable Futures (ISF) is an interdisciplinary research and consulting organisation at the University of Technology Sydney. ISF has been setting global benchmarks since 1997 in helping governments, organisations, businesses and communities achieve change towards sustainable futures. We utilise a unique combination of skills and perspectives to offer long term sustainable solutions that protect and enhance the environment, human wellbeing and social equity.

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Executive Summary

Introduction

The energy transition is imminent. Coal has been the dominant source of electricity generation for the past few centuries. With growing environmental awareness and the looming threat of climate change, this trend is beginning to show signs of change. In many parts of the world, renewable energy is now cheaper than new-build coal power, and expected to soon be cheaper than existing coal fired plants.

Like all change, this transition is socially and economically disruptive, consequently affecting the lives of people especially workers and local communities in coal mining areas. In particular, communities in the global south experience a disproportionate impact of the transition to a low carbon economy. Hence it is important to fairly consider and address their concerns. These concerns are shared by the global climate dialogue and labour organisations alike.

The inclusion of a just transition for these communities may also be a prerequisite for the acceleration of the energy transition which climate protection requires. Hence, fossil-fuel based communities have to be taken on a just transition journey to ensure we can make the transition happen in time.

A just transition is multifaceted but generally understood as a “fair and equitable process of moving towards a post carbon society”. Just transition was recognised in the Paris Agreement as “a just transition of the workforce and the creation of decent work and quality jobs”. This is not a new concept though, and we can trace the origin of the terms to Unions in the 1980s describing a program to support workers who lost their jobs to environmental protection policies; entrenched in the dichotomy between the “green” (environment only) versus “brown” (jobs and public health) civic movements. Over time the just transition concept has become embedded in the environmental and climate justice discourse.

Using the broader concept of energy justice, there are three main aspects which have to be considered for workers, communities and disadvantaged groups:

- distributing benefits and costs equally,
- a participatory process that engages all stakeholders in the decision making, and
- recognising multiple perspectives rooted in social, cultural, ethical and gender differences.

Thus, a just transition requires a holistic approach that encompasses economic diversification, support for workers to transition to new jobs, environmental remediation and inclusive processes that also address equity impacts for marginalised groups.

The Institute for Sustainable Futures (ISF) at the University of Technology Sydney, in collaboration with the Institute for Advanced Sustainability Studies (IASS) Potsdam, were asked to investigate just transition pathways away from existing coal industries and identify enablers and measures that have proven successful (or unsuccessful). This report focusses on coal-dependent communities and their efforts and challenges in the structural change process.

Research Methodology

This report explores what a just and fair transition looks like in the four country cases of Germany, Poland, South Africa and Indonesia. It aims to understand enablers and barriers to economic restructuring in the energy sector and identify and compare measures that ensure a just socio-economic transition for the workers and local communities involved. We include the power sector in the analysis due to the interdependency with coal in these



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regions, and the overall implications for the energy transition. In each country, one region was used to exemplify their pathway to a low carbon society.

- **Germany:** Lausitz – brown coal mining and power generation
- **Poland:** Silesia – black coal mining and power generation
- **South Africa:** Mpumalanga – black coal mining and power generation
- **Indonesia:** East Kalimantan – coal mining and power generation

The study draws on qualitative research through desktop research of current literature, studies and government and other reports, including a brief media analysis of the most recent developments, supplemented with expert interviews.

Prospects for a Just Transition: Shared lessons

The cases studied are very different since the pace of the energy transition is determined by both global and national factors. Germany and Poland, already have significant experience with scaling down and phasing out coal generation and mining, while South Africa and Indonesia have only just embarked on the transition journey, and their national economies are still heavily dependent on coal. They also reflect the different role of coal with Germany a net importer, and Poland with predominantly domestic consumption for energy generation. South Africa and Indonesia, in contrast, are two of the largest global exporters of coal.

The cross-country findings are synthesised to assist the implementation of a just and fast transition process, for consideration by both policy makers and social and environmental actors. The key areas to be addressed in the transition process are:

Building a social compact & institutional coordination and funding

A key element of a structural transformation process which ideally occurs at the beginning is a mutual agreement between relevant local, regional, national (and sometimes international) stakeholders about the process, the implementation and the desired outcomes of the transition. It is important that representatives of the most affected communities are included in this process.

There is a structural tension between unions/labour and environmental movements that needs to be managed: environmental groups want as fast a transition as possible in line with the massive concerns of climate scientists but faster transitions threaten the capacity of local labour markets to cope and therefore the immediate futures of workers. In Poland and South Africa especially, the social tensions associated with transitioning regional workers and communities has led to political roadblocks for the energy transition. The failure to pre-plan and invest in just transition measures has been a key factor in the unravelling of labour support for energy transition with the first closures of coal plants. Germany on the other hand has endeavoured to secure political support through pre-planning and investment in just transition measures. However, just transition plans are less advanced in South Africa and Indonesia.

Just transition investment and energy transition policy integration is a pre-condition for a fast transition. The coordination and targeted allocation of funding for appropriate measures is key for a just transition process. Just transition funds are being established in North America, the European Union and Australia – sometimes with new independent authorities to coordinate and implement programs. Such authorities are often established through national legislation and tasked with facilitating the transition process. Major investment in just transition plans is needed to secure up-front support and maintain commitment through energy transition if it is to occur at the pace needed to avoid dangerous climate change.

There are a variety of national-led consultations or taskforces occurring which facilitate the development of social compacts and high-level political frameworks to catalyse the energy



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transition processes and support mutual understanding of the challenges and trade-offs to a low carbon transition (e.g. Canada, Scotland, South Africa, Germany, European Union).

In fact, some national discourses are captured in justice trade-offs – for example availability and affordability of energy versus health and environmental impact (Poland and South Africa). This stifles the social dialogue and disables stakeholders to find shared solutions planning for a way forward. A shared platform/ coordinated social dialogue and social compact between societal stakeholders is needed to facilitate a shared understanding of the transition scenario, clarify major questions (e.g. funding) and help to develop a transition package for realistic and sustainable prospects of workers and their communities. The German Commission on Growth, Structural Change and Employment (“Coal Commission”) in Germany is a successful national platform to bring together the different stakeholders including representatives of local communities to map out a plan for the future of the regions and negotiate the allocation of resources.

Planning for closures

Lack of responsibility and action taken by coal mining or power companies is putting communities at risk. Measures from coal mines and power companies to meet the challenges have been patchy, and often “too little too late”. The announcement of mine or power plant closures on short notice makes it extremely difficult for local communities and economies to adjust.

Large energy businesses, and particular the coal mining and power industry have a societal responsibility to support the transformation process. This includes facilitating the economic transition for workers, rehabilitating degraded areas, and compensating or undertaking long term environmental tasks (e.g. water balance). Yet, compensation for environmental degradation and renaturation measures are often left to government or communities to deal with. Site remediate is important to improve the quality of the local environment which is often very poor in coal communities but also because remediation can be an important source of low and mid-skilled at the most acute point of the transition when redundancies are fresh.

There is now a range of successful examples of the use of site remediation and industry regeneration to improve the local environment and economy. It appears crucial to increase pressure on mining companies to comply with their societal tasks, while the national, regional and local government efforts should be accompanied by industry initiatives and plans preparing for mine or power plant closures.

Economic diversification, job creation and community benefits

The phase-out of coal mines and power stations will require the establishment of equivalent decent paid and quality jobs¹ to avoid communities suffering from emigration and social deprivation. New jobs in clean energy technology production, construction and maintenance can play an important role in economic development. Large-scale investment in renewable energy will create an overall increase in total employment compared to fossil fuel. There are for example opportunities to use decommissioned coal mines for installing pumped hydro plants or for installing large scale solar projects.

However, net employment gains do not mean that the new jobs will therefore be located in the communities where there are job losses, and active policies are needed to ensure that opportunities are realised, and that retraining is available. There is also concern that the new jobs created will not be of similar quality to the jobs which disappear, particularly because renewable energy tends to be more distributed and does not have the same history of unionisation.

¹ According to the OECD the quality of jobs is measures by earning quality, labour market security and quality of work environment.



Consequently, there is a need for local economic diversification to create labour demand. The Silesian region demonstrates how the development of a variety of other industries and services can puffer significant socio-economic disruptions. However, Poland as well as the German case study shows that economic diversification takes time and early planning is required. Markets and companies will not manage this transition effectively without coordinated policy, negotiations and initiatives from a range of stakeholders.

Additional local and regional initiatives by NGOs, communities and local governments are important to mobilise for and demonstrate new local economic opportunities for example the deployment of new technologies (e.g. Germany and Poland). In Indonesia, social businesses and NGOs have had the most success with micro-grid renewable energy projects.

Recommendations

Incorporate considerations of justice transition principles into energy policy-making and other relevant international, national and regional frameworks.

It is easy for just transition to be overlooked in the focus on emissions reduction commitments and implementation. We need justice aware energy policy where just transition actions have to be elevated. This includes international agreements, national compacts, regional and local developing plans but it also means incorporating just transition principles in institutions and programs for finance, capacity-building, education, political engagement, labour markets and education and training.

National or international governments, frameworks and initiatives should provide funds for coal dependent communities for the energy transition process.

Support for coal dependent communities is an overall societal responsibility. Major just transition and coal region funds are emerging in advanced economies but developing countries lack the resources are likely to struggle to invest adequately amidst competing priorities. International climate agreements should include commitments to just transition processes in developing economies, including making just transition funding for coal dependent regions eligible for investment from the Green Climate Fund.

Take an early, participatory approach to creating a broad social dialogue and developing solutions with local stakeholders.

It is important to overcome traditional political divisions between stakeholders (e.g. unions versus environmental NGOs) by actively identifying common ground and collaborating across sectoral boundaries. Thus, a social dialogue should be established early with different political, industry and civil society actors at all governance levels and including the affected communities to understand the opportunities, challenges and trade-offs inherent in the energy transition. This requires the establishment of effective community engagement and decision-making processes at an early stage. Locally developed initiatives like local grant programs and capacity building measures that can empower local communities in the transition process should be supported.

Integrate social and local economic criteria into large-scale renewable energy policy and make it compulsory that large-scale renewable energy developers provide value back to local communities.

Large-scale RE support should be bound to essential criteria which guarantee local social and economic benefit for communities. Policy requirements for benefit-sharing packages should include direct jobs that come from the construction, operation and maintenance of the plant itself. It should also comprise local procurement such as supply chain jobs that come from providing services to the plant such as manufacturing components locally or training centres. Other benefit sharing mechanism include community benefit funds, sponsorships or local ownership/ co-investment opportunities to ensure broader community support.



Maintain, encourage and promote local bottom up initiatives, particularly include funding for distributed energy programs focussed on coal-dependent regions.

The deployment of renewable energy resources can offer new job opportunities for local communities along the entire value chain. However, the potential for large-scale renewable development does not always dovetail with coal mining regions. Distributed energy programs with funding for local renewable energy, energy efficiency, community ownership and micro-grids can be an important source of equivalent jobs and support the legitimacy of transition.

Set up active labour market policies that are tailored to coal-communities to support the reallocation of local jobs accompanied by measures to establish new diverse industries.

Active long term labour market interventions including retraining courses, support in job application processes and financial support for individuals throughout the entire reorientation period should be part of every local/ regional transition package. Local vocational and educational institutions will require expansion and adaptation, and the corresponding financial support, to ensure they can offer equal access to all and the appropriate skills training and capacity building. This should be accompanied by efforts to diversify the local and regional economy to increase labour demand.

Governments should mandate responsibilities for coal companies to prepare for the transition and take responsibility for site remediation.

Policy measures should be taken to facilitate and mandate the coal industry to start the transition process and implement site regeneration initiatives. Important elements include tools such as guidelines to help companies plan and information about good practice where remediation created value for the companies as well as local workers; mandatory notice periods for closures; mandatory requirements for establishing funds to be allocated for environmental remediation.

Insist on rule compliance and mobilise for stronger environmental standards.

Environmental and social advocates can collaborate and combine their campaigns to raise awareness and mobilise public support for stronger environmental standards (for air, water and soil) to enhance human health, and to rehabilitate areas which have been adversely impacted by coal operations. Making demands place-bound and raising the awareness about the local impacts (e.g. argument about health or individual economic loss) provide easier to grasp reasons and generate local support for coal phase out. Using and insisting on the compliance with existing environmental rules can be an instrument to create additional pressure on the coal industry.

Recognise and tackle the adverse impacts of the transition for vulnerable groups and eradicate energy poverty by providing access to distributed renewable energy and energy efficiency solutions

Empowering vulnerable groups in the transition process is a societal responsibility which requires a national and international approach. This includes collaborations with welfare groups

Conclusion

The imminent threats of climate change make a fast transition imperative. The societal responsibility to protect the natural environment for present and future generations is an overarching justice principle. A fair distribution of the costs and benefits, a due process in energy decision-making and the consideration of relevant stakeholders including the recognition of vulnerable groups is indispensable to accelerate the energy transition.

The concept of energy justice offers a decision-making tool that can assist politicians, policymakers, communities and consumers in making more informed choices as they implement (or experience) the energy transition. It comprises a complex set of principles and criteria that go well beyond technological and economic considerations for a future energy system. Since coal still represents a major energy source and constitutes the primary



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livelihood for many communities, a transition can only be equitably realised if a fair process, local concerns and human rights are respected and addressed. This imperative is magnified if the transition is rapid, as it must be if the global temperature rise is to be kept within acceptable limits. If there is not significant investment in a just transition plan ahead of coal closures, there will be wider ramifications for energy transition.

However it has to be acknowledged that there is no one size-fits-all solution. The challenges of the coal regions are similar but definitely not identical. Hence, it is important to continue working on the ground, to see what areas of commonality and what specificities there are. While some regions are just at the beginning, other regions are planning and implementing many new ideas and projects such as developing geothermal and hydro energy in former coal mines, investing in e-mobility, digitalisation and data centres, building innovation parks and forming local energy communities or supporting the tourism and agricultural sector.

Moreover, energy justice requires the global and intergenerational dimensions of energy systems to be recognized and considered. Thus, the universal right to affordable energy access should be fully integrated into the energy transition, at the same time as the equitable distribution of environmental costs between current and future generations requires a greatly accelerated phase out of coal.

Structural transformations of coal regions is not a new phenomenon and is occurring in many communities around the world. There are likewise many examples of governments, industry and civil society actors taking action to alleviate the negative impacts for their respective regions. The four cases studies have offered a number of ideas, policy examples and good practices which can assist structural transformation processes to phasing out coal production and use. The analysis offers criteria and guidance on principles to incorporate into energy transition planning. Eventually, “the dominant model of energy policy—business as usual, what we’re doing now—can only be endorsed if one has extremely limited criteria for assessment” (Sovacool et al. 2017).



1 Introduction

The energy transition is an urgent but socially and economically disruptive process that will affect the lives of many workers and communities around the world. 184 states have signed the Paris Agreement recognising the urgency of shifting to a low-carbon economy and committed to keeping the global temperature rise well below 2 degrees Celsius and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius (UNFCCC 2019).

The need to ensure a just transition for affected communities is acknowledged in the Preamble of the Agreement, which states: "taking into account the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities ..." (UNFCCC 2015, 2016). Different countries have further reinforced this statement; for example, the European Commission underlined in the Energy Union Package 2015, the important role of social partners and invited them "to include the energy transition in their social dialogue at European level" (European Commission 2015).

The Institute for Sustainable Futures (ISF) at the University of Technology Sydney, in collaboration with the Institute for Advanced Sustainability Studies (IASS) Potsdam, were asked to investigate just transition pathways away from existing coal industries and to identify enablers and measures that have proven successful (or unsuccessful).

We recognise that a just transition is multifaceted, with both local and global dimensions, and the manner and speed of the energy transition, or any failure to transition, will have lasting social, environmental and economic impacts on current and future generations. Having said that, the scope of this study is limited, and focuses on a particular aspect of the transition towards a low carbon world: the need for justice for fossil fuel workers.

At the centre of our analysis are coal-dependent communities and their efforts and challenges in the structural change process. To this purpose, we have conducted four case studies in selected coal mining regions in Germany, Poland, South Africa and Indonesia. Applying a qualitative approach based mainly on desktop research and literature analysis, we explore the status, barriers and opportunities for a just transition away from lignite and hard-coal mining. We include the power sector in the analysis due to the interdependency with coal in these regions, and the overall implications for the energy transition.

We have developed a framework of key principles for a fair and equitable energy transition process to assess particular measures, drawing on international literature and practice from scholars, social and environmental organisations and, in particular, unions. However, since the four countries are at very different points of the energy transition process, the individual case studies have different emphases. This applies in particular to Indonesia, which has yet to start the transition process in earnest and faces specific challenges because of its level of socio-economic development.

Our approach for each case study was guided by the main research question: "What lessons can be drawn, and what recommendations derived to support the country in a just transition process?"

The report is structured into five sections.

- Section 2 introduces the just transition concept, its imperatives in the climate change discourse, current definitions and theoretical considerations and some examples and discussion of existing initiatives across the world. In addition, to better understand the challenges associated with a just transition, the current global status of the coal industry is explored.



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- Section 3 gives an overview of the methods applied in this study and the assessment framework developed for the case study analyses.
- Section 4 contains the case studies from Germany, Poland, South Africa and Indonesia, and the analysis of actual or potential structural transformations of coal-based regions.
- Section 5 summarises the findings in a cross-country analysis, including some general challenges and opportunities across the cases.
- Section 6 includes some recommendations and a short conclusion.



2 Just Energy Transition

2.1 Why do we need a just energy transition?

There is broad societal consensus acknowledging the scientific evidence of anthropogenic global warming. The IPCC Special Report in October 2018 stressed again that we are heading towards a scenario of 3-5 degrees which will come with sea level rises and extreme weather events such as heat waves, heavy rain, drought and associated wildfires, and coastal flooding. The risks posed to society increase with rising temperatures. In order to avoid the most damaging impacts of climate change and stay within the 1.5 degree path, we have to reduce our emissions by 45% from 2010 levels in the next 12 years (IPCC 2018).

The message can't be clearer, we have to transition fast!

Although the impacts of climate change are global the distribution of impacts disproportionately affects particular geographical regions due to uneven distribution of physical climate change hazards. These communities are predominantly found in the global south and have fewer (if any) adaptive resources which makes them more exposed and vulnerable. The costs of climate change will accrue to the poorest, while the rich might even benefit from it. In addition those who are hit the hardest by climate change are largely the least responsible for causing it. These facts have been emphasised in the preamble of the Paris Agreement in 2015, highlighting the importance of international climate justice which links human rights and development with the imperative of equally sharing the burden of climate change (UNFCCC 2015).

But the Paris Agreement also takes into account the local and regional dimension of communities that are built upon the extraction and use of fossil fuel resources. The transition to low carbon energy systems will impact disproportionately on those communities, so it is important to fairly consider and address their concerns. These concerns are shared by the European Trade Unions (ECUT) who emphasise that "from a workers' perspective, the transition will profoundly reshape the labour market in ways that creates both new risks and new opportunities for workers: new jobs but also, in some cases, destruction of jobs, replacement of some existing occupations by new ones, along with the need for new competencies and skills (ETUC 2015)." The International Labour Organisation (2015a) also highlights the need for sustainable development in association with the creation of decent work and green jobs to contribute to the fight against climate. Social protection is stressed as a fundamental human right that is a prerequisite to ensure a just transition process (ILO 2015a, 2015b).

However, there has been a lack of "justice" incorporated in energy decision-making. Energy planning is to a large extent informed by cost benefits analysis and techno-economic models. Such planning frequently overlooks the social dimensions of change, and the need to transition not just the technology but the people. It overlooks the growing interdependence of local, national and global energy systems across the entire energy lifecycle.

The consideration of fossil fuel dependent communities and the societal obligation to secure the livelihood of workers in the fossil fuel industry is part of delivering energy justice. However, the inclusion of a just transition for these communities may also be a prerequisite for the acceleration of the energy transition which climate protection requires. This acceleration requires political will, which is only likely with a broad social consensus, and is effectively undermined by lack of provision for those communities who will be unduly impacted. Hence, fossil-fuel based communities have to be taken on a just transition journey to ensure we can make the transition we need happen in time.



2.2 Just transition: definitions and principles

The 'just transition' idea is not new. In general, it is understood as a "fair and equitable process of moving towards a post carbon society" (McCauley and Heffron 2018). The concept originates from the trade union movement in North America in the 1990s and was initially understood as a program to support workers who lost their jobs due to environmental protection policies. In fact, it was embedded in the long standing dichotomy between the "green" (environment only) versus "brown" (jobs and public health) frames for mobilising. Subsequently, the concept has received increasing attention from unions, academics, policy makers and other industry representatives, and from environment groups. The latter started to engage with the just transition concept in the late 1990s, and in the last decade the need for a just transition has gained greater traction.

The division between environmental and labour movements has shrunk, and moving towards a just transition frame which combines both environmental and job foci is considered as a potential turning point (McCauley and Heffron 2018). While it has to be acknowledged that differences remain, particularly regarding questions about the urgency of climate change mitigation, adaptation and consequently the pace of the transition, the inclusion of justice in the climate debate has broadened the consensus for the energy transition and climate action in general.

For example, UNFCCC (2016, p. 12) reconfirms the interrelation stating: "At the same time as climate concerns have risen to unprecedented prominence, urgent social and economic challenges remain unresolved. Securing adequate and decent employment for all jobseekers remains one of the biggest such challenges, and this requires, first and foremost, the creation of an enabling environment for sustainable enterprises to prosper and create jobs." The quantitative (job creation, substitution, elimination and transformation) qualitative (decent employment and reduced occupational hazards) impacts of climate action on employment are of particular concern.

The International Labour Organisation (ILO) refers to the need of a just transition (and therefore the energy transition itself) in the context of sustainable development and its contribution to the goals of decent work for all, social inclusion and the eradication of poverty (ILO 2015b). The ILO defines the following guiding principles for a just transition policy framework:

- Enable social dialogue, which includes all stakeholders to create social consensus on the goals and pathway to sustainability
- Take into account workers' rights
- Address the strong gender dimension of many environmental challenges and outcomes
- Creation of more decent jobs, including the anticipation of impacts on employment, and adequate and sustainable protection against job losses and displacement, skills development and social dialogue, including the effective exercise of the right to organize and bargain collectively
- Promote an enabling environment for enterprises, workers, investors, and consumers
- Consider that there is no "one size fits all" approach, consequently policies and programmes need to be designed in line with the specific conditions of countries, including their stage of development, economic sectors and types and sizes of enterprises
- Acknowledge the importance of international cooperation among countries

In summary, the ILO considers four main building blocks of the Decent Work Agenda -social dialogue, social protection, rights at work and employment. These must be addressed with adequate policies that are directed at both current workers in fossil fuel industries and



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(future) employees in green jobs. The ILO stresses for example the integration of social protection measures such as healthcare, income security and social services to protect retiring workers largely dependent on natural resources. Advancing the creation of decent jobs in sustainable economies should also include occupational safety and health policies to protect workers from occupational hazards and risks.

Box 1: Opportunities and challenges for workers in the transition process:

Although the transition to a low carbon economy can be a motor for progress, prosperity and innovation, it entails a number of positive and negative impacts for workers.

The ECTU (2015) highlights in particular, that:

- After an initial loss, a small net positive impact on workforce and economic growth is predicted over the medium and long term
- It is expected that there will be great differences between sectors and geographical regions, which means that some sectors and regions maybe be advantaged while others disadvantaged because of economic specialisation or natural resources
- The green economy will offer great job potential particular in renewable energy. But the new technology development may lead to a higher degree of automatisisation of production processes, which in turn reduces the need for workers.
- The requirements of green jobs can differ quite significantly the skill and knowledge profile of employment in fossil fuel industries, which makes direct transfers more challenging.
- There are risks for carbon intensive industries associated with lower demand for certain products, higher investment needs to cope with tighter environmental standards as well as with a higher carbon price.
- Transition may also impact the quality of jobs. The medium and low skilled jobs in the local carbon economy could be exposed to poorer working conditions and more occupational health and safety risks.

Over time the just transition concept has become embedded in the environmental and climate justice discourse. However, these discourses have frequently been confined to environmental activist fora, and have not been effective in influencing decision-making (Jenkins 2018). As a result, academics sought for more focused and practical justice models and proposed the concept of “energy justice”, which draw heavily on the climate and environmental justice backgrounds, but are mainly concerned with energy systems. This enabled a more focussed alternative to the broader concepts and a tool to deal with the complexity of energy dilemmas and choices (Sovacool et al. 2017). In addition, Jenkins (2018) emphasises that since the concept is not the product of anti-establishment social movements, it has greater potential for policy uptake, and finding acceptance among other civil society stakeholders. Energy justice is an interdisciplinary concept which seeks to tackle the complex task of “identifying, diagnosing and redressing the negative impacts of energy decisions and the unequal distribution of costs, risks and vulnerabilities across multiple levels of governance, supply chains and political jurisdictions and transnational boundaries”

A just energy system, which will include both international and local dimensions, will consider:

- how the burdens (costs and externalities) of energy systems are distributed;
- how the benefits (access and financial gains) are distributed
- if a due process and representation of the communities and relevant stakeholders in energy decision-making is ensured; and
- how marginalised or vulnerable groups are specifically recognised (Jenkins et al. 2016).



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In addition, the concept comprises social inclusion, decent work and poverty alleviation within low-carbon development across the whole-economy, including manufacturing, industry, services and agriculture in some regions.

Applying energy justice as a conceptual tool, Sovacool et al. (2017) provides a summary of energy justice themes and their implication in 10 points (see Table 1). Considering these in the context of the just transition concept helps to understand the complexity of the energy and climate related conundrum.

Table 1: Energy justice themes and values

Normative values	Implication
Availability	People deserve sufficient energy resources of high quality (suitable to meet their end uses)
Affordability	All people, including the poor, should pay no more than 10% of their income for energy services
Due process	Countries should respect due process and human rights in their production and use of energy
Transparency and accountability	All people should have access to high quality information about energy and the environment and fair, transparent, and accountable forms of energy decision-making
Sustainability	Energy resources should be depleted with consideration for savings, community development, and precaution
Intergenerational equity	Future generations have a right to enjoy a good life undisturbed by the damage our energy systems inflict on the world today
Intragenerational equity	All people have a right to fairly access energy services
Responsibility	All actors have a responsibility to protect the natural environment and minimize energy-related environmental threats
Resistance	Energy injustices must be actively, deliberately opposed
Intersectionality	Expanding the idea of recognitional justice to encapsulate new and evolving identities in modern societies, as well as acknowledging how the realization of energy justice is linked to other forms of justice e.g. socio-economic, political and environmental

Source: Sovacool et al. 2017.

In a just transition the dilemma of the positive effects of exploiting fossil fuel resources for the local community – including jobs, regional/local economic development, community revenues (e.g. tax) and cultural identity – have to be placed into perspective against their known global environmental as well as regional and local hazards (e.g. emissions, soil, water and air pollution), and their adverse social and economic implications. Unfortunately, in debates stereotypes and emotions are often used to emphasise the need for maintaining the status quo or promoting radical change. Simplistic approaches should be avoided to open the possibility for negotiations and honest public discussions.

Social science studies confirm that the socio-political and community acceptance are important in the context of energy infrastructure change and its successful implementation (Aaen, Kerndrup, and Lyhne 2016; Walker, Wiersma, and Bailey 2014; Wüstenhagen, Wolsink, and Bürer 2007). In addition, Campbell and Coenen (2017) suggest that seeds for ‘just’ regional transitions to decarbonised economies lies “in a careful understanding of the potential to build on the specific historical context of the regions industrial development and capabilities”. To integrate different views and approaches, as well as to understand values



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and norms in the energy system and to supports general sense making, the just transition notion can serve as a conceptual, analytic and decision making tool. In Section 3 we propose a just transition framework to help guide the discussion.

2.3 Status of coal industry and employment situation

In the past decade, modern renewables have sustained average growth rates of 5.4%, while fossil fuel and nuclear combined have grown at 1.6%² (REN21 2018), and according to the IEA “the world is gradually building a different kind of energy system” (IEA 2018). The remarkable growth of renewable energy has shown that a clean energy pathway is possible. However, the overall share of global coal consumption for electricity has not changed much since 2000 (see Table 2). The global increase in energy demand has been met to some extent by renewable energy, but also in a large part by the growth of coal and particularly gas generation over the last two decades.

Table 2: World electricity generation by fuel and technology (in% and TWh)

	2000	2017	Change 2000-2017
Coal	38.8%	38.3%	- 0.5%
Oil	7.8%	3.6%	- 4.2%
Gas	17.8%	22.8%	+ 5.0%
Nuclear	16.8%	10.3%	- 6.5%
Renewable energy	18.5%	24.7%	+ 6.2%
Hydro	16.9%	16%	+ 0.9%
Wind and solar PV	0.2%	5.9%	+ 5.7%
Other renewables	1.4%	2.8%	+ 1.4%
Total generation	100% (15,441)	100% (25,679)	
Electricity demand	13,156	22,209	

Source: IEA World Energy Outlook 2018

Coal still constitutes almost 40% of the world’s electricity generation. Many states and particular regional and local economies are heavily dependent on the production and use of coal. The Chinese and Indian economic development has been largely based on coal consumption, and the two are the biggest coal importers. Indonesia and South Africa are among the top five exporters, and have large mining workforces (see Table 3).

Table 3: World’s top exporters and importers of coal 2017

Top Exporters	Top Importers
Australia – 389 Mt	PR China – 256 Mt
Indonesia – 370 Mt	India – 200 Mt
Russia – 171 Mt	Japan – 189 Mt
Colombia – 83 Mt	South Korea – 134 Mt
South Africa – 76 Mt	Chinese Taipei – 66 Mt

Source: IEA 2017

² Shares of total final energy consumption,



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However, projected coal consumption has been downgraded more sharply than oil or gas, and projected renewable generation has actually been revised upwards (IEA 2018).

A study showed a significant drop in coal power station deployment due to high levels of decommissioning of older plants and declining policy support (particular in India and China) (Shearer et al. 2018a). This builds significant pressure for the coal industry, such that, if these trends continue, by 2022 yearly plant closures will exceed new capacity and the global coal fleet will begin to shrink.

The relative decline in coal power is driven by cost, emissions targets, and risk considerations. Wind and solar are now the cheapest options for new generation plant (Lazard 2018), and 146 countries have national targets for renewable electricity (REN21 2018). The trend is amplified by the fact that banks and financiers have become more reluctant to invest in coal plants because of the risk of stranded assets and/ or climate liability. Among the 33 renowned institutions who committed to exit or reduce their coal plant financing are Deutsche Bank, Credit Swiss and US Bankcorp (BankTrack 2018).

Additional political and economic drivers are climate policies, pressure to lower urban air pollution and the growing competitiveness of alternative clean technologies.

The implications for coal communities are harsh. In Europe, it is estimated that the coal sector currently employs about 237,000 people with the vast majority working in coal mining (185,000) (Alves Dias et al. 2018). Poland, the largest coal producer in Europe, employs more than 80,000 people in the sector (Ciepiela 2018; Szpor and Ziółkowska 2018).



2.4 International examples of just transition measures

Structural transformations of coal regions is not a new phenomenon and is occurring in many communities around the world. There are likewise many examples of governments, industry and civil society actors taking action to alleviate the negative impacts for their respective regions.

In our review of measures, models and activities from different countries we identified four key areas to be addressed in the transition process:

- Building a social compact
- Planning for closures
- Economic diversification, job creation and community benefits
- Institutional coordination and funding

The rest of this section gives international examples of action in these areas.

2.4.1 Building a social compact

One of the key elements of a structural transformation process which ideally occurs at the beginning is a mutual agreement between relevant local, regional, national (and sometimes international) stakeholders about the process, the implementation and the desired outcomes of the transition. This agreement is formed in (inter)national or regional taskforces, forums, platforms or other multi-stakeholder processes, where representatives from government, industry, academia and civil society investigate trade-offs, discuss just transition opportunities, negotiate potential funding pathways, and ultimately establish policy frameworks. It is important that representatives of the most affected communities are included in this process.

Table 4: Examples of social compact models

Level	Example
International Powering Past Coal Alliance	This Alliance was formed at the Paris Conference of Parties in 2015 and constitutes a coalition of national and sub-national governments, businesses and organisations working to advance the transition from coal. They recognise that EU and OECD countries must phase out coal no later than 2030, and the rest of the world no later than 2050, and commit to a respective set of actions including support for clean energy generation. Members include, for example, Canada, UK, Denmark and subnational governments such as the Australian Capital Territory, City of Melbourne, Australia, and the US State of California (Powering Past Coal Alliance 2018).
European Union Coal and Carbon-Intensive Regions in Transition Initiative	The Platform on Coal Regions in Transition is part of the Coal and Carbon-Intensive Regions in Transition Initiative, included in the Clean Energy for All Europeans Package launched in November 2016. It aims to address specific social and economic concerns of regions where coal mining is the main source of economic activity. The Platform set up working groups bringing together almost 300 stakeholders to each of its meetings to discuss transition strategies, projects and best practices. 13 coal regions are already benefiting from direct support and tailor-made assistance to ensure they can maximise the use of EU funds and support tools available during transition (European Commission 2017).



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<p>Canada</p> <p>Alberta Advisory Panel on Coal Communities</p> <p>Task Force on Just transition for Canadian Coal Power Workers and Communities</p>	<p>The country has committed to phase out coal by 2030; coal currently contributes 9.0% of Canada’s electricity generation.</p> <p>The Advisory Panel on Coal Communities was established in 2016 and concluded its work in 2017. The Panel met with workers and community members to hear their challenges and ideas for the long-term economic sustainability of their communities. To this purpose the Panel facilitated a number of public engagement meetings, telephone town hall events and community visits. The outcomes included a report with 35 recommendations focus on three areas: workers, communities and First Nations (Government of Alberta 2018).</p> <p>The Task Force is responsible for providing knowledge, options and recommendations to the Minister of the Environment and Climate Change on implementing a just transition for workers and communities directly impacted by the accelerated phase out of coal fired electricity in Canada (Government of Canada 2018a).</p>
<p>Germany</p> <p>German Commission on Growth, Structural Change and Employment (Coal Commission)</p>	<p>In November 2016, Germany confirmed its climate target in the Climate Action 2050 with the aim to reduce its emissions by 55% by 2030 and to become extensively greenhouse gas-neutral by 2050.</p> <p>The German Commission on Growth, Structural Change and Employment (Coal Commission) was established in June 2018 to investigate the pathway for a sustainable structural transformation process in the lignite regions. 28 members from environmental NGOs, unions, industry and energy associations, representatives from the coal regions and scientists work on solutions to combine climate action with economic prospects, structural development, social cohesion and social acceptability. An interim report was published in October 2018 which includes possible measures for the lignite regions such as the establishment of local economic innovation clusters and fostering research and development, infrastructure development (incl. digitalisation), considering the regions as experimental fields for an accelerated implementation of regulations, the targeted local settlement of national authorities and institutions, active labour market interventions and support for bottom up processes (BMU 2018; KWSB 2018).</p> <p>Please also see the German Case Study.</p>
<p>Scotland</p> <p>Just Transition Commission Scotland</p>	<p>The Scottish Government commits Scotland to being carbon-neutral by 2050. In December 2018, they became signatory of the international Powering Past Coal Alliance (Scottish Government 2018b).</p> <p>In September 2018 the Scottish Government announced the establishment of a taskforce to advice the Scottish Ministers on practical, realistic, affordable actions for a fair transition away from fossil fuels. Within a two year process the Commission will produce recommendations while applying the ILO just transition principles in a multi-stakeholder process including workers, communities, NGOs, business and industry leaders, and other relevant bodies across Scotland (Scottish Government 2018a). In Scotland’s case, fossil fuel workers are mostly in the oil and gas industry, and the just transition commission is specifically addressing how the opportunities associated with the low carbon economy can be realised in ways that increase equity and reduce poverty.</p>

2.4.2 Planning for closures

Large energy businesses, and particular the coal mining and power industry have a societal responsibility to support the transformation process. This includes facilitating the economic transition for workers, rehabilitating degraded areas, and compensating or undertaking long term environmental tasks (e.g. water balance). National, regional and local government measures should be accompanied by industry initiatives and plans preparing for mine or power plant closures.



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Table 5: Examples of industry just transition measures

Example	
Italy	The Italian multinational power company Enel plans to close 13 GW of thermal coal power stations by 2050 and has worked with local governments, business and communities where the plants are located to develop plans past closure (Burrow and Polman 2018; Smith 2017). These initiatives are considered good practice by ICTU.
Australia Liddell Innovation Project	After announcing the closure of Liddell Coal Power Station (2000 MW) by 2022, the owner AGL, an Australian power producer, has initiated a local community and business dialogue. The “Liddell Innovation Project” seeks input for potential development of the Liddell site and resources – be it energy, industry or agricultural development, or perhaps other bespoke opportunities. In addition, in close collaboration with the union (Construction, Forestry, Mining and Energy Union), AGL developed a plan to ensure employment security through offering the opportunity for existing employees to either remain employed at the repurposed Liddell plant, transition to a nearby plant or take voluntary redundancy (AGL 2018)
Worker Transfer Scheme for Latrobe Valley Workers	In an example of a joint government/ industry initiative, the Worker Transfer Scheme was established in 2016/17 by the Victorian State Government after the French company Engie announced that they would be closing Hazelwood power station within 6 months on March 31, 2017. The State Government facilitated an agreement with power companies and unions in order to open opportunities at other power stations for retrenched Hazelwood workers, so they can continue working in the power generation industry. All the Latrobe Valley power generators including AGL (Loy Yang A) and Engie (Loy Yang B) are participating in the Scheme and have commenced recruitment activity (Latrobe Valley Authority 2018b).
Germany RAG Foundation	The RAG Foundation was established in 2007 by the German coal mining corporation RAG AG after an agreement with the states North-Rhine Westphalia and Saarland and the Mining, Chemical and Energy Industrial Union. The aim is to finance RAG’s perpetual mine management obligations - “inherited liabilities with unlimited duration” - related to coal mining after the closure of hard coal mining in 2018. The RAG Foundation has the following tasks: ensuring that coal mining is discontinued in a socially acceptable manner; building up the foundation’s assets; financing perpetual mine management and supporting education, science, and culture. Starting in 2007 with an initial budget of 6 billion, the fund has increased to 17 billion at the end of 2017. The first projects will start in 2019, while the Foundation is estimated to spend around €220 million annually in order to finance the perpetual mine management (RAG-Stiftung 2018a, 2018b).

