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Just Transitions: A Review of How to Decarbonise Energy Systems While Addressing Poverty and Inequality Reduction

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Abbreviations

ALMPs	active labour market policies
ALUCF	agriculture, land use change and forestry
CA4J	Climate Action for Jobs
CCT	conditional cash transfer programme
COP	Conference of Parties
EU	European Union
GDP	gross domestic product
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
LPG	liquified petroleum gas
LMIC	low- and middle-income country
MIC	middle-income country
NDC	nationally determined contribution (in the context of the Paris Agreement)
REDD+	an international framework for activities that reduce emissions from deforestation and forest degradation
SDG	Sustainable Development Goal
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

Executive summary

Background and aim

Just transitions are at the centre of the global policy agenda, as recognised (implicitly and explicitly) in the Paris Agreement and the "Glasgow Climate Pact" from COP26. In a broader sense, just transitions reconcile two critical challenges that we face. We need urgent, transformative efforts to eliminate emissions and halt warming at 1.5 degrees Celsius, but emissions reduction should not halt efforts to meet other Sustainable Development Goals, such as those focusing on reductions in poverty and inequality. It should follow the "leave no one behind" principle and push the 2030 Agenda, as around 9 per cent of the global population lives in extreme poverty, and inequalities within countries are increasing. Addressing this issue is of instrumental significance to the goal of reducing harmful emissions. In fact, *not* considering the social dimensions of climate policies might make it difficult to implement some emissions reduction measures due to their low social acceptability. Many reforms have already been blocked for these reasons in recent years; and research has found that fairness is the most important driver of public acceptability of climate policies. Therefore, paying attention to poverty and inequality reduction both strengthens the political economy and makes more ambitious climate policies possible.

As with most of the research on just transitions, this paper focuses on the decarbonisation of the energy sector. This focus is justified given the energy sector's large share in global emissions, as well as the high potential for emissions reduction it offers compared to that of other sectors. Most of the just transitions debate, moreover, puts employment effects at the centre of the analysis – a focus that has its roots in the political voice of trade unions. However, an exclusive focus on workers in carbon intensive energy industries runs the risk of missing the bigger picture, and this paper therefore takes a broader perspective. In fact, the final goal of transitioning to decarbonised energy systems can only be reached through a range of policies that, in turn, significantly affect poverty and inequality. Two such policies, namely carbon pricing and the removal of fossil fuel subsidies, are considered particularly efficient tools to incentivise emissions reduction and drive energy transitions; these policies are also at the centre of international climate negotiations and national policy planning. But, if not mitigated through social protection programmes, the adverse effects of carbon pricing and subsidy reforms on poverty, especially in the short-term, can be more significant than the effect of employment disruption in the energy sector alone. To understand the political feasibility of energy transitions and its consequences for poverty and inequality, it is therefore important to consider both the effects on employment and the short-term effects on prices.

Given this background, the discussion paper aims to answer the following questions:

- How can a just transition that gains wide popular support through distributional effects within and across countries and contexts be ensured?

- What instruments of social protection are needed and how do they work differently from each other?

Findings

Starting with a focus on employment in the energy sector, a *net increase* in the number of jobs is expected, given that energy from renewables creates more jobs compared to the generation of electricity from fossil fuels, but the effect is small. In addition, new jobs might not necessarily reduce poverty and inequality for two main reasons. First, jobs will be created in sectors with lower wages, meaning that workers will still live in poverty despite having a job. (These issues are particularly important in the context of lower-income countries due to the characteristics of their labour markets.) Second, these jobs might not be accessible to those without the required skills or the means to travel.

Moving beyond jobs in the energy sector, policies that will incentivise an energy transition away from fossil fuels will increase prices, especially in the short term. This is the case with carbon pricing and with the removal of fossil fuel subsidies, which will lead to higher prices of both energy and non-energy goods, thereby increasing poverty. This effect of carbon pricing can be more significant in terms of both absolute and proportional changes in global and national poverty than the effects arising from changes to jobs in the energy sector.