2.4.3 Job creation, local economic diversification and community benefits

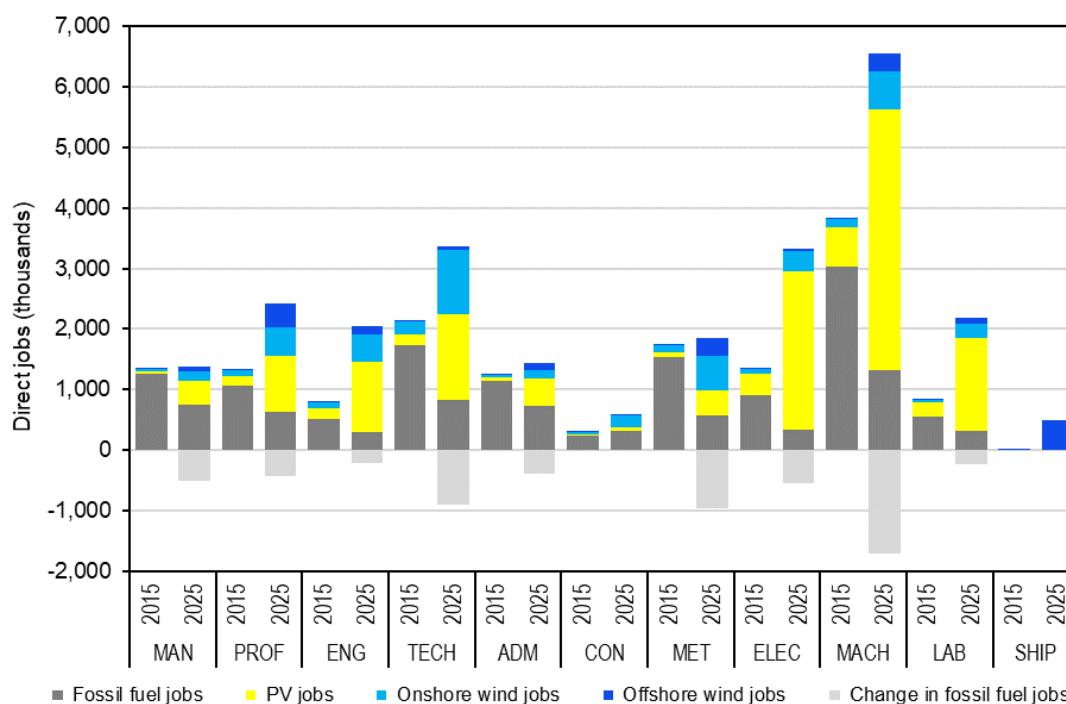
A crucial issue in the structural transformation process is the securing future employment and the economic livelihood of workers, their families and the broader community. The phase-out of coal mines and power stations will require the establishment of equivalent decent paid and quality jobs to avoid communities suffering from emigration and social deprivation.

New jobs in clean energy technology production, construction and maintenance can play an important role in economic development. The 1.5 degree scenario analysis for employment in key renewable energy technologies (solar PV, onshore wind, offshore wind) and fossil fuels (coal and gas) between 2015 and 2025 found that the job losses in fossil fuel industries are exceeded by new employment in clean energy industries (Dominish et al. 2018) (see Figure 1). A UNFCCC (2016) review of studies also found that climate policies can contribute to net employment gains, with an estimated 0.5–2 per cent, or 15–60 million additional jobs globally. However, net employment gains do not mean that the new jobs will therefore be located in the communities where there are job losses, and active policies are needed to ensure that opportunities are realised, and that retraining is available.



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Figure 1: Global occupational breakdown of energy jobs 2015 - 2025 in 1.5C scenario



MAN: Managers; PROF: Professionals; ENG: Engineers; TECH: Technicians; ADM: Administrative staff; CON: Construction trade workers; MET: Metal trade workers; ELEC: Electricians; MACH: Machine operators; LAB: Labourers; SHIP: Shipcrew.

Source: Dominish et al 2018.

There is also concern that the new jobs created will not be of similar quality to the jobs which disappear, particularly because renewable energy tends to be more distributed and does not have the same history of unionisation. However, an increasing number of new clean energy companies are starting to consider and address the risks and opportunities for their workforce. There are also a growing number of investors who recognise the need to integrate the social dimension into their climate strategies and examine their contribution to a just transition (Robins et al. 2018). This includes compliance with good labour practices and standards (e.g. creation of fair and safe jobs, upskilling opportunities), the formalisation of work arrangements, fostering dialogue with workers and unions and including the broader community in relevant decision making processes to reflect overall just transition principles.

In addition, there are a number of renewable energy policies that incentivise and/ or require clean energy companies to address social and economic criteria and support local community development and engagement.



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Table 6: Examples of job creation and community benefit - government and industry

Job creation and Community Benefits	Example
Renewable Energy Policy - Economic and social investment criteria	<p>South Africa</p> <p>In South Africa's renewable energy auctions 30% of the assessment criteria are not related to price. These auctions have mobilised billions in investment in socio-economic expenditure, and significantly increased local jobs and content.</p> <p>Australian Capital Territory (ACT) renewable energy auctions also contains social evaluation criteria that are considered alongside the bid price (these criteria weighted at 20%). In addition to price, auctions were evaluated on local community engagement and the submission of a Local Community Engagement plan for both process and outcome –. Another criteria was that proponents must submit a Local Investment Plan outlining how they will contribute the ACT's local investment priorities – also weighted at 20% (ACT Government 2018).</p> <p>Denmark</p> <p>Denmark Renewable Energy Act includes the '20% rule' which requires wind farm developers to offer 20% of the project to the local community on a co-ownership basis (Danish Government 2009).</p>
Australia CWP Renewables	<p>CWP Renewables is an internationally operating renewable energy developer, owner and asset manager. With the Sapphire Wind Farm in northern New South Wales, CWP pioneers Australia's first community co-investment into a large scale wind farm. The approach by CWP Renewables was guided by the aim to build long-term community support for the project and test innovative ways to differentiate from competitors (CWP Renewables 2018).</p>
Germany Siemens	<p>Siemens is one of the global manufacturers of energy efficiency and energy generation, energy transmission and resource saving technologies – including wind turbines production and installation. The company is committed to occupational safety and health standards for its estimated 351.000 employees around the world. The company has signed an agreement with ILO in 2017 pledging to help improve international employment security through financial and logistical support for the G7 initiative "Vision Zero Fund" (VZF) (ILO 2018; Siemens 2017).</p> <p>The company has also established a training programs "The Siemens Graduate Program" to give young graduates the opportunity to start an international career in one of the different business areas of the company (Siemens 2018).</p>

However, energy jobs alone are not sufficient. This is particular pertinent, since Dominish et al. (2018) employment analysis shows that some very specialised jobs will be lost, such as machine operators in coal mines, with no replacement. These losses will not be simply substituted with jobs created in the clean energy industries. In addition, new jobs will not necessarily be located where jobs are being lost; for example, off shore wind jobs cannot be moved to a particular region because to provide employment for workers who are losing their jobs. Therefore strategies include supporting economic diversification in order to offer a broader range of job opportunities and increase regional resilience.

Key features of successful economic diversification strategies include:

- Developing 'clusters' (inter-linkages with related industries and educational institutions) and fostering the establishment of new industries
- 'Smart specialisation' (extending the capabilities of existing industries and workers)
- Funding labour-intensive projects (e.g. site remediation and plant decommissioning).
- Infrastructure upgrades



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Table 7: Examples of measures to support local economic diversification

Local economic diversification	Example
Netherlands – public investment in innovation clusters	Transition of the coal mining region Limburg started in 1960s with the last Dutch coal mine closing in 1974. The public sector invested heavily in supportive infrastructure, higher education and training and in fostering private sector innovation and entrepreneurship, particularly through clusters, in order to rebuild sectors and areas (Sheldon, Junankar, and De Rosa Pontello 2018; Wehnert et al. 2018).
EU Smart Specialisation Platform (S3)	Since 2011 European Commission offers support for its Members States and regions through the Smart Specialised Platform to foster job creation and enable each region to identify and develop its own competitive advantages. This initiative is part of the Cohesion Policy and financed through European Regional Development Fund. It is based on a partnership and bottom-up approach bringing together local authorities, academia, business spheres and the civil society, working for the implementation of a long-term sustainable development strategy for the regions (European Commission 2018d).
Australia Latrobe Valley	<p>The Victorian State Government supports economic diversification through a range of different projects and activities implemented by the Latrobe Valley Authority (Latrobe Valley Authority 2018a):</p> <ul style="list-style-type: none"> • Economic Growth Zone to reduce red tape for businesses and offering assistance for companies wanting to start or expand their business in the region • Smart Specialisation Strategy to develop local economy based on existing strengths. • Expression of Interest process to encourage jobs and investment for renewable energy and new energy technologies in the Latrobe Valley • Community funds to invest in home energy upgrades, community facilities etc. • Establishment of the Gippsland Hi-Tech Precinct - centre for research, business incubation, new product development, start up support, and education and training.
Australia Latrobe Mine Rehabilitation Strategy	<p>Following on from the Hazelwood Mine Fire inquiry in 2016/17 and the closure of the Hazelwood power plant and mine, the State Government of Victoria is in the process of developing a Regional Rehabilitation Strategy, and has established the Latrobe Mine Rehabilitation Advisory Committee (the Committee) and a locally based Mine Rehabilitation Commissioner.</p> <p>The Regional Rehabilitation Strategy will address open questions associated with geotechnical, groundwater and surface water issues, the assessment of potential regional impacts on the environment, and the evaluation of future land use options.</p> <p>Both newly established institutions play a key role to plan effectively for the rehabilitation of the three Latrobe Valley brown coal mines and engaging the local community in the process. The Government estimates that the rehabilitation of the mine sites could produce hundreds of new, secure, full-time jobs – depending on the funding of the plant owner (Department of Economic Development Jobs Transport and Resources 2018; Sheldon, Junankar, et al. 2018).</p>

2.4.4 Institutional coordination and funding

The coordination and targeted allocation of funding for appropriate measures is another key area for a just transition process. Just transition funds are being established in North America, the European Union and Australia – sometimes with new independent authorities to coordinate and implement programs. Such authorities are often established through national legislation and tasked with facilitating the transition process.



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Table 8: Examples of just transition institutions and funds

Just Transition Authority and Fund	Example
Australia Latrobe Valley Authority	A promising model is the Latrobe Valley Authority : local staff administer grant funds in concert with regional government programs (e.g. incentives for new businesses which have led to a new electric vehicle facility) and collaborate closely with the community to deliver on plans for new jobs and sustainable development (Latrobe Valley Authority 2018a).
Germany IBA Emscher Park	In Germany, the North Rhine Westphalia State Government established the Internationale Bauausstellung Emscher Park (IBA Emscher Park) in 1989 - a ten year program for environmental and urban renewal of a montane region affected by structural change in the northern Ruhr area. The program was implemented by the also newly established IBA Emscher Park (GmbH) (IBA planning company) managing the realisation of 120 projects and allocation of an investment volume of 4 billion DM (Deutsch Mark) with 2/3 provided by government funding (Ministerium für Städtebau und Wohnen Kultur und Sport des Landes Nordrhein-Westfalen 2018).
Spain Transition Agreement	Spain will shut down most of its mines by the end of 2018. The country's unions fought for many years to retain coal mining subsidies. In October 2018, a "Framework Agreement for a Just Transition of Coal Mining and Sustainable Development of the Miner Counties" for the period 2019 to 2027 was reached between the government and the unions. The just transition plan includes a 250 million Euro fund and combines support for mining communities through economic reactivation and worker packages (including early retirements, remediation, re-skilling). The mining agreement also includes support for private mines and environmental restoration work (Ministerio de Industria Comercio y Turismo 2018; Neslen 2018; Perry 2018; Del Río 2017).
International Green Climate Fund	<p>The Green Climate Fund was established to limit or reduce greenhouse gas (GHG) emissions in developing countries, and to help vulnerable societies adapt to the unavoidable impacts of climate change. Given the urgency and seriousness of this challenge, the Fund is mandated to make an ambitious contribution to the united global response to climate change.</p> <p>While this fund does not cover specific just transition measures yet, there is a great opportunity to open eligibility for just transition investments in developing economies.</p>

A carbon tax if implemented could be another source of just transition funding.



3 Methods and Framework

This study is part of ISF's Global Energy Scenarios for 100% Renewable Energy. The scenarios explore the employment effects of different energy industries including coal, gas, wind, solar and hydro energy. This study complements the quantitative analysis with qualitative research. In collaboration with the Institute for Advanced Sustainability Studies, it investigates four country cases to analyse their pathways to a low carbon society. In each country one region was used to exemplify the structural transition and phase out of the coal/lignite industry.

The project aims to understand enablers and barriers to economic restructuring in the energy sector and identify and compare measures that ensure a just socio-economic transition for the communities and workers involved. The research was focussed on the following countries and regions:

- **Germany:** Lausitz – brown/ lignite coal mining and power generation
- **Poland:** Silesia – black coal mining and power generation
- **South Africa:** Mpumalanga – black coal mining and power generation
- **Indonesia:** East Kalimantan – coal mining and power generation

The key research questions were:

- What measures (e.g. programs and transition plans) were taken to prepare and/or implement the structural changes associated with the phase out of coal mining and coal fired power generation?
- What are the socio-economic effects of those measures and did they enable, or prove ineffective on, the transition pathway?
- What role does government, industry and civil society play?
- Who are the main stakeholders in the region that can enable a just transition pathway?
- What lessons can be drawn from country cases and what recommendations can be derived for the development of (national or regional) transition plans?

The study is based on qualitative research, using expert interviews and desktop research of current literature, studies and government and other reports. In addition, a brief media analysis of the most recent developments was conducted.

To help guide our analysis, we developed a framework which integrated the key principles of the ILO and other unions and considerations from the scholarly discourse on energy justice. The framework was used to assess the measures and actions in the case study regions (where possible) and to highlight policies, programs and initiatives that support any of the following key principles of our understanding of the just transition concept:



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Table 9: Analysis framework - just transition - key dimensions

Just outcomes: distributional dimension <i>the even distribution of benefits and costs (ills) on all members of society regardless of their income, race, etc.</i>		Just process: procedural dimension <i>access to decision making processes that govern the distribution of outcomes</i>		
Key stakeholders	Decent work	Environment	Equity in Cost and Benefit Sharing	Social Dialogue
Fossil Fuel Sector Workers	<p>Are there adequate protections for workers who will lose their jobs?</p> <p>Examples <i>Redundancy pay</i> <i>Early retirement</i></p>	<p>Is the workplace environment quality improved?</p> <p>Examples <i>Less air pollution</i> <i>Fewer health issues</i></p>	<p>Are there mechanisms/ assistance to minimise the costs on displaced workers and facilitate transition?</p> <p>Examples <i>Retraining courses</i> <i>Active labour market initiatives</i></p>	<p>Is there adequate workplace representation and voice to ensure their interests are considered?</p> <p>Examples <i>Workforce/ Union representation is included in transition dialogue</i> <i>Mechanisms to ensure workforce engagement along the spectrum of approaches: from inform to empower (p.9)</i></p>
Other local workers and broader community	<p>Are there measures to diversify the economy to provide employment opportunities?</p> <p>Examples <i>Support for local industry development e.g. grants or tax incentives</i></p>	<p>Is the local environment quality improved?</p> <p>Examples <i>Less air pollution</i> <i>Improved water and soil quality</i></p>	<p>Are there measures to ensure access to the economic opportunities from clean energy technologies?</p> <p>Examples <i>Government support for community energy models or schemes</i> <i>Co-ownership or investment options</i></p>	<p>Are there mechanisms for community participation in the transitions plans?</p> <p>Examples <i>Community surveys</i> <i>Community committees</i> <i>Other mechanisms to ensure community engagement along the spectrum of approaches: from inform to empower (p.9)</i></p>
Vulnerable or Disadvantaged Groups	<p>Do economic development policies provide mechanisms that improve access to work for vulnerable and disadvantaged groups?</p> <p>Examples <i>Programs and policies to promote jobs for low income households, indigenous, women (e.g. quotas)</i></p>		<p>Do measures to widen access to clean energy technologies include the interests of vulnerable or disadvantaged groups?</p> <p>Examples <i>Support to facilitate access to clean energy for low-income earners</i> <i>Government support for community energy models or schemes,</i></p>	<p>Are there participation mechanisms that provide for the inclusion of vulnerable or disadvantaged groups?</p> <p>Examples <i>Mechanisms to ensure community engagement along the spectrum of approaches: from inform to empower (p.9)</i></p>



4 Case Studies

4.1 Germany – Lusatia

Summary of key findings

As a major lignite (brown coal) mining district, Lusatia is currently at the centre of political efforts to achieve German climate protection targets, which require a coal phase out.

The details of the coal phase out and the roadmap for the economic, social and structural support measures are crucially important for the future of Lusatia. While lignite is of little significance to the overall German economy, it is very important for the region. Lusatia is home to 42% of Germany's lignite sector direct employees, approximately 8,800 people (down from around 80,000 at the end of the 1980s).

Re-unification caused substantial structural transformation in Lusatia, with entire sectors (such as textiles) closing, and the loss of thousands of jobs across the remaining industries. The lignite regions in the East did not receive comparable support to the West German hard coal mining areas (such as the Ruhr) after unification. Mass redundancies occurred, unemployment rates rose to 20%, and there was significant emigration, especially among younger people.

In this context, lignite mining was perceived as a significant economic stabiliser. Direct, indirect and induced employment from the sector contributes approximately 17% of regional employment, and wages of direct employees are much higher than other industries. New lignite power stations were constructed in Lusatia as recently as 2012. Against this background, moves of the federal government to close existing lignite plants since 2014 have met with significant opposition in the region.

Current measures

A broad range of measures have been initiated and taken at national, state and local level to support the transition process in Lusatia (see also Table 10). They foster both the distributive and procedural dimension of a just transition and include:

- New funding programs and mechanisms
- Different platforms for social dialogue on national (Commission "Growth, Structural Change and Employment"), state (e.g. Regional platforms) and local level (e.g. Zukunftswerkstatt Lausitz) as well as the engagement in the EU Platform on Coal Regions in Transition
- Initiatives for regional economic development, establishment of research and education institutions and infrastructure expansion e.g. innovation cluster building (chemical industry), institute for research on the energy transition and model region for 5G mobile communication
- Specific initiatives for local workers and communities e.g. Innovation Region Lausitz GmbH (iRL) to promoting the private sector

Conclusion

Creating a fair low-carbon transformation is a demanding task that depends on many prerequisites. There are some lessons to be learned from current experiences in Lusatia:

- **Pre-emptive approach:** the case study shows how important it is to create suitable framework conditions and start developing alternatives at an early stage in order to gain credibility and trust among affected communities and workers.



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- **Establishing good framework conditions:** The institutional and financial framework for a successful structural change is vital, including the provision of sufficient funding and an institutional framework to organise the transition process.
- **Social compensation:** Socioeconomic hardship induced by the energy sector transformation should be avoided both for employees and regions, with appropriate compensation available before negative consequences are felt.
- **Community and citizen participation:** Solutions should be developed with local stakeholders, with appropriate participation procedures. Otherwise, the disappointment and frustration of the population to the point of turning away from politics is to be feared.
- **Political leadership:** Without fast and bold political action a fair and fast low-carbon transformation in mining regions is unlikely. The EU Platform on Coal Regions in Transition is a first and important step in organizing dialogue and exchange of information, and resources should be provided to capture and systematize the knowledge for organizing structural change processes.

4.1.1 Introduction

As a major lignite (brown coal) mining district in Germany, Lusatia is currently at the centre of political efforts to achieve national climate protection goals.

By the middle of the century, Germany wants to reduce greenhouse gas emissions by 80-95% relative to 1990. This long-term goal is based on German commitments in the international Paris Climate Agreement from December 2015. In the short term, greenhouse gas emissions are to be reduced by 40% by 2020 and by at least 55% by 2030 compared to 1990 levels. The Federal (national) Government has decided that phasing out coal-fired power generation, including an accelerated exit from lignite, is one of the central ways to reduce CO₂ emissions and thus achieve national climate targets (BMU 2016). But since no decision on further short-term reduction of coal fired power plants has been taken by the government, Germany missed an important opportunity to assure that the country will meet its climate target 2020.

Lignite is the most climate-damaging energy source with the highest CO₂ output per kilowatt hour (1.150 g CO₂ per kilowatt hour which is more than two third of natural gas CO₂-emissions per kilowatt hour). In Germany lignite is currently responsible for producing almost 19% of Germany's total CO₂ emissions and about 46% of the total electricity sector CO₂ emissions. While hard coal-fired power stations will run exclusively on imported coal from 2019 onwards, Germany is still the world's largest producer of lignite (BSR 2017, p 17). Almost one quarter of the electricity produced in Germany comes from this energy source. In addition, about half of the German mercury emissions, one third of the sulphur dioxide emissions and one tenth of the nitrogen oxide emissions come from the extraction and conversion of lignite (Öko-Institut 2017, AG Energiebilanzen 2018).

The details of the coal phase out and the roadmap for the economic, social and structural support measures, as well as the respective contributions of individual lignite mining areas are currently the subject of political negotiations. This process is crucially important for the future of Lusatia, as an exit from lignite will result in considerable structural adjustment for the region. While lignite is of little significance to the German economy overall, the regional contribution is significant.

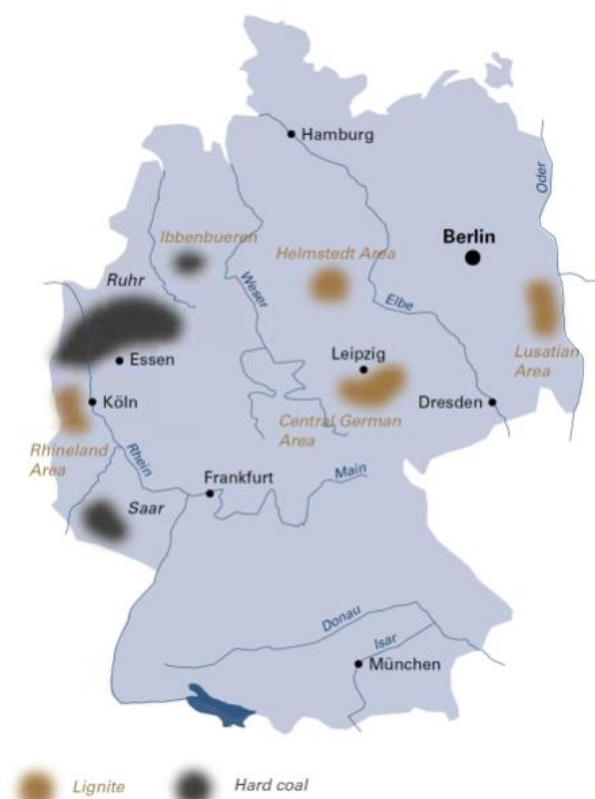


4.1.2 Lusatian Mining Region

The Lusatian lignite mining area is the second largest of three remaining lignite mining areas in Germany (see Figure 2 and Figure 3). It is located in the east of the country in the border triangle of Poland and the Czech Republic. Lusatia extends over two states (German Bundesländer)³, the southern area of Brandenburg and the north of Saxony. In Brandenburg, Lusatia comprises four regional districts Elbe Elster, Dahme Spreewald, Spree Neisse, Oberspreewald Lausitz, as well as the administratively independent city of Cottbus. In the north of Saxony, it includes the regional districts of Bautzen and Görlitz.

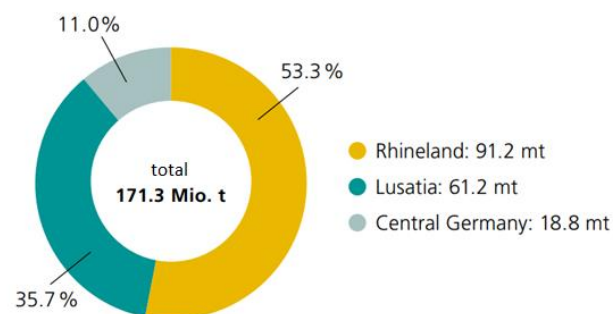
Lignite mining is a significant feature of Lusatia. Since the 1920s, more than 125 villages were relocated, in whole or in part, to make way for lignite mining, which ultimately affected more than 25,000 people (MWFK 2017). Whole tracts of land and settlement structures were profoundly altered by mining, significantly affecting the water balance. Today, Lusatia is characterised by enormous mining fields and 26 artificial lakes created by the flooding and recultivation of the former coal-mining sites (Wirtschaftsregion Lausitz 2018a).

Figure 2: Lignite production according to mining areas (2017)



Source: Euracoal

Figure 3: Coal Reserves in Germany (2015)



Source: DEBRIV 2018

A special regional feature of Lusatia is the Sorbian-Wendish population of about 60,000, with bilingualism clearly visible in the German-Sorbian town and street signs. The Sorbs are a nationally-recognized minority with fixed rights in the constitutions of Brandenburg and

³ Germany is a federal republic consisting of sixteen states (Bundesländer) and 294 regional districts (Landkreise) and 107 administratively independent cities.



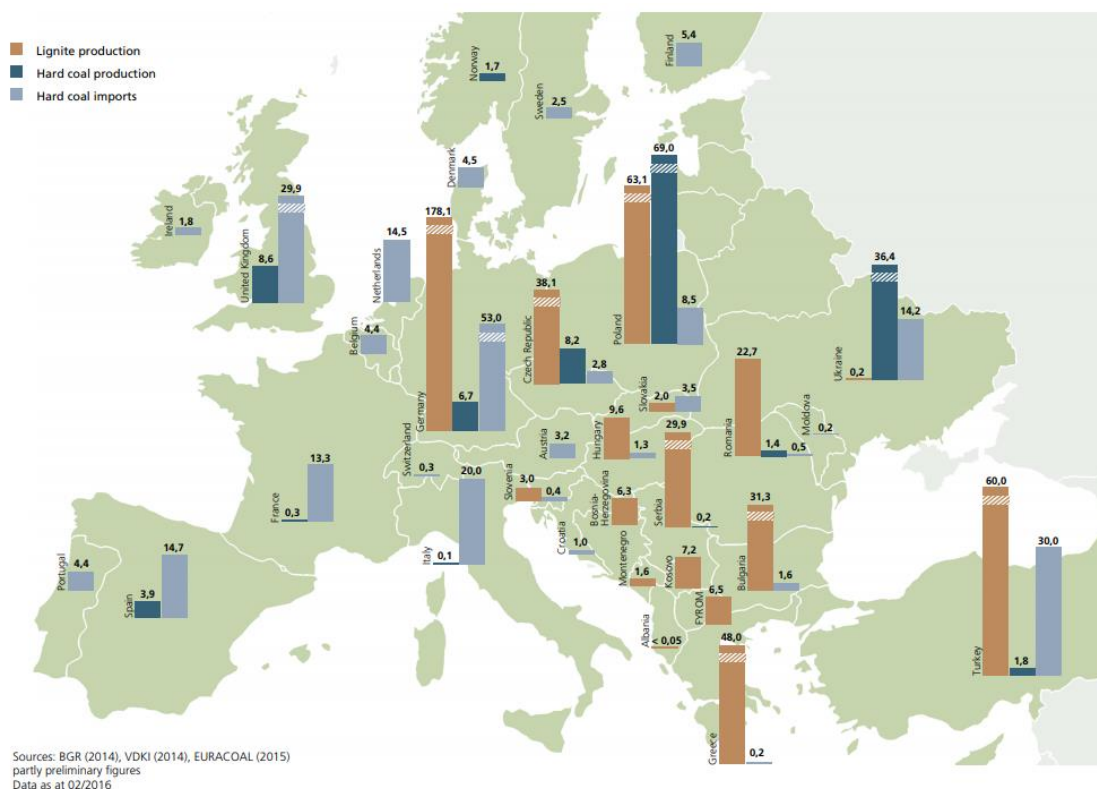
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Saxony. However, mining has had significant impact on their ancestral settlements, their language and rich culture for decades. According to the Sorbs' political representatives, the majority of those relocated so far by mining activity have a Sorbian/ Wendish identity. Due to their special concerns, the Sorbs also have a seat in the brown coal committee of the state of Brandenburg (Ministerium für Wissenschaft, Forschung und Kultur Brandenburg 2017, 25).

Lusatia is a traditional industrial and mining region whose gross value added and total employment in these sectors is still above the East German average (Prognos AG 2018a). More than 80,000 employees work in the industrial sector (including lignite) while there are a total of around 60,000 companies established in the region. In spite of a long tradition in manufacturing, most parts of Lusatia are classified as rural (RWI 2018a). It is a sparsely populated region with a rather fragmented economic structure. Around 1.16 million people live in Lusatia on a total area of 11,727 km² (Wirtschaftsregion Lausitz 2018b).

The four active opencast mines in Lusatia are owned by Lusatia Energie Bergbau AG (LEAG), Jänschwalde and Welzow-South in Brandenburg, and Nochten and Reichwalde in Saxony (see Table 2). The four mines produced a total of 61.2 million tonnes of lignite in 2017. This is almost one third of the total production in Germany (171.3 million tonnes in 2017). Most of the Lusatian production (94%) is used for electricity generation, with a small proportion for district heating. About 3.8 million tonnes are used for refining or household-consumption (DEBRIV 2018, Öko-Institut 2017). At the end of 2015, the Cottbus-Nord opencast mine was shut down, and Jänschwalde is expected to close in five years. The mines supply the power plants in Jänschwalde (in Brandenburg), Schwarze Pumpe and Boxberg (Öko-Institut 2017).

Figure 4: Lignite and hard coal production and imports in Mt in 2014/2015 in Europe



Source: DEBRIV



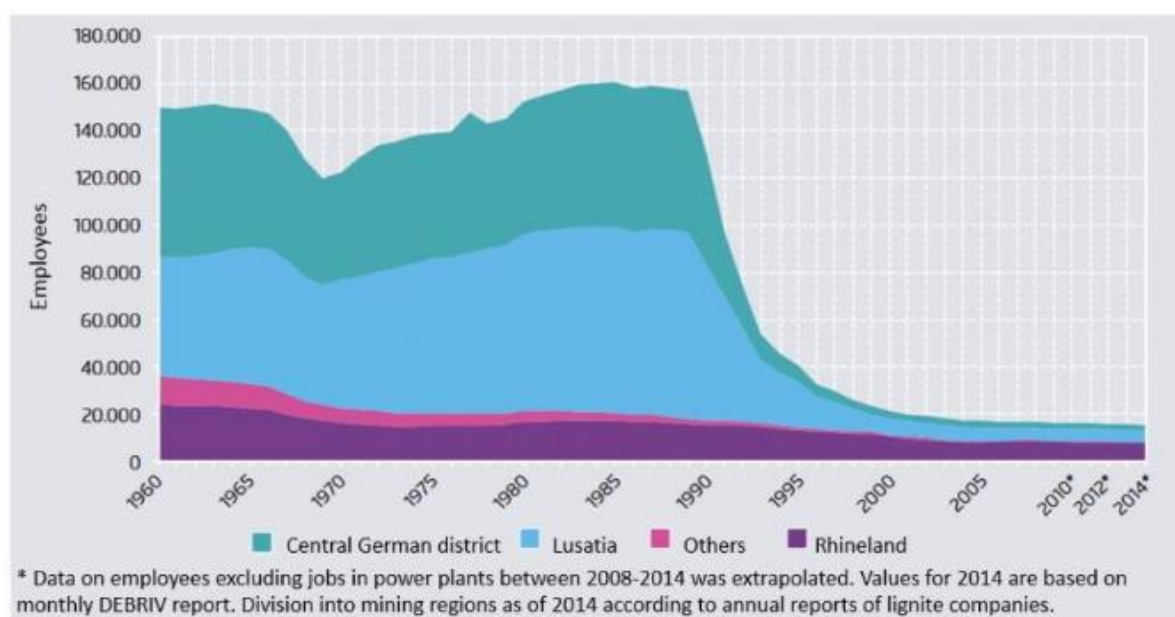
4.1.2.1 Employment in the lignite mining sector

As of the end of 2015, about 20,800 people were employed directly in the lignite sector in Germany, of which three-quarters were employed in mining and one-quarter in lignite-fired power plants. More than 50% of these employees are over 50 years old (Hermann, Schumacher and Förster 2018, 10). Approximately 42% or 8,800 of the direct employees in the lignite sector are located in the Lusatia region. If indirect and induced employment is also included, there is a total of 56,000 employees associated with the lignite sector across Germany (RWI 2018a, 12).

Employment in Lusatian lignite mining district grew steadily from 1912, reaching a peak of 80,000 mining workers at the end of the 1980s and an annual output of around 200 million tons. After the German reunification in 1989/90, Lusatia went through a substantial structural transformation. Within a few years, this led to the loss of thousands of jobs and closure of entire sectors such as the textile industry. The unemployment rates grew to over 20% in some regions. The lignite industry was hit particularly hard and the number of people employed directly in the sector fell (see Figure 5).

Employment in the Lusatian lignite sector has continued to decline in recent years. Although lignite production has remained steady since 2000, rationalization has reduced the number of employees in the mines by almost 30%. Between 2002 and 2016, employment in lignite-fired power plants declined by an average of 3% per annum, while lignite coal mining employment declined by around 2% per year (Hermann, Schumacher, and Förster 2018, p. 13). At the same time employment grew in other sectors (e.g. local trade) and the overall unemployment rate in the region dropped in 2017/18 significantly.

Figure 5: Employees in German lignite mining sector 1960-2014



Source: Agora Energiewende/ Öko-Institut (2017) with monthly data from DEBRIV

Employment associated with the lignite sector in Lusatia is concentrated in the district of Spree-Neiße, and there are relatively high levels in the districts Oberspreewald-Lausitz, Görlitz and Cottbus (see Figure 6 and Table 10) (Seibert et al, 2018).

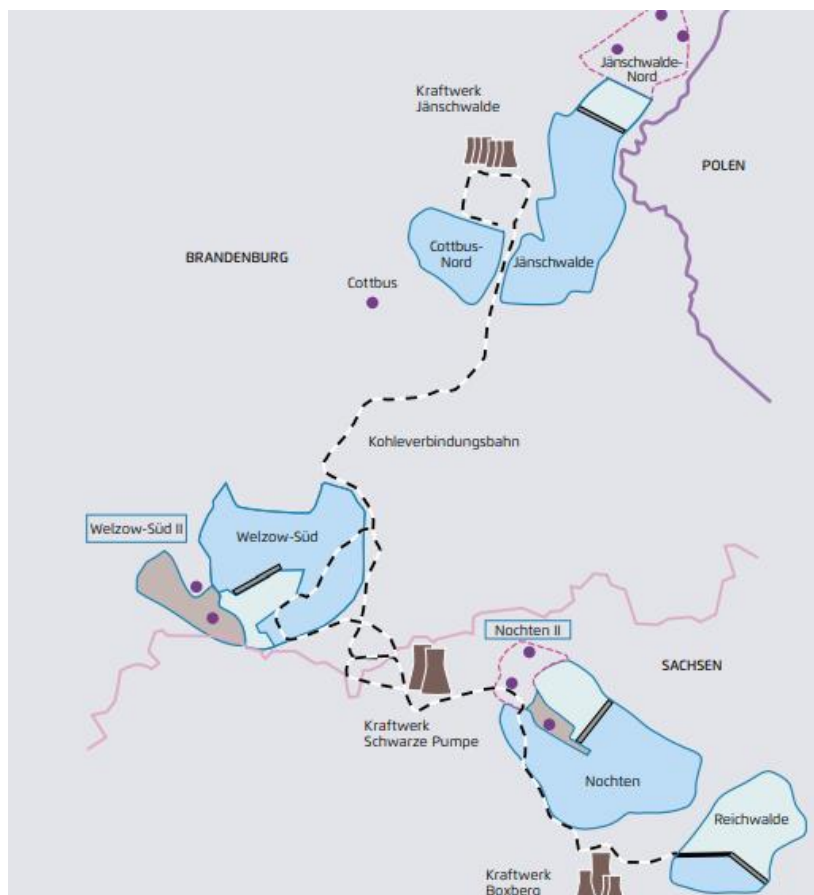
German employment conditions in the lignite industry are very good due to existing collective agreements (Tariff Agreements), with a high salary compared to other



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industrial jobs. The gross wages and salaries of employees directly employed in the lignite sector are around 85% higher than the average income of employees in other industries in this region (RWI 2018b, 16).

Figure 6: Lusatian Mining Region, East-Germany



Source: Öko-Institut 2017

Table 10: Lignite plants and mines in the Lusatian Mining Region

Open-cast mines	Production volume (2015, Mt)	Lignite Plants	Installed Capacity (MW)	Units (MW)	Commissioning year
Jänschwalde	11,9	Jänschwalde	1.860	6x 465	1981-1985
Welzow-Süd	18,2	Schwarze Pumpe	1.500	2x750	1997/1998
Nochten	17,8	Boxberg	2.427	2x 465	1979/80
Reichwalde	12,2			1x 857	2000
				1x 640	2013
TOTAL	62,5				

Source: Öko-Institut 2017/DIW et al 2018.

4.1.3 Experience after German reunification – lignite as a "stabilization anchor"

Unlike in West Germany's hard coal region (Ruhr region), the lignite regions in the East haven't received a comparable support to compensate for the loss of jobs or industries after



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the reunion. For example, the transition in the Ruhr region began in the 1960s and was accompanied by billions of subsidies for hard coal mining, social compensation measures for miners and economic diversification efforts for local communities (Illing, 2012). The motto in the Ruhr region was “no one should be left behind” (free direct translation “no miner should fall off the mountain” - „Kein Bergmann soll ins bergfreie fallen“). The experience of the miners in East Germany was quite different. Despite measures to mitigate social hardships such as short-time work arrangements, job creation measures, company transfer or early retirement, mass redundancies occurred. The result was a significant emigration, especially among younger people. Individual cities and communities such as Hoyerswerda (65,442 in 1990) have lost up to half of their population (36,687 in 2011) in the course of this development (Hoyerswerda 2011; Siebers 2018).

Against this background, the remaining active mining industry became a “decisive economic factor and thus stabilized the region” (Siebers 2018, 4). Trade unions and work councils got active and pushed both state governments in Saxony and Brandenburg to adhere to supporting the industry (Siebers 2018). The governments provided the planning basis for the continued operation of opencast mines and enabled the construction of new power plants. Hence, power plant sites in Lusatia are quite young compared to the lignite plants in the western part of Germany (see Table 10). The “Schwarze Pumpe” power plant became the first Lusatian lignite-fired power plant in Lusatia after 1990. The Boxberg power plant in Görlitz in Saxony was upgraded with two new blocks and two of its old blocks were retrofitted in the 1990s. All Jänschwalde blocks were also retrofitted during the 1990s (LEAG 2018).

In addition, the state and local governments missed the opportunity to prepare a long time strategy for the phase out and the structural change of the region despite a looming phase out of coal. For example Brandenburg did not consider any transition measures in its energy strategy in 2012 (Brandenburger Energiestrategie 2030) although there was already clear evidence that the state won’t meet its climate targets when continuing with coal mining and coal-fired power generation.

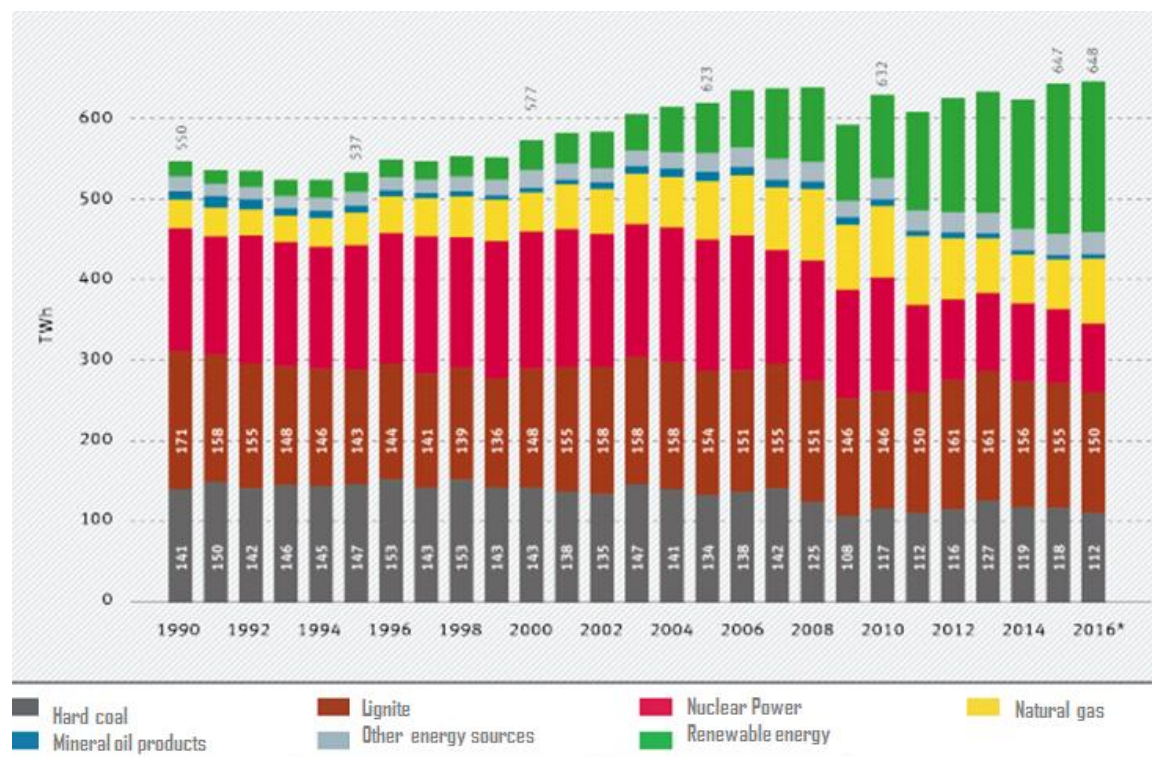
4.1.4 German Energy sector and the transition process – employment effects

The core project for achieving the climate targets in Germany is the energy transition, which is part of a “macroeconomic modernization strategy” (BMW, 2018, 5). With the increasing decentralization and flexibility of the entire energy system, the German energy industry is undergoing a fundamental, structural transformation process (see Figure 7) (BMW 2018).

In order to advance the energy transition, a comprehensive set of targets was adopted. This includes the expansion of renewable energies, the reduction of primary energy consumption and the increase of energy efficiency with associated strategic goals in the electricity, heat and transport sectors as well as the legally agreed phasing out of nuclear energy in Germany by 2022.



Figure 7: Gross electricity production in Germany since 1990, energy source



Source: AEGB 08/2017; Graph: Umweltbundesamt (2017).

4.1.4.1 Current status of the energy transition

The energy transition in Germany has developed particularly as transition of the power sector with constantly growing shares of renewable energy in the market. In the electricity sector, renewables covered 36.1% of gross electricity consumption in 2017 (Agora Energiewende, 2018).

The growing share of renewable energy is also reflected in employment. Over time, there is a clear shift in overall employment from the classical energy industry to renewable energy. Renewable energy employment in Germany in 2016 accounted for 338,700 jobs. Almost half of them are employed in wind energy, particularly in the northern states of Germany. On the other hand, only 45,300 people work in solar energy sector, and 105,600 in biomass (Ulrich and Lehr 2018a). However, studies commissioned by trade unions show that the working conditions of workers in the wind and solar industries are, for the most part, significantly worse than those of the overall manufacturing industry, e.g. in terms of income levels, working hours, job security, satisfaction with the work situation and equality of women. Although it has been shown in recent years that many initiatives at company level have led to improvements, for example in collective bargaining, there is still a need for action (IG Metall 2014; Lenz, Ludwig, and Timm 2017). This applies in particular to the level of unionisation – there is a significant gap of workers in the renewable energy industry sector organised in unions. .

Germany is on the way to miss its 40% reduction target for CO₂ emissions compared to 1990. The Federal Environmental Ministry had to admit that the country will only reach 32%. Since 1990, total greenhouse gas emissions in Germany have fallen by 27.3% or 343 million tonnes of CO₂ equivalents by the year 2016. A total of 909 million tonnes of greenhouse gases were released, which is approximately 2.7 million tonnes more than in 2015 (BMU 2018). The sluggish progress in the building and transport sectors is also one reason why the energy sector - and thus coal - is under pressure to make a significant contribution to reducing emissions.



4.1.4.2 Federal Government measures to reduce lignite consumption

Although the Federal Government had already adopted ambitious climate protection goals in 2010, measures to reduce coal-fired power generation were initially not considered as a necessary instrument to bring down emissions by the Government. However, this changed in early 2014, when the Government was forced to realise that without further measures, the climate protection target 2020 would be missed significantly. Instead of reducing 40% by 2020, only a reduction in greenhouse gases of around 33% by 2020 will be reached, which is a 7% breach of the target (BMUB 2014). A nationwide discussion began on introducing national measures to reduce CO₂ emissions in the electricity sector, with the focus on lignite-based power generation, as in particular older lignite-fired power plants (Öko-Institut, 2017).

In the following years, the Federal Government gradually implemented measures to reduce lignite consumption. As part of the implementation of the 2014 "Climate Protection Action Program 2020" the Federal Government agreed in July 2015 to achieve a reduction of 22 million tonnes of CO₂ in the electricity-producing sector by 2022. Initially, an additional levy on all older power plants was planned ("national climate contribution"), but this was withdrawn after considerable resistance from trade unions, lignite companies and certain politicians. Instead a compromise was negotiated. From 2017-2019, 13% of the installed lignite output in Germany (2.7 GW) from 2017-2019 will be put into "safety readiness" for four years and finally be shut down after 4 years. If necessary, the reserved capacities should be able to secure the power supply in case of enduring extreme situations, but no longer run in regular operation. Plant operators receive compensation of approximately 1.61 billion (EUR 230 million per year) (Agora Energiewende 2017).

The second climate-motivated intervention in the lignite industry was associated with the adoption of the "Climate Change Plan 2050" in the lead-up to the UN Climate Change Conference in Marrakech in November 2016. For the first time, the German government defined a sectoral reduction target for the energy sector, which would de facto mean a reduction of the installed capacity of coal-fired power plants in Germany from 46 GW today to 16 GW in 2030. The remaining coal power plants would produce only about 82 terawatt hours, with a CO₂ emissions of about 80 MT, a reduction of about 66% (Agora Energiewende & Aurora Energy Research 2018).

4.1.4.3 Impacts for the Lusatian lignite sector

These national developments had a direct impact on the Lusatian lignite business.

- **Earlier shutdown of lignite units:** The two oldest of six 500-megawatt power plant blocks at the Jänschwalde location in Lusatia are affected by the "safety readiness" measure. The first (Block F) was taken offline on September 30, 2018 and the second (Block E) will follow on September 30, 2019. The 30th of September marked a decisive point for Lusatia. It was the first time that the impact of the climate policy of the Federal Government was felt locally (Lausitzer Rundschau, 2018a).
- **Sale of the lignite branch:** Another decisive point was when the previous owner, the Swedish state-owned company Vattenfall was forced by the Swedish government to reach its climate targets and therefore fundamentally restructured their business in Germany and as a consequence sold the entire lignite business in Lusatia in 2016 due to a more climate oriented repositioning of its economic activities (Vattenfall, 2016). After lengthy sales negotiations, the lignite coal branch went to a consortium of the two Czech companies Energetický a Průmyslový Holding a.s. (EPH) as well as PPF Investments Ltd., each have taken 50% of the lignite business in the Lusatian district through a complicated system of intermediate companies. The lignite coal branch was renamed as "LEAG".
- **Plans for new mines were abandoned:** In March 2017, LEAG announced its new plans for the Lusatian mining sector for the next 25 to 30 years. The "district concept"



(Revierkonzept) also indicated that lignite is losing its importance. The company actually downsized planned mining fields or completely abandoned them, thus making fundamental changes to mining plans. Earlier plans to build a new power plant (in Jänschwalde) and another proposed opencast mine (Jänschwalde-Nord) were abandoned, and only part of the Nochten II mine is still planned, with 200 people affected by relocation. The company will decide about future investments for the highly controversial open-cast mine "Welzow-Süd II" by 2020, when there is more political and legal certainty.⁴ As a reason, the company stated that these investments "are no longer economically justifiable in the light of the inter-regional political and economic framework conditions" (LEAG, 2017).

4.1.4.4 Impacts for workers, their communities and the region

In the last years, the adaptation and restructuring process in the company has so far been largely done in a socially acceptable manner. Both the collective payment agreement for the employees and the ban on dismissals for operational requirements was taken over by the new owner (Siebers, 2018). These measures were also confirmed in LEAG's strategic plan. However, there is great uncertainty for the employees, because the employment guarantee will cease end of 2020 (LEAG, 2017).

As a result of the "safety readiness" measure, LEAG will make 600 workers in power plant and open pit mining operations redundant. According to the IGBCE, as a result of the shutdowns, another 900 jobs will be lost for medium-sized companies that work as suppliers, maintenance staff and service partners for LEAG (Lausitzer Rundschau 2018a). Redundancies as part of the "safety readiness" measure require that jobs are completely removed, and are not re-staffed when employees retire or go into early retirement.

However the general works council was able to introduce a staff development program with the aim of rejuvenating the workforce between 2005 and 2018. This enabled approx. 1.200 young employees to receive long term contracts after their apprenticeship. This practice ended when the first block of the Jänschwalde power plant was put into "safety readiness" mode. In addition, training capacities have been reduced (Siebers 2018).

Since the average age of workers is already quite high, it was possible to reduce the employment in a socially acceptable way through retirements. But many people are concerned about the prospects for young people in the region when jobs are removed without replacement. There are fears of another wave of emigration, leaving older people behind.

Millions of tax repayments burden communities

In addition to the impacts for workers and communities, the Lusatian cities and local governments currently face heavy financial burdens induced by commercial tax reclaims of Vattenfall. In the last two years, the former owner of the lignite operation unit in Lusatia has repeatedly claimed back tax payments amounting to millions, affecting over 25 municipalities and towns in Lusatia. The tax refund for Vattenfall is due against the background of falling electricity prices, declining sales and losses in the lignite business and the nuclear phase-out. The repayment period spans almost 15 years and amounts to several millions. For example, in 2016, the local governments of Weißwasser and Boxberg had to raise more than 20 million Euro (Lausitzer Rundschau 2018d). This indicates the dependencies of local governments on the lignite business.

⁴ In 2014 and 2015 state governments of Saxony and Brandenburg approved the lignite mining plans for two new lignite opencast mines (Welzow-Süd II in Brandenburg, coal quantity 200 Mio. t, Nochten II in Saxony – coal quantity 300 Mio. t). These projects would have meant that 2,200 people would have to relocate due to the destruction of their villages (1,600 in Saxony, 800 in Brandenburg) (Öko-Institut 2017). There was strong opposition from affected residents and villages, environmental organizations and other civil society actors.



New perspectives for villages threatened by opencast mining

However, the decision made by LEAG to stop plans for the lignite mining fields of Jänschwalde-Nord and also for the largest part of Nochten II was a sign of relief and hope for the communities that would have otherwise been destroyed for sake of the new lignite mines. In these villages in particular, lignite has hindered or severely restricted economic development in the threatened villages in the past. And this is still true for Proschim, since LEAG hasn't finally decided on the future of its lignite mining plans for Welzow Sued II and the coal-phase out plan is not yet clear.

Hagen Rösch, who is managing director of the family-owned business "Rösch Group" complains that "for far too long the coal has been held on with dogged determination, the inevitable exit has been postponed and an early structural change has been blocked" (Neues Deutschland 2018). For example, his own plan for a solar park was not approved because he was too close to the coal excavators he said (ibid.). The Rösch Group, which is located in the middle of the threatened village of Proschim, is one of the largest agricultural enterprises in Lusatia with just 80 jobs and an important supplier of green electricity. The medium-sized family business has a biogas production facility with a combined heat and power plant, generates climate-neutral biogas and has built nine solar power plants with a peak output of 1.34 MWp. This makes it one of the most important owner-managed employers in Lusatia (Rösch-Gruppe 2018).

4.1.5 Just transition measures and initiatives

The structural change that began during the re-unification has been affecting Lusatia for more than 25 years. Therefore, dealing with economic restructuring is by no means a new experience in the region.

According to the existing and approved lignite plans, mining operations are going to end in Lusatia within the next 25 years. It is clear, that this process will be happening much faster. Thus, there is a need to accelerate action on structural change.

However, in Lusatia, action on designing the transformation beyond coal was for a long time blocked by strong political conflicts over the fundamental question of the future of lignite. The need for a faster transition was only realised by the supporters of an expansion of lignite mining when it became apparent that pressure from Federal Government could lead to a reduction and even a complete phase out of lignite power generation. The need to develop viable economic prospects for the region beyond lignite became increasingly high on the agenda of local economic and political actors and state governments.

As a result, in the past years, many initiatives have been launched by different stakeholders to develop ideas and new projects in Lusatia. There is a broad consensus that the existing structural funds and regional policy support instruments are insufficient to cope with such a challenge, and that substantial additional resources are needed to assist lignite mining areas in generating promising new business and development plans. A forward-looking approach is seen as crucial, to prevent another structural break (WSB Commission 2018).

4.1.5.1 Challenges of structural change in Lusatia

In Lusatia, the existing conditions for a successful structural change are particularly challenging compared to the other lignite mining areas in Germany:

- The lignite and associated industries contribute the highest proportion of employment in Lusatia compared to other mining areas. The share of workers directly employed was 2% in 2016 compared to 1.2% in Rheinisches Revier and only 0.3% in the Central German mining area. If the employees dependent on or induced by the lignite sector in Lusatia are added, it can be seen that in Lusatia a total of 3.3% of these employees or 17.5% of these employees from the manufacturing sector are employed or dependent on the lignite sector (RWI 2018a).



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- The phase out of the lignite industry means a significant part of the economic activity in Lusatia will disappear (Seibert et al. 2018, p 17). The mining, power and related industrial sectors contribute to a high gross value added per employee, above the East German average (ibid.). A gross value creation of more than 4.8 billion EUR is generated directly, indirectly and induced by the lignite sector (RWI 2018b, p 15). According to the industrial union IG BCE, LEAG currently pays 1.4 billion Euros a year in wages and commissioned services, most of which remain in Lusatia (Lausitzer Rundschau 2018c). Of this, 500 million go to salary payments annually (Siebers 2018).
- After reunification, new economic sectors such as the chemical industry, mechanical engineering or vehicle construction as well as the food or metal industry have grown which employ almost half of Lusatia's industrial employees work today. In Brandenburg, around 5,000 people were employed in the chemicals sector in 2016 and around 7,500 in Saxony. BASF's site in Lusatia accounts for a large proportion of these jobs. The chemical industry is a strength of the region which needs further research activities to maintain but has not developed into a new industrial "core" whose existence would be the prerequisite for the viability of many other companies comparable to lignite with its supplier companies (Prognos 2018, p 31, 39).
- Lusatia is the only lignite mining region that has only one urban area (Cottbus). However, despite its 100,000 inhabitants, the administratively independent city is classified as rural (RWI 2018a, 11). The region of the Lusatian is composed exclusively of administrative regional districts that are classified as peripheral or very peripheral. In contrast, in Western Germany, all districts of the Rhinish Mining area are defined as central and urban with highlight developed infrastructure and educational institutions. The more rural a region and the less it is connected to the centres, the lower the attractiveness of the location for the settlement of companies and the capacity for innovation (RWI 2018a, p 11). Hence, the starting conditions for economic diversification are very different from West Germany.
- Innovation is very weak throughout the region. Over 90% of companies are micro- and small enterprises with less than 10 employees. This means enterprises have few resources and less in-house capacity for innovation. Lusatia is also remote from research institutions and universities (RWI 2018a, p 16; Wirtschaftsregion Lausitz, 2018b).
- Demographic change in Lusatia is a considerable challenge. Since German reunification, Lusatia has continuously lost inhabitants, with a 19% decline from 1995 to 2015. For the working age population (15 to 65), the drop is even more pronounced, 26% in the same period, due to a strong emigration of younger people. Forecasts suggest that further declines in the labour force are imminent, with a reduction of the labour force by more than a third between 2012 and 2035 (Seibert et al, 2018, 15).
- The unemployment rate for the whole economy in Lusatia has fallen in recent years, mainly due to a demographic shift leading to a decline in the number of people of working age. There are considerable differences in the unemployment rate in different Lusatian municipalities (Seibert et al 2018, p 23).
- The eastern German lignite mining regions (Lusatia and Central Germany) are still among the weakest economic regions in Germany requiring the highest level of subsidies. Therefore, they already benefit from a series of national and EU regional policy measures which amounted to more than 13 billion Euros for structural change in the past five years (Bundesregierung 2018). This money was not directly targeted for a sustainable transition process.



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- There is also higher coordination efforts resulting from different organisational framework conditions of the two federal states and many districts involved (Prognos 2018, p 19).

However, it has to be stressed, that even if the phase out of coal has significant socio-economic impact on regional and local communities in the Lusatia region, there is no threat of either mass unemployment as in the 1990s nor an economic catastrophe or the impoverishment of the whole region (Markwardt et al 2016, 30). The economy of Lusatia is by no means solely dependent on the lignite industry, as it is not industrially homogenous but rather has a comparatively diverse industrial structure (Agora Energiewende 2017). In addition a shortage of skilled workers, however, is a major challenge for companies (Seibert et al 2018, Prognos 2018).

4.1.5.2 The challenge: Integrating climate ambition and just transition

An externally enforced transformation

A key characteristic of the discussions in Lusatia on the lignite phase out and structural change is the broad scepticism with regards to future perspectives. Most of the affected companies, municipalities and employee representatives from the lignite industry and other affected sectors fear for jobs and prosperity in the region. In this regard, the climate policy of the Federal Government is seen by many stakeholders in Lusatia as a threat from the outside. Company representatives consider the industrial base of the region "particularly endangered, which is not related to international competition, but induced by a decision of the Federal Republic of Germany" (Wirtschaftsinitiative Lausitz (WIL) 2018). Ute Liebsch (District Manager Cottbus of the Industrial union IG BCE) accused political leaders in Berlin of "letting an entire region bleed" for the implementation of their "over-ambitious climate goals" (Lausitzer Rundschau 2018c).

Drivers for the structural change debate

Given that Lusatia has already gone through a painful restructuring period many say this should not be repeated (Lange & Krüger 2017; Prognos 2018). "The Federal Government has a duty and responsibility to avoid further disruptive cuts in the economic and life of the people affected and, instead, to improve opportunities for the future" (ibid). In other words, Anne Neuendorf (Deputy Chairwoman of the DGB Saxony District) said the request is "Structural development instead of structural break!" (DGB-Bezirke Berlin-Brandenburg und Sachsen 2018).

Against this background, the State and Federal governments keep stressing that lignite regions should receive support for the creation of new jobs and future economic prospects, before coal is phased out. The prime ministers of Brandenburg, Lower Saxony and Saxony state they will only consider earlier mine or power plant closures if new, equivalent jobs had previously been created (Staatsregierung Sachsen 2018). Similarly, the Federal Minister of Economics and Energy, Peter Altmaier, stated that there is a need to "first talk about the jobs that are created and then about the jobs that will be lost" (Lausitzer Rundschau 2018d; PNN 2018b). Chancellor Angela Merkel clearly stated in a discussion in the German Bundestag (Parliament): "It's not about first deciding on any exit dates, it's about giving people hope, giving them a future, really preparing for structural change" (Süddeutsche Zeitung 2018). Environmental organisations warned against playing climate protection and social goals off against each other. They are arguing that fast and high climate ambition is urgently needed to meet the climate targets (DNR, BUND and Greenpeace 2018).

Discussions in the "Commission on Growth, Structural Change and Employment" indicate that if consensus will be reached there will be a negotiation package consisting of both: climate ambition and concrete measures for securing a socially fair transformation.

Hence concerns about jobs and the loss of regional added value play a central role in the political debate about the phasing out of lignite in Lusatia. The major challenge for the



governments is how the well-paid jobs that will be lost in the lignite industry can at least partly be replaced with similar quality employment as fast as possible, and how to create regional added value through other industries. But that is not an easy task given that there is a particular problem with creating equivalent new jobs. This can be illustrated by the development of the tourism sector. Due to the scenic nature of the region and the geographical proximity to the conurbations of Cottbus, Dresden and Berlin, there is a great demand for tourism. In total, about 13,800 people are employed in the Lusatian tourism, hotel and restaurant industry. However, 42% of the workforce in this area earns only a small salary (Prognos 2018, 41).

There are also concerns that fast structural change without compensation of jobs and opportunities lead to a strengthening of the right-wing populist alternative party for Germany (AfD) in Lusatia. Both parties that lead the state governments (social democrats in Brandenburg, Christian democrats in Saxony) fear of losing ground in the upcoming local and state elections (May/ September 2019), as the AfD achieved particularly high votes in the East German coal mining regions in the last general election in September 2017. In the two Saxon districts of Görlitz and Bautzen, the AfD won both direct mandates and received more than 32% of the second votes (Tagesschau Online 2017; Deutsche Welle 2018). Nevertheless, there is no clear evidence that the coal-phase out is the most important or one of the most important factors for that development. One of the key reasons is the community's profound distrust in state and federal political decision makers because of many years of disappointed expectations after the reunification. In addition, the state governments missed the opportunity to prepare a long time strategy for the socio-economic transition of the region despite a looming phase out of coal.

So there is a strong need to scale up action on structural change.

4.1.5.3 Measures by Federal Government

The Federal Government emphasised the need to consider the regions and workers affected by the brown coal-phase out in the 2050 Climate Action Plan. The Plan states: "it is paramount, that concrete future opportunities in the affected regions are implemented before any concrete decisions shall be taken to gradually phase out the lignite industry" (BMUB 2016, 59).

In order to achieve this goal, the Federal Government has taken a number of measures to promote and support structural change in the lignite mining areas and to advance political consensus.

At a first step, they have adopted several additional funding mechanisms for the lignite regions in Germany:

- **Support program for the regional actors:** The Federal Cabinet decided in June 2017 to assist structural change in the lignite mining areas by supporting regional initiatives and projects. For this purpose, about 4 million Euros from the Energy and Climate Fund (EKF) will be made available each year from 2018 to 2021⁵, with 40% going to Lusatia. This program follows a bottom-up approach. The Regional Innovation Concepts (RIKs) prepared by regional partners in co-operation with the Federal Ministry of Economics and Technology should form the "central basis for decision-making and action for local actors". Further, by means of: "an activating participatory process of municipalities, social partners and civil society, the RIK should take up ideas and concepts from the region and integrate them into the program" (BMWi 2017). Ideas and project competitions are the central instrument for this. The federal project is planned for at least ten years, but after four years an interim evaluation will decide on the continuation and adaptation of the program.

⁵ Within the framework of the newly created "Federal Model Project for Enterprise Revier"



- **"WE! - Change through innovation in the region":** With the federal funding program "WE! - Change through innovation in the region", the Federal Ministry of Education and Research (BMBF) has launched an additional fund of € 150 million. The program which was launched in April 2017 is initially intended only for structurally weak regions in East Germany and aims for "sustainable, innovation-based structural change". It is aimed at broad regional alliances of companies, universities, research institutions and civil society organizations, which together develop new conceptual approaches and thereby exploit innovation potential in their region. The program also promotes Lusatia's innovation alliances (for example, on land use and mining land landscapes) (MWFK & MWE, 2017).
- **Priority spending for lignite regions:** In addition, the Federal Government has allocated further structural funds. In the spring 2018 coalition agreement, it allocated priority spending of EUR 1.5 billion for the period 2018-2021 on the themes of "Regional Structural Policy/ Structural Change Coal Policies".

Commission "Growth, Structural Change and Employment" (WSB Commission)

As a second major step, the Federal Government set up a national negotiation forum to accelerate consensus building across all relevant stakeholders on the coal phase out and structural change. The Commission "Growth, Structural Change and Employment" ("Coal-Commission") was already announced in the "Climate Protection Plan 2050" to commence their work 2016. However it took another two years before the Commission got finally established which was owed to the governmental inaction before the federal election 2017 and a long coalition building process in the first half of 2018. It finally started working at the end of June 2018.

The German Federal Government points out that changes induced by decision for climate action are "not to be unilaterally at the expense of the coal-producing regions and their employees", but rather to "open up opportunities for sustained economic momentum with high-quality employment" (WSB Commission 2018b). In order to achieve this, the Commission has an ambitious task: to draft recommendations by the end of 2018 that will address both climate change and structural change in lignite mining areas. These include for example creating a concrete perspective for new, future-proof jobs in the affected regions, developing a mix of instruments that bring together economic development, structural change, social inclusion, social cohesion and climate change, and a plan to progressively reduce and stop coal-fired generation, including a closure date (ibid.). The Commission has a timeframe of 6-8 months and consists of 4 chairmen and 28 voting members. This is a relative large panel of experts considering the complex task and finding publicly acceptable compromises. Apart from two former prime ministers of Saxony and Brandenburg and a formerly long-time CDU head of the Federal Chancellery, the Commission represents a wide range of actors from environmental organizations, trade unions, business and energy associations, academia, local representatives and representatives from opencast mining communities from the regions. Lusatia has two representatives in the Commission: the mayor and chairwoman of the Lausitzrunde Christine Herntier from Spremberg and the city councillor Hannelore Wodtke (Green Future for Welzow) from Welzow, who is directly affected by lignite mining and who is representing the local opposition against new mines in Lusatia. The states that are particularly affected by the coal phase out, as well as Saxony and Brandenburg, attend the committee meetings, but have only the right to speak and not to vote (WSB Commission, 2018a).

At the end of October 2018, the Commission adopted a first interim report on structural change including a demand for a long term framework with sufficient funding (Commission WSB, 2018b). The Commission still has to vote on what additional resources will be required "to accompany the structural change process beyond this legislative term in the long term" (WSB Commission 2018). A final report, which should include an exit path for coal, was



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originally due to the UN Climate Change Conference in Katowice (Poland), but will only be ready after it (most likely presented in early February 2019).

The Commission has become a central focal point of the overall carbon emissions and structural change discussions, and receives considerable attention. Many actors are involved in the negotiations, with a great interest in achieving joint results. Actors, including the affected states, raise public awareness about their particular issues and demands through high-profile conferences, demonstrations, appeals and position papers. The considerable time pressure of just a few months has accelerated the processes to find a feasible compromise, but also led to significant conflicts.

Other initiatives

The Federal Government has also started an important industrial policy initiatives. Federal Minister of Economics Peter Altmaier is currently trying, in coordination with the EU and companies, to promote the development of gigawatt production for battery cells for electric cars in Germany and Europe. He has estimated a total of one billion Euros in the budget by 2021 to support consortia that want to tackle the issue. Lusatia is being discussed as one of the possible locations for the production site (Lausitzer Rundschau 2018d).

The German Bundestag has already allocated 2019 funds in the millions for the establishment of new research institutes in Lusatia. For example, an institute on low-carbon industrial processes is planned in Cottbus/ Görlitz to advance research into converting coal-fired power plants into storage power plants (Lausitzer Rundschau 2018e).

4.1.5.4 State governments measures (Saxony and Brandenburg)

Until 2016, when Vattenfall sold the lignite branch, the state governments in Brandenburg and Saxony have largely raised objections against a debate on structural change away from coal. They argued for lignite as a bridging technology that will have a role in the energy system for a long time (Agora Energiewende 2017).

But in the last 2 years, the state governments have started to support the development of future economic perspectives for the region. The issue of building future economic development paths beyond lignite increasingly gained political significance. For example, Brandenburg's Prime Minister Dietmar Woidke set up his own "Lausitz representative" in the summer 2018, making structural change a "top priority" (Staatskanzlei Brandenburg, 2018).

The state governments started a whole set of activities, for example, the commissioning of studies, the development of joint position paper or coordination of joint initiatives and projects. They have also been actively involved in setting up new regional platforms to bundle the potential of Lusatia across borders and to get all regional actors on board (see below 4.1.5.5.). Saxony and Brandenburg launched a joint policy paper in 2017 'Together for the Future of the Industrial Region of Lusatia'. The paper set priorities for structural change under the headings of infrastructure development, innovation, education, culture, business development and skilled worker development (state governments of Brandenburg and Saxony, 2017). The Prime Ministers of both states want Lusatia to remain an industrial and energy region.

The state governments call for a long-term federal-fed fund, a federal law on measures and an immediate program for the region. They estimate that at least 60 billion Euros will be needed for addressing the structural change brought by the lignite-phase out over the next 30 years (Staatsregierung Sachsen, 2018).

Jointly with the Federal Government the state governments have also pushed for the development of measures and projects, which include the establishment of institutes for research on the energy transition in Lusatia, e.g. on storage technologies and low-carbon



industrial processes, a model region for the future 5G mobile communications standard⁶, as well as the electrification and upgrading of railway lines for better connecting Lusatia to more urban areas, also in Poland. Some of this has already been initiated in cooperation with the federal government (see 4.1.5.3.).

There is also active involvement of both states in the EU Platform on Coal Regions in Transition that has been launched by the European Commission in December 2017 to help develop projects with the potential to kick-start a viable economic and technological transformation in coal regions. The platform provides opportunities for national, regional and local representatives and EU staff to discuss how these regions can best modernise their economies (European Commission 2017).

4.1.5.5 Regional actors and their initiatives

In recent years, many existing and new established actors in the region have contributed to accelerating structural change through e.g. organising workshops or conferences, the development of initiatives and project proposals or the creation of alliances (Agora Energiewende 2017). There is also a certain competition between the different municipal associations in the region, which has made cooperation in the region sometimes difficult so far.

Wirtschaftsregion Lausitz (“Economic Region Lusatia”)

In order to improve inter-municipal cooperation the state governments of Saxony and Brandenburg have established jointly with the Federal government and the regional districts the *Wirtschaftsregion Lausitz GmbH* as a joint development-cooperation of Saxony and Brandenburg with the aim to "coordinate the municipal efforts for local economic development, profiling, and marketing" (state governments Brandenburg and Saxony 2017, 4). It is supposed to become the new structure for managing and organising the transformation process across the region. Members are the heads of the district authorities in the region. Executive director Thorsten Bork wants the *Wirtschaftsregion Lausitz* to become the central platform that spans both federal states to manage structural change in Lusatia (*Wirtschaftsregion Lausitz* 2018b).

Zukunftswerkstatt Lausitz (“Future Factory Lusatia”)

The *Zukunftswerkstatt Lausitz GmbH* (“Future Factory” Lusatia) is an important project of the *Wirtschaftsregion Lausitz* strongly supported by the state governments. It aims to organize a broad based participation process for finding a new joint guiding vision for the region which is able to bring together the various sub-areas and cultural identities in Lusatia under a common development goal. In addition, the development of a conceptual basis for the process of structural change in Lusatia is one of the listed objectives (*Zukunftswerkstatt Lausitz* 2018a, *Wirtschaftsregion Lausitz* 2018a, Kreis Görlitz 2017). This interregional measure is supported with 7.3 million Euro from the federal government and the state governments (ibid). The Federal Ministry of Research also grants additional funds for the scientific monitoring process. The *Zukunftswerkstatt Lausitz* so far is the only official initiative to facilitate a broader engagement process beyond existing political and economic networks in Lusatia. This initiative offers a huge potential for Lusatia.

Lausitzrunde – Local government/ municipal actors

The *Lausitzrunde*, a union of around 30 municipal representatives from Lusatia, has developed into one of the important regional voice for structural change (*Lausitzrunde* 2018a). The alliance was created in 2016 and claims to "cross-party, democratically elected representatives of different local authorities, from the small community to the cities of

⁶ Lusatia has been selected as one out of five regions to establish the 5G mobile communication standard with high priority to carry out more intensive research and test experiments and thus gain important application experience with the new communications standard. Also, the budgetary committee of the German Bundestag has approved 85 million Euro until 2021 to support this initiative (Jurk 2018).



Lusatia" (Lausitzrunde 2016). The mayors and district councillors are the main members of the Lausitzrunde. The main aim is to develop common positions and priorities on important topics for the future of Lusatia and to represent the interests of the citizens with regards to the state and federal state (ibid). In view of the imminent sale of Vattenfall and the planned exit from lignite, the alliance was launched in 2016. One of the alliances first activities were sending letters to chancellor Angela Merkel and the former economic minister Sigmar Gabriel to call on them to support the region in the inevitable structural change resulting from the coal-phase out (Lausitzrunde 2018b).

Innovation region Lusatia

The Federal Government's decision to shut down two 500 MW blocks at the Jänschwalde power plant site has also accelerated the regional economic action by business representatives. The Innovation Region Lausitz GmbH (IRL) was founded as a new economic consulting initiative by IHK Cottbus in collaboration with the Cottbus Chamber of Crafts, the Association of Business Associations Berlin and Brandenburg e.V., the Business Initiative Lausitz (WiL) and the University of BTU Cottbus-Senftenberg. The IRL works with large companies, medium-sized companies as well as founders on ideas and strategies, to enable the Lusatia to deal with the structural change. It supports companies affected by lignite phase out in the development and securing of new business areas and develops growth projects for Lusatia (Innovationsregion Lausitz – iRL 2018). The iRL serves as a platform and organises special-targeted workshops. It is more likely to work on short-term effective projects. The focus is above all on promoting the private sector, in particular the already existing companies in Lusatia, and for those who live in the mining and energy sectors and who have to reorient themselves in the remaining time (Prognos AG 2018, 19).

Trade unions: structural development instead of structural disruption

The trade unions are important players in the context of the lignite phase-out who are very engaged in the public discussion about structural change in the region. The unions organise public protests and conferences to make their voices heard (DGB-Bezirke Berlin-Brandenburg und Sachsen 2018). They demand "reliable future prospects and a fair structural change" for the employees and "a forward-looking structural development that secures added value and good jobs," according to Christian Hoßbach, DGB Chairman for Berlin and Brandenburg (ibid.). For the Trade Union for mining, chemicals and energy industries (IGBCE), structural policy alone is not enough to compensate for the regional value creation of the lignite sector. For them it is necessary to discuss the framework conditions and measures for new industrial investments to flow into Lusatia (IGBCE Foundation's Work and Environment 2018).

The IGBCE, whose members are directly employed in the lignite industry and the industrial union IG Metall, which represents the service providers of the lignite industry in the industrial and craft enterprises, jointly presented their demands for a good future development of Lusatia in a public appeal in summer 2018. They warned against an early shutdown of the lignite units and call on the state government and community to implement a long-term structural policy that will help the Lusatian region to achieve new economic strength on a comparable scale (IG Metall & IGBCE 2018).

Activities of smaller civil society and citizen groups

Many civil society actors are also actively involved in shaping structural change in their region. There is a variety of actors and approaches that shows the huge potential in the region.

For example, in September 2017 the Protestant Church Berlin-Brandenburg-Silesian Upper Lusatia (EKBO) founded the Center for Dialogue and Change (ZDW) as a joint institution of the regional church and the four Lusatian church circles in the EKBO in order to shape the structural change in Lusatia accompany. The Center was set up with the aim of providing a platform "for the understanding of actors in the various fields who can make their own



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contribution to a good life in Lusatia" (EKBO 2017). General Superintendent Martin Herche wants to support the great commitment of the people in the region and make a profound contribution to this design process with the Center for Dialogue and Change (ibid.).

The umbrella organisation of the Sorbs and Wends in the region, the *Domowina*, has also become active in the structural change discussion in the region. In September 2018, together with the *Zukunftswerkstatt Lausitz*, they invited to a conference on structural change from the point of view of the Sorbs and Wends and to develop their vision of the future after the end of lignite mining (Zukunftswerkstatt Lausitz 2018).

Even smaller associations participate successfully in the discussions. For example, the "Lausitzer Perspectives e.V." a local "think tank" wants to contribute their perspectives on structural change in Lusatia (Lausitzer Perspektiven 2018b). The association has a professional web presence, and organises round tables, publishes position papers and develops policy recommendations, such as the proposal for a "Fund for Civil Society" (Lausitzer Perspektiven 2018a).

In addition, there are also other practical approaches. In order to support the transformation in the lignite mining areas, the cooperatively organized green electricity provider "Greenpeace Energy" has launched its own electricity product on the market. In the "Solar Power Plus Tarif", customers also pay a soli subsidy for every kilowatt hour for the construction of new solar plants directly in the lignite mining areas in Lusatia and the Rhineland. The customers receive ten% of these solar systems in their electricity supply. In Lusatia, two citizens from the open-pit village of Proschim are local partners. The Energy Cooperative wants to make a contribution to supporting the expansion of renewable energies and to create work and economic perspectives in the districts. According to Greenpeace Energy, 4,500 customers from all over Germany have already switched to the Soli tariff (Friedrich 2018).