There are, nonetheless, viable options for achieving just transitions – reducing both poverty and inequality alongside a reduction in emissions. The analysis in this paper has focused on the role of social protection in both addressing job changes in the energy sector and increases in prices that hit all consumers arising from policies that spur on energy transitions. Active labour market policies have the potential to address employment disruptions and to enable lower-income workers to access jobs in the renewable energy sectors, but their coverage is limited in lower-income countries, and many policies can increase employment in the short term but are found to be unsuccessful in upgrading skills for longer-term changes in labour markets.

In terms of higher prices, *environmental fiscal reforms* can be used, whereby the revenue resulting from carbon pricing or reductions in fossil fuel subsidies funds cash transfers to households. Social assistance is well placed to fulfil this role, being the social protection instrument with the highest coverage in lower-income countries. Implementing environmental fiscal reforms, whereby the revenues from carbon pricing (or reforms of fossil fuel subsidies) is distributed back to households, can decrease poverty and inequality. But failures to target those most in need, and low administrative capacity, mean that many of the poor are still not reached by these programmes. While many advocate for universal rebates (giving the same per capita transfers to all), it is questionable whether universal coverage can be reached in the short term.

Policy implications and research gaps

From a policy perspective, it has been shown that policies that incentivise energy transitions (such as carbon pricing and fossil fuel subsidy reforms) can reduce poverty and inequality in the short-term when combined with social transfers. This would also address the social acceptability and political economy issues and, in turn, allow for more ambitious climate policies.

Nonetheless, the design of the policy needs to be given close consideration. To maximise a reduction in poverty and inequality and avoid dualistic social protection systems (formal vs. informal), one solution could be to start with social assistance policies and link or add labour market policies to them; this is increasingly done in Latin America. Moreover, the need to expand social protection in lower-income countries can be pushed through recent global initiatives, launched at the COP and other international arenas taking advantage of the expansion of social protection during the COVID-19 recovery period.

In terms of research and policy gaps, just transition debates need to go beyond the energy sector and better represent the socio-economic priorities of lower-income countries, specifically of some regions. For example, Africa and Latin America have larger emissions from agriculture, land-use change and forestry; therefore, emissions reduction from those sectors might be more relevant in terms of poverty and inequality compared to a narrow focus on the energy sector. This is important, as there is incomplete global policy coverage of emissions outside the energy sector; therefore, starting debates in national and international frameworks can facilitate the integration of social objectives into climate policies in rural sectors.

Finally, there needs to be a better understanding and agreement on fairness and ambition of climate policy at the international level, and the use of equity frameworks and ethical parameters. This would serve in monitoring and quantifying international support for poorer countries. This is crucial, as limited resources and access to technologies, alongside the previously mentioned inequitable distributions, constrain the capacity of lower-income countries to achieve just transitions.

1 Introduction

To avoid devastating climate change effects, global emissions need to be quickly reduced in the next decade, and reach net zero by mid-century. The "just transitions" concept recognised that urgent efforts to mitigate climate change and halt warming at 1.5 degrees Celsius should go hand in hand with efforts to reduce poverty and inequality, as these social objectives should be intrinsic to all government policies. This also reflects the Sustainable Development Goals (SDGs) of the Agenda 2030, which aim to achieve environmental, social and economic goals jointly. As the impact of climate change will persist for some time, exacerbating poverty and inequality, it is critical to avoid a triple injustice whereby the poorest people (and countries) that have contributed least to climate change will suffer the most from climate change effects *and* from climate change mitigation policies.

Linking environmental policies to social objectives is not just intrinsically critical, however, but also instrumental in that efforts to mitigate emissions could be more ambitious if they were to consider social outcomes. On one hand, inequality and poverty might directly lead to increased emissions through various channels. For example, the large economic and political power of vested interests in the fossil fuel and carbon intensive industries often obstructs policies to mitigate climate change; similarly, given consumption inequalities and high-carbon lifestyles, the wealthier individuals represent the largest share of the global footprint. On the other hand, public acceptability is identified as critical to implement climate policies. If a climate mitigation policy is considered to be unequal or to increase poverty, it is unlikely to be implemented due to public protests; as has been seen on several occasions in recent decades (Klenert et al., 2018).