One local initiative pursues a special kind of professional marketing which gained some momentum. The initiative promotes the region as the best location for establishing a Tesla Gigafactory to produce components of electric vehicles. Within few weeks an online platform (<https://www.welcome-tesla.com/de/>) where the initiative was launched received over 124,000 supporters from citizens, business and other organisations. The goal is to raise attention in Silicon Valley and convince Elon Musk to move his planned factory in Europe to the Lusatia.

Hannelore Wodtke, member of the coal commission, supports an interesting proposal to make the village Welzow which is affected heavily by lignite mining a site for a European fire-fighting squadron. The project is feasible due to the special landing runway, which is located directly at an open pit rest lake. Two representatives of the companies (Frank-Air/Dresden Aerospace AG) had developed a corresponding concept. A training centre could create a total of 100 jobs there. Wodtke is complaining that her proposal has not been yet taken up by the Brandenburg state government at all (Allianz für Welzow 2018).

A very positive development is the growing share of local people becoming active in making Lusatia a more attractive place to live and work. As one example, the association "Raumpionierstation Oberlausitz" ("space pioneer station Upper Lusatia") in Saxony supports people who want to move to the countryside or who want to return back to Lusatia.

Nevertheless, public meetings, conferences and other activities on structural change organised by civil society are still rare and not at the centre of public attention. Civil society actors for example initiated a public forum in the wake of the closure of the two blocks of Jänschwalde power plant and organised a public forum with 100 representatives of companies, initiatives and municipalities to discuss ideas for a future beyond lignite (Grüne Liga, 2016). However these initiatives often lack public support and resources. In addition, people engaged in local community initiatives are already stretched and lack capacity to get further involved in the (new) topic of structural change. Hence, it is important to ensure the support for the many existing initiatives and projects such as the historic association in Peitz



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(historischen Verein zu Peitz) or the Arboretum Dubrau, as well as providing additional public resources for new local initiatives to facilitate the local transition process (Schuster 2018).

Establishing new support structures is also essential, since LEAG is a major donor for associations and initiatives in the region. There is a risk that these funds are simply cut off in the course of the lignite phase out. In addition, it is paramount that local communities receive new economic development opportunities and can actively participate in the transformation process. However locals complain that there is the predominant feeling that "they are not asked" (IASS Research 2018).

It is also important, that those communities that are most affected by lignite mining in terms of environmental consequences of open-pit mining such as the deteriorating water quality of local rivers, high levels of sulphate and issues with mining lakes also receive additional financial and political support. An active approach to community engagement is needed while providing information, advising on the acquisition of funds or developing and implementing new ideas. This also includes funding for smaller local projects initiated by civil society (Agora Energiewende 2017; IASS Research 2018; Lausitzer Perspektiven 2018c).



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Table 11: Summary of German transition measures

The majority of measures are only proposed or in their initial stages, which impedes an assessment of their impact at this point.

STAKEHOLDER	JUST OUTCOMES: DISTRIBUTIONAL DIMENSION			PROCEDURAL DIMENSION
	Decent work	Environment	Equity in cost & benefit sharing	Social Dialogue
MINING WORKERS	n/a	n/a	n/a	n/a
OTHER LOCAL WORKERS AND BROADER COMMUNITY	<i>National measures</i>			
	n/a	n/a	National 2050 Climate Action Plan commits to phase out of coal through a just transition process and funding such as: <ul style="list-style-type: none"> • WEI - Change through innovation in the region" € 150 million • "Regional Structural Policy/ Structural Change Coal Policies" 	WSB Commission → Involvement of diverse set of actors from government, industry and civil society in the negotiations, with a great interest to achieving joint results ↘ BUT 2 years to get established, short timeframe with a very ambitious task leading significant conflicts
OTHER LOCAL WORKERS AND BROADER COMMUNITY	<i>State government initiatives</i>			
	n/a	n/a	Establishment of institutes for research on the energy transition for storage technologies and low-carbon industrial processes Cluster region for chemical industry Model region for 5G mobile communication Infrastructure development	Brandenburg's Prime Minister established a "Lausitz representative" Regional platforms to bundle the potential of Lusatia across borders and to get all regional actors on board Engagement and collaboration in the EU Platform on Coal Regions in Transition
OTHER LOCAL WORKERS AND BROADER COMMUNITY	<i>Local and bottom up initiatives</i>			
	Innovation Region Lausitz GmbH (iRL) to promoting the private sector	n/a	Establishment of joint development-cooperation <i>Wirtschaftsregion Lausitz</i> to coordinate the efforts for local economic development, profiling, and marketing "Lausitzer Perspectives e.V."	Zukunftswerkstatt Lausitz – local community dialogue The Lausitzrunde – alliance of local governments Trade unions facilitated public appeals and protests Workshops and conferences by civil society organisations on structural change Protestant Church Berlin-Brandenburg-Silesian Upper Lusatia (EKBO) founded the Center for Dialogue and Change (ZDW) – a platform for local actors



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STAKEHOLDER	JUST OUTCOMES: DISTRIBUTIONAL DIMENSION			PROCEDURAL DIMENSION
	Decent work	Environment	Equity in cost & benefit sharing	Social Dialogue
Vulnerable/ Disadvantaged Groups	n/a	n/a	n/a	n/a



4.1.5.6 How to successfully implement structural change?

Little faith in policy makers

There are great fears in the region that the bitter experience after 1990 are repeated and the region is ultimately left to deal with the problems alone. Christine Herntier, mayor of Spremberg and chairwoman of the Lausitzrunde, reports on a sceptical attitude in the Lausitz. "There are many people living in Spremberg and in Lusatia who work in the energy industry. But even those who do not work directly in coal, are unsure. There was a deindustrialization of Lusatia after the fall of the Wall. Many people now ask themselves how it is done this time, if it has not been successful last time" (PNN 2018a).

A particular challenge for dealing with structural change is the lack of trust in the responsible political decision-makers at state and federal level. This was amplified by the transfer of Block F of the Jänschwalde power plant to the safety reserve on 30 September 2018. The trade union IG BCE criticized the fact that the imminent loss of 600 industrial jobs and 900 additional jobs is taking place in a structurally weak region without any noticeable structural compensation (Lausitzer Rundschau 2018b).

As a consequence of past experiences, there is a deeply rooted scepticism about well-sounding words and declarations of intent. This makes it clear that it is not just about the lignite as such, but the conflict dynamics and the resistance of people directly affected by the brown coal withdrawal from possible job effects in the region has a lot to do with lack of trust and credibility towards politically responsible decision-makers. But reconciling all this in the short term is a great challenge.

Major steps forward

There are now a number of promising proposals for emergency measures, support programs and other projects (Lausitzrunde 2018b). Much has also been included in the WSB Commission's interim report (KWSB 2018). There are also initiatives from the Federal Government to support infrastructure development, innovation and research.

A whole package of measures is discussed, among those:

- Creating new jobs by ensuring the appropriate framework conditions that motivate private investors / companies to locate or expand in Lusatia;
- Supporting those companies affected by the coal-phase out to develop into new business
- The settlement of federal agencies or authorities in Lusatia
- Acceleration of planning procedures for the execution of important infrastructure projects
- Strengthening the Lusatian infrastructure in the areas of transport and digitalisation
- The continuation of the efforts of economic development in Brandenburg and Saxony with the goal to locate larger companies;
- Additional investment in research and science with the establishment of research institutes
- Creating better framework conditions for spin-offs and start-ups

However, a prioritization of the measures and their embedding in a general strategy is still lacking.

The efforts of unions and the governments are aimed at preserving and replacing the job losses with work in similar or other producing industries to ensure well-paid and secure employment. The IG BCE promotes an "industrial future for Lusatia" (IG BCE Foundation Work and Environment 2018). In this respect, the industrial policy opportunities in the context of the energy transition also play a role in the public debate.

The state governments and regional economic actors rely in particular on industrial policy solutions, so do the unions. District Manager IG Metall Berlin-Brandenburg-Saxony Oliver



Höbel states: "We want to remain an energy and industrial region and demand reliable and sustainable future concepts for the Lausitz district": "We need an introduction to a structural change that secures good industrial work and new jobs with good work." (Lausitzer Rundschau 2018c)

The primary focus of state governments is currently on larger-scale projects, such as the establishment of research institutes, the creation of new industrial development, transport technology and digital infrastructure. But smaller projects from local actors should not be neglected.

There is scepticism about the focus on larger-scale projects and industrial solutions. Hagen Rösch, managing director of the family's own business "Rösch Group" says: "I don't see why a big business should settle here. The conditions are very bad. The infrastructure is inadequate, and also the internet connection is too bad. Small and medium-sized companies with fresh ideas would have to be relied upon, not the large companies (Neues Deutschland 2018).

Renewables as one of the solution

Although there are already concrete steps for promoting energy transition and industrial policy initiatives in the region, the expansion of renewable energies in the opencast mining areas has not received much attentions as future prospect. This could be because there is still great scepticism about how the region can really benefit. The spokeswoman for the Lausitzrunde Christine Herntier assumes: "The municipalities, unlike conventional energy generation, do not benefit from the renewables." (Potsdamer Neue Nachrichten, 2018).

In fact, the development of large-scale renewable energy projects does not automatically contribute substantially to regional added value. But, regionally or local organized structural change with citizen participation and ownership such as community renewable energy initiatives could create more than twice as many local jobs as created through non-resident investors and developers (Gottschalk et al. 2016). Local community initiatives will also reap higher regional added value, for example through tax revenues and the strengthening of the local economy due to salaries paid and spent there. According to a recent study (IFOK et al 2018) Lusatia has local economic development opportunities for renewable energy almost along the entire value chain, with the exception of manufacturing of systems and components. Hence small businesses, such as craft enterprises have to be enabled to provide the technologies and services needed for the energy transition. Eventually these smaller players generate considerable added-value and employment on the ground (Hirschl, Salecki, and Heinbach 2012).

It became clear that both is needed: bold action on industrial initiatives for a low-carbon economy and support for smaller local projects and political and financial participation of civil society and citizens.

4.1.5.7 Opportunities of current initiatives and local capacities to manage a just transition

It is just the beginning.....

The coal phase-out poses great challenges but also great opportunities for Lusatia. After a long period of conflict over the future of lignite mining, there has been an increasing openness by all relevant actors to address and actively shape the upcoming transformation in the region.

The design of structural change beyond lignite is only just beginning. In fact a new dynamic can be noticed. There is a lot of good will and commitment from a wide variety of actors contributing to the public debate. While there are many projects and ideas in the pipeline, often the actual implementation is still pending and carries the character of declaration of



intent. There are many promising measures, initiatives, ideas and projects, but it is not yet clear whether and how they will be implemented.

It is important that the appropriate framework conditions will soon be put in place in terms of appropriate financial and institutional settings. The Federal level has to take decisions soon.

It can be positively noted, that a variety of stakeholders is engaged and consulted in the Coal Commission. Involved citizens and community members from opencast mining areas were formally equal (in terms of voting rights per member) to important association presidents of industry, energy industry and employers. This is a novelty among the expert commissions convened by the Federal Government in the energy sector. The trade unions and environmental organizations are also well represented with three members each.

Fast or fair: a dilemma?

It became clear that the disillusionment of many people in the region is not just about lignite or the loss of jobs. The conflict is more deeply rooted and can be explained by the difficult starting conditions for the structural development, the long history of massive job losses, the lack of government support and a high suspicion of the political leaders. The experience of mass unemployment and the “democratic emptying of space have dug deep into the collective memory of the region” (Markwardt et al. 2016, 8). In the light of this bitter experience, designing and managing further structural change is in fact a “socio-psychological task” (ibid). This is made worse because “the region will lose its industrial identity and mission, which has so far been defined by lignite” (ibid, 23). A replacement has yet to be found.

Experience in other countries shows that structural change processes take time and that there is no overnight solution to replace an entire industry. Examples show that it takes 15 to 20 years to stabilize employment and population in a pre-crisis situation (Lacasa, Klement, and Dornbusch 2018). Against the background of many years of delays with action on structural change, the problem is now emerging. This poses a dilemma: fast stand against effective and fair solutions. In this respect, it will be important to combine individual and urgent measures as quickly as possible with continuous, successful development of new business areas (Markwardt et al 2016, p 9).

Major challenges to be addressed

Although, there is a clear consensus about the goals for the structural change, there is great uncertainty regarding specific strategies and concrete ways for implementation. Industrial union leader IGBCE Michael Vassiliadis put it in a nutshell: "Everyone is ready to support structural change, but nobody has yet a comprehensive answer on how to do it" (IGBCE 2018).

So there are still a lot of challenges to address. A particular challenge in Lusatia is the trans-regional territory requiring to coordinate and collaborate across state, regional and local administrative borders (Lausitzer Rundschau 2018d, 2018e). Despite the many committed actors, measures and initiatives, it has not yet been possible for all relevant actors to work together. Nevertheless, there are good signs that the current political processes in the region will result in finding feasible institutional arrangements for getting over this problem.

So far it has not been sufficiently successful to involve all groups equally in the structural change process and provide opportunities for the population to participate in a public process. But there is hope that this is going to be changed with the upcoming model visioning process of the Zukunftswerkstatt Lausitz. Otherwise, there is great risk for disappointment and frustration.

There is a strong focus on the economic processes associated with structural change, like innovation and research, infrastructure and private investments. Nevertheless, for structural change to become successful in Lusatia, support is also needed for the “soft” aspects of the change process, creating decent living environments in the region.



Case studies from transition processes in coal dependent communities

The consistent and lasting support for structural change in the lignite mining regions requires strengthening of local participation, especially with regard to the energy transition both in political and financial dimensions. There are huge potentials that should and could be realized.

Strength	Weaknesses
<ul style="list-style-type: none"> • Motivation and readiness of all actors to get involved in the structural change process • Processes that, if possible, integrate at different levels • High attention and additional funding 	<ul style="list-style-type: none"> • Lack of effective coordination and governance mechanisms so far at Lusatian level that bring together all relevant actors • Small innovation potential, poor starting conditions • So far, no clear strategy on how to compensate for jobs • Involvement of civil society and citizens needs to be stronger • Neglect of small projects • Community has little confidence in the political leaders
Opportunities	Threats
<ul style="list-style-type: none"> • Lusatia could become a European “model region” for structural change away from coal • Pioneering the development and application of low-carbon technologies at a larger scale • Pioneering the transformation towards community-based renewable energy • Pioneering on a democratic and inclusive transformation process 	<ul style="list-style-type: none"> • Failure of a new development path beyond lignite • Promising project ideas from the region are not taken up • Federal Government provides only limited support, region is left alone with the problems • Broad disappointment and frustration among the population over poor progress on economic development • Newly created jobs are predominantly low-paid and unsecure jobs • Social unrest • Strengthening right-wing parties that address dissatisfaction with failed promises

4.1.6 Conclusion

Creating a fair low-carbon transformation is a demanding task that depends on many prerequisites. There are some lessons to be learned from current experiences in Lusatia although the transformation process is still at the beginning.

Pre-emptive approach: the case study shows how important it is to create suitable framework conditions and start developing alternatives at an early stage, since this had not been happening in Lusatia early enough. In order to gain credibility and trust among affected communities and workers, it is crucial for the political decision-makers to proactively assume responsibility to develop alternative employment pathways and engage communities early in the process. The search for alternatives, such as low-carbon industries, decent jobs and sustainable living conditions must therefore be implemented as early as possible on the way.

Establishing good framework conditions: The institutional and financial framework for a successful structural change is vital and has to be put in place soon. Central to this is the provision of sufficient funding and an institutional framework to organise the transition process. The latter includes appropriate steering and coordinating bodies to facilitate different interests and address concerns and needs of different actors. Empowering actors to take control of the process is also central.



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Social compensation: Socioeconomic hardship induced by the energy sector transformation should be avoided both for employees and regions. Appropriate compensation should be available before negative consequences are felt. The more profound the upcoming change and the potential negative consequences, the more important this point is, as people are more able to accept change if they can envision alternatives. Affected companies should be involved at an early stage and receive incentives and support for restructuring.

Community and citizen participation: Solutions should be developed with local stakeholder forums in order to be sustainable, feasible and desirable. This requires appropriate participation procedures and the involvement of a range of local actors in political decision-making process. This could be done e.g. through a broad regional visioning processes (translation: "Leitbildprozess") to identify the future role of the region. It is important that the developed mission statements also become effective in a decision-making and implementation phase within the framework of structural funding. Otherwise, the disappointment and frustration of the population to the point of turning away from politics is to be feared. It must be ensured that promising ideas from the villages are seriously considered and taken up and that citizens and civil society also get funding for smaller scale projects.

Political leadership: The EU Platform on Coal Regions in Transition is a first and important step in organizing dialogue and exchange of information and collecting best practice examples on multiple levels. Without fast and bold political action a fair and fast low-carbon transformation in mining regions is unlikely. Political leadership is required to make the changes necessary in a short time span, and there is an urgent need to build up the necessary expertise in government to deal with the upcoming transformations so that other regions can build on experience gained. Resources should be provided to capture and systematize the knowledge for organizing structural change processes.



4.2 Poland – Silesia

Summary of key findings

Poland is the second largest coal mining country in Europe and the ninth largest producer in the world, with most of the coal used domestically, delivering almost 80% of Poland's electricity. There is a comparatively large coal mining work force, with most Polish collieries concentrated in the Silesia region. The need for a just transition has been increasingly recognised since this issue entered the Polish public discourse approximately 1.5 years ago (ISF Research, 2018).

Despite national and international pressure to reduce the production and consumption of coal in the energy system, the country has been resistant to change. The national government is the main shareholder for the majority of coal mines and power plants, and consequently has a high stake in the sector's future. Unions also have considerable political power, which has so far been exercised to decelerate the transition to a low carbon energy system. Both groups employ arguments of energy security in addition to employment and local economic dependencies to maintain their position.

However, there is a slowly intensifying public discussion about the negative environmental impacts of coal and the potential economic and social disruption that an unplanned and abrupt phase-out of coal could cause – not least since the 2018 United Nations Climate Change Conference was held in Katowice.

The country already holds a wealth of experience in the structural transformation of its coal sector since the collapse of the Soviet bloc precipitated requirements to increase the efficiency of the energy sector in a new market regime. This resulted in a sharp decline in employment for more than 300,000 workers between 1989 and 2018 which was accompanied by government measures addressing different just transition principles. These had varying degrees of success, arguably because of a lack of planning, consistency and resourcing.

The range of measures undertaken combine labour market interventions (workers packages including early retirement, compensation and retraining), regional and local economic development support and, more recently, the promotion of clean energy technologies including renewable energy and energy efficiency. However, the latter requires a much stronger commitment by government to achieve an orderly transition away from coal.

Nonetheless, some Silesian coal communities appear to be managing the transition process well and offer examples of good practice. Silesia in particular has been able to a large extent to create new opportunities and prospects for the local community through local economic diversification, strategic innovation and education. While there is “no one size fits it all” approach, the Silesian region offers some lessons for other communities.

The general findings and recommendations can be summarised as follows:

- **A broad societal dialogue should be initiated as early as possible:** it is crucial that diverging positions of the main stakeholders on the energy transition are bridged. Building consensus and cooperating has been difficult in the past due to politicisation and polarisation of stakeholder groups. In Silesia some first steps are taken by local governments and municipalities in collaboration with the civil society actors on the topic of coal related health issues. This should be expanded to broader questions of just transition. Drawing on similar experiences elsewhere this could be a taskforce, platform or commission providing it includes representatives from government, industry and civil society at both the national and regional/ local level. It is important that this platform helps to raise awareness about the opportunities of the energy transition but also finds solutions for the specific challenges the affected communities face.



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- **The just transition requires both a top-down and a bottom-up process:** In the last few years, Polish communities have been successfully mobilised on the environmental and health impacts of coal, and some communities have expressed interest in owning renewable energy projects. However, there are too few incentives for Polish prosumers to broadly engage in the energy market.
- **Adequate resourcing and institutional allies:** National and regional government support is essential for coordinating and resourcing the structural transformation for example through targeted EU co-funding earmarked for just transition measures. Strategic allies should be found to champion the opportunities of the transition demonstrating the feasibility and desirability of the energy transition. They can also push for the establishment of dedicated national or regional authorities to coordinate and manage the just transition process endowed with sufficient resources. This could ensure a planned and targeted approach.
- **Action is needed by coal companies:** Ultimately to plan early and strategically for the closure of mines and power plants their owners have to assume their societal accountabilities. This includes on the one hand taking responsibility for workers and families, as already practiced (e.g. by offering workers packages), and on the other hand taking responsibility for mine or power plant site remediation. Measures should be driven and stipulated by national government. However since many mines are economically struggling, the question of financing those measures has to be answered.



4.2.1 Introduction

Poland is the second largest coal mining country in the Europe and the ninth largest producer in the world (Enerdata, 2018). Most of the coal is used domestically delivering almost 80% of Poland's electricity and 74% of heat, so the Polish mining and energy sector are very interdependent (Polish Energy Regulatory Office 2017). Poland has the fifth-highest greenhouse gas emissions in the EU (Eurostat 2016), while its per capita emissions are about the average for the EU (net emissions (with LULUCF) - 9,65 tCO₂/capita) (KOBiZE 2016). The emissions mainly stem from fossil fuel combustion (Global Carbon Atlas 2018) and contribute to severe health impacts with 44,500 premature deaths each year in Poland (EEA 2018).

Poland is exposed to a number of external and internal factors that are driving change in the energy sector. These include the climate commitments under the Paris Agreement and the obligations under the EU climate and energy policies (European Commission 2018a), the declining economic viability of Polish coal mines (Baran et al. 2018; Szpor 2017), and a growing awareness about health issues and decreasing tolerance of air pollution caused by emissions from burning coal and vehicles.

„In the coming years, the region is facing an energy revolution, which will not only result in the increased share of renewables in the energy consumption mix, but above all make local citizens and entrepreneurs the owners of decentralised energy sources. This trend will have a social and economic dimension.” Statement of the Podlaskie Regional Government – in the Regional Operational Programme 2014-2020

At the centre of the public discussion is the potential economic and social disruption that the phase out of coal could cause. Poland has a comparatively large work force employed in the coal mining and power sector with a concentration of most Polish collieries in the Silesia region (European Commission 2017; Polish Geological Institute 2017; Statistics Poland 2018f; Szpor 2017).

Consequently, it is critical to ensure a fair and equitable transition that respects workers needs and considers the concerns of the communities and vulnerable groups. This is amplified by the country's experience in the 1990s when a major restructure of the coal industry resulted in a reduction of the mining work force of about 200,000 miners within a decade (Szpor 2017).

The aim of this case study is to explore current developments in Poland's energy transition process with a specific focus on the Silesian region, to discuss just transition activities and to ultimately provide a summary of recommendations on based upon existing studies and this research. As well as desk research, we have consulted different experts from industry, the not-for profit and the academic sectors and analysed a number of newspaper articles to better understand the current political and societal debates.

The Polish case study is divided into four main sections.

- **Background:** the socioeconomic development in the country and specifically the Silesian region,
- **The energy sector:** status of the energy transition, objectives and drivers,
- **Just transition measures:** an overview of experiences, opportunities and initiatives both current and past,
- **Analysis and recommendations:** findings are summarised in a SWOT analysis, and complemented by recommendations



4.2.2 Background: Socioeconomic Development and role of coal in Poland and Silesia

Poland is one of the fastest growing economies in Europe, with a population of more than 38 million (Statistics Poland 2018d). Since the 1990s the country has developed from an emerging to a developed economy with rising income status (OECD 2018b; World Bank 2018b). It has grown faster than its neighbours at an average of real GDP 4.6% (2007-2016), and reached close to 70% of average EU GDP per capita by the end-2017 (World Bank 2018b) (see also Table 12). The result is a comparatively low unemployment rate of 5.8%,⁷ while at the same time workers enjoy a robust real income growth and wages growth (Ministerstwo Rodziny Pracy i Polityki Społecznej 2018). The major employment sectors are agriculture (1.6 million people), industry (5.2 million), with the largest share in the service sector (9.7 million) (Rynekpracy.org 2018). Economic growth has been driven to a large extent by a restructuring of the economy from agriculture to more productive sectors and by buying foreign technologies (OECD 2018b). However it has been pointed out that the economy remains dominated by sectors with limited dynamics and low added value per worker, such as agriculture, energy, and mining (McKinsey&Company 2015).

Table 12: Comparison of socioeconomic figures Poland, Silesian voivodship

	Country	Silesian voivodship
Population	38,434,000 (Nov 2018)	4,548,200
Geographic size (sq. km) (thousands)	312,696 km ²	12,334 km ²
Administrative division	16 voivodships, 314 districts, 66 cities with district status and 2478 communities	36 districts and 19 cities with district status and 167 communities
GDP	520 billion (current US\$ in 2017)	12.4% of Poland's Gross Domestic Product (GDP) is generated here
GDP growth (real growth)	3.3% (between Q4 2015 and Q4 2016).	3.2% (between 2015 and 2016)
Average gross wage	4,580 PLN (Nov 2018)	4,790 PLN (Nov 2018)
Rate of unemployment	5.8% (Nov 2018)	4.3% (Nov 2018)

Sources: (Ministerstwo Rodziny Pracy i Polityki Społecznej 2018; Statistics Poland 2018a, 2018b, 2018d, 2018e, 2018f, 2019); *Urząd Statystyczny w Katowicach 2018*.

As a result of economic adjustment processes the importance of the coal industry for the national economy has decreased significantly in the last three decades (Szpor 2017; Szpor and Ziółkowska 2018) (see also section 4). The three main types of coal produced in Poland are steam coal, coking coal and lignite, extracted at a total volume of 120 million tonnes in 2017, of which the majority is used for domestic energy generation (Polish Geological Institute 2018b). As illustrated in **Error! Reference source not found.**, the coal trade balance has been slightly positive in 2015-2016, although imports increased significantly in 2017 and 2018 due to shortages on the domestic market with the majority coming from Russia followed by the US and Colombia (Barteczko 2018a; Kozłowska 2018; Simon 2018). In 2018 coal imports reached approximately 18-19 million tonnes – making Poland a net importer for the second year in a row, with approx. 70% coming from Russia (Dziennik Gazeta Prawna 2018).

The share of the Polish coal sector in real GDP growth in the years 2005 - 2013 was on average -0.02% (Bukowski et al. 2015). The contribution of the sector to the national GDP generation is considered marginal (Baran et al. 2018). Nonetheless, Poland has one of the

⁷ In 2017, the average unemployment rate among EU countries was 7.6%.



largest coal industry workforces in the EU: the direct national mining force (including lignite and hard coal) is reported at 82,717 workers (2017) (Szpor and Ziółkowska 2018) (including 63 721 miner under the ground) and constitutes 0.49% of the total economically active population (Alves Dias et al. 2018);⁸ in addition around 13,500 people work in coal-fired power plants (ibid). The number of indirect jobs arising is estimated at 49,000 in intra-regional supply-chains and around 88,000 if inter-regional trade is included (ibid). Experts point out that the sector's influence on local and regional economies can still be substantial (ISF Research 2018).

Silesian Voivodship

The Silesian Voivodship is a prosperous, highly industrialised region located in the southern part of Poland (see Figure 8). It consists of 167 communities grouped in 36 districts. It has population of about 4.5 million (12% of Poland's total population) and is characterised by high degree of urbanisation (77%; 60.55% for Poland in 2017) and population density (370 people/ km², 123 for Poland) (Statista 2018). The Silesian region has one the lowest unemployment rates in the country (4.3%) (Statistics Poland 2018c) with more than 1.64 million people attributed to the economically active population in 2016 (Statistics Poland 2018f). In addition, it contributes 12.4% to the Polish GDP (Baran et al. 2018; Urząd Marszałkowski Województwa Śląskiego 2018). The region's capital is Katowice, which belongs to a larger conurbation of 19 large cities in Poland. Hence, Silesia is described as polycentric with administration, finances, companies, universities and cultural establishments distributed across the urban centres (Baranyai and Lux 2014).

Figure 8: Location of Silesian Voivodship (Śląskie region)



Source: Urząd Marszałkowski Województwa Śląskiego 2018

In this regard, Silesia is comparable with the Ruhr region⁹ in Germany, with highly urbanised spatial structures and heterogeneity (Baranyai and Lux 2014; Herpich, Brauers, and Oei 2018; Wehnert, Best, and Andreeva 2017). The other commonality with its German counterpart is the long history of mining, power generation and coal dependent heavy industries (i.e. steel and iron) contributing to the region's economic development.

Since the 1990s Silesia has gone through a substantial structural transformation triggered by privatisation, efficiency requirements and technological development after the collapse of the Soviet Union. This resulted in significantly reduced employment in the industrial sector particularly the mining and steel producing segments.

⁸ Estimates from different authors vary. Witajewski-Baltvilks et al. 2018 state that in 2015 90,000 workers were employed in hard coal mining (p. 8).

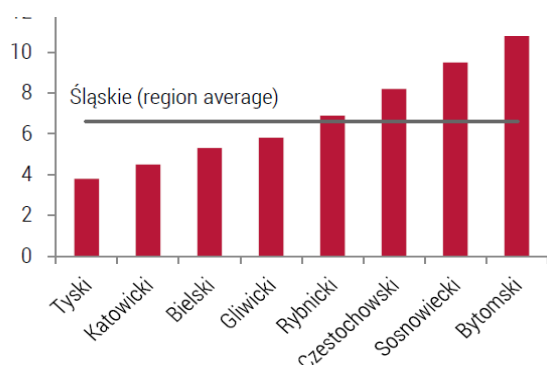
⁹The Ruhr region is a highly populated region within the German state of North-Rhine-Westphalia (NRW) which developed economically through coal mining, coal power generation and coal-reliant heavy industries



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However, other sectors grew and today the region has a healthy labour market with an unemployment rate below national average (4.3%, November 2018). Yet, the employment situations varies across the sub-regions with the Bytomski sub-region showing the worst

Figure 9: Unemployment rate in the sub-regions of Silesian voivodship, 2014



labour market conditions (see Figure 9).

Source: Witajewski-Baltvilks et al. (2018)

In the last three decades the heavy industry sector (mining, steel and iron production) has become less important (7% of the all employees), while the service sector now employs 45% of the regional workforce (see Table 13) (Urząd Marszałkowski Województwa Śląskiego 2018). The regional economy benefits from the growth of manufacturing, electrical machine industry, IT, and energy industries. The automotive industry plays an important role, as the region is the largest motor vehicle producer in the country, and the food industry is also significant (ibid). As can be seen in Table 13, this trend is continuing, with every sector except mining and quarrying increasing.

Table 13: Employed Persons by Sector in Voivodship Silesian (in thousands)

	Agriculture , Forestry and Fishing	Industry – incl. mining, quarrying etc.	Industry - Manufacturing	Construction	Trade; Repair of Motor Vehicles	Transportation and Storage
2015	102.2 (99.3)	134.2	350.3	102.2	275.4	95.4
2016	102.4 (99.4)	125.8	364.9	103.3	279.3	100.8

	Accommodation and Catering	Information And Communication	Financial And Insurance Activities	Real Estate Activities	Professional, Scientific And Technical Activities	Administrative And Support Service Activities
2015	30.7	37.6	28.0	14.1	61.9	36.1
2016	32.9	40.6	28.3	15.4	70.5	39.8



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	Public Administration And Defence; Compulsory Social Security	Education	Human, Health and Social Work Activities	Arts, Entertainment And Recreation	Other Services	Total
2015	45.6	106.9	76.2	14.4	26.2	1672.0
2016	45.9	108.5	78.3	14.9	28.9	1706.0

Source: Statistics Poland 2018 p.128.

Nonetheless, the region still holds the largest workforce in the coal mining and power sector in the country. Witajewski-Baltvilks et al (2018) estimate that in 2015, 90% of all hard coal mining workers were located in Silesia accounting for about 81,000 jobs, yet, less than 5% of all workers in the region.¹⁰ It is also one of the two regions with the highest coal production in Europe, and one of the largest in terms of number of enterprises active in coal mining (Alves Dias et al. 2018).

The main coal companies in the region include Polska Grupa Górnicza, Jastrzeska Spółka Weglowa, Tauron Wydobycie, and Przedsiębiorstwo Górnicze Silesia.

4.2.3 Energy sector and the status of the transition process

Poland's energy sector is characterised by a high coal dependency, with coal providing 79.5% of electricity and 74% of heat generation (Polish Energy Regulatory Office 2017). The share of renewable energy is about 13.36% (end of 2016) for electricity generation with wind (8,35% op.cit.) and biomass (6%) as the most important resources (REN21 2018). Natural gas (4.3%) and crude oil supply most of the rest.

Table 14: Sources of electricity production in Poland 2017

	GWh	%
Total production	165,852	100
Hard coal	79,868	48.2
Lignite	51,983	31.3
Wind	13,855	8.4
Biofuels and waste	150	0.1
Natural gas	7,172	4.3
Hydro	2,767	1.7
Others	10,057	6

Source: Polish Energy Regulatory Office Website (2018)

In the last years, Poland has continued to pursue new coal plants, with four power units recently built or due to be finished in 2019/2020. This will add almost 4GW to Poland's coal fleet (Alves Dias et al. 2018; Shearer et al. 2018).

¹⁰ Wehnert et al. 2018 provide a similar figure stating the 80,000 workers are employed in hard coal mining in Silesia.



Table 15: Coal Power Capacity in Development and Operating in Poland (MW)

Number of units power production of the central disposal - 2018 (JWCD)	Capacity of operating units 2018 ¹¹	Units to be turned off in 2019		New units included in 2019 - 2020		Modernisation 2019 - 2020	
		Number	Capacity MW	Number	Capacity MW	Number	Capacity MW
118	27,623	14	2575	4	3177	4	4,275

Source: Polish Power Grid Co 2018

In addition, the Polish government seeks new investment to explore new and re-open a number of existing coal mines including two in the Upper Silesia region for coking coal and thermal coal exploration (Baran et al. 2018). Resulting from the historical socialist economy, the state has vested interests in the coal industry with the majority of mines and utilities still in government ownership or with the government retaining a voting majority.

There are five main coal mining regions across the country with about 26 active mines. A major coal basin is located in the Upper Silesian Coal Basin with a size of 5,600 km² (Polish Geological Institute 2018a).

Despite Poland's heavy dependency on coal, the energy sector is slowly beginning to change (Macuk, Maćkowiak Pandera, and Rubczyński 2018). This has been driven by the country's commitment under the EU Renewable Energy Directive (2009/28/EC) that set a target of 15% renewable energy sources (RES) in the gross final consumption of energy by 2020. This target was confirmed in Poland's National Renewable Energy Action Plan 2009 and split it into the following sub-targets: 19.13% renewable electricity, 17.05% green heat and 10.14% green transport.

The growth of RES was encouraged through a number of support schemes including Renewable Portfolio Standard and quota scheme with certificate trading. In February 2015 the government changed the certificate to an auction scheme as the main incentive for medium and large scale renewable energy. This move has been criticised by a number of experts, who concluded this would make Poland miss its 2020 RES target (Janeiro and Resch 2017).

4.2.3.1 Objectives and positions main stakeholders in the Polish Energy Market

In Poland the discussion of the energy transition is polarised along the traditional jobs versus environment dichotomy. The objectives and positions of different stakeholders emerge in three main leitmotifs. The three main positions may be summarised as:

- 1) National security, energy sovereignty, work protection
- 2) Environmental protection, focussed on climate change
- 3) Local environmental concerns

Each of these positions are explored below.

National security, energy sovereignty and jobs including workers protection, and would prefer a longer term coal dominated energy path. These points are predominantly used by representatives of the national government, trade unions and utility associations in response to energy market developments and counter EU climate policies. The Polish Government Energy Policy Strategy (2009) assumes coal to remain the dominant fuel in the energy sector until (at least) 2030 (Polish Ministry of Economy 2009). In the Polish Strategy for Responsible Development (SRD) (2017), the government confirmed its view on coal dominance to 2050 while focussing efforts on restricting the coal sector by increasing

¹¹ Despite of this in Poland exist power capacity in wind turbine (5971 MW) and independent unite (10 573 MW)



efficiency and competitiveness, and deploying “clean coal technologies” (CCS and high-efficiency, low emission power stations) (Ministry of Infrastructure and Development 2017).

This view was again confirmed in the draft Energy Policy for Poland until 2040, presented by the Ministry of Energy in November 2018 (Ministerstwo Energii 2018b). Although energy security and affordability are the leading goals of the energy policy, the reduction of the energy sector’s impact on the environment is also acknowledged. Nonetheless, coal remains a dominant part of the energy mix until 2030 (Ministerstwo Energii 2018c). The following projections are made:

- The share of coal will decrease to 60%;
- The share of RES will increase to 21% (mainly due to PV and offshore wind farms);
- Energy efficiency is expected to increase by 23% by 2030 compared to 2007;
- Introduction of nuclear power capacity is planned until 2033;
- CO₂ emissions shall be reduced by 30% by 2030 (compared to 1990).

In addition, the Polish Law and Justice Party (PiS) government repeatedly assures the coal industry its support with high policy representatives declaring that coal is the basis of the energy sector (netTG.pl 2017). In a letter to the mining worker celebration in Silesia, President Duda wrote: “The mining industry and coal-based energy are and in foreseeable future will remain the foundation of our country’s energy and energy security (Biznes Alert 2018). The government’s view is aligned with industry representatives projections, which expect the share of coal to constitute around 60% in 2030, and 50% of total electricity demand in 2050 (PKEE 2018).

Despite, the government also acknowledges the need for **diversification in the energy sector** (Ministry of Infrastructure and Development 2017). However, the traditionally very influential trade unions protect the incumbent industry (Mikulska and Kosinski 2018).¹² Their political power stems from the particularly strong membership engagement with the majority of miners organised in a trade union (Trappmann 2012). The Unions position is accompanied by climate change scepticism (Euracoal 2018). In the context of the COP24, a joint statement of the three major workers association (e.g. OPZZ, NSZZ Solidarność and Forum ZZ) calls for “a full assessment of all climate-related policies to date in terms of ecological effects and socio-economic impacts”. Their agenda is to replace the concept of “decarbonisation” with one of “climate neutrality” whereby CO₂ emissions are balanced by CO₂ absorption in forests (Euracoal 2018).

In another position paper for the COP24, the Ministry of Energy stated: “Poland is against increasing CO₂ reduction targets adopted by the EU by 2030, as this will have a negative impact on the power sector as well as the entire Polish economy” (Ministerstwo Energii 2018e).

Environmental protection” the second view point is represented mainly by environmental NGOs such as Greenpeace, WWF and a number of think tanks such as Institute for Sustainable Development, Institute for Renewable Energy and or support organisations such as National Energy Conservation Agency (KAPE 2018). They argue and call for a coal phase out by 2030 (Greenpeace) or 2050 pointing towards the high carbon emissions density of the coal sector and Poland’s commitment in Paris and EU context. The organisations also criticise the significant subsidies for the coal sector (Siedlecka, Śniegocki, and Wetmańska 2017). However, according to one interviewee, climate change is less alarming to the Polish public (ISF own research 2018). Instead, other public concerns of environmental issues have increased significantly in the last years.

¹²There are around 25,000 individual trade unions in Poland. Three-quarters of all company unions belong to one of the three trade union confederations: NSZZ Solidarność, OPZZ or Forum FZZ. The ratio between organised workers and those who could be organised represents a level of organisation of almost 50 per cent (Trappmann 2012). In 2014, out of 19.5 thousand trade unions registered in REGON (Register of National Economy), 12.9 thousand organisations (66% of registered trade unions) were active.



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Local air quality issues: the third strand relates to local environmental issues, such as poor air quality associated with outdated heating systems, old cars and the coal industry, water pollution and the destruction of forests, farms and homes through new or planned extension of coal mines (CoalMap.eu 2015; Gardiner 2015; MiningSEE 2016; Moura 2018; Nabrdalik and Santora 2018; Vasev 2017). Those concerns are high on the agenda of local communities, local governments as well as local, national and international environmental NGOs.

The poor air quality is also related to another public concern of growing attention (Sałach and Lewandowski 2018). Energy poor households contribute to air pollution through the use of old furnaces and burning low-quality coal in winter months. According to the Institute for Structural Research, 4.6 million Poles live in energy poverty and there is a risk that this number will rise with the shift towards environmental friendly but more expensive alternatives (Rutkowski et al. 2018).

Table 16: Stakeholder position and political power on energy transition

Group	Representatives	Position	Political Power
National Government	Led by right wing, conservative PiS party Ministry of Energy	Pro coal position as long as it promises local legitimacy and political support – ideal solution of a co-existence of coal and renewable energy Pro-nuclear	Strong political power
Local Government	Diverse political affiliation	There is a huge gap between local and regional authorities on the one side and the national government. Local and regional authorities are definitely more open to renewables and fighting climate change than the government in Warsaw	Weak to medium political power
Utilities/ mining industry	Mainly state owned directly or indirectly state controlled Polish Electricity Association	Preserving the energy supply security and increasing the competitiveness Defending coal usage Advocates for capacity market establishment	Strong political power
Unions and workers	Great number of different unions and sub branches Trade unions, Main bodies: OPZZ, ZZ forum, Solidarność	In defence of coal workers' rights, supporting the continuation of the sector while drawing on climate scepticism.	Strong political power
Renewable Energy Industry	Polish Wind Energy Association Solar Energy Association	Promoting the potential of renewable energy sources	Weak political power
Academia/ Think Tanks	Wise, IBS, Heinrich Boell Foundation, Institute for Renewable Energy	Promoting renewable energy, energy efficiency and demand management measures and educational campaigns Strengthening the rights and participation of consumers in the energy debate	Weak political power
Not for profit organisations and movements	Greenpeace, Bankwatch, WWF	Calling for a rapid coal phase out and promoting renewable energy and energy efficiency solutions	Weak but growing political power



Group	Representatives	Position	Political Power
European Union	EU Commission	Increase the pressure through climate targets and carbon price – providing support in form of EU funds and transition dialogue forums	Medium political power

Source: ISF research 2018.

4.2.3.2 Drivers of the energy transition

Despite the government's adherence on a coal dominated energy regime, there are a number of factors that point to significant changes which may undermine the legitimacy of this stance. Exposed to global and national pressures, the Polish coal sector is in a state of flux that will ultimately impact workers and communities.

It can appear irresponsible to insist on a long-term planning with a fuel source that could expose the Polish community to a socio-economic downturn and further ecological destruction when alternative clean technologies are available that are both cost competitive and offer an environmental friendly solution.

It is crucial to highlight drivers that can bring about an energy transition much faster and more drastically than anticipated (Fickling 2018). Those include:

Old and inefficient power plants and depleting mines

The majority of Polish coal power plants are old (more than 30 years) and inefficient (Alves Dias et al. 2018; IEA 2016). This leads to frequent power shortages and energy supply restrictions which negatively impact other industries such as the automotive suppliers, steel and chemical sectors (Foy 2015). Since hot summers occur more frequently in the last decade, the problem is exacerbated further as natural water supplies used to cool power stations fall short e.g. in 2015 or 2018 (Barteczko 2018c; Foy 2015). One recent example of the potential pace of coal-phase out is Poland's largest electricity utility PGE which gave short notice in October 2018 to close the 370 MW Unit 1 and 2 Belchatow power plant after June 1, 2019 (GPI 2018). The state-owned company suggested the closure may occur earlier due to "the deteriorating technical condition" of the units (ibid). In fact, it is estimated that 1/3 of the Polish coal power plants will be decommissioned by 2030 or earlier posing great risk for job losses of more than 7,000 employees in the sector (Alves Dias et al. 2018).

The replacement and upgrades of existing plant represent a significant economic challenge and will ultimately lead to further subsidy from the Polish Government, and eventually the Polish tax payer since alternative technologies are already cheaper (Fickling 2018; Randall 2016). Hence, the country's energy dependency on energy resource imports is growing in the last years, demonstrating the ambiguity of the Government's coal strategy. Poland increasingly relies on Russian and other state's coal and gas supplies (Barteczko 2018a; Kozłowska 2018), which poses political as well as socio-economic issues (ISF Research 2018). Consequently the country is more and more exposed to international rises of commodity prices.

This is also related to the coal mines struggling with unprofitability and high inefficiency. This is mainly related to high production costs, increased competition with coal imports and unsold production from domestic low quality coal. In addition, economic viable reserves are depleting requiring the exploration of new or deeper pits. Experts anticipate that hard coal mines will face a high risk of closure after the removal of subsidies. In Silesia at least 11,325 jobs have been lost since 2015 while almost 41,000 jobs are at risk (Alves Dias et al. 2018).

Increasing electricity prices

Electricity prices for household consumers in Poland are among the highest in the Eastern European region (Eurostat 2018). While the average price of electricity for household consumers fell in the first half of 2018 (ibid), the wholesale price on the competitive market is on the rise due to increasing costs of coal and carbon emission permits and growing



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electricity demand (Polish Energy Regulatory Office 2018b). The monthly wholesale price increased by 24.5% between the third quarter of 2017 and 2018 (ibid), and experts assume this trend will continue under the Government's current energy strategy and ultimately impact households prices (Wierzbowski, Filipiak, and Lyzwa 2017).

The price trend is also associated with the European Emission trading scheme, which has been reformed by the European Council a year ago and led to a tripling of the carbon price (see Figure 10). Carbon Tracker Initiative forecasts that it could double by 2021 and could quadruple to €55 a tonne by 2030 if EU legislates emission targets with Paris climate commitments (Carbon Tracker Initiative 2018).

Although the Government has declared it will keep power prices stable for households ahead of the regional elections (Barteczko 2018b), the increasing cost for utilities will have to be compensated elsewhere. Indeed, the state-owned companies want to raise electricity prices for individual consumers by up to 30% (Baca-Pogorzelska and Piszczatowska 2018). However these plans were extraordinarily halted by Sejm in late December 2018 (Jakub Kowalik 2018). The four large state-owned utilities either face a significant loss which will ultimately impact the tax payer, or will have to charge higher prices to industry clients. Pressure from utilities and Polish industry suggest that the Government will not be able to keep this promise for a long time (Barteczko 2018c).

Figure 10: Polish electricity prices in 2018



Source: Martewicz 2018

Subsidies for the coal sector wear down societal legitimacy

A number of studies point to hidden societal cost of Poland's coal dependency (EEA 2018; Gray, Watson, and Ljungwaldh 2018; HEAL 2015; Siedlecka et al. 2017; Vasev 2017). Coal sector subsidies depend on significant contributions of government and so tax payers' money, and accept deteriorating public health and negative local and global environmental impacts.

A study conducted by WiseEuropa, found the coal mining and power sector received \$53.5 billion subsidies between 1990 and 2016 (PLN 230 billion (an average of PLN 8.5 billion per year)) (Siedlecka et al. 2017). In the mining segment, the subsidies are mainly related to payments for the restructuring after 1990s, the recapitalisation of state-owned mines, employment packages, pensions and security benefits that are higher than in other sectors. Experts indicate that this preferential treatment has resulted in some public controversy over the years (ISF Research 2018). However, the strong influence of trade unions on the government is likely to mean further "state aid" is provided to loss-making mines.



In fact, there are concerns that further subsidies will come through an initiative launched by the European Commission in December 2017 with was established with exactly the opposite purpose. The goal of the Platform for Coal Regions in Transition is to promote a fair transition of coal regions ensuring “that no region, no sector, no community, no worker is left behind in the process of energy or industrial transition” (European Commission 2017, 2018b) (see also Box 5). In February 2018 the Polish government proposed a list of projects which could be financed as a part of the initiative. But NGOs strongly criticised the process how the list was drafted and the project were pre-selected due to a lack of transparency, public participation and consultation. In addition, the main beneficiaries are coal mining companies receiving support for technological improvements to fossil fuel burning, utilisation of mine methane or geothermal heat from mine waters and air, while only one project is dedicated to RE development (CEE Bankwatch Network 2018; Greenpeace Poland 2018).

The power generation segment also requires significant subsidies amounting to 0.3% of the GDP since 1990 including funding for e.g. R&D and infrastructure, ETS allowances, stranded costs and use of domestic coal. In addition, the study authors emphasise that external costs of coal combustion in power plants exceed the value of the aforementioned subsidies by as much as an order of magnitude. This applies in particular to the societal costs for health issues caused by pollutant emissions.

In this context, the recent shift to the capacity market model which guarantees ‘backup’ power through an auction mechanism is viewed critically by some energy experts. Despite the principle of technology neutrality and the aspiration to accompany the phase out of coal, the coal sector could in fact benefit significantly. In consideration of the capacity market payments, WiseEuropa analysis forecasts that the coal sector will generate total costs exceeding €35 billion (PLN 154 billion) in the period of 2017-2030, with mine-closure subsidies approved by the European Commission standing for as little as 12% of this. The subsidies will also extend to new coal fired power plants such as the 1 GW coal-fired unit Ostrołęka C. The Carbon Tracker Initiative labelled the project a “financial disaster” reliant on capacity market payments throughout its lifetime (Gray et al. 2018).

Growing bottom up local opposition

There is a growing bottom-up movement including communities, NGOs, universities and local and regional governments that is opposing the development of new mines and new coal fired power plants, motivated by air pollution as well as climate concerns (ClientEarth 2018; Krakowski Alarm Smogowy 2018; StopEP 2016; Vasev 2017).

An example is the little town of Imielin near Katowice/Silesia, where a local movement consisting of local residents and authorities protest against the plans of the mining company Polska Grupa Górnicza (PGG) to start coal extraction in the Imielin-North field, which overlaps with half of the town’s territory. The proposed additional mining activities would result in major deformations of the land (ground to subside up to 6 meters), which will entail a higher risk to the safety of buildings and their residence. It will also pose risks to the local infrastructure (gas pipelines and roads) and the local environment in particular the water reserves (Zygmunt 2018).

Other examples of local protest and initiatives include the Krakowski Alarm Smogowy campaign which successfully rallied for a ban on burning coal and wood in household stoves (Gardiner 2015b; Krakowski Alarm Smogowy 2018). After 5 years campaigning the city provides support for replacement of coal and wood burning boilers, and energy bill assistance and home insulation grants for low-income people (Knap 2018). This initiative has started a country wide movement and inspired many other communities. Other examples are the successful local campaign which led to the closure of the Koksownia Dębieńsko coking plant in Silesia in August 2018 (ClientEarth 2018; JSW SA 2018), and the community in Przeciszów (near Oświęcim) campaigning to stop the construction of a new mine by the mining company Kopex (Olszewski 2016).

The issue of public health has become a major mobilisation factor while at the same time employment in the coal sector is becoming less attractive (Energiewende Team 2017).



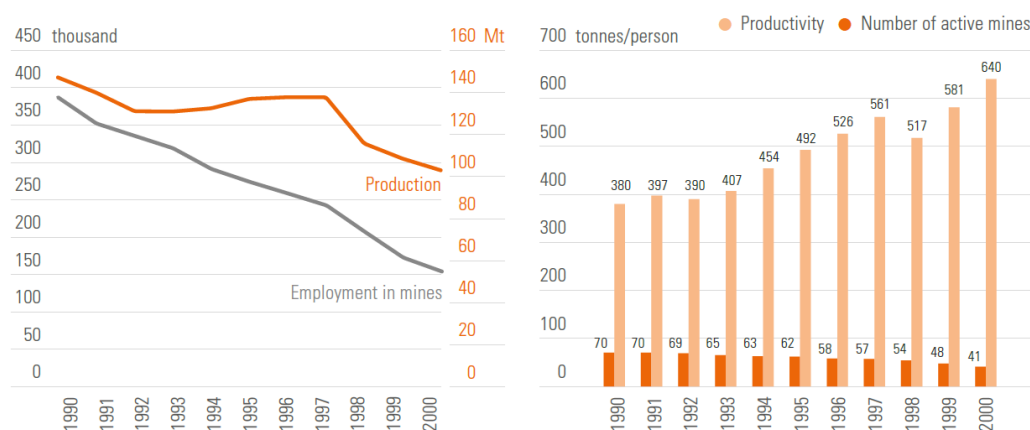
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Hence there is great potential for anti-air pollution campaigns to link their protest with calls for people owned clean energy alternatives. Experience in other countries such as Germany and Denmark have shown that the social movements became really effective when they combined their oppositional stance (e.g. anti-nuclear) with a solution-orientated approach focusing on alternative energy initiatives (Mey 2017).

4.2.4 Just transition measures and initiatives

Since the 1990s Poland is experiencing a structural transformation of its coal mining industry. During the Communist period (1945-1989) the coal sector was one of the back bones of the national economy and employed more than 380,000 workers (Baran et al. 2018; Macuk, Maćkowiak Pandera, and Rubczyński 2018; Szpor 2017). After 1989 the transition to a market economy required massive changes to increase productivity resulting in a significant job losses. Between 1989 and 2017/8 the workforce in the mining sector fell by almost 80% (ibid) (see also Figure 11).

Figure 11: Employment, production and number of active mines and their productivity



Source: Szpor 2017.

Silesia has been one of the core regions for coal mining and power production since the 18th century, and has become an industrial hub with a number of conurbations that attracted employers from across the country. This region felt the sharpest impact of the economic restructuring and modernisation.

The excessive size of the workforce was considered the biggest obstacle for reaching sector profitability, and the national government adopted a number of programs and policies to speed up the socio-economic transformation in the early 1990s. Several labour market packages and economic revitalisation initiatives were introduced (Szpor 2017; Szpor and Ziółkowska 2018). Consequently, the country can draw on experiences of the last 30 years and further develop these activities to benefit affected communities during the current energy transition.

The follow section gives a short overview of the instruments applied in the last decades. These are then considered using the just transition framework developed in Section 3.

4.2.5 Experiences and lessons learned

In the past three decades the country has introduced a number of programs to specifically support workers and coal communities (see Table 17). Szpor (2017, 11) emphasises that because the country lacked knowledge and experience with the free market economy it tested various instruments with differing degree of success.

The first packages introduced in the 1990s focused on miners and their families and mainly provided economic incentives to depart from the active workforce. Szpor and Ziółkowska



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(2018, 12) note that the incentives introduced before 1998 were not effective, as they were too small to be attractive.

This changed with the Mining Social Package in 1998 which included early retirement payments, “golden handshakes”, and active labour initiatives such as training and allowances. This package achieve its goal, insofar that it significantly reduce the workforce, to lay off 115,000 workers¹³. However the program did not provide long-term sustainable prospects for workers or communities. The most popular measures (redundancy payments and ‘golden handshakes’) were not accompanied with sufficient activities to support reintegration in the labour market, leading to socio-economic deprivation of the beneficiary households. In fact, experts (ISF Research 2018) consider that initiatives such as retraining and welfare allowances received too little attention, as they were voluntary and insufficiently tailored to the specific needs of miners. For example, programs did not take into consideration miners’ educational levels, the local job market situation, or miners’ inexperience in needing to seek work.

The second set of measures introduced in 1998 to 2002 included programs for development for communities receiving the specific status “mining communes”. These programs offered opportunities for local governments to collaborate with mining companies for local economic diversification, to acquire facilities and real estate owned by mining companies and utilities, and to receive higher tax revenues and preferential loans for local economic development. Despite the lack of an in-depth evaluation of this program, experts found that many local governments did not have sufficient experience or political power to stimulate or diversify their local economy. In fact, the program was very dependent on local capacities, knowledge and skills. Nonetheless, there are successful examples of these measures contributing to economic revitalisation and job creation in the Silesian region for example establishing a car manufacturing industry hub (Gliwice and Katowice) and medical equipment production and health services (Zabrze). Since Poland’s integration in the EU in 2004 there have been new funding opportunities for local government initiatives for example in Gliwice, Zabrze and Katowice.

There have also been synergies with general economic development measures, such as the Special Economic Zones (SEZ) Act introduced in 1994, which provides benefits (such as tax exemptions) to attract international investors through. While this program is not specifically aimed at coal communities, there are many geographical overlaps (Grzegorzczak 2018; Schaefer 2018), and the region is considered a leader among Polish SEZ. There are more than 300 business entities operating in the zone, having invested approximately €7.45 billion (PLN 32 billion) and created more than 76,000 new jobs in Silesia (KSSE 2018). The Katowice SEZ enabled investments from General Motors Manufacturing Poland, Fiat-GM Powertrain Polska, NGK Ceramics Polska, Delphi Polska Automotive Systems, among others.

Energy transition measures that enable citizens to contribute to the transition, although not aimed specifically at coal communities, are also assessed within the just transition framework. Two relevant measures were established in response to European regulations:

- 1) The introduction of feed-in-tariff which would give prosumers (incl. households, public institutions and enterprises) the opportunity to benefit from wind, solar and bioenergy technologies was well intended (RES Legal Europe 2018). But the implementation was delayed, changed and eventually withdrawn, leaving the prosumers in a limbo (Szulecki 2017).
- 2) The Clean Air Priority Program (2018) offers tax reliefs for energy efficiency measure of single-family houses and contributes to improved air quality by reducing the individual coal consumption. The success of this measure remains to be seen,

13 M.Wilczyński, *Zmierzch węgla kamiennego w Polsce*. Instytut na rzecz Ekorozwoju, Warszawa, 2013 (title in eng. *Twilight of hard coal in Poland*)



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although some preliminary assessments by the World Bank (2018a) point to issues of an under-resourcing of the program by €5.8 billion (PLN 25 billion) and consequently failing to deliver broad air quality improvements. In addition, if not connected with other technical and financial incentives it will be insufficient to meet the EU emission reduction goals (Zubel 2018). From an energy justice point of view, the program design targets house owners while apparently excluding low income renters and apartment dwellers, who are anyway most vulnerable and exposed to energy poverty.



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Table 17: Summary and assessment of national transition programs and measures in Poland

STAKEHOLDER	JUST OUTCOMES: DISTRIBUTIONAL DIMENSION			PROCEDURAL DIMENSION
	Decent work	Environment	Equity in cost & benefit sharing	Social Dialogue
MINING WORKERS	Measure: Mining Social Package Instruments (1990s/ 2000s)			
	<p>Early retirement – 75% of monthly salary within 5 years of retirement</p> <p>→ well received; helped achieve significant workforce reduction voluntarily</p> <p>“Golden handshake” – redundancy payment of 24 months average salary:</p> <p>↘ Individual difficulties to manage the lump sum – long term negative impacts on the workers’ economic situation</p> <p>Industry measures:</p> <p>↘ Relocation of existing workforce to other mine sites – lack of long term strategy</p>	<p>Workplace environment</p> <p>↘ No specific measures were found that considered workplace environment improvement</p>	<p>Retraining courses – Single retraining course</p> <p>↘ Lack of further active support leading to retreat from labour market</p> <p>Welfare allowance – 65% payment during period of training and job seeking for 2 years</p> <p>↘ Did not receive much reception – perceived too risky to find employment within 2 years considering the lack of experience in job seeking, lower education levels, and uncertainties in the local labour market</p>	<p>Trade union involvement –</p> <p>→ Representatives were involved in the preparation process and ensured consideration of workers view, legitimization of the package and smoothed the implementation process</p>
OTHER LOCAL WORKERS AND BROADER COMMUNITY	Measure: Mining Communities Program (1998)			
	<p>Colliery-community collaboration – LG entitled to create new non-coal enterprises with mining companies</p> <p>↘ LGs lacked experience to support local economic activities</p>	<p>↘ The package was insufficient in resources and scope to enable brownfield revitalisation leaving some towns and cities unattractive for investors</p>	<p>Acquisition of property – Mining companies urged to hand over unneeded real estate to mining communities/ LGs (e.g. hotels, sport facilities, residential buildings etc.)</p> <p>→ LGs acquired buildings/ land ↘ BUT only some used it for initiating economic activity</p> <p>Additional tax revenues – LGs received slight increase in %age of personal income tax</p>	<p>↘ The package was introduced quite late, so didn’t avoid the adverse effects on communities from job losses.</p> <p>No reference was found about broader community participation in preparation or implementation process of the measures</p>



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STAKEHOLDER	JUST OUTCOMES: DISTRIBUTIONAL DIMENSION			PROCEDURAL DIMENSION
	Decent work	Environment	Equity in cost & benefit sharing	Social Dialogue
			<p>⚠️ LGs lacked experience to support local economic activities</p> <p>Preferential loans – Local governments could apply for preferential loans</p> <p>⚠️ LGs lacked experience to support local economic activities</p> <p>Special Economic Zones (1994 and 2008) - tax incentives and allowances offered to international investors</p> <p>➔ considered to have resulted in total investment value of more than €20 billion and over 186,000 new jobs nationally; ⚠️ BUT lack of participation of local stakeholders, NGOs and local governments in setting up the SEZ regime</p>	
OTHER LOCAL WORKERS AND BROADER COMMUNITY	Measure: Clean Air Priority Program (2018)			
		<p>– tax relief for energy efficiency measure of single-family houses</p> <p>➔ Outcomes remain to be seen. ⚠️ BUT issues so far: sole focus on single-family houses with a minimum income excludes more vulnerable groups (e.g. renters/ apartment dwellers); costs of program underestimated; and it is insufficient to meet EU emission reduction goal</p>		<p>➔ ⚠️ Program was developed in consideration of NGO and LGs contribution</p>
OTHER LOCAL WORKERS AND BROADER COMMUNITY	Measure: Renewable Energy Act (2017/18)			
		<p>➔ expected to drive new development in the sector particular large scale solar ⚠️ BUT significant siting restrictions for wind deployment apply</p>	<p>Auctions and Feed in Tariff for small scale biogas and hydro power (2017)</p> <p>➔ New mechanism with net metering for prosumers/ households introduced ⚠️ BUT still face a number of barriers regarding</p>	



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STAKEHOLDER	JUST OUTCOMES: DISTRIBUTIONAL DIMENSION			PROCEDURAL DIMENSION
	Decent work	Environment	Equity in cost & benefit sharing	Social Dialogue
			economic viability, lack of stability and policy uncertainty	
	Measure: Clean energy technologies access for vulnerable or disadvantaged groups			
Vulnerable/ Disadvantaged Groups			→ Regional and local/ LG level initiatives (e.g. Krakow) that focus on vulnerable households, ↘ BUT no national programs	



4.2.6 Opportunities and initiatives for a just transition

As well as threats, energy sector transformation and the development of renewable energy sources offers opportunities for a just transition process both on local/ regional and national level. Renewable energy and energy efficiency deployment have great potential to constitute the future energy pathway of the country (Ecke et al. 2017).

Although only a diversified economy at local level can ensure employment opportunities for a broader segment of the community, the renewable energy sector has considerable employment potential. Renewable energy investments created direct and indirect employment for approximately 31,000 people in Poland in 2016 (Wehnert, Suerkemper, et al. 2017, p. 33). The total employment potential of the government's renewable energy package including offshore wind, bioenergy, and solar PV is estimated at 100,000 new jobs until 2021 (Wehnert et al 2017, p. 34).

In addition, energy efficiency measures are highly labour intensive while reducing fuel poverty, improving the air quality of urban areas and improving energy security. Ürge-Vorsatz et al. (2012) suggest that a deep renovation of Poland's residential and public buildings could reduce 84% of its energy use and corresponding CO₂ emission, which would make public financing in this area one of the most powerful measures. Its direct and indirect employment impact alone is expected to be larger than the job loss in the incumbent energy sector. A study by IBS (2017) found that a "comprehensive thermal modernisation of single-family houses in the Silesia and Małopolskie could create additional 32,000 jobs (annual full-time equivalents)" (IBS 2018).

The renewable sector also offers opportunities for mining communities to maintain jobs in their regions through for example the creation of Renewable Energy Hubs and new construction jobs for energy efficiency measures (Ürge-Vorsatz et al. 2012; Wehnert, Suerkemper, et al. 2017). The development of renewable energy projects at closed coal mining sites has become common practice in many European countries, with many examples of redevelopment for solar and wind energy generation, particularly in Germany (Alves Dias et al. 2018). In the Netherlands the potential of geothermal heating systems using coal mine water has been successfully tested with positive socio-economic impacts. Hydro power plants and pumped hydroelectric storage in former mines are seen as opportunities and have been successfully developed for example in Spain and Germany (ibid).

In addition, there appear to be great opportunities for citizen energy driven by prosumers and communities. In fact, citizen energy has actually accelerated the energy transition in some other European countries while increasing its local acceptance and providing socio-economic benefits (incl. jobs) to communities. According to an analysis of the Instytut Energetyki Odnawialnej (Institute for Renewable Energy) there are around 300,000 prosumers in Poland in 2015, with a potential to tenfold increase to 3.6 million until 2030 (Wiśniewski and Oniszk-Popławska 2015). Another study suggests that 46% of Polish homes are suitable for solar PV with a potential of 5 million prosumers contributing approximately 15 GW to the national energy supply (GfK 2017). These energy citizens could produce renewable electricity, adapt electricity demand to renewable energy production or store energy at times of oversupply (Kampman, Blommerde, and Afma 2016).

Hence promoting positive example of local initiatives and mobilising for household and community energy participation and ownership can accelerate the local transition and increase acceptance offering local benefits to the community. This also includes learning from community initiatives in other countries (e.g. Germany or Denmark etc.) and closely collaborating with the community energy networks (e.g. <https://www.communitypower.eu/>) to increase political pressure on national and EU level.



Economic development and diversification

Since the livelihood of hundreds of thousands of Poles, their families as well as their communities still depends on the incumbent industries, the development of alternative economic opportunities is an important step in the transition process. While the deployment of clean energy technologies offers significant employment prospects, these jobs can have geographical limitation or require certain skillsets and knowledge.

Box 2: Institutional support for citizen energy

Although there are still a number of barriers, some promising steps have been taken by national and local governments to facilitate prosumer and community energy initiatives.

In 2016 the amendments to the RES Act introduced a definition of 'energy cooperative' that refers to cooperative generation activities from RE installations up to 10MW (for electricity), up to 30MW (for heat) and biogas installations up to 40 million m³. The funding mechanism for prosumers is based on a net-metering system with no specific tariffs set. This means that for feeding back the surplus of non-consumed energy (e.g. when the prosumer is not able to consume the generated energy due to his absence), the prosumer will receive a rebate for the energy drawn from the grid from their retailer. Furthermore the RES Act allows for tax provisions which explicitly exempts prosumers from the payment of tax for solar panels. Advocating to strengthen opportunities for communities, and promoting these options could help to encourage a bottom up community energy movement.

Institutional support could also come through European funding which has a specific focus on low carbon economy development. Several regions support local government to access funding which enables collaboration with their local communities for renewable energy installations. For example in the Silesia Regional Operational Program (ERDF/ ESF – 2014-2020) has a total budget of 4 billion with the majority dedicated to low carbon economy measures. It planned 59MW of additional capacity of renewable energy production and measures to improve energy efficiency in individual (households) and public buildings (European Commission 2018c).



Box 4: Bottom up initiatives, local energy cooperative and housing community initiative

There are a number of great examples and pioneering communities in the country, whose experience should be distributed and replicated.

One of the first example of people power from Jaworzno in Silesia. The “Shrine of Our Lady of Perpetual Help” was the first church to install solar PV (72kW) on their roof in Poland to produce electricity for lighting and heating of the building. The installation was partially sponsored by the EU funds, and the local community through fund raising (Vlasakova 2014).

Another example is the initiative of a private energy company BioPower, in collaboration with another ESCO and four local municipalities in the Lubelskie voivodeship. In 2014, this initiative established the first modern energy cooperative Spółdzielnia Nasza Energia (Eng. Cooperative Our Energy) in Poland. They built 15 small energy and heat producing biogas installations (0.5-1 MW each), based on an innovative embedded network approach (Community Power 2018). This enabled and ensured cheap green electricity generation, local jobs, local economic development and energy security for the community.

A third example is the project initiated by a housing community in Szczecin (Voivodship West Pomeranian) which implemented a 24kW solar PV system in a multi-residential building to cover their shared electricity demand (lighting of staircases, outdoor area, underground parking, lifts, air conditioning and ventilation installations). In addition to lowering electricity bills, the project helps to increase energy literacy while the renters can monitor the energy production and consumption in an app (Krawczyk 2018).

Box 3: Role of Local Governments

As the government closest to the people, local governments play an important role to supporting and driving clean energy initiatives in and with their community. Driven by economic, social and environmental motivations, local governments in Poland have become quite involved in promoting energy efficiency and renewable energy actions. This is despite the challenges that many of those communities still heavily depend on coal based energy generation. Nevertheless, the opportunities that come with new technologies, have local governments pursuing clean energy projects both for their own needs and those of their community. Although Polish municipalities have limited resources and capacities, many have found ways to engage and drive energy transition measures.

In fact, local governments are increasingly taking an enabling approach to clean energy and playing a leadership role. Examples of local governments leading in the space include:

- City of Częstochowa in Silesia: Establishment of a City Engineer’s Office that implements energy efficiency measures since 2003, including the Programme of Energy and Environmental Management in the public buildings in Częstochowa.
- Jaworzno: The city has found an innovative solution to modernise its street lighting despite lacking the financial resources through the help of a local power distributor
- Jelenia Gora: the issue of air-pollution led the city to seek EU co-financing and establish the KAWKA program which included educational campaigns and low-emission source mitigation projects targeting individual households
- Niepołomice in cooperation with several neighbouring municipalities (Wieliczka, Skawina, Miechów) provided grant funding to install renewable energy systems in private and public buildings. The aim was to diversify local energy sources and to promote renewable sources, and improve the economic situation of citizens in non-urbanised areas.

Local governments have the opportunity to mediate between initiatives and deprived communities, raise awareness of funding opportunities and seek to localise the emerging benefits of the energy transition.



Consequently, a local and regional economic diversification is crucial to ensure workers and communities have a choice. In addition, a greater diversity can make sure that communities are more resilient and avoid the exposure to the volatility of a single industry.

The Silesian region has particularly demonstrated how to capitalise on economic opportunities (see also Section 2). Historically mining as well as iron and steel industries constituted the key economic sectors in the region. Today, Silesia is the largest automobile producer in Poland. Other industries including IT, business process outsourcing, logistics, manufacturing and food sectors have grown in importance (Urząd Marszałkowski Województwa Śląskiego 2018). The country's ambition to become an electric vehicle leader combining scientific research, entrepreneurship and state support further encourages innovation and development in the Silesian region (Ministerstwo Energii 2018a, 2018d; Polska Agencja Prasowa 2018). Car manufacturers such as Fiat Chrysler (FCA) consider producing zero-emission versions of their vehicles in the region (Chapman 2018; Deutsche Welle 2018).

In addition, Silesia is a leader in terms of overall employment in the RES industry with over 40% (Grzegorz Wiśniewski et al. 2016). The potential of the region is based on qualifications and traditional economic infrastructure. It is suggested that the potential for renewable energy equipment production would be able to compensate for the loss of jobs in the mining sector and traditional power engineering, unavoidable for economic reasons. The region has built strong and competitive foundations of the regional RES industry, especially in the production of solar collectors, photovoltaic systems and biomass boilers (ibid, p. 4).

An important instrument to support Poland's transition to a low carbon and diversified economy are the EU Structural and Investment Funds (ESI). The country is the single largest recipient of EU funding with more than EUR 86 billion allocated for the 2014-2020 period (European Commission 2018a).

An analysis found that a very large share of funds in Silesia are assigned to sustainable transport and road infrastructure development, and other general structural support for the region. Although those measure promote the regional economic development, "they do so on a very general level and irrespective of the future of coal" that means that there is a lack of specifically targeted funding for coal-phase out measures such as the promotion of renewable energy (Wehnert 2018, p. 20). Nonetheless, €236.666 are also dedicated to employment and labour market integration. The biggest share (33%) explicitly focusses on adaptation of workers, enterprises and entrepreneurs to change (Wehnert 2018).

Additional targeted support from the European Commission comes through the (permanent) Platform for Coal Regions in Transition. Silesia has been selected as one of the EU pilot regions to identify short- and medium-term solutions to help them transition to a more future-proof business model (see Box 5) (European Commission 2018b).



Box 5: Platform for Coal Regions in Transition

The Platform for Coal Regions in Transition has been launched by the European Commission in December 2017 and brings together different EU, national, regional and local stakeholders to support coal regions in the structural transition process towards a low carbon future. The aim of the initiative is to design transition strategies, build a pipeline of projects, provide technical assistance and prepare for implementation plans. The platform shall ensure additional and targeted support for transition of coal regions with a specific focus on long-term planning, social fairness, new skills and financing for the real economy (European Commission 2017, 2018b; Greenpeace Poland 2018).

Two working groups have been established and are concerned with economic diversification and strategies and projects in the area of clean air, eco-innovation and energy system transformation. Deliverables are planned in form of reports and toolkits. In addition, specific projects are identified and their implementation is facilitated with the support of existing EU programmes, funds and financial funds.

Currently, pilot projects are underway in three regions: Silesia (Poland), Western Macedonia (Greece), and Trencin (Slovakia).

The initiative provides opportunities to both learn from other countries and regions, and benefit from additional financial support for Silesian coal region.

Yet, it has to be ensured that the project selection process is done in a fair, transparent, inclusive and participatory way and holds true to the purpose of the initiative to support a transition to a clean and renewable energy system.

Cultural change and new identities

It can be noticed that there is great ambivalence in the opinions about the coal sector in the country particularly on local level (ISF Research 2018). While the public understanding of coal and the mining industry has long been an “emblem of technological progress, socioeconomic development and international prestige” and contributed significantly to national identity building (Kuchler and Bridge 2018) this perception is slowly changing.

Reportedly a qualitative study found that members of coal communities support the transition efforts and in fact favour a future for their children beyond coal (ISF Research 2018). This development is reinforced by the experience of the miners considering their jobs no longer as safe or prestigious (e.g. associated with high pay or other privileges) while the current sector transformation creates a lot of uncertainty (Energiewende Team 2017).

Symbolic for the cultural transformation and search for new identities is the story of Bytom. The City of 170,000 people is one of those hardest hit by the struggling mining sector with a comparatively high unemployment rate of 20% in the Silesian region in the mid-2010 years (Urząd Pracy 2018). Since 2015, the unemployment has dropped significantly (ibid), while the city is in the process to reinventing itself by focussing on alternative tourism and promoting local arts with a theatre and dancing academy and numerous galleries.

“While the end of the heavy industry and the introduction of the neoliberal economic model was a catastrophe, it was a great stimulus for the local arts scene – similar to Detroit and other post-industrial places” (Nehring 2015). The local gallery Kronika supports the efforts with educational programs for children and teenagers from Bytom and surrounding areas to learn about contemporary arts and modern design. Part of that is the “Silesian Design” which has re-emerged as a craftsmanship and poses another promising idea for both local economic development as well as identity formation for the region (ibid).

4.2.7 Analysis and Conclusion

It can be summarised that the country trialled a broad range of measures to support a just transition process, but it can be argued that the implementation lacks ambition, consistency and resourcing. From the successes and failures of the programs and measures, there are



several lessons learnt on how to improve the restructuring process (Baran et al. 2018; Szpor 2017; Szpor and Ziółkowska 2018; Witajewski-Baltvilks et al. 2018), those include:

- Continue to apply programs to support voluntary workforce reduction benefitting from demographic changes in the workforce while capping new recruitments, directing young people in other sectors and strengthen educational/ university programs (for coal mining jobs)
- Circumvent/ abolish “golden handshake” measures
- Include obligatory professional retraining in every instrument for labour market restructuring with longer-term support of capacity building for workers to address their educational levels, skill advantages and higher expectations in wages¹⁴
- Enforce and progress coal sector efficiency measures and decrease production costs to achieve emission reductions
- Evaluate the community economic development programs, identify good practice and suggest/ inform other regions about lessons learnt; in addition all future policy programs should be based on thorough scientific evaluations of restructuring programs
- Strengthen networking and collaboration opportunities of local communities, not-for profit organisations and local governments – both in the region and across regions
- Support economic diversification and build economic resilience both at local and regional level including alternative, labour-intensive industries (e.g. energy efficiency and renewable energy), investment in transport infrastructure to stimulate labour mobility and improve of educational opportunities
- Empower local governments and communities in decision making processes and strengthen local government political influence and resourcing e.g. to apply for EU funds (15% co-financing required)
- Maintain and further promote regional/ local economic particularities e.g. the automotive industry in the Silesian region
- Address the specific needs of deprived/ vulnerable communities which are disadvantaged in regard to infrastructure, educational or other industrial opportunities
- Intensify international collaboration with other coal transition regions

In addition, interview partners highlighted the need to plan and start early for the transition process not leaving local structural changes exposed to global forces.

Poland’s energy system is experiencing a transition since the early 1990s. While it is a slow transition in terms of technology and resource change, it has been socioeconomically disruptive for many communities. Their experience are valuable and important to consider in the continuing transformation of the Polish energy sector. However, the current political discourse in the country appears to ignore the international and national drivers such as the increasing carbon costs, the efficiency crisis of the sector and the adverse environmental and health impacts. All of those will likely accelerate an energy system change and contribute to further social disruptions and significant costs for the workers and communities. A particular driver is the persistent and health threatening air-pollution related to household burning of low quality coal in inefficient stoves and emissions of coal power plants. The growing local opposition that already leads to the implementation of higher environmental quality standards, also creates momentum to promote alternative clean energy solutions.