Given this background, just transitions are at the centre of the global policy agenda, as recognised (implicitly and explicitly) in the Paris Agreement, the Glasgow Climate Pact from COP26 and by the recent Intergovernmental Panel on Climate Change (IPCC) report on mitigation (IPCC, 2022). In addition, the governments of South Africa, France, Germany, the United Kingdom, the United States and the European Union (EU) have announced at COP26 a Just Energy Transition Partnership to support South Africa's transition from coal to a more climate-friendly energy production. Most importantly, the partnership underlines the importance of justice in the transition, in order to promote employment and livelihoods (EC [European Commission], 2021).

The literature and policy processes around just transition usually focus on the energy sector and its workers, and this paper also focuses on the decarbonisation of the energy sector. This means that particular attention is given to how the production of electricity and heat can be made more environmentally friendly, whilst addressing adverse impacts on those who work in industries producing fossil fuels, and the communities that depend on them. This focus is partially justified by the significant contribution made by energy production to global emissions; the energy sector, which generates electricity and heat, comprises around 34 per cent of global emissions, and it is considered an easy sector to decarbonise in the short term. In addition, given that the decarbonisation of the economy also entails using electricity instead of fossil fuels for transportation (which currently accounts for 14 per cent of global emissions), cooking, and heating, the energy sector will become even more important

(Lamb et al., 2021).[1, 2] In parallel, the focus on the energy sector also reflects the strong advocacy of organisations that represent workers in the sector (especially coal miners), as outlined in Section 2.

Moreover, most of the debate on just transitions puts employment effects at the centre of the analysis, a focus that has roots in the political voice of trade unions. Here, however, this paper takes a broader perspective because a narrow focus on employment effects in the energy sector represents a limitation in many ways. To start with, energy transition also touches employment in other sectors (directly and indirectly), especially ones involved in the supply chain of renewable energy generation. Most importantly, the goal of decarbonising the energy sector will not be achieved in a vacuum, but through the implementation of a range of policies that will also have an impact on poverty and inequality beyond workers in the energy sector (Lamb et al., 2020). For example, putting the right price on emissions through carbon pricing or the removal of fossil fuel subsidies will be required to steer investments into renewable energy. These policies will affect consumers, as the cost of electricity or fuel increases in the short term; this is especially true for low-income households with low capacity to adapt (such as not having the resources to buy an electric vehicle). The poverty-increasing effects of carbon pricing can be potentially much larger than the effects resulting from job disruptions due to energy transitions.[3] Going beyond a narrow focus on employment in the energy sector was also underlined in the recent IPCC report on mitigation, which stated that just transition should ensure that no people, workers, places, sectors, countries or regions are left behind in the move from a high-carbon to a low-carbon economy.

Given this background, this paper has three main aims. The first is to critically summarise the literature on the ultimate effects of energy transitions, and specific policies to achieve the transition (carbon pricing), on poverty and inequality. The paper has an explicit focus on the links with monetary poverty and inequality as key social dimensions of interest. We nonetheless recognise that income is just one of multiple social dimensions to be considered. For example, a reduction in air pollution will lead to health gains. The second and main objective is to critically examine which social protection mechanisms can be used to enable just transitions i.e. such that energy transitions, including policies to incentivise them,

1 Remaining global emissions come from agriculture, land use change and forests (21%), industry (25%) and buildings (6%).