¹⁴ Workers would have to accept a significant pay cut. The difference in earnings between workers in the mining sector and other (educational) equivalent professions is almost 50%. For example a worker in mining earned PLN 7179.90 in 2016, while employees in the agriculture and manufacturing sector at similar education level received respectively PLN 4468.77 and PLN 3827.87 (Statistics Poland 2018f).



Hence it is paramount to start a broad social dialogue on local, regional and national level now. Learning from previous experience demonstrates that early planning is essential to avoid similar adverse impacts to local communities. Actions have to be taken now to ensure that the energy transition can be implemented fairly.

In addition, it can be noted that the national discourse, as in many other countries, is captured in energy justice trade-off. On the one side basic justice principles such as energy security, availability, jobs and affordability are highlighted by national policy makers and the industry, whereas, on the other side, health impacts, transparency and local, national and international environmental concerns are predominantly advocated by NGOs, communities and local stakeholders. These divisions are a major barrier for finding a joint strategy and plan for future interventions. Hence it is important to acknowledge potential trade-offs, while get involved in a dialogue beyond these divides and plan early for how to best manage the conflicting goals and interests in the transition process.

The table beneath is a high-level SWOT assessment of the capacity for just transition in Poland:

Strength	Weaknesses
<ul style="list-style-type: none"> • Experience from 30 years of transition process building up knowledge what could work and what doesn't • Poland has enough renewable energy resources to transition to a clean technology system • Growing bottom up movement and community opposition to new coal power plants and air pollution • Local government demonstrating leadership and taking action for renewable energy and efficiency measures • Inspiring community energy stories from across the country 	<ul style="list-style-type: none"> • High dependency on coal for electricity production • Stakeholders driving change have little political power • Climate change is low on the public agenda • Lack of political ambition to take action • Position of trade unions and their political influence could impede a broader social dialogue
Opportunities	Threats
<ul style="list-style-type: none"> • Renewable energy and energy efficiency provide great job potential and economic development for coal regions • Energy efficiency upgrades of buildings could become a major growth sector for local economies • Air pollution issue is a major public concern that should be combined with promoting clean alternatives • Further strengthen the role of local government and their capacities to support the transition process • Ongoing cultural change and new identity formation building on diverse artistic and touristic activities 	<ul style="list-style-type: none"> • Rapid and uncontrolled transition due to external factors such as significant increase of CO2 emission allowances • Government and trade unions blockade the social dialogue and cement the national coal-focussed path way • Lack of collaboration with civil society and particular local stakeholders (e.g. local governments) and lack of transparency of national policy interventions put community at risk • Uncontrolled transition process could intensify social exclusion and energy poverty • Lower education level of mining workers provides challenges to transition to other sectors easily

There are some lessons learnt from the Polish experience:

- Inefficiencies and lack of profitability drives the coal sector transformation and could accelerate the transition unexpectedly
- Higher electricity prices can deteriorate the public legitimacy and increasing energy poverty is a major concern that should not be neglected



- Environmental concerns beyond the climate debate can motivate change
- Strongly divergent positions impede the willingness for social dialogue and early planning of transition process
- Lack of political leadership exposes communities and workers at risk to re-experience disruptive impact of energy transition

General recommendations:

- Detailed evaluation of all transition programs since 1990
- Increase expertise and knowledge about the opportunities of structural transition in government
- Find allies in other sectors e.g. Farmers Association and collaboratively campaign for change
- Set up national and regional authorities to coordinate and manage the transition process
- Set up a package with (identified) just transition measures and earmark a share of EU funds for their promotion
- Broad social dialogue including unions, environmental and social (health) NGOs and all levels of government
- Strengthen the work of decentralised/ local governments and encourage the collaboration with national and regional governments to collaboratively lead, coordinate and fund planning and implementation working together with employers, unions and communities including NGOs.



4.3 South Africa – Mpumalanga

Summary of key findings

South Africa faces an especially complex energy transition. As one of the leading global exporters of coal, the country is confronted with the transformation of a coal-intensive economy in the context of high unemployment, poverty, class and racial inequality, and where 8 million people still do not have access to electricity (IEA 2017). The concept of just transition is embedded in climate policy and with major stakeholders such as Congress of South African Trade Unions (COSATU).

International experiences of coal transitions highlight that typically labour and economic adjustment measures don't start until closures are imminent and regional economies are unable to cope. As many as one-in-three workers do not find another job, there is wider economic decline in regions built around coal and inter-generational poverty (Sheldon, Junankar, et al. 2018).

South Africa is currently on course for this type of scenario. The forecast of the draft 2018 Integrated Resource Plan (IRP) (which determines utility investment) is that 12.8 gigawatt of coal capacity will close by 2030, but the national utility (Eskom) is not planning for coal closures. In fact, Eskom is in financial crisis (Steyn, Burton, and Steenkamp 2017) and still building additional coal plants amidst surplus generation (Eskom 2018). The draft IRP scenario may be conservative in terms of coal closures, as it is based on maintaining a cap on new renewable energy investment - notwithstanding its own modelling that removing limits on renewable energy is the least-cost option. Whereas utilities and asset owners in many nations have developed renewable energy portfolios alongside existing fossil fuel plants, South Africa's model has created a political fault-line between coal-based Eskom and the private sector, mostly foreign-owned renewable energy industry.

Alongside the challenges, there are also some notable strengths to build on. Firstly, the integrated utility and national planning mechanisms create a foundation for an organised response. Secondly, South Africa has already pioneered an innovative model of renewable energy auctions with criteria for local jobs, black enterprises and socio-economic programs. Lastly, the emergence of renewable energy as the least-cost generation source is building support across the business sector, civil society and the public.

The National Planning Commission's 'Social Dialogue on Just Transition' process comes at a pivotal moment for energy transition in South Africa: the objective of this process is to create a social compact for just transition between government, labour, civil society and business (FSE 2018) – which is essential to resolve the social conflict that is currently preventing investment and planning to support workers and communities for energy transition. High-level political agreement and multi-stakeholder governance at national and regional level have been essential features of successful transitions elsewhere.

With just transition concepts embedded in national and regional policy frameworks, a beginning has been made, but there is still a long way to go to ensure the energy transition in South Africa. There are a range of initiatives from around the world that provide models which South Africa can draw on to plan its own just transition. Lessons from these experiences should be kept in mind while charting a course for South Africa (see conclusion for recommendations).

1. Building a Social Compact for Just Transition:

- The 'Social Dialogue on Just Transition' is a major opportunity to establish a political framework and governance system for just transition in South Africa.
- Developing a new business model for Eskom: An independent review to assess international developments and a model for Eskom aligned with a clean energy transition is essential for building a lasting social compact. Structural separation of functions,



ownership models for renewable energy plants and developing new energy services (e.g. energy efficiency) are areas which should be considered.

2. Planning for Closures

- Tripartite framework agreements: Company and industry-level agreements with unions (and often involving government) to manage coal closures over time are emerging in different countries. As a currently integrated utility, Eskom is well-placed to develop a framework agreement for coal closure with unions to manage impacts, including worker redeployment, retraining and no forced redundancies.
- Site remediation and de-commissioning: South Africa has a legal requirement for mining site remediation bonds but there are demonstrated cases of non-compliance. Independent audits should confirm Eskom is also allocating funds for de-commissioning. Remediation is important for environment quality but also an important source of jobs at the point of closure and site regeneration for alternative uses (e.g. tourism).

3. Economic diversification, job creation and community benefits

- Building on the Renewable Energy Auctions : The model has delivered large-scale renewable energy investment and community benefits – but could be enhanced:
 - Job quality: including ILO decent work criteria (e.g. freedom of association) in bid criteria
 - Manufacturing jobs: a steady, long-term build-out of renewable energy and manufacturing bid criteria to increase local jobs
 - Best-practice community benefit sharing: stronger alignment of benefit funds with local government and community interests.
- Mpumalanga specific interventions: most of the large-scale renewable energy will be located in other regions of South Africa so other interventions will be required for economic development and job creation.
 - Distributed energy program: a distributed energy program (solar PV, energy efficiency, micro and off-grid systems) focussed on Mpumalanga could create new energy jobs, improve local living standards, build support for clean energy and grow community owned renewable energy.
 - Green Economy Strategy. The key features of successful economic diversification strategies include developing clusters with inter-linkages among related industries, ‘smart specialisation’ by extending the capabilities of existing industries and workers and investing in labour-intensive projects (e.g. site remediation and plant decommissioning). Funding and implementation of Mpumalanga’s green economy strategy would be a good start

4. Funding a Just Transition: a Least-Cost IRP and Just Transition Authority

- A Just Transition authority could be established in South Africa through national legislation to coordinate investment, plans and engagement. Funds could be sourced from:
 - A least-cost IRP which removed the ceiling on renewable energy and halting the construction of coal plants would release substantial revenue for just transition measures (including early retirements, remediation, re-skilling). This could form the basis of agreement with trade unions as it has in other nations (e.g. Spain).
 - The implementation of a carbon tax, which ring-fencing money for the just transition.
 - International Climate Fund and other developmental aid - eligibility criteria should be expanded from technology transfer to include just transition programs in coal-dependent regions given their strategic importance.

4.3.1 Introduction

South Africa is an emerging economy. The diverse structure of the South African economy is a critical aspect of its historical and current growth performance. Key economic sectors range from mining and energy to manufacturing, tourism and agriculture. The global economic crisis led to considerable deceleration. Structural change has led to the relative importance of the manufacturing sector declining slowly and growth taking place in the services sector. Manufacturing declined from 19 per cent in 1993 to 17 per cent in 2012, while the services sector – finance, real estate and business – increased from 17 per cent to 24 per cent in the same period (Statistics South Africa 2012).

However, South Africa's economy is rebounding led by manufacturing, finance, transport and trade industries, while negative contributions to GDP growth came from the mining, electricity and construction industries (Statistics South Africa 2018a). This was largely the result of low production in mining of 'other' metal ores including platinum, iron ore, gold, copper and nickel.

Coal is South Africa's dominant energy source, one of the largest contributors to the overall mining value and an important employer. However there seems to be a softening of coal's power with the introduction of solar and wind energy. This movement will be more pronounced as the health, economic and environmental benefits of renewables are mainstreamed. Any transition from the coal economy necessitates looking at the impact on jobs and employment. Recognising this, South Africa has included Just Transition in its Nationally Determined Contribution (NDCs). While primarily being led by trade unions, the Just Transitions discourse is now occupying national attention.

This case study assesses the prospects for a just transition in South Africa. The first section sets the context for energy transition in South Africa by examining the position of coal mining and power generation in the economy and power system of South Africa and Mpumalanga. The second section details the just transition initiatives implemented to date in South Africa, notably the local economic and social investment provisions in the large-scale renewable energy auctions. The third section analyses the challenges and opportunities for a just transition in South Africa, highlighting some of the initiatives being implemented internationally that could be adapted to South Africa. The final concluding section contains recommendations for a just transition in South Africa.

4.3.2 Mpumalanga Mining Region: Socioeconomic Profile

Mpumalanga is a small South African province, occupying 6.5% of South Africa's land area. It is rich in coal reserves with more than 80 per cent of South Africa's coal is sourced in Mpumalanga. Other minerals found in the province include gold, platinum group minerals, chromite, zinc, cobalt, copper, iron and manganese. The country's major power stations, three of which are the biggest in the southern hemisphere, are situated in this province. This case study focuses on this region to explore the prospects for a Just Transition from the coal sector.

Mpumalanga accounted for just under 8 per cent of South Africa's population and GDP in 2016. Agriculture, mining, manufacturing and construction made up 45 per cent of Mpumalanga's output. Mpumalanga contributed around one-fifth of national mining output and just under 10 per cent of national manufacturing and agriculture value.



Table 18: Country and Regional Profile

	Country	Mpumalanga
Population (2016) (millions)	55.7	4.3
Geographic size (thousand square km)	1,220.8	76.5
Administrative divisions	9 provinces; Constitutional multiparty, three spheres - local, provincial and national government.	21 municipalities, no metro areas.
Key economic sectors	Mining services and transport, energy, manufacturing, tourism, and agriculture	Tourism, Large-scale manufacturing particularly chrome-alloy and steel manufacturing
GDP(2016) (million Rand)	4,350,314	323,722 (2016) Contribution to SA GDP: 7.4%
GDP growth (2016)	0.6%	0.2%;
Unemployment Rate (Q3 2018)	Standard: 27.5% Expanded: 37.3%	Standard: 32.5% Expanded: 42.3%

Sources: (Statistics South Africa 2016b, 2018b)

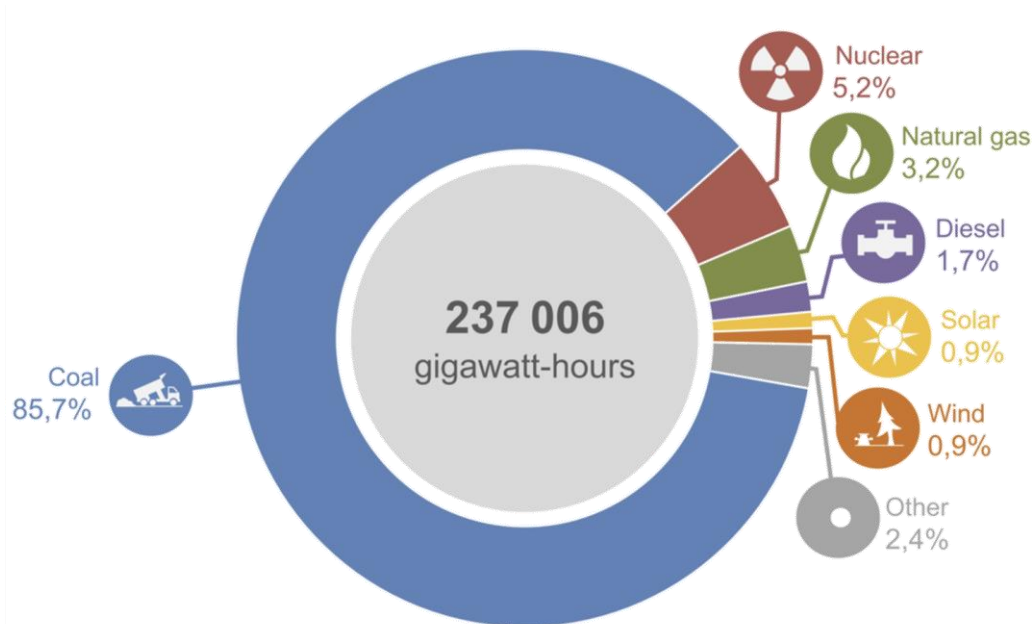
Mining accounts for over one-fifth of Mpumalanga's economy. Mpumalanga also has extensive heavy industry, which forms part of the long-standing Highveld complex, and a strong commercial agricultural sector. As a result, it benefited from the commodity boom that lasted from 2003 and 2011 but has experienced much slower growth since it ended; mining production grew at 10 per cent per annum but then declined at 2.5 per cent per annum. Unemployment in Mpumalanga is higher than the national average – around 1/3rd active labour market participants are unemployed under the standard rate and over 40 per cent under the expanded unemployment definition (which includes discouraged unemployed who are not 'actively seeking' work) (Statistics South Africa 2018b). Youth unemployment in Mpumalanga is 55 per cent (Youth Explorer 2016).

4.3.3 Energy Transition in South Africa

South Africa has a very high reliance on coal-fired power and is one of the leading global exporters of coal. In 2016, South Africa produced 253 mega-tonnes of coal and exported 76 mega-tonnes of coal to a range of Asian and Middle-Eastern nations; over half of exported coal went to India (Burton, Caetano, and McCall 2018). Coal accounts for around three-quarters of primary energy, including 25-30 per cent of liquid fuel supply and industrial and household uses and over 85 per cent of domestic electricity production (see Figure 12) (Burton et al. 2018).



Figure 12: Total electricity generated by source in South Africa, 2016.



Source: (Statistics South Africa 2016a)

At the centre of South Africa’s electricity system is currently a single, vertically-integrated utility (Eskom) with responsibility for generation, transmission and distribution networks and retailing.¹⁵ Eskom is a state-owned company. A national electricity plan, the Integrated Resource Plan (IRP), sets investment parameters for Eskom and retail electricity tariffs are set by an independent regulator (the National Energy Regulator of South Africa). Eskom operates 30 power plants totalling 45.6 GW of capacity (37.8 GW of coal) and employs 48,600 persons (Eskom 2018). Around 34 GW of coal-fired power plant capacity is in Mpumalanga.

South Africa’s coal-based energy system is under enormous pressure due to a confluence of factors:

- the fuel costs for coal-fired power have risen significantly (300 per cent over two decades), there are major cost over-runs on new coal plants Medupi and Kusile and the fleet is becoming more expensive to operate and maintain as it ages;
- Rising electricity prices have led to a slowing in demand (- 0.6% per annum in recent years) and over-supply of generation. Steyn noted that excess capacity is estimated currently at 5 GW and could rise to 8 GW by 2022 under a low-demand scenario (Steyn et al. 2017);
- There has been frequent load-shedding with major impacts on households and industry;
- Large-scale renewable energy is cheaper than the average cost of supply for operating and new coal plants. The Integrated Resource Plan modelling concluded that removing the existing limit on new renewable energy capacity was the ‘least-cost’ option. Other analyses of the Renewable Energy Independent Power Producer Procurement Programme (REIPPP) reached the same conclusion based on bid

¹⁵ Some retailing is wheeled to municipalities but they are highly dependent on Eskom.



prices (Burton et al. 2018; Eberhard and Naude 2017). The REIPPP has contracted just under 6500 MW of renewable energy at some of the lowest prices in the world¹⁶;

- Under the National Environmental Management: Air Quality Act, Eskom's coal plants require 'extensive' abatement measures (Government of South Africa 2018a). Eskom has implemented some projects in partial response to the legislative requirements but is seeking widespread exemptions as it claims the costs of remediation are unaffordable. Mpumalanga is one of the global 'hotspots' for nitrogen dioxide due primarily to emissions from the coal plants.

Eskom has a 'liquidity crisis' (Steyn et al. 2017) and a corruption crisis which has led to removal of senior executives, a new board and investigations into over 150 corruption claims. An internal review of Eskom is currently underway (Eskom 2018).

Eskom's operating model is intertwined with coal-fired power and the utility is committed to further expansion of coal-fired power. Two large coal-fired power stations (Kusile & Medupi) totalling 9.6 GW of additional capacity are currently being built and a procurement process for an additional 2.5 GW of capacity is underway. Building additional coal plant in the context of Eskom's financial crisis, cost over-runs and surplus generation has led some analysts to raise the prospect of insolvency

Essentially, the unavoidable conclusion is that Eskom is still spending vast amounts of capital on a power station construction programme that South Africa does not need and cannot afford ... South Africa might well face a stark choice: Abandon a large part of the Kusile (and possibly part of the Medupi) project, or allow Eskom and possibly the state to default on its financial obligations and pay an enormous economic and social price (Steyn et al. 2017).

The risks of the coal expansion program and stranded assets are underlined by the projections of the 2018 Integrated Resource Plan update: 12.6 GW of coal plant will be de-commissioned by 2030 and 34.4 GW by 2050¹⁷. South Africa's national climate policy is not yet a significant driver of energy transition. As the nationally determined contribution for the Paris agreement is based on a 'peak, plateau and decline' approach; greenhouse emissions will peak 2020-25, plateau for a decade and then fall thereafter. However, there is a carbon budget within the draft IRP for the electricity sector which would be a constraint within the lifetime of many coal assets if it were implemented (Government of South Africa 2018a).

Furthermore, Greenpeace Africa's assessment of the latest IPCC report is that at least half of the coal plants would need to be de-commissioned by 2030 to be consistent with the emissions reductions for a 1.5 degree warming scenario (Meth 2018).

There is a strong divide between Eskom's coal-based model and the renewable energy sector which has been a major influence on the politics of energy transition in South Africa. Independent power producers, mostly foreign multi-nationals, have been awarded contracts for renewable energy projects under the REIPPP. Eskom has attributed the announcement of closing five aging coal plants to the REIPPP and refused until recently to sign power purchase agreements with the selected bidders by the Department of Energy (Burton et al. 2018). Eskom has a 95% unionisation rate. South African unions were early advocates for a just transition but potential job losses from coal plant closures has led to conflict with Eskom and a legal challenge to the REIPPP contracts from mining unions: the unions position is they are not opposed to renewable energy but only support publicly-owned renewable

¹⁶ While not all have been built, Eskom has recently committed to building the remaining capacity and this is contained in the draft 2018 IRP.

¹⁷ The projection of the IRP for 2030 is based on plants reaching the technical end of their lifetime and plants that will be unable to meet the air quality legislative requirements. The 2050 projection is based on modelling on the least-cost power system to meet South Africa's 2050 energy and climate targets.



energy (COSATU 2018). Declining unionisation in blue-collar heartlands also increases pressure to resist change in an area with such high membership.

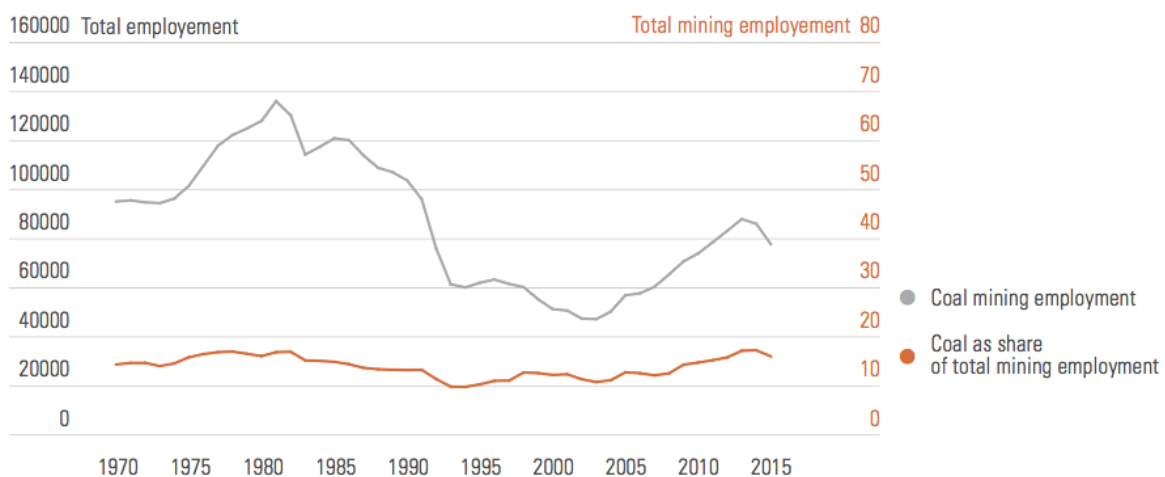
The draft 2018 IRP, which aims to align electricity sector investment and planning with climate policy, reflects the political tensions around South Africa’s energy transition. The plan contains a target for a long-term shift away from coal to 20 per cent of electricity generation by 2050 but includes provision for the expansion of coal generation (noting this will soften job losses) and gas generation up to 2030. The draft 2018 IRP update contains provision for the existing contracted renewable energy plants but an annual build limit on new renewable energy to 2030 - despite acknowledging removing the cap would be the ‘least cost’ model. 200 MW of embedded generation is scheduled to be built annually.

Mpumalanga

South Africa’s coal sector is concentrated in Mpumalanga, which accounts for over 80 per cent of coal mining production volume and about 90 percent of the country’s coal-fired power plants. On top of Eskom’s workforce which is just under 50,000, there are around 80,000 employees in coal mining (see Figure 13). Whereas there is single employer in power generation, coal mining includes the ‘majors’ and ‘junior’ miners. Industry fragmentation and a higher proportion of semi-skilled and low-skilled workers present major challenges for an organised response to transition.

Mining represents just under 7% of employment in Mpumalanga but its significance is much larger; it is estimated each coal worker supports on average three dependents, there is high unemployment (32-42%) in the region and almost one-in-two households live in poverty. Coal mining employment fell by over half from 1980 to the early 2000s, grew strongly until recent years when employment has started falling again:

Figure 13: Employment in the coal sector in South Africa 1970-2015



Source: (Burton et al. 2018)

Coal employment is projected to continue falling due to non-climate policy related factors such as mechanisation (Burton et al. 2018). In other words, energy transition has already begun and will continue irrespective of climate policy measures.

4.3.4 Just transition measures and initiatives in South Africa

South Africa was one of the leading advocates for the inclusion of just transition principles within the Paris Agreement. Across major stakeholders, there is a general understanding and support for just transition principles - which can be found in national policy documents, the draft IRP, the peak union body COSATU (2012) and the environmental movement

(Scholtz 2011). However, there have been few just transition initiatives to date. The draft 2018 IRP does not mandate just transition planning, but does recommend detailed socio-economic analysis of the impacts of coal plant decommissioning to ensure ‘communities that were built on the back of the coal-to-power sector are not left behind in the transition’ (Government of South Africa 2018a).

The renewable energy auctions are the leading just transition initiative, including world-leading non-price criteria to promote local jobs and economic development, socio-economic investment and black enterprise development. Bids need to meet a range of minimum eligibility criteria (notably a minimum of 40 per cent South African participation) and 30 per cent of evaluation scores for the merit criteria are based on economic development criteria.

Table 19: Elements of the Economic Development Criteria

Element (Weighting)	Description	Threshold	Target
JOB CREATION (25%)	RSA Based employees who are citizens	50%	80%
	RSA Based employees who are Black people	30%	50%
	Skilled employees who are Black people	18%	30%
	RSA based employees who are citizens and from local communities	12%	20%
	RSA based citizens employees per MW of Contracted capacity	N/A	N/A
LOCAL CONTENT (25%)	Value of local content spending	40% – 45%*	65%
OWNERSHIP (15%)	Shareholding by Black People in the Seller	12%	30%
	Shareholding by Local Communities in the Seller	2.5%	5%
	Shareholding by Black people in the Construction Contractor	8%	20%
	Shareholding by Black people in the Operations Contractor	8%	20%
MANAGEMENT CONTROL (5%)	Black people in Top Management	-	40%
PREFERENTIAL PROCUREMENT (10%)	BBBEE Procurement**	-	60%
	QSE & SME Procurement**	-	10%
	Women Owned Vendor Procurement**	-	5%
ENTERPRISE DEVELOPMENT (5%)	Enterprise Development Contributions***	-	0.6%
	Adjusted Enterprise Development Contributions***	-	0.6%
SOCIO ECONOMIC DEVELOPMENT (15%)	Socio-Economic Development Contributions***	1%	1.5%
	Adjusted Socio-Economic Development Contributions***	1%	1.5%

Source: Department of Energy, South Africa

The aggregate results are impressive:

- Across the four bid windows, the percentage of local content has grown significantly from around 45 per cent to 65 per cent. Based on bid documentation, employment equivalent to just under 110,000 job-years has been generated with almost 80 per cent going to black citizens and just over half in local communities;
- Around \$6 billion rand of investment has occurred in black enterprise projects and \$19 billion rand of investment in socio-economic developments in surrounding communities;
- Local community ownership of around 10 per cent has occurred for large-scale wind and 15 per cent for solar PV projects (Eberhard and Naude 2017).

However, the renewable energy auctions have also come in for criticism:

- **There are disputes over the level and quality of jobs:** there are a variety of studies using different metrics making different claims (Steyn et al. 2017) – but one of the general features of large-scale renewable energy is most of the jobs are created during construction phase with low levels of on-going operational employment. There are also claims of sub-standard pay and conditions;
- **The effectiveness of implementation of economic development investment has been challenged:** based on focus groups and interviews with local representatives, McDaid (2016) find socio-economic expenditure is often not going into local priorities, there is little transparency over how the investment is allocated and little or no role for municipal government.



- **The jobs and economic benefits do not occur in Mpumalanga:** other regions have higher-quality wind and solar resources. To date, almost none of the projects and associated investment of the REIPPP has occurred in Mpumalanga. Note that this does not mean the policies are ineffective – in a country with such high unemployment local job creation requirements are an important way of ensuring benefits are shared. However, it does mean that the policies on auctions will not by themselves deliver a just transition for coal sector employees and regions without government intervention to create bidding windows focused specifically on Mpumalanga.

Beyond the renewable energy auctions, there have been few concrete initiatives. There is no evidence of planning for transition by Eskom – in its 2018 annual report de-commissioning is described as a ‘medium to long-term priority’.

While South African climate policy has the notion of a just transition embedded within it (RSA 2016), no detailed sector specific plans for coal companies, workers, or communities exist. Eskom’s failure to engage with relevant stakeholders, set aside budget for planning and decommissioning, and their unilateral announcement of closures has created mistrust and no doubt fear amongst coal plant, trucking, and mine workers. Thus, even though unions were historically a driving progressive force around climate change and justice—they have called for a just transition towards a low-carbon economy for many years, and have noted the risks of climate change since at least 2009 (COSATU 2011) — they are now opposing the closures of stations and the roll out of renewable energy (Burton et al. 2018).

There are some other initiatives which contribute to the wider just transition outcomes:

- **Air quality standards:** the Air Quality Act (2004) requires a number of Eskom plants to retrofit abatement technology which will improve the local environment (Republic of South Africa 2005);¹⁸
- **Electrification programs:** electrification programs have extended access to electricity from only 1/3 households to 88 per cent (Government of South Africa 2018b), helping to ensure energy access. However, there is still a considerable task to ensure universal access.
- **Green economy strategy development:** Mpumalanga has developed a green economy strategy in the areas of low-carbon economy (primarily distributed energy), natural resource management and greener towns and cities (DNA Economics 2016). Implementation has been limited to date (primarily energy efficiency in public buildings).
- **National Development Plan:** South Africa is committed to including a high-level section with a commitment to a just transition in the National Development Plan – 2030. The National Planning Commission ‘Social Dialogue on Just Transition’ was launched in May 2018 to develop pathways for South Africa to 2050. The second phase has now begun with a year-long consultation with key stakeholders to develop a consensus which will culminate in a summit in April 2019. The aim is to create a national ‘social compact’ with agreement on actions towards a just transition and will feed into the National Development Plan (OneWorld 2016).

¹⁸ Currently most of Eskom’s coal-fired power plants are not complying to the countries air pollution standards. The Government will decide in 2019, if from 2020 coal-fired power stations needs to comply with existing legislation. This decision could lead to further decommissioning.

4.3.5 Prospects for a just transition in South Africa: Lessons and Opportunities

The low-cost results from the renewable energy auctions combined with the rising prices of coal-fired grid electricity is shifting the positions of a cross-section of stakeholders. There are two key points to note from the stakeholder responses (detailed views in Annex):

- There is widespread support for renewable energy on the basis that is the least-cost source of new generation;
- The major socio-political barrier to transition is job protection, which underlines the importance of measures to create jobs and support workers.

Social Dialogue on Just Transition

The ‘Social Dialogue on Just Transition’ is a major challenge in the current context but also an opportunity. South Africa, like other nations such as Canada (Government of Canada 2018b) and Scotland (Scottish Government 2018a), has established a taskforce or community consultation process to establish a just transition plan which is an essential first step. One of the strongest lessons from past experience is that early planning is vital – if transition planning is delayed and restructuring commences once crisis and mass redundancies are on the horizon workers will bear most of the costs. Governance arrangements should be established at a national and regional level as it is a long-term process which requires an adaptive, participatory governance model and negotiated trade-offs between stakeholders (see section 2.4).

South Africa’s currently integrated utility model does open up scope for planning that is more challenging for nations with deregulated and privatised models (where there are ‘barriers to exit’ because plant closures increase market prices and the viability of other generations creating an incentive to stay open). However, it must be noted that Eskom’s structure is currently under debate, and the utility may not retain its current form in the future, due to its overwhelmingly high levels of debt. There will need to be trade-offs between parties on the pace and scale of transition to establish a framework agreement. There is an inherent tension between the objectives of the environmental movement to expedite a transition as quickly as possible, the capacity of local economies and labour markets to adapt and achieving a broad-based framework agreement. But the draft IRP also provides a ready-made foundation for transition planning: under the current draft that means planning for the closure of 12.8 GW of coal plant by 2030.

A new business model for Eskom

The major fault-line that stands between a social compact for a just transition reflects a division between the national utility Eskom (which is government owned) and its unions and the mostly foreign-owned private sector renewable energy industry. The structure of renewable energy support policies appear to have institutionalised this split. Unions that embraced just transition are now feeling pushed to protect the jobs of members in a context where the alternatives are unclear and uncertain.

Utilities around the world are grappling with how they modernise their business model in the clean energy era. The rise of disruptive clean energy technologies, the prospect of grid defection and the ‘death spiral’ (fewer consumers paying higher prices for fixed capital costs that creates an on-going cycle of rising prices and falling demand) and integration of renewable energy technologies are some of the key drivers. Structural separation of business functions, ownership models for renewable energy and alternative revenue sources from energy services are some of the issues that need consideration. Eskom previously delivered energy efficiency roll-outs which is an example of an energy service compatible with the clean energy transition. It is beyond the scope of this paper but an independent review to assess international developments and a model for Eskom aligned with a clean energy transition is an essential component for building a lasting social compact. Without an alternative business model, Eskom is likely to continue to resist energy transition.



Planning for Closure

There is no question there are going to be coal closures – the only question is the pace and the timing. It is striking in this context that Eskom has not allocated funding for de-commissioning or begun workforce planning – in its 2018 annual report it is described as a ‘medium to long-term priority’:

Eskom faces plants closing and a financial crisis that already means that retrenchments are likely to happen in the coming years, but it has no plans for decommissioning plants or for retraining, reskilling, and supporting workers to migrate to other stations or into new industries. Even without any climate policy impacts, the closures of power plants are inevitable (Burton et al. 2018).

Eskom’s approach is consistent with past experience which highlights that effective workforce planning and transition should not be left to companies. Without an effective policy framework or regulation, most companies have under-invested in workforce support and planning and implement measures only once retrenchments are imminent. At this point local labour markets cannot cope with the volume of displaced workers.

There are a range of models emerging in other nations at a company level and an industry level to prepare the workforce for closure. A company-level just transition framework between Eskom and its unions is possible, particularly because it is an integrated utility, and a monopoly provider in many cases. However, industry-level approaches across the entire coal sector are likely to be more effective and will need to be used to manage labour displacement from both coal mining and coal power stations.

Industry-level approaches used successfully in other countries include:

- Early retirements (with incentives from government) to assist in creating vacancies and manage down labour supply without undue burdens on workers;
- Industry-wide redeployment agreements between power stations, and with other sectors to create new job opportunities;
- re-training to develop new skills (e.g. a solar installation re-training program).
- Income support for workers that do lose their jobs, to help them and their families cope and re-enter the workforce;
- Relocation and travel assistance where this is a preferred choice: this is not suitable for all workers, but can also support redeployment of workers.

In addition to the workforce planning, it is important that site remediation takes place – both to restore local environment quality and to create semi and low-skilled jobs at the most critical time of the transition. Projects can last up to a decade and provide an important source of employment (Sheldon, Junan, and De Rosa Pontello 2018).

Mine rehabilitation bonds are mandated for coal mining in South Africa. Ideally, Eskom would agree to a coordinated approach linked to the IRP as part of a national just transition plan but if not the use of de-commissioning bonds should be considered for Eskom.

Building on the Renewable Energy Auctions: Decent Work and Community Benefit-Sharing

Some unions are advocating for the abandonment of the renewable energy auctions in favour of full public ownership. From an international perspective, the inclusion of social and local economic criteria in the renewable energy auctions provides a foundation that it would be unwise to abandon. The social outcomes could however be improved from the renewable energy auctions through three key measures:

Inclusion of decent work criteria in the renewable energy auctions to improve the quality of jobs



There have been reports that the jobs in renewable energy projects pay sub-standard rates and conditions, and union presence is low.

The bid process could be used to promote better outcomes by including ILO Decent Work principles in bid criteria:

- full and productive employment (e.g. stable job opportunities);
- rights at work (e.g. safe working environment);
- social protection (e.g. employment conditions); and
- the promotion of social dialogue (e.g. collective representation)

An example of use of decent work criteria is the *Green Jobs Act of 2016* in the Philippines which included decent work in definitions of 'green jobs' linked to incentives and funds.

Manufacturing job creation

Wind and solar PV projects create substantial construction jobs for around 12-18 months and a small number of on-going operational jobs. Of course, if there is an ongoing build-out of renewable energy, some of those jobs can become semi-permanent and there are opportunities for workers to move from project to project as in other construction sectors, , but this will require more consistent rollout of renewable energy than is currently taking place.

Development of manufacturing jobs is important for developing better-paying, stable, on-going jobs from renewable energy projects. Some manufacturing jobs were created as part of the REIPPP (Eberhard and Naude 2017) but the stop-start character of the renewable energy auctions has undermined the development of a local manufacturing sector – stronger policy certainty and demand is needed (Murray 2017). A steady build-out of renewable energy capacity, a long-term commitment and strengthening of manufacturing criteria in auction bids could re-start a local manufacturing sector by establishing a pipeline of projects.

Embed links to local government programs and community governance for socio-economic expenditure

The outcomes of the renewable energy auctions could also be improved by embedding best practice community engagement and benefit sharing in the bid requirements. For many communities, the benefit-sharing funds are the major lasting impact as the jobs and economic flow-on effects beyond the construction phase are low. McDaid (2016) found low levels of transparency on the socio-economic expenditure and connection with local governance and priorities. Best-practice community benefit sharing involves:

- transparent fund governance with local representation and co-development of fund principles, projects and management to ensure process is seen as fair;
- benefit-sharing that is place-appropriate i.e. tailored to local circumstances and needs and complements other local programs to maximise effectiveness;
- a mix of programs that delivers benefits to a cross-section of stakeholders from neighbours to the project through to infrastructure that benefits the wider community (Hicks et al. 2018).

Best practice community benefit scheme principles should be embedded into renewable energy bid criteria requirements.

Distributed energy roll-out in Mpumalanga: new energy jobs and access to energy

Enhancing the economic and social benefits of new renewable energy projects is an important element of a just transition, but most of the large-scale renewable energy projects will not be in coal-dependent regions without government intervention. However, distributed energy jobs could play a significant role in Mpumalanga if the embedded generation



investment in the 2018 IRP (200 MW p.a.) was accelerated and directed to the region. There are also examples of energy efficiency retrofit programs from other nations that can equally provide local jobs and distribute the benefits of clean energy technologies to local businesses and communities.