2 It is argued that the decarbonisation of all sectors in the economy and aforementioned sources of emissions has to be achieved through five pillars of action: i) phasing out of fossil fuel electricity generation and replacing it with carbon-free sources such as wind and solar power; ii) using electricity instead of fossil fuels for transportation, cooking, and heating; iii) increasing public and non-motorised transportation; iv) halting deforestation and planting trees, which will require shifting diets away from animal-based foods towards more plant-based food, and; v) reducing waste in all sectors, recycling materials, and switching to sustainable construction materials, such as wood or bamboo. In terms of emission reduction potential, the transport and (heavy) industry (steel, cement, and chemicals) are known as "hard to abate" due to the immense challenge of electrification and the costs of transition.

3 As a further example, there are potential trade-offs, especially in relation to the deployment of renewable energy (Lamb et al., 2020); grid-level solar, wind and hydropower projects, despite increasing employment opportunities, might have negative effects on livelihoods and poverty, such as involuntary resettlement; they might also fail to achieve procedural justice due to inadequate consultation by authorities and companies. Therefore, for poverty and inequality it is important to understand energy transitions more widely, and to look at the diverse range of policies used to achieve them, which might have different effects on poverty and inequality.

actually reduce, rather than increase, poverty and inequality. A third and final aim is to propose a way forward in terms of policy action, such as international financing and policy initiatives, and research foci, such as the need to consider just transitions beyond the energy sector, especially for poverty (and inequality) reduction.

In summary, the paper argues that it is possible to make energy transitions just, but that it is not an automatic outcome. In fact, energy transitions will generate both opportunities (including net gains in total employment; improvements in job quality and working conditions, more resilient and democratic energy systems) and challenges (including job losses and displacement of unskilled and poorer workers due to economic restructuring; stranded assets; adverse effects on the incomes of poor households from higher energy and commodity prices; potential increase of social marginalisation of certain groups) for the reduction of poverty and inequalities (Lamb et al., 2020; Peñasco, Anadón, & Verdolini, 2021). Proper design of policy mixes combining socio-economic and climate policies are needed. One example considered is *environmental fiscal reforms*, where revenues from carbon pricing and fossil fuel subsidy reforms are directly recycled to households through cash transfers. In this sense, an expansion of social protection coverage in lower-income countries is required; this should also benefit from coordinated international financing initiatives, as well as from the expansion of social protection as a response to the COVID-19 pandemic.

The paper is structured as follows. It first explores the definition of just transitions in Section 2, looking at both the historical development of the concept and the current understanding applied in this paper. Section 3 concentrates on a specific outcome: how energy transitions affect jobs and, as a consequence, poverty and inequality. Section 4 looks at how social protection policies can be used to address these issues and make energy transitions more socially just and inclusive. In Section 5 the paper goes beyond the focus on employment by considering how enabling policies for just transitions, such as carbon pricing, central to COP26 and in post-COVID-19 recovery, can reduce poverty and inequality whilst reducing emissions, thereby achieving just transitions. Section 6 discusses how to expand social protection. Finally, the paper outlines the main policy implications and proposes next steps to accelerate the implementation of just transitions.

2 What is a "just transition"? Going beyond a narrow employment perspective

The concept of just transitions has its roots in labour movements from the 1970s trying to address workers displaced from their jobs in the process of phasing out polluting industries for the benefit of the environment (Stevis, Morena, & Krause, 2020). The United Nations Framework Convention on Climate Change (UNFCCC) of 1992 (UN [United Nations], 1992) and the Kyoto Protocol (UN, 1997) recognised the importance of addressing social dimensions involved in the path towards reaching climate mitigation objectives, particularly in low-income countries. The UNFCCC states that all member states need to take action towards the climate but also by considering their common but differentiated responsibilities and their specific national and regional development priorities. The first explicit reference to just transition can be found in the preamble of the Paris Agreement arising from Conference of Parties (COP21) held in 2015, which mentions the need to take "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...” (Healy & Barry, 2017). In parallel, in 2015, the International Labour Organization (ILO) approved the *Guidelines for a just transition* (ILO, 2015), which were meant to help countries transition to low-carbon economies through action aligned with both their NDCs (Nationally Determined Contributions, in the context of the Paris Agreement) and SDG 8, which calls for decent work and economic growth. The guidelines underline the role of social dialogue (especially between workers’ and employers’ organisations) and list nine key policy areas and institutional arrangements where environmental, economic and social sustainability can be addressed: (i) macroeconomic and growth policies; (ii) industrial and sectoral policies; (iii) enterprise policies; (iv) skills development; v) occupational safety and health; (vi) social protection; (vii) active labour market policies; (viii) rights and (ix) social dialogue and tripartism.