Distributed energy can play a range of important roles in a just transition:

- New energy jobs with the prospect of transfer for some occupations as coal-sector employment declines;
- Increased legitimacy: a visible demonstration of energy transition;
- Improved energy access: off-grid and micro-grid projects could increase access to energy with social and economic pay-offs;
- Improved reliability of supply: embedded generation can improve the reliability of supply in the region and will have no material impact on the generation over-supply.

Green economy strategy development in Mpumalanga has identified a range of clean energy opportunities for the province. Opportunities identified include bio-energy, solar PV (distributed), micro hydro power and energy efficiency (DNA Economics 2016).

Again, if the program is well-structured with a steady build-out, long-term commitment and clear bid criteria local manufacturing could be developed in Mpumalanga.

Economic diversification: creating new labour demand

Ultimately, just transition for the workforce depends on diversification of the regional economy. Each region has different mixes of economic sectors and capabilities so economic diversification strategies need to be tailored. (Sheldon, Junan, et al. 2018) usefully summarise the three key elements identified across the literature: cluster strategy, smart specialisation and investing in labour-intensive projects (see section 2.4).

South Africa and Mpumalanga has developed green economy strategies but implementation to date has been relatively slow. Following the 2010 Green Economy Summit, the 2011 Mpumalanga Economic Growth and Development Path (MEGDP) identifies the green economy as a strategic sector with the potential to create jobs. The Green Economy Development Plan (GEDP) was finalised in 2017 by the Department of Economic Development & Tourism (DNA Economics 2016). The implementation pillars of the Green Economy Development Plan do not yet include significant plans for renewable energy and are:

- Biomass: biomass is proposed as the priority green energy initiative for the province. Energy generation from forestry and sugar cane will be examined, which face decline because of less demand for paper and the proposed sugar tax.;
- Towns and urban centres initiatives: goals include establishing waste to energy projects, deployment of solar PV on government buildings, partnerships in driving energy efficiency.
- Sustainable agriculture: goals included alternative forms of energy in Agri-hubs (e.g. solar lighting, farmer development of mini-hydropower plants); and
- Sustainable tourism.

In 2018, 3 project plans on green economy initiatives were developed, and biogas pilot projects were implemented. To implement its plan, the Mpumalanga government will need about R30 million (Yende 2016).

A least-cost IRP: reallocating funds from coal expansion to just transition

The scale of the challenge of transitioning coal and carbon-intensive regions is leading to the proliferation of just or coal transition funds. Examples include the European Union,



Germany, Spain, Canada, Australia and the US. Sometimes, these funds are administered by existing institutions or sometimes a new authority or body is established to coordinate programs, engage with communities and allocate grants.

How to fund just transition plans in South Africa? Funds will be required from a variety of sources. Burton et. al. (2018: 6) have highlighted the multi-billion opportunity to discontinue the new coal plants and resourcing just transition initiatives with the savings:

While subsidies for Eskom are an option, the ability of the state to continue to prop Eskom up is limited, and the money is better spent in supporting workers and regional development initiatives to diversify the structure of the Mpumalanga economy to make it more robust. Planning for the transition and for the possible impacts on coal workers requires a plan on which plants will close and when, who can be redeployed, who is retrained and who pays.

Ireland & Burton (2018) estimate the new coal plants will add between \$16 - \$27 billion to electricity system costs based on different scenarios to encompass renewable energy technology costs and the implementation or otherwise of climate policy measures.

A similar shift in approach by government and unions has just occurred in Spain. Until recently, unions had strongly mobilised for subsidies to maintain the operations of coal mining. A 2.1 billion euro aid plan in 2016 had kept the industry going. Unions and the government have agreed to end the subsidies for coal mining and negotiated a 250 million euro just transition fund including payments for early retirements, environmental remediation works on mining sites and retraining and redeployment into green energy jobs.

South Africa is at a similar juncture to Spain. Building more expensive coal plants represents a large-scale subsidy from households and businesses. It will create coal sector jobs, where displaced workers from elsewhere in the coal sector can be deployed. However, those jobs may not prove to be secure if future policy requires closures, and those power stations become stranded assets. Choosing the more expensive generation source will also lead to higher prices, which may reduce jobs elsewhere. Using the same subsidies for worker support and economic diversification measures now is likely to deliver better long term outcomes for Mpumalanga.



Table 20: Assessment of national transition programs and measures

STAKEHOLDER	JUST OUTCOMES: DISTRIBUTIONAL DIMENSION			PROCEDURAL DIMENSION
	Decent work	Environment	Equity in cost & benefit sharing	Social dialogue
MINING WORKERS	Measure: Renewable Energy Independent Power Producer Procurement Programme			
	<p>Job Creation targets– 80% employees are RSA citizens, 50% are black people (30% skilled employees are black people) and 20% from local communities.</p> <p>➤ Well received with large employment created focussed on black citizens and in local communities.</p> <p>➤ Many jobs were during construction not ongoing. No projects in Mpumalanga. Protections for workers and mitigation strategies are weak.</p>	<p>Workplace environment</p> <p>➤ No specific measures were found that considered workplace environment improvement</p>	<p>Local Content spending targets– 65%</p> <p>Shareholding targets – targets for black people and local communities in the seller and construction contractor</p> <p>➤ \$25 billion rand investment in black enterprise and local socio-economic development projects</p> <p>➤ Effectiveness of implementation of economic development investment has been challenged.</p>	<p>➤ Union representation is high within the coal workforce.</p>
OTHER LOCAL WORKERS AND BROADER COMMUNITY	Measure: Air Quality Act - 2004			
		<p><i>Eskom plants to retrofit abatement technology</i></p> <p>➤ ➤ Delays and postponements in complying with minimum emission standards for its plants.</p>		
OTHER LOCAL WORKERS AND BROADER COMMUNITY	Measure: Integrated National Electrification Programme (INEP) - 2002			
	<p>➤ Target of creating one new informal job for every 100,000 rand of INEP capital expenditure only partially met (Prasad 2013).</p>	<p>➤ Non-grid solar systems considered for informal settlements</p>	<p>➤ Distributed generation is still low. The IRP includes an annual limit of 200 MW of distributed generation but there are no significant measures to open up access.</p>	<p>➤ top down approach with no community participation</p>
VULNERABLE OR DISADVANTAGED GROUPS			<p>➤ Significant investment has occurred to increase electrification but no significant measures to expand access to clean energy.</p>	



Measure: Mpumalanga Green Economy Development Plan (GEDP) - 2016				
OTHER LOCAL WORKERS AND BROADER COMMUNITY	<ul style="list-style-type: none"> ➔ Good start – but needs funding. ➔ Jobs is a priority in the plan but no specific measure are designed for a just transition. 	<ul style="list-style-type: none"> ➔ Biomass is the priority green energy initiative with pilots being implemented. 		<ul style="list-style-type: none"> ➔ Limited consultation with public sector stakeholders, extended to business associations and companies.
Measure: National Development Plan 2030				
MINING WORKERS	<ul style="list-style-type: none"> ➔ Decent work is on the agenda, however there are no specific initiatives to action on this in the coal sector. 		<ul style="list-style-type: none"> ⚠ There is currently no planning for coal closures and measures to reallocate the workforce. 	<ul style="list-style-type: none"> ➔ The ‘Social Dialogue for Just Transition’ is including community participation in the development of just transition plans. ⚠ Emphasis on the need for policy alignment at all levels of government on infrastructure investment keeping in mind environmental consequences and national mitigation targets. But this has not yet been initiated.
OTHER LOCAL WORKERS AND BROADER COMMUNITY		<ul style="list-style-type: none"> ➔ Environmental indicators in the criteria for evaluating investment in bulk infrastructure ⚠ Progress towards target to generate 20,000 MWh of renewable energy by 2030 has been sluggish 		
VULNERABLE OR DISADVANTAGED GROUPS	<ul style="list-style-type: none"> ⚠ Economic development policies and programs are at an early stage but do not include access measures. 			



4.3.6 Conclusion

Energy transition in the context of a coal-intensive, developing economy is very challenging – and unless there is a positive change emerging from the just transition social dialogue process the outcomes for South African workers and communities in coal regions could be severe. Eskom is in financial crisis and currently building coal power stations that will increase emissions and the exposure of Eskom, its workers and surrounding communities to the risks and costs of energy transition.

The National Planning Commission social dialogue on just transition comes at a pivotal moment for energy transition in South Africa. The energy transition is effectively underway, large-scale coal closures are on the horizon and a series of renewable energy auctions have demonstrated a model to combine investment with social and local economic criteria. However, the legitimacy of clean energy transition is also being challenged, the national utility is in financial crisis and committed to coal expansion instead of planning for transition.

Building further coal plants does create large numbers of local jobs in Mpumalanga during the construction phase – but will add to the overall costs of the energy transition. New coal plants are no longer the least-cost generation option. The risk that they become stranded assets in the future because of climate commitments is also potentially a high community cost.

The table beneath is a high-level SWOT assessment of the capacity for just transition in South Africa:

<p>Strengths</p> <ol style="list-style-type: none"> 1. National planning infrastructure in place and community engagement underway: 'Pathways to just transition dialogue' (National Planning Commission). 2. Just transition concepts are embedded in major South African policy frameworks 3. Renewable energy auctions: world-leading framework includes local jobs and socio-economic development. 4. One of the stronger economies and governance in Africa 5. The integrated utility model (Eskom) facilitates planning and advanced notice for coal closures 6. Mpumalanga has already developed a green economy strategy 	<p>Weaknesses</p> <ol style="list-style-type: none"> 1. The concentration of the coal sector in regions of Mpumalanga: high concentration presents challenges to economic diversification 2. High levels of poverty and unemployment in Mpumalanga: one barrier to adaptation is the skills profile of the workforce 3. Eskom's finances, structure and economic model: Eskom is the sole integrated utility, is financially weak, and planning for coal expansion instead of energy transition. The utility's future structure is also under question, creating more uncertainty 4. The capacity to finance a just transition plan: international funds are likely to be required but there is no recognition for just transition in existing funding mechanisms.
<p>Opportunities</p> <ol style="list-style-type: none"> 1. The 'Pathway to just transition dialogue' creates a space to develop a national and regional just transition plan and governance framework. 2. Based on past transitions, contemporary just transition initiatives and South African practices, elements of a plan could include: <ul style="list-style-type: none"> • Planning for closures: company and industry-level framework agreements for 	<p>Threats</p> <ol style="list-style-type: none"> 1. Social and political polarisation (e.g. labour and environmental groups): social conflict will delay and prevent planning which is essential to manage impacts for a just transition. 2. Vulnerability to export markets: if there is an abrupt decline in coal exports, the social impacts could undermine the consensus needed for transition and the effectiveness of transition strategies which require time.



<p>worker redeployment, site remediation plans</p> <ul style="list-style-type: none"> • Building on the renewable energy auctions: enhancing local jobs, decent work standards and community benefit sharing. • Economic diversification strategies e.g. the Mpumalanga green economy strategy • A Just transition Authority and Fund 	<p>3. Financial insolvency for Eskom: financial collapse could also impact on the funds, plans and consensus for a just transition</p>
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Recommendations

The key recommendations for a just transition in South Africa are:

- *The primary aim of the ‘social dialogue for just transition’ process should be the negotiation of a social compact:* a high-level political framework is required between key stakeholders which includes commitment to manage the coal plant de-commissioning schedule in the IRP and the establishment of a just transition fund and authority established by legislation to manage impacts on workers and communities.
- *Coal expansion plans by Eskom should be discontinued and funds reallocated to a Just Transition fund:* additional coal plant will increase electricity prices, increase risk, and defer the just transition investment and planning that is urgently required to avoid catastrophic social impacts when coal closures accelerate. It also locks in emissions that reduces South Africa’s future ability to meet climate commitments.
- *Eskom should be required to negotiate a just transition framework agreement with trade unions:* a coordinated approach to worker redeployment, re-training, retirements and redundancies is needed to avoid involuntary redundancies and provide support for workers to transition to new jobs
- *An independent review is needed to develop a business model for Eskom aligned with clean energy transition:* a key source of social conflict and impediment to fair and fast transition is the reliance of the national utility on coal-fired power. Eskom has a very important role to play in transition. The review should evaluate models and develop recommendations for Eskom aligned with energy transition.
- *Limits on renewable energy in the IRP should be removed as the least-cost solution in exchange for revisions to bid criteria:* decent work, manufacturing jobs and local community benefits should be enhanced.
- *Large-scale distributed energy and economic diversification programs should be implemented in Mpumalanga:* distributed energy and economic diversification are needed to create alternative economic activities and jobs as coal plants are de-commissioned. It is crucial that the roll out of renewable energy is implemented with a great level of clarity and certainty for RE developers by the government, otherwise it will be difficult to drive the job creation that is needed.
- *South African government and stakeholders should advocate for inclusion of just transition programs within the Green Climate Fund:* Eligibility for investment from the Green Climate Fund should be extended to just transition programmes for coal-dependent regions in developing nations. South Africa faces an extremely challenging transition. Social licence for energy transition will be as important as the technology transfer and investment in new infrastructure.



The experience of South Africa highlights that just transition investment is not just a worthy goal to seek from energy transition – it is a pre-condition to an energy transition at the pace that is required to avoid dangerous climate change. The failure to pre-plan and invest in just transition measures has been a key factor in the unravelling of labour support for energy transition with the first potential closures of coal plants.

There is also a wider implication for the international community. Eligibility for international funds should be extended to just transition investments for coal-dependent regions in developing nations: social licence for energy transition in these nations will be as important as the technology transfer and investment in new infrastructure.



4.4 Indonesia – East Kalimantan

Summary of key findings

Indonesian coal production has risen dramatically over the last 10 to 15 years, and Indonesia has emerged as one of the world's largest exporters of coal, and the largest exporter of the world. This trajectory is expected to continue over the next few decades with emerging economies of China and India needing to supply electricity to their immense populations. Domestically as well, coal is the dominant energy source to power the national grid. The government's ambitious energy program spurs on domestic coal consumption, with mining companies expanding into the energy sector.

Though renewables form only a small share of the energy mix currently, the Indonesian government has committed to a renewable power future, with a target of 23 per cent by 2025. However, there are concerns that it is unlikely to meet these targets. Despite environmental awareness and global commitments to reduce the country's dependence on coal and oil, investments in renewable energy sources in Indonesia have shown a slow decline over the past three years.

There is a disconnect between government energy policy to increase the share of renewables, and the electricity company's (Pusat Litrik Negara - PLN) management of the country's energy supply (Atteridge, Aung, and Nugroho 2018). While regulations require PLN to purchase electricity produced by independent power producers (IPPs), they are also required to return a profit to the government and claim the cost of shifting to renewables make it difficult to increase their share in the energy mix. Thus PLN has actively opposed a transition towards renewable energy.

Additionally, the mining sector makes up a large portion of government revenue and GDP despite where mining companies have not paid tax or resource rents or are mining illegally. Recognising this, the government initiated the "Clean and Clear" program to ensure that mining companies are compliant led to the revocation of about half the permits issued to coal companies and the issuance of moratoriums on new licenses. However both provincial and national moratoriums have yet to be regulated. Mine rehabilitation obligations are often ignored by companies but offer an employment opportunity.

Rising unemployment for coal miners in Indonesia is already an issue, with many small companies going bankrupt or abandoning projection affected by global price fluctuations. Getting trade unionists to understand that climate change is indeed a labour issue is still a problem (Gausi 2018). However there has been little discussion on addressing job loss in the coal mining sector or potential for new green jobs in the renewable energy sector or other economic diversification.

It is evident that a transition is the Indonesian energy sector in imminent, this paper explores the opportunities for a just transition in Indonesia. Drivers for the transition range from the volatility in coal prices and energy insecurity from subsidies and reliance on imported oil to the environmental and social impacts of mining including the rising unemployment. Although planning for a just transition has a long way to go in Indonesia, there are building blocks in place through the increased levels of electrification through small-scale renewable energy systems and the government's experience of implementing social assistance alongside fossil fuel subsidy reforms.

Some lessons from the review of the energy sector and just transition measures in Indonesia include:



- To increase the supply of renewable energy, to meet development requirements and decarbonise the energy system, some stakeholders have suggested allowing more players to enter the electricity market (Atteridge et al. 2018).
- Encourage RVGs, particularly through private finance or the redistribution of fossil fuel subsidies, introducing technology standards for RVGs and improving policy inconsistencies (Schmidt, Blum, and Sryantoro Wakeling 2013).
- Create a trust fund for the implementation of community-owned energy projects for rural electrification (Guerreiro and Botetzagias 2018).
- Improve enforcement of mine rehabilitation requirements, and make it less easy for companies to avoid rehabilitation through community use of the pits. Create a plan and funding for rehabilitating mines where companies have gone bankrupt.
- Continue fossil fuel subsidy reform, particularly for electricity and LPG cylinders, and improve the implantation of associated social assistance programs to ensure all target households are reached (Asian Development Bank 2015).
- Develop plans for economic diversification for fossil fuel dependent regions.

4.4.1 Introduction

Indonesia is the largest economy in the Association of Southeast Asian Nations (ASEAN), and one of the fastest growing. It is geographically and culturally diverse, with more than 17,000 islands making up the archipelago. More than half of the population of 264 million live on the island of Java.

The economy has had solid economic growth, increased living standards and poverty has approximately halved since 1980. The strengths of the economy include low inflation and low government debt. Challenges for the country include low government revenues, gaps in infrastructure and low spending on social protection, education and health (equivalent to around 7% of GDP) compared to other countries. A high proportion of the population works in informal labour (> 70% of employment) and there is a low-share of private sector businesses as major state-owned enterprises play an important role in the economy compared to other countries (OECD 2018a).

Despite strong economic growth, 27% of the population is poor and 7.2% in extreme poverty¹⁹, with poverty higher in rural areas. Households are vulnerable to climate change, as well as increasing electricity prices (Asian Development Bank 2015).

¹⁹ As measured by the World Bank indicator of \$3.20 a day and \$1.90 a day (2011 PPP)



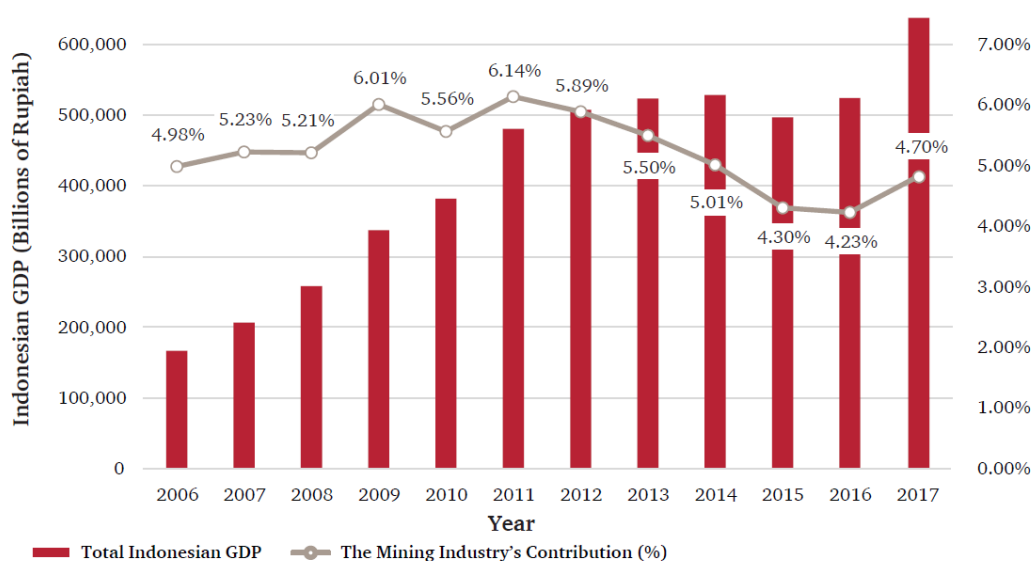
Table 21: Key economic data for Indonesia and East Kalimantan

	Indonesia	East Kalimantan
Population	264 million	3.5 million
Geographic size	1,904,569 km ²	140,000 km ²
Population density	138 people/ km ²	22 people/ km ²
Key industries share of GDP	Services: 44% Industry: 39% Agriculture: 13% Mining: 4.7%	Coal mining: 37%, Oil & gas extraction: 34%
Key industries share of employment	Services: 47% Industry: 22% Agriculture: 31%	n/a
GDP	IDR 13,824 trillion USD \$1,016 billion (2017) PPP in USD \$3,259 billion	IDR 669.9 trillion USD \$50.1 billion PPP in USD \$158 billion
GDP per capita	IDR 52,826,766 USD \$3,946 PPP in USD \$12,456	IDR 157,040,344 USD \$11,732 PPP in USD \$37,029
GDP growth	5.2% (2018)	4.95% (2003-2011)

Source: World Bank 2018, Hilmawan et al., 2016, Statistical Yearbook of Indonesia 2017

Services dominate the economy with 44% of GDP and 47% of employment. Agriculture is 13% of GDP but around 31% of employment, and industry is 39% of GDP compared to 22% of population. Mining contributes a high proportion of Indonesian exports, with around 10% of state total export revenue (IDR 37.37 trillion or USD 2.8 billion) (Apriando 2017). By 2007, coal had become the most important type of mining to the Indonesian economy (see Figure 14) (Hilmawan, Yudaruddin, and Sri Wahyuni 2016).

Figure 14: Mining Industry’s Contribution to Indonesian GDP 2006 to 2017



Source: PWC 2018, Bank Indonesia



Coal mining and the East Kalimantan economy

Kalimantan, on the island of Borneo, is one of the least densely populated parts of Indonesia, with population centred in one city. Most of the island is covered by forests, mining concessions and palm oil plantations. Kalimantan dominates coal production with more than 90% of the country's production (Fünfgeld 2016), and the province of East Kalimantan alone produced 65% of coal in 2012 (Hilmawan et al., 2016).

East Kalimantan is one of the wealthiest provinces in Indonesia, with around three times GDP per capita compared to the national average.

The economy of East Kalimantan was dominated by forestry from 1970-1990, but is now dominated by fossil fuel production, including coal, oil and gas. 37% of the Gross Regional Domestic Product (GRDP) of East Kalimantan is from coal mining, and oil and gas contributes around 34% (Hilmawan et al., 2016). East Kalimantan contributed 65% compared to total coal production in Indonesia (ibid).

Figure 15: Exports of coal from Indonesia



Source: Image generated at <https://resourcetrade.earth>

More than 40% of the land area of East Kalimantan, an area of 5.13 million hectares, is covered by coal mining concessions held by 1,430 mining permit holders (Apriando, 2017). Another study estimated that 70% of the province area had been allocated (Apriando 2017). It is estimated that current coal mining covers an areas of around 3.3 million hectares (Komara, Choesin, and Syamsudin 2016).

Coal mining in Indonesia is cost competitive with other regions. Labour costs are lower than some other major exporters, deposits are close to the surface, and the proximity of mines to the sea or inland rivers for shipping reduces transport costs (Global Business Guide Indonesia 2014).

India is the top importer of coal from Indonesia, followed by China, South Korea and Japan (see Figure 15). There is also growing demand from South East Asia, with Vietnam, Thailand and Philippines three of the fastest growing markets (between 2010 and 2015), alongside Spain and India. Exports have declined to parts of Europe, the US and Asia (Bradley 2018).



The economy of East Kalimantan is vulnerable to changes in world fossil fuel prices and highly dependent on the economic success of the two biggest importers of Indonesia coal, India and China (Hilmawan et al., 2016). For example, Indonesia’s coal industry suffered in 2012 and 2013 as economic growth slowed in China. This led to overproduction from Indonesian companies, creating further oversupply, which further reduced prices and income (Global Business Guide Indonesia, 2014). Despite falling world prices, production has continued, but not with the same rapid growth as seen in the early 2000s (Indonesia Investments 2015).

Coal prices in Indonesia reached a six-year high in June 2018, mostly because of restored demand from China and increases in demand from India, South Korea and Japan (Indonesia Investments 2018c).

4.4.2 Energy sector and the energy transition process

This section reviews the energy sector in Indonesia by considering three aspects for the concept of a just transition: energy access, the status of the renewable energy transition and the dependence on fossil fuels.

Table 22: Key energy data for Indonesia and East Kalimantan

	Indonesia	East Kalimantan
Total final energy consumption	Oil 37% Bioenergy 27% Coal 18% Electricity 10% Gas 8%	n/a
Residential final energy consumption	Bioenergy 71% Electricity 14% LPG 13% Kerosene 1%	n/a
On-grid power generation (Indonesia) and generation capacity (East Kalimantan)	Coal 53% Gas 25% Oil 10% Hydropower 7% Geothermal 4% Other renewables <1%	Oil 35% Coal 34% Gas 29% Hydropower 1.5%
Level of electrification	95.35% electrification	99.99% electrification
Coal mining	343 million tonnes produced in 2016 81% exported	184 MT of coal produced, 65% of Indonesian coal (2012)

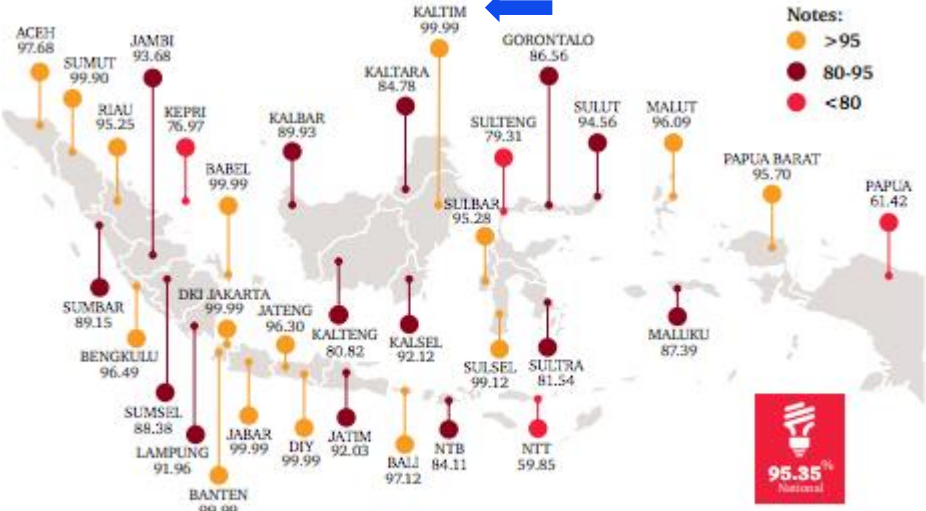
Source: IRENA 2017 (2014 data), PwC & APLSI 2018 (2017 data), Hilmawan et al., 2016
 Note East Kalimantan is share of installed capacity, not generation

4.4.2.1 Energy access

Indonesia has made an impressive increase in the number of people that have access to electricity, up from 65-70% of household in 2013 to 95% of households in 2017 (see Figure 16), and Kalimantan as a whole has nearly 100% electrification. However, access is unequal in Indonesia as a whole, and the rates of electrification are much lower in

remote areas and poorer households. There are around 10 million households without access to electricity (Lorenzen et al 2018). The challenges to connect households to electricity include the costs of investment, lack of infrastructure and inconsistent government regulations (Lorenzen et al 2018).

Figure 16: Electrification rates in Indonesian provinces (%) in 2017



Source: 2017 Performance Report of MoEMR

Source: Reproduced with permission from PWC 2018, Kaltim = East Kalimantan

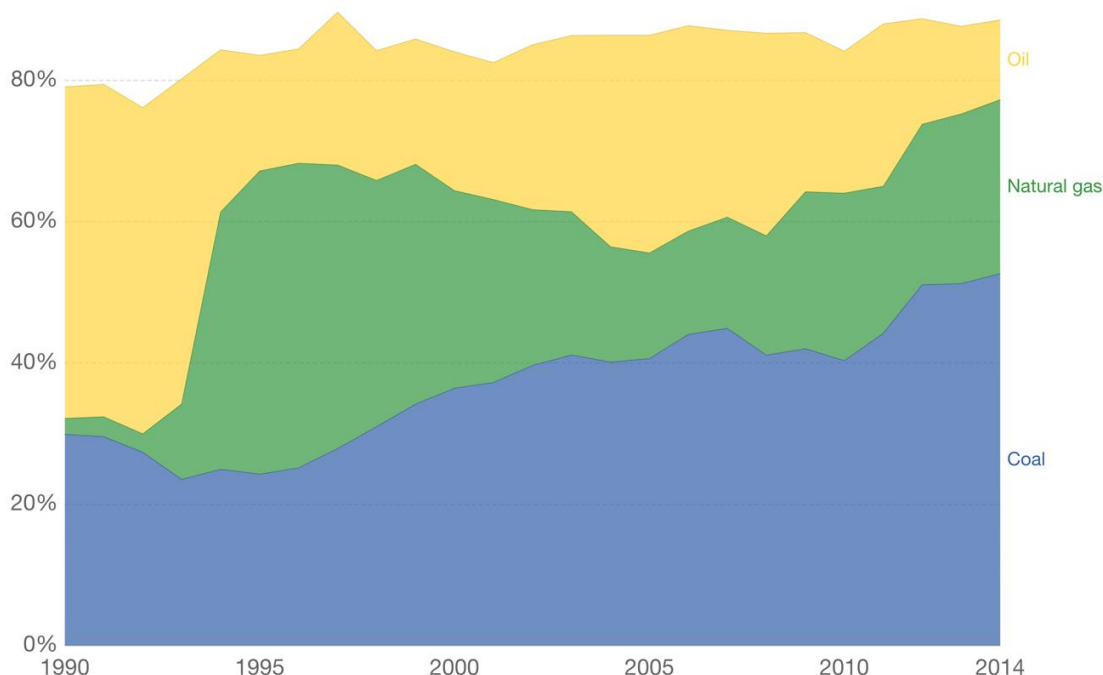
Indonesia is the largest consumer of energy in ASEAN, and consumption from transport and industry is growing fastest. Energy consumption grew by 65% between 2000 and 2014, and is set to grow by another 80% by 2030. Household consumption of energy is on average to other countries in ASEAN region. Household consumption of electricity per capita in Indonesia was about 812 kilowatts per hour in 2014 (World Bank 2018).

4.4.2.2 Status of renewable energy transition

Indonesia has set an ambitious target to increase modern renewable energy to 23% of total primary energy supply by 2025, and 31% by 2050 (excluding traditional bioenergy such as fuelwood), as part of the 2014 National Energy Plan (Government Regulation No. 79/2014). Under this plan, the use of gas would double, coal would triple and renewables would grow eleven-fold (IEA 2016a). According to the International Renewable Energy Agency (IRENA) Indonesia could meet its 2050 target by 2030, through significant renewable energy resources for solar PV, geothermal and hydropower (IRENA 2017).

Currently only a small share of electricity production is from renewables with more than 80% coming from fossil fuels (see Figure 17). Hydropower generates around 7% of on-grid power generation, geothermal 4% and other renewables such as solar PV and wind energy are less than 1%. The use of coal in the energy system is growing, and accounts for over half of on-grid power generation (IRENA 2017).

Figure 17: Share of electricity production from fossil fuels in Indonesia



Source: IEA via World Bank 2017

The majority of renewable energy in Indonesia is from the use of fuelwood for cooking, which is the main cooking energy for 40% of households in 2015 (IEA 2017). These types of cook stoves are responsible for 165,000 premature deaths each year from indoor air pollution, and there are two major programs in place to replace them with more efficient cook stoves or small-scale domestic biogas systems (ibid).

Under Indonesian law, all vital utilities must be controlled by the state. The state owned electricity company Pusat Listrik Negara (PLN) controls the electricity sector, and until the market was opened up to Independent power producers (IPPs) in 2009 generated all electricity (Schmidt et al., 2013). PLN is responsible for transmission and distribution of electricity and operates most power plants, predominantly coal fired. IPPs generate electricity from renewable sources but must sell this power to PLN in line with national feed-in-tariffs. Rural cooperatives are the only other entity allowed to generate and distribute electricity (Guerreiro and Botetzagias, 2018).

As PLN controls the electricity market, it has considerable political power, and has actively opposed a transition towards renewable energy. This may be because state-owned energy enterprises with large fossil fuel portfolios, such as PLN in Indonesia or Eskom in South Africa, are reluctant to develop a renewable portfolio which would compete with output from their existing fossil fuel power stations (Atteridge et al, 2018).

There has been a contradiction between government energy policy to increase the share of renewables and PLN's management of the energy supply. This is due to the fact that PLN must return a profit to the government while the company claims that higher-cost energy supplies like renewables are difficult to include in their energy portfolio (ibid). New feed-in tariffs introduced in 2017 cap the cost of electricity from IPPs so they don't exceed local generation costs by PLN, and PLN are required to purchase all electricity from IPPs (Atteridge et al, 2018).



Coal miners in Indonesia are obligated to sell 25% of their coal to the domestic market for a price of US\$ 70 per tonne (as of July 2018). Many companies are reluctant to do this as they can get higher prices through exports (Indonesia Investments 2018).

4.4.2.3 Dependence on fossil fuel exports

Indonesia is one of the world's largest exporters of coal, and the largest exporter of liquid biofuels and gas in the region. Indonesia was previously a large exporter of oil products but has become the second-largest oil importer in South East Asia as reserves and production have declined (OECD/IEA 2015).

The production of coal has grown rapidly since the decentralisation agenda beginning in the early 2000s (see Figure 18). The 2009 Mining Law gave district and municipal governments authority to issue mining permits, and thousands of licences were handed out to small and medium sized mines. Alongside a boom in coal prices, the number of coal mines exploded, without ensuring district governments had the capacity to ensure these new mines adhered to permit laws (Apriando 2017; Esterman 2017). This led to increased number of mines in areas where permits cannot legally be issued (such as forest conservation areas and within 500 metres of residential areas), increased deforestation and corruption (Atteridge et al., 2018).

Mining comprises 1.3% (935,753 workers) of the total (officially registered) workforce in Indonesia (BPS 2018a). 14.6% (136,318 workers) of the total sector's workforce is located in East Kalimantan. Mining also constitutes 12.8% of total employment in the region (ibid). The existence of high levels of informal work is also true of the mining sector, with informal workers in all parts of the mineral value chain, including extraction, processing and trading. It is estimated there were ten times more people employed across the mining sector informally than formally (from 1997 to 2000) (Lestari 2013).

Economic, social and environmental impacts of mining

The mining sector makes up a large portion of government revenue and GDP. The national government receives non-tax revenue including mining royalties and land rent, and tax revenues. Mining made up 7.2% of GDP for the country in 2016, and coal mining approximately a quarter of this (Atteridge 2017).

However, illegal mining accounts for approximately 50 to 80 million tonnes of coal per year, and leads to lost royalty revenue for the government. There is also "semi-legal" mining where permits are issued in areas that are e.g. protected or residential areas (Atteridge 2017).

Even where mining is legal there are revenue gaps where companies have not paid tax or resource rents, and it is estimate the government is owed \$380 million in mining royalties (across all types of mining) (Mongabay 2017).

While the country's future of coal is rather uncertain, there are estimates that Indonesian coal mining is likely to peak by 2026, and could even be earlier, according to analysis undertaken in 2016 (Rosyid and Adachi 2016). The National Energy Plan has a target of phasing-out exports of coal and natural gas to protect domestic supply, but there is no date for this goal (IEA 2016a).

Rising unemployment for coal miners in Indonesia is already an issue, driven by the dependency on world coal prices and China's coal import policy (Indonesia Investments 2018b). Many small companies have gone bankrupt or abandoned production, as they are most affected by price fluctuations (Global Business Guide Indonesia 2014). For example, around 125 coal mining companies had ceased production in East Kalimantan by August of 2015 and around 5,000 workers lost their jobs. It was expected that 200 companies



would have ceased production, either temporarily or permanently by the end of 2015 (Indonesia Investments 2015), with additional reports in June 2016 of mines closing down (Jensen 2016).

In addition, coal mining in Indonesia has resulted in some significant environmental and social issues. Many coal mining companies have avoided their legal responsibility for mine remediation, with more than 630 open-pit coal mines abandoned by mining companies in East Kalimantan. These mines become filled with acidic water, and at least 27 people, mostly children have died in the pits (Apriando, 2017). The water and tailings from mine pits is polluting surround rice paddies and rivers (Jensen, 2016).

Coal mining areas often overlap with orangutan habitat, and it has been found that rehabilitated coal mining areas are not a good replacement habitat (Niningsih et al., 2017). Quite apart from the environmental damage, this reduces the ability of diversification into tourism related industries as mining diminishes.

Box 6: Further issues and impacts of coal mining in Indonesia

Environmental and social impacts:

- Since underground mining is difficult in Indonesia, there are mostly open cut mines exploiting deposits close to the surface, which leads to wide-scale deforestation or destruction of agricultural land, and water and soil contamination
- Mining occurs in protected areas; are 6.3 million hectares of mining concessions have been granted within zones for forest protection (Mongabay 2017).
- Many coal mining companies have avoided their legal responsibility for mine remediation, more than 630 open-pit coal mines have been abandoned by mining companies in East Kalimantan. These mines become an environmental hazard with impacts on water quality and agriculture production (Apriando, 2017, Jensen, 2016).
- Mining concessions are more likely to be turned into housing developments or agricultural land, rather than the replanting of forests (Jensen 2016).
- Coal mining areas often overlap with orangutan habitat, and it has been found that rehabilitated coal mining areas are not a good replacement habitat (Niningsih et al., 2017)

4.4.3 Just transition measures and initiatives

Although global trends point towards a slowdown in coal demand (IEA 2018), the future of coal production and export trends in Indonesia are difficult to predict due to regionally differing demand. Indonesia experiences a continues rapid growth in coal production and there are no specific indicators that the country is reversing this course in the near future. This case study research couldn't find any particular initiatives that introduce the just energy transition process for the country.

However there are some developments that appear relevant in the just transition context for Indonesia, these are highlighted below. Drawing on the just transition framework



(Section 3) and the international examples (Section 2.4) we also discuss some potential measures and activities relevant for a just energy transition in East Kalimantan.

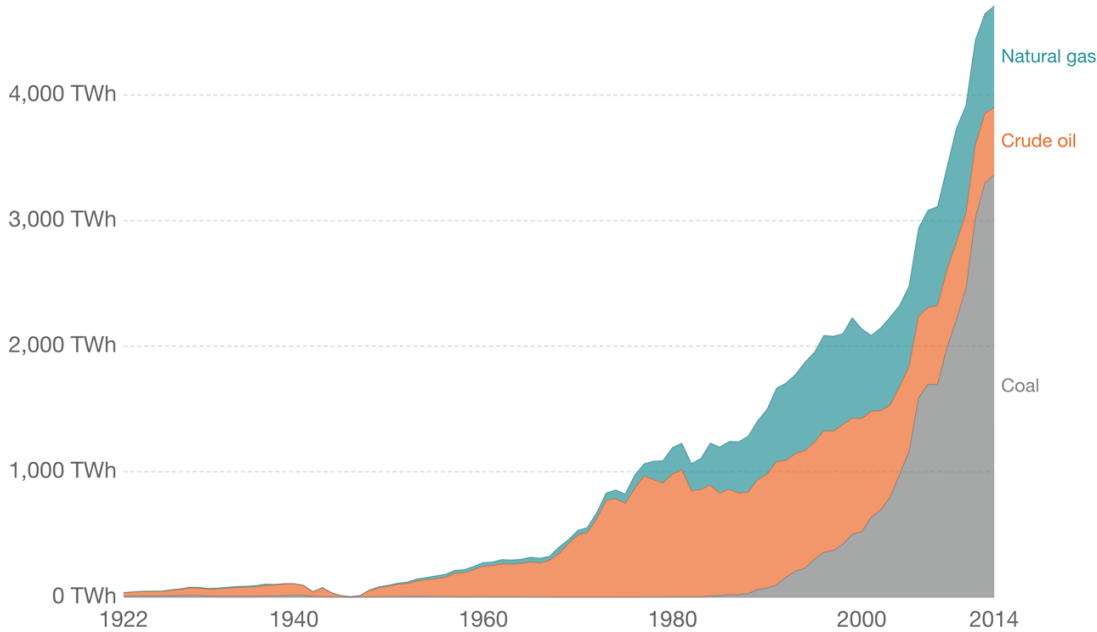
4.4.3.1 Recent reforms in the coal mining sector

Following the impacts of the rapid growth in new coal mines (see Figure 18) the government revoked the authority for issues mining permits from the district and gave it to the Provincial government, through the revised the Decentralisation Law (Law No. 23/2014 on Local Government). The government began a program called “Clean and Clear” to check that all mining companies have legal permits, paid royalties and taxes and followed environmental laws including requirements for mine remediation (Atteridge 2017). This program found 40% of licences were not “clean and clear”, and around half of these (2187 permits) were revoked. In East Kalimantan the rates are even higher, and 59% of 1,404 permits held by coal companies in East Kalimantan in 2017 are at risk of being revoked (Mongabay 2017).

The governor of East Kalimantan, issued a moratorium on new licences in 2015 and has threatened to punish companies that have violated their remediation obligations (Jensen 2016). At the national level, the president announced a moratorium, and the national government has capped planned coal production rates. However both provincial and national moratoriums have yet to be regulated.

While the impact of the program remains to be seen, it might help reduce the extent of illegal mining and consequently improve the legal status of workers in the sector.

Figure 18: Fossil fuel production in Indonesia (in TWh/ per year 1922 – 2014)



Source: Coal production - The SHIFT Project, Oil production - Etemad & Luciana, Gas production - Etemad & Luciana
OurWorldInData.org/fossil-fuels/ • CC BY-SA

Source: Image generated at Our World in Data: <https://ourworldindata.org/fossil-fuels>

4.4.3.2 Alternatives for economic development and diversification

East Kalimantan is characterised by its high dependency on mining of natural resources particular coal, oil and gas. In order to prepare the region, its community and workers for the energy transition, the crucial strategy is to diversify its economy. However economic



diversification for fossil fuel dependent regions in Indonesia is a challenge since the sector is (comparatively) profitable and there are little incentives to develop other economic sectors (Hilmawan et al., 2016).

The region was previously dominated by forestry, and it is likely that forestry and agriculture could again be viable alternatives to fossil fuels. This should be focused on the development of agro-industries and value adding to current agriculture and forestry industries.

However there are certain barriers, these include:

- Environmental legacy of coal mining: Coal mining is polluting to soil and water, and this needs to be addressed for further developing food crops.
- Potential environmental impact: The environmental impacts of monoculture palm oil plantations are well known. Any increased focus on palm oil needs to make sure that current forest size is maintained and local communities are not harmed. Environmental protection needs to be a priority, and initiatives such as the Roundtable on Sustainable Palm Oil (RSPO)²⁰ can help encourage this.
- Vulnerability of agriculture and forestry to climate change: Alongside a reduction in fossil fuels, preventing deforestation is an important climate mitigation measure. Future agriculture and forestry industries may be vulnerable to changes in climate policy, and need to make sure they are in line with the climate targets of the country.

The region can also look to increasing the share of services and tourism in the economy, however its remoteness and lack of infrastructure and human resources remain a barrier. Investment in infrastructure development and education will be important in the future.

Another complex question emerges in the just transition context for East Kalimantan. In fact, the region has a lower rate of poor population in comparison to other regions in the country (e.g. East Kalimantan 218,000 in comparison to East Java with 4.3 million people below the poverty line) (BPS 2018b). While poverty in Indonesia has declined over the past decade out of a population of about 260 million, more than 25.9 million still live from less than US\$ 1.9 per day (international poverty line). This raises the challenge of propriety and proportionality. Supporting the just transition process in those regions has to be accompanied with a country wide approach to eradicate poverty and improve the livelihoods of communities and workers overall.

Mine rehabilitation:

The rehabilitation of previous mine sites may be an opportunity for employment in the region. Coal mining companies are legally obligated to fill in open-pit mines when they are no longer in use and remediate the surrounding vegetation. The regulations are often ignored, leaving the pits to fill with acidic water, which has had devastating consequences for local communities. The National Commission on Human Rights reports that 27 people were killed in mine pits owned by 17 companies between 2011-2016. The water in these pits also contains high levels of heavy metals above levels safe for human health, which are a health risk if utilised by local community members (Apriando, 2017). In some cases these pits are left behind as the coal mining companies claim the community wants the pit to remain (ibid).

If mining companies abruptly go out of business they are more likely to leave abandoned mining pits behind, as happened in 2015 when 125 companies in East Kalimantan went

²⁰ See more details at: <https://www.rspo.org/about>



bankrupt. Ensuring mine rehabilitation will be difficult for companies that no longer exist. There are more than 630 abandoned open-pit coal mines in East Kalimantan according to a survey by the East Kalimantan Office of Mines and Energy, although mining companies have only reported about half of this number (Apriando, 2017). It is therefore important to undertake the rehabilitation of coal mines now, while the sector is profitable (Atteridge et al., 2018).

4.4.3.3 Promoting equity in access to renewable energy

Although the country has made an impressive increase in the number of people that have access to electricity and particularly East Kalimantan has benefitted from this progress, low rates of electrification pose great challenges for other regions (Lorenzen et al 2018). Promoting equity in access to electricity is an essential part of a just transition, to ensure that poor or vulnerable households can access, afford and benefit from electricity.

Extending the electricity grid is unfeasible and costly in many contexts where people do not have access to electricity, and this is even more pronounced in Indonesia, where electrification rates are lowest in smaller remote islands and rural areas (Guerreiro and Botetzagias, 2018). At the same time the national electricity grid is strained and unreliable, with frequent blackouts (Schmidt et al. 2013). Decentralised renewable energy electrification can address both energy access and climate change (Guerreiro and Botetzagias, 2018).

Renewable energy based village grids

Village grids are a solution to providing electricity in remote areas, however most village grids in Indonesia are currently powered by diesel plants. Solar PV or micro-hydro (small-scale systems less than 100 kW with minimal environmental impact) and the renewable technologies most suitable for renewable energy based village grids (RVGs).

Economic analysis undertaken in 2013 found that micro-hydro powered village grids are more competitive than diesel, however solar PV is not competitive (Blum, Sryantoro Wakeling, and Schmidt 2013). However, given the time since this study, and the rapidly decreasing cost of solar PV, solar PV may now be competitive. The study also found that the cost competitiveness of solar PV increased with the increase remoteness of the village (ibid). PLN has aims to build solar powered village grids on several hundred islands, but progress has been slow, and international NGOs have also supported various initiatives. There is very little private finance for establishing renewable energy based village grids, which could be a potential way to overcome the major barrier of the lack of finance for projects. Policy reform could also promote the development of RVGs through the redistribution of fossil fuel subsidies towards funding grids, introducing technology standards for RVGs and improving policy inconsistencies and access to finance (Schmidt et al. 2013).

Community energy

Electrification will not automatically lead to better development outcomes, and many top-down models for electrification have had limited success (Guerreiro and Botetzagias 2018). Electricity services need to be adapted to local needs, promote local participation and investment. Community based energy schemes have the potential to address both electricity needs and address local development needs, as they can retain ownership of the system in the community, be financially sustainable and generate income for the community. This means the projects are more likely to be able to continue on without external assistance.



There are many successful examples of community based RVGs, mostly micro-hydro, and mostly led by private or not-for-profit organisations. Particularly successful is Ibeka, a social business with 60 renewable energy projects across Indonesia.²¹ Their goals are to:

- Develop renewable energy programs that prioritize the benefit of the community and positively impact its self-reliance, as well as its socioeconomic and environmental issues;
- Support the wider adoption of renewable energy utilization, especially small-scale hydro power for local equity building; and
- Promote rural social entrepreneurship to benefit the local community and local economic diversity.

The implementation process for a project has a strong correlation with its ongoing success, as well as ensuring communities legal, economic and technical ownership of the project, as well as ownership of the process itself.

In order to scale-up community energy projects in Indonesia, Ibeka has recommended the creation of a trust fund to implement projects, rather than the current spending on rural electrification which has been less successful (Guerreiro and Botetzagias, 2018).

An Energy Resilience Fund has been proposed, which would collect money from oil and coal mining to use for electrification of disadvantaged villages, as well as to cushion fluctuations in oil prices (Alvionitasari, 2016). The framework for this fund was under development, but is currently on hold (IRENA 2017).

4.4.3.4 Promoting social development through fossil fuel subsidy reform

Fossil fuel subsidies have long been a political and economic issue in Indonesia, and reforms began in 2005 to reduce the high government spending on subsidies, which reached 20% of government expenditure at various times between the 1960s and 2000s (Asian Development Bank 2015). Reforms for oil products (gasoline, diesel, LPG and kerosene) for transport and cooking have been introduced and reformed multiple times over the period. The most recent reforms are the reduction of subsidies and subsequent price increase of nearly 40% for gasoline and diesel at the end of 2014, and the removal of gasoline subsidies entirely in 2015 and a fixed subsidy of IDR 1000 per litre (about 8 US cents). Electricity prices are capped, which is a cost to the government and state-owned electricity provider, but reform is underway with an increase in tariffs in 2013 (IRENA 2017).

Energy subsidies are holding back Indonesia's development and transition to a sustainable energy system. Subsidies on fossil fuels hold back the switch to renewable energy and increase the country's dependence on imports of oil. Energy subsidies take up a significant portion of the government budget that could be spent on funding energy infrastructure, as well as health, education and sanitation (OECD/IEA 2015). Fossil fuel subsidies in Indonesia have generally dwarfed spending on social assistance – in 2012, Indonesia spent \$36 billion on fossil fuel subsidies, but only \$3 billion on social assistance programs (Asian Development Bank 2015).

Fossil fuel subsidies have been found to disproportionately benefit wealthier sections of society, and be an ineffective policy, whether for social or economic aims (Coady, Flamini, and Sears 2015). This is true in Indonesia, where although subsidies were originally implemented as a poverty reduction measure, the subsidy on transport fuels mainly benefitted middle and upper class households (Chelminksi 2018). It is estimated 5% of the

²¹ See more details at: <http://3.ibeka.or.id/wp/index.php/en/our-mission/>



poorest third of households were consuming subsidized transport fuels, compared to 70% of the wealthiest third of households (IEA 2016b). In looking at the share of total subsidies, less than 1% of subsidies went to the top 10% of households and 40% went to the top 10% of households (Diop 2014). Removing fossil fuel subsidies is therefore in effect a just transition measure, as it stops the flow of taxpayer money to the rich at the expense of poorer households.

However, the removal of fossil fuel subsidies impacts poor households hardest, as even if they don't consume fuel directly, as increased fuel prices can create inflation and raise the overall cost of food and other goods (Chelminksi 2018). The Indonesian government has acknowledged this and have put in place measures targeted towards supporting the poor during reforms. Beginning with the first major reforms in 2005 the government has introduced a cash transfer program called Bantuan Langsung Tunai (BLT) and schemes to subsidise rice, provide health insurance and assistance for students (Pfefferle 2017).

Success of previous reforms

Fossil fuel subsidy reform has been mostly successful, environmentally, economically and socially. Fossil fuel subsidies were to the value of \$27.7 billion USD in 2014, about 70% on oil products and 30% on electricity. Spending on fossil fuel subsidies is projected to be less than 1% of GDP, down from 3% in 2014 (IEA 2016b).

There has been some success in social assistance linked to subsidy reform. However, not all social assistance programs associated with the reforms have reached the citizens they are designed for. The poorest 30% of households were allocated assistance through Bantuan Langsung Tunai (direct cash assistance), Jamkesmas (public health insurance), and Raskin (rice subsidy). However, a review of programs in 2010 found that less than one-third of citizens targets received all three of the programs (The World Bank 2012).

Impacts on employment levels linked to fossil fuel subsidy reform are unknown (Gass and Echeverria 2017).

Future subsidy reform

The government is responsible for setting fuel prices in line with price rises in the global market, but there is a risk that reforms may backslide due to public pressure about the impacts (Gass & Echeverria, 2017). As of March 2018, the Indonesian president has instructed ministers to keep fuel prices stable, which would mean that prices would not rise with global prices, in effect bringing back part of the subsidy (Varagur, 2018).

Although reforms have been mostly successful, the importance of reforms and the link to creating a sustainable energy system and increasing social assistance must be communicated to the public make sure they have social licence to continue. Electricity subsidies could be further reformed though updating tariffs (at a level affordable for each household group), as the current level of subsidies are forecasted to cost 6.7 billion USD in 2019 (Lauranti and Djamhari 2018).

Further reforming subsidies for electricity and LPG cylinders would create further savings in government budget to spend on social welfare and development (ADB 2015). This must be done while continuing social assistance programs tied to reforms, and improving the implementation of the social assistance programs to make sure all target households are reached.



4.4.4 Conclusion

Although planning for a just transition has a long way to go in Indonesia, there are building blocks in place through the increased levels of electrification through small-scale renewable energy systems and the government's experience of implementing social assistance alongside fossil fuel subsidy reforms.

The drivers for a just transition to renewable energy include:

- Decreasing reserves of coal, volatile global prices and unstable employment and rising unemployment in coal mining (Indonesia Investments 2015)
- High cost of fossil fuel subsidies and high reliance on imported oil (IRENA 2017)
- The environmental and social impacts of coal mining (Mongabay 2017)
- Air pollution from existing coal-fired power plants responsible for 6,500 premature deaths each year (IRENA 2017)

It is notable that in the measures and initiatives outlined in the previous section, there has been little discussion on either addressing job losses in the coal mining sector. There is also little discussion about the potential for new 'green' jobs in the renewable energy sector or other areas.

4.4.4.1 Recommendations

The following recommendations are drawn from the review of the energy sector and just transition measures.

- To increase the supply of renewable energy, to meet development requirements and decarbonise the energy system, some stakeholders have suggested allowing more players to enter the electricity market (Atteridge et al., 2018).
- Encourage RVGs, particularly through private finance or the redistribution of fossil fuel subsidies, introducing technology standards for RVGs and improving policy inconsistencies (Schmidt et al., 2013).
- Create a trust fund for the implementation of community-owned energy projects for rural electrification (Guerreiro and Botetzagias, 2018).
- Improve enforcement of mine rehabilitation requirements, and make it less easy for companies to avoid rehabilitation through community use of the pits. Create a plan and funding for rehabilitating mines where companies have gone bankrupt.
- Continue fossil fuel subsidy reform, particularly for electricity and LPG cylinders, and improve the implantation of associated social assistance programs to ensure all target households are reached (ADB 2015).
- Develop plans for economic diversification for fossil fuel dependent regions.

The strengths, weaknesses, opportunities and threats for Indonesia are summarised below.



Strengths	Weaknesses
<ul style="list-style-type: none"> • Exceptional renewable energy resources, particularly for solar PV, geothermal and hydropower • Strong economic growth, low inflation and low government debt • Experience from various reforms for fossil fuel subsidies, including program increasing social assistance for the poorest 30% of households • Growing bottom up movement and community opposition to new coal power plants • Capacity of NGOs and social businesses to implement renewable energy village grids and community energy projects, with evidence for the types of models that are successful. 	<ul style="list-style-type: none"> • High dependency on export of coal as a source of government revenue, particularly in Kalimantan • High dependence on coal as domestic source of electricity • Competing priorities for government and NGOs (e.g. improving healthcare, sanitation etc.) • Control of the electricity market by state-owned company which is reluctant to increase share of renewables, lack of private finance for RE • Complex regulatory environment for energy and resources • Lack of data on the hundreds of coal mining companies and prevalence of informal mining • Coal mining companies that disregard regulations (i.e. illegal mining, lack of rehabilitation) • Planning for workforce impacts not yet taking place • Opportunities for economic diversification for coal mining regions are limited, and are mainly agriculture and palm oil. These industries are also vulnerable to climate change and can have environmental impacts (i.e. new deforestation caused by palm oil plantations would not be in line with climate goals)
Opportunities	Threats
<ul style="list-style-type: none"> • Fossil fuel subsidies are more beneficial for wealthier segments of society, so removing them will open up budget for renewable energy and social assistance for the poor • Geography of areas that need electrification is best suited to village grids powered by renewable energy, which could provide diverse employment • Air pollution, particularly from transport and coal fired power plants, is a major public concern that may drive public pressure for a more renewable energy and transport system • The use of coal for electricity generation needs to reduce to meet Indonesia's climate targets under the INDC, which pledges a 29% - 41% reduction in emissions by 2030 from energy, industry and land-use change. 	<ul style="list-style-type: none"> • Competing priorities for government and NGOs efforts (e.g. improving healthcare, sanitation etc.) • Coal prices are vulnerable to international prices, and the strength of the economies of China and India (major importers) • Skills of workers from the regions affected by a decline in coal may not be in line with requirements for new industries • Majority of job creation in renewable energy unlikely to be in coal mining areas • If coal mining companies abruptly cease production there is a threat they may not complete mine remediation (considering many companies are already avoiding remediation obligations) • Small coal mining companies and informal mining may find it harder to adapt than the big players



5 Cross Case Analysis and Recommendations

This study explored four very different country cases to better understand the opportunities and challenges of a just energy transition process. Their starting positions are very different. Whereas in Germany and Poland, there was already significant experience with scaling down and phasing out coal generation and mining, South Africa and Indonesia have only just begun to embark on the transition journey, and their national economies are still heavily dependent on coal. This also reflects the different role of coal: Germany is a net importer, and Poland predominantly uses its production for domestic energy generation. South Africa and Indonesia, in contrast, are two of the largest global exporters of coal (see Table 23) with coal contributing 17.4% of total South African mining export earnings, and 85% of Indonesian mining export earnings (Indonesia Investments 2018a; Minerals Council South Africa 2018).

Table 23: Coal production, consumption and employment in the four cases (2016 data)

	Germany	Poland	South Africa	Indonesia
Coal production (Mt)	172 Mt	131 Mt	255 Mt	463 Mt
Coal imports (Mt)	55 Mt	8.6 Mt	0.5 Mt	None
Coal exports (Mt)	-	9.3 Mt	70 Mt	373 Mt (81% of production)
% of coal in electricity supply ²	40.2%	81%	85%	53%
Number of coal power plants ³	167 (in 2017)	37	30	62 operating 20 under construction
Number of active mines ⁴	10	35	25	Estimated at thousands
Employees in coal sector (estimate) ⁵	22,500 – 26,500	80,000 - 120,000	118,000	121,000

Sources: see case study references and IEA (2018) *Coal information (2018)*, OECD/IEA, 2018, World Bank 2018.

5.1 Broader context of energy transitions in the case study countries

The pace of the energy transition in the four countries is determined by both global and national factors. Whilst the global climate agreement and the growing competitiveness of clean energy technologies creates pressure for incumbent energy systems, these factors are mediated by national socio-economic, political and institutional factors, which often impede rapid changes. However, the immanent threats of climate change make a fast transition imperative. The societal responsibility to protect the natural environment for today's and future generations is an overarching justice principle. In addition, as any major industry sector transformation, the energy transition creates socio-economic disruptions and contributes to social inequalities. Consequently, to accelerate the energy transition it is inevitably to ensure a fair distribution of the costs and benefits, a due process in energy decision-making and the consideration of relevant stakeholders including the recognition



of vulnerable groups. The many facets of energy justice highlight the urgency of putting plans and requirements for a just transition in place.

Across the four countries, we have seen different combinations of factors that contribute to the energy sector transformation these include:

- Climate commitments, aging and increasingly inefficient power plants and coal mines (e.g. Poland), the rising costs of coal (e.g. through EU carbon price for Germany and Poland), and difficulties to finance new coal power plants due to climate risk, all increases the pressure on the incumbent energy industries.
- *The falling cost of renewable energy*: renewable energy is now generally cheaper than new coal plants (and approaching the cost of existing plant). There is growing recognition that fossil fuel subsidies or limits on renewable energy increase electricity prices. This shifts public opinion generally, including slowly changing the positions of business groups and communities in coal production regions (e.g. Poland).

While these factors accelerate the energy transition, the rapidity itself can act against energy justice principles, as it may lead to unplanned or early closures, as was seen in Poland in 2018 and Indonesia in 2015, when at least 125 mining companies ceased production. However, it has been found that in some cases governments and respective stakeholders disregard the mounting evidence for system changes, failing to act and hence putting workers and local communities at risk (e.g. Poland). There are a number of factors which make it harder to achieve a just transition, including:

- ***Dependency of economies on coal exports***: A high share of coal exports create a particular economic dependency, and makes the cost of transition high unless those earnings are replaced.
- ***Regional concentration of the industry***: The case studies show a geographical concentration of coal mines and coal power plant which provides particular challenges. All regions still have a (relative) high number of workers, indirect jobs and related industries which would be disproportionately impacted by coal mines/power plant closures.
- ***Lack of resources***: Some of the coal regions lack potential (natural, financial and human) resources and capacities to establish new industries (e.g. Germany). This provides challenges for the local labour markets which cannot absorb a large number of people. In addition, the mining workforce has a lower average educational level making it more challenging to find equivalent quality jobs.
- ***Identification as a “coal” region***: Countries such as South Africa and Indonesia (and historically Poland) consider mining, and in particular coal, as an industrial development tool which links into downstream industries, creating an intertwined minerals and energy sector. The long history of mining (e.g. Germany and Poland) has created a local/ regional cultural understanding and identification with the sector, which makes change difficult.
- ***Institutional lock-in***: all four case studies highlight the challenge of embedded institutional, political and economic structures associated with a particular technological regime.
- ***Divergent positions on energy justice trade-offs***: Strongly divergent positions on just energy transition issues – e.g. energy availability/ security versus environmental and health concerns - makes it very difficult to create a broad social dialogue: In Poland and South Africa a deep division between stakeholders’



positions on the energy transition was apparent. Particular strong positions persevere among trade unions (e.g. Poland, South Africa), some private utilities/mines and state-owned electricity companies (e.g. Indonesia, Poland).

5.2 Key findings

The cross-country findings are synthesised with key recommendations to assist the implementation of a just and fast transition process, for consideration by both policy makers and social and environmental actors.

The findings and recommendations are structured according to the international examples:

Social Compact (see examples in section 2.4.1) and institutional support (see examples 2.4.4)

1. *Just transition investment and energy transition policy integration is a pre-condition for a fast transition*
 - The challenges at the heart of action on climate change are magnified for coal-dependent regions and economies: up-front planning and action which involves these communities taking on risks and costs is needed to avoid disastrous impacts for future generations.
 - In Poland and South Africa especially, the social tensions associated with transitioning regional workers and communities has led to political roadblocks for the energy transition. The failure to pre-plan and invest in just transition measures has been a key factor in the unravelling of labour support for energy transition with the first closures of coal plants. Germany on the other hand has consistently managed to secure political support through pre-planning and investment in just transition measures.
 - If there are 'stranded workers' or 'stranded communities' (to use the language of Sharyn Burrows, Head of the International Union Federation), there will be political conflicts that will slow or stop the transition. There are cases of successful coal transitions but they are the exception: the fears of workers are not irrational. Major investment in just transition plans is needed to secure up-front support and maintain commitment through energy transition if it is to occur at the pace needed to avoid dangerous climate change.
 - The falling cost of renewable energy and vulnerability to change in export markets could lead to abrupt change. But energy transitions in developing economies with coal-based economies are more complex due to factors such as high levels of poverty. Governments and stakeholders do not have the same level of resources to draw on to manage these transitions.
 - However, just transition plans are less advanced in South Africa and Indonesia. The social impacts of energy transition could be devastating. Developing nations are likely to need support to manage energy transitions: social licence for energy transition in these nations will be as important as the technology transfer and investment in new infrastructure.



Recommendations:

Incorporate considerations of justice transition principles into energy policy-making and other relevant international, national and regional frameworks:

Energy is both a basic human need and vital economic activity.

Therefore, energy justice principles should be incorporated into all energy planning and international, national and regional policy frameworks. This includes international agreements, national compacts, regional and local developing plans but it also means incorporating just transition principles in institutions and programs for finance, capacity-building, education, political engagement, labour markets and education and training. It is easy for just transition to be overlooked in the focus on emissions reduction commitments and implementation. We need justice aware energy policy while just transition action have to be elevated.

National or international governments, frameworks and initiatives should provide funds for coal dependent communities for the energy transition process,

Support for coal dependent communities is an overall societal responsibility. Major just transition and coal region funds are emerging in advanced economies but developing countries lack the resources are likely to struggle to invest adequately amidst competing priorities. International climate agreements should include commitments to just transition processes in developing economies, including making just transition funding for coal dependent regions eligible for investment from the Green Climate Fund.

2. *Social dialogue and community engagement can ensure broader stakeholder acceptance*

- There are a variety of national-led consultations or taskforces occurring which facilitate the development of social compacts and high-level political frameworks to catalyse the energy transition processes and support mutual understanding of the challenges and trade-offs to a low carbon transition (e.g. Canada, Scotland, South Africa, Germany, European Union). For example, the European Union Coal Regions in Transition Platform Working Groups launched in December 2017. The two working groups cover strategies and projects focusing on the economic diversification of coal regions and improvement of air quality (European Commission 2017).
- A shared platform/ coordinated social dialogue and social compact between societal stakeholders is needed to facilitate a shared understanding of the transition scenario, clarify major questions (e.g. funding) and help to develop a transition package for realistic and sustainable prospects of workers and their communities. The Coal Commission in Germany is a successful platform to bring together the different stakeholders including representatives of local communities to map out a plan for the future of the regions and discuss the allocation of resources.
- There is a structural tension between unions/labour and environmental movements that needs to be managed: environmental groups want as fast a transition as possible in line with the rising panic of climate scientists but faster transitions threaten the capacity of local labour markets to cope and therefore the immediate futures of workers.
- National discourses are captured in justice trade-offs – for example availability and affordability of energy versus health and environmental impact (Poland and South



Africa). This stifles the social dialogue and disables stakeholders to find shared solutions planning for a way forward.

- Community consultation and engagement – using formal and informal communication channels and creating a shared vision for the future that can support new identity building for the region. The Future Lap Lusatia is instrumental in convening local dialogue, engaging the community in a future visioning process and encouraging local economic activities the region (Wirtschaftsregion Lausitz GmbH 2018).

Recommendation:

Take an early, participatory approach to creating a broad social dialogue and developing solutions with local stakeholders.

In order to secure the buy-in of affected communities and to increase their capacities to address the transition challenge, locally developed initiatives should be supported. This could include local grant programs and capacity building measures can empower local communities in the transition process.

It is important to overcome traditional political divisions between stakeholders (e.g. unions versus environmental NGOs) by actively identifying common ground and collaborating across sectoral boundaries. Thus, a social dialogue should be established early with different political, industry and civil society actors at all governance levels and including the affected communities to understand the opportunities, challenges and trade-offs inherent in the energy transition. This requires the establishment of effective community engagement and decision-making processes at an early stage.

Job creation, local economic diversification and community benefits (see examples in section 2.4.3)

3. *Large renewable energy is part of the solution – but not the answer to a just transition*
 - Large-scale investment in renewable energy will create an overall increase in total employment compared to fossil fuel. There are for example opportunities to use decommissioned coal mines for installing pumped hydro plants or for installing large scale solar projects.
 - Social acceptance and long term support for large scale RE developments depends on the interactions between local communities and large scale developers. It is often a subjective perception of the individual host community if large scale RE developments are perceived as cost or benefit. Particular vulnerable communities have to be recognised and engaged in the development process.
 - Embedding good social and local economic criteria in renewable energy developments is important to good transition outcomes. South Africa's model is contested by local stakeholders but the broad approach of including local jobs, socio-economic expenditure and participation by disadvantaged groups is one that other nations should adopt.



Recommendation:

Integrate social and local economic criteria into large-scale RE policy and make it compulsory that large-scale RE developers provide value back to local communities

Large-scale RE support should be bound to essential criteria which guarantee local social and economic benefit for communities. Policy requirements for benefit-sharing packages should include direct jobs that come from the construction, operation and maintenance of the plant itself. It should also comprise local procurement such as supply chain jobs that come from providing services to the plant such as manufacturing components locally or training centres. Other benefit sharing mechanisms include community benefit funds, sponsorships or local ownership/ co-investment opportunities to ensure broader community support.

4. Bottom-up and local initiatives like distributed RE projects have a special role in just transition

- Local associations, clubs and initiatives in coal communities are (often) supported by the local coal mining or power plant companies. It is important to recognise and maintain this work of civil society and volunteer actors after coal-phase out (e.g. Germany).
- Additional local and regional initiatives by NGOs, communities and local governments are important to mobilise for and demonstrate new local economic opportunities for example the deployment of new technologies (e.g. Germany and Poland). In Indonesia, social businesses and NGOs have had the most success with micro-grid renewable energy projects.
- New investment in large scale RE developments and jobs are often not in the coal-based regions. For example in Germany despite the RE growth it has not created significant local economic opportunities for Lusatia region. Hence investment in distributed energy (local generation, energy efficiency, community energy) has a particularly important role to encourage:
 - New energy jobs: employment growth and the prospect of transfer for some occupations as coal-sector employment declines;
 - Increased legitimacy: a visible demonstration of energy transition;
 - Improved energy access: off-grid and micro-grid projects could increase access to energy with social and economic pay-offs, and distributed options are the best solution in contexts like Indonesia where households who do not have access to electricity are usually located in remote areas where grid connection is not appropriate;
 - Improved reliability of supply: embedded generation can improve the reliability of supply especially in regional areas.



Recommendation:

Maintain, encourage and promote local bottom up initiatives, particularly include funding for distributed energy programs focussed on coal-dependent regions

The deployment of renewable energy resources can offer new job opportunities for local communities along the entire value chain. However, the potential for large-scale renewable development does not always dovetail with coal mining regions. Distributed energy programs with funding for local renewable energy, energy efficiency, community ownership and micro-grids can be an important source of equivalent jobs and support the legitimacy of transition.

5. A holistic approach to labour demand and supply beyond energy policy is essential
- As energy policy and interventions will not be sufficient, a holistic suite of measures is needed to manage the impacts on labour supply and workers. This means job growth from large-scale renewable energy will not in-and-of-itself be the answer to a just transition. There is a need for local economic diversification to create labour demand. The Silesian region demonstrates how the development of a variety of other industries and services can puffer significant socio-economic disruptions. However, the German case shows that economic diversification takes time and early planning is required.
 - Markets and companies will not manage this transition effectively without coordinated policy, negotiations and initiatives from a range of stakeholders.
 - Active labour market interventions which manage down the numbers of workers over time through early retirement, redeployment and retraining are an important element to prepare the workers and their families for the transition. The example from Silesia demonstrates the importance of local educational institutions (e.g. universities and science institutes) that offer vocational and further training and provide opportunities for young people.
 - There are significant differences in the configuration and capacity of national welfare systems to puffer labour market disruptions induced by the coal-phase out. Germany has a well-developed welfare system, which supports workers in labour market transition processes. However, specific measures for coal dependent communities are crucial to ensure workers can find back into the local labour market quickly. Poland has applied a range of different instruments of labour market interventions, yet with varying degree of success. Both countries made some valuable experience in active labour market interventions, yet those have yet to be evaluated and understood in more detail to determine their success for coal communities.

Recommendation:

Set up active labour market policies that are tailored to coal-communities to support the reallocation of local jobs accompanied by measures to establish new diverse industries:

Active long term labour market interventions including retraining courses, support in job application processes and financial support for individuals throughout the entire reorientation period should be part of every local/ regional transition package. Local vocational and educational institutions will require expansion and adaptation, and the corresponding financial support, to ensure they can offer equal access to all and the appropriate skills training and capacity building. Those measures shall be accompanied by efforts to diversify the local and regional economy to increase labour demand.



Planning for closures (see section 2.4.2)

6. *Lack of responsibility and action taken by coal mining or power companies is putting communities at risk*

- Measures from coal mines and power companies to meet the challenges have been patchy, and often too little too late.
- The announcement of mine or power plant closures on short notice makes it extremely difficult for local communities and economies to adjust.
- Compensation for environmental degradation and renaturation measures are often left to government or communities to deal with. Site remediate is important to improve the quality of the local environment which is often very poor in coal communities but also because remediation can be an important source of low and mid-skilled at the most acute point of the transition when redundancies are fresh. There is now a range of successful examples of the use of site remediation and industry regeneration to improve the local environment and economy.

Recommendation:

Governments should mandate responsibilities for coal companies to prepare for the transition and take responsibility for site remediation:

Policy measures should be taken to facilitate and mandate the coal industry to start the transition process and implement site regeneration initiatives. Important elements include tools such as guidelines to help companies plan and information about good practice where remediation created value for the companies as well as local workers; mandatory notice periods for closures; mandatory requirements for establishing funds to be allocated for environmental remediation.

Beyond the four areas with international activities, there are further aspects to consider and address:

7. *Apply environmental quality regulations can also be an important lever for creating change*

- Community concerns about environmental quality (e.g. air, water or soil) spur local protest and encouraged broader public campaigns creating awareness about e.g. health issues induced by the production and use of coal.
- The use of environmental regulations (e.g. environmental impact assessments) and insisting on rule compliance were a significant factor in a number of the cases to drive decommissioning or prevent the setup or expansion of mines
- In South Africa, regulations to address air quality in a global hot-spot for nitrogen dioxide have been an important focal point for campaigning in Mpumalanga. Compliance with air quality regulations is according to the Department of Energy one of the key factors behind their forecast that over 9 GW of coal plant will be de-commissioned by 2030. In Poland, plans to expand mining activities increasingly meet concerns and opposition of the respective communities over land deformations, damage to homes and impact on the local environment and infrastructure.



Recommendation:

Insist on rule compliance and mobilise for stronger environmental standards:

Burning and mining coal directly affects human health and natural resources, and communities who have traditionally been directly involved in coal mining or power production have disproportionately borne these burdens. Making demands place-bound and raising the awareness about the local impacts (e.g. argument about health or individual economic loss) provide easier to grasp reasons and generate local support for coal phase out. Using and insisting on the compliance with existing environmental rules can be an instrument to create additional pressure on the coal industry.

In some regions, environmental and social advocates can collaborate and combine their campaigns to raise awareness and mobilise public support for stronger environmental standards (for air, water and soil) to enhance human health, and to rehabilitate areas which have been adversely impacted by coal operations.

8. Energy poverty and other concerns of vulnerable groups have to be addressed in the transition process

- Vulnerable and marginalised groups including low income households are particular exposed to the sector transformation, however the situation in countries such as Germany and Poland is very different from South Africa and Indonesia
- A key justice concern is access to affordable energy services
- In Poland, the issue of energy poverty manifests mainly in thermal comfort and heating as an essential energy service. Since domestic coal is a very cheap source for heating, the coal phase out can increase the risk of energy poverty for households particular in rural areas and those living in detached houses. Hence the impacts of the transition to new energy sources particular for low income households have to be recognised and addressed.
- In the global south, still many people lack principal access to reliable and clean energy for basic needs, or pay a proportional high share of their income for electricity. Hence providing energy services is embedded in a broader agenda of sustainable socio-economic development, wellbeing and quality of life to ultimately eradicate poverty.
- Government interventions and investment in small-scale RE developments and energy efficiency and retrofit programs are key measures to address these issues
- Other concerns are related to land rights issues, lack of access to information and participation in decision making processes, and increased exposure to health/ environmental harms induced by energy production and consumption

Recommendation:

Recognise and tackle the adverse impacts of the transition for vulnerable groups and eradicate energy poverty by providing access to distributed RE and energy efficiency solutions

Empowering vulnerable groups in the transition process is a societal responsibility which requires a national and international approach. This includes collaborations with welfare groups



6 Conclusion

The concept of energy justice offers a decision-making tool that can assist politicians, policymakers, communities and consumers in making more informed choices as they implement (or experience) the energy transition. It comprises a complex set of principles and criteria that go well beyond technological and economic considerations for a future energy system. Since coal still represents a major energy source and constitutes the primary livelihood for many communities, a transition can only be equitably realised if a fair process, local concerns and human rights are respected and addressed. This imperative is magnified if the transition is rapid, as it must be if the global temperature rise is to be kept within acceptable limits.

However it has to be acknowledged that there is **no one size-fits-all** solution. The challenges of the coal regions are similar but definitely not identical. Hence, it is important to continue working on the ground, to see what areas of commonality and what specificities there are. While some regions are just at the beginning, other regions are planning and implementing many new ideas and projects such as developing geothermal and hydro energy in former coal mines, investing in e-mobility, digitalisation and data centres, building innovation parks and forming local energy communities or supporting the tourism and agricultural sector.

Moreover, energy justice requires the global and intergenerational dimensions of energy systems to be recognized and considered. Thus, the universal right to affordable energy access should be fully integrated into the energy transition, at the same time as the equitable distribution of environmental costs between current and future generations requires a greatly accelerated phase out of coal.

The four cases studies have offered a number of ideas, policy examples and good practices which can assist structural transformation processes to phasing out coal production and use. In addition, the framework offers criteria and guidance on principles to incorporate into energy transition planning. Eventually, “the dominant model of energy policy—business as usual, what we’re doing now—can only be endorsed if one has extremely limited criteria for assessment” (Sovacool et al. 2017).



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