In subsequent UNFCCC COPs, the concept of just transition became increasingly important. First, just transition was central to COP24 (Katowice, 2018) which culminated in the adoption of the “Silesia Declaration on Solidarity and Just Transition”.[4] The declaration provides a broader vision for an equitable and fair response to the challenges faced by the communities and countries affected by transition (Jenkins, Sovacool, Błachowicz, & Lauer, 2020). Second, COP25 in Madrid, following the United Nations Climate Action Summit 2019, where some 46 countries made commitments to support a just ecological transition by formulating national plans for a just transition through social dialogue, saw the launch of the initiative Climate Action for Jobs (CA4J). Third, the main multilateral outcome of COP26 in 2021, the Glasgow Climate Pact entails two references to just transitions, focusing on low-emission energy systems and job creation; it also recognises the need to support developing countries in their just transitions. Finally, many countries have started to set up commissions for just transition (IPCC [Intergovernmental Panel on Climate Change, 2022).

While a narrow focus on jobs in the energy sector is implicitly assumed in most policy and academic debates, there is no agreed definition. One important point to consider is the need to go beyond labour markets and workers in specific industries, towards a more holistic concept already used by some. In fact, not only workers but also consumers might be affected by energy transitions and climate policies, for example through price changes. Policies that used to decarbonise the energy sector, such as the removal of fossil fuel subsidies, will also have consequences for the price of household energy and transportation. The importance of considering different actors and groups beyond workers was underlined in the latest and recently published IPCC report on climate mitigation (IPCC, 2022); it was also demonstrated at COP26 in Glasgow, where the concept of just transition was used beyond the usual limited concept of a trade-off between keeping jobs and promoting environmental protection. There were also calls for a more significant inclusion of agriculture in just transition debates, for example through a shift towards agroecology, pushed by initiatives such as a Just Rural Transition Initiative and the Policy Dialogue on Accelerating Transition to Sustainable Agriculture (UKCOP26, 2021).

What seems to be agreed is that the concept of just transitions needs to address different forms of justice, given its roots in debates on environmental, climate and energy justice,

4 As an intermediate step, the “Talanoa Dialogue” (UNFCCC, 2018), initiated at COP21 (Paris 2015), and launched at COP23 (Bonn, 2017), underlined the importance of holistic approaches across multiple economic sectors for climate change mitigation.

which include three dimensions of justice: *distributive* justice, meaning that there must be an equitable distribution of the benefits and burdens of the transition (based on principles such as equality or equity), including across generations; *procedural* justice, underlining that the decision-making processes about the impacts of and responses to climate change need to be fair, accountable, and transparent; and r*ecognition* justice, calling for no group of society to be ignored, discriminated or marginalised in policy decisions. These three dimensions are interlinked and need to be considered jointly for a more integrated approach to just transitions. Nonetheless, looking at procedural and recognition justice is beyond the scope of this paper, which focuses mainly on the distributional dimension. But it is important to state that the poorest are often not involved in consultations and public debates. As seen also in previous episodes, public acceptability and citizen support also plays a critical role in the implementation of energy transitions and related policies.

In the next sections we focus mainly on the evidence on poverty and inequality (distributive justice), touching also on how this in turn affects procedural and recognition justice. We look first at the effects on jobs in the energy sector, and then at the poverty and inequality effects through higher prices.

3 Energy transitions and jobs

We start by looking at how energy transitions affect employment outcomes for communities and workers. The main issue is that while energy transitions might result in a net increase in jobs (the difference between jobs lost and those created), new jobs might not be available to those without the required skills or the means to travel to them, and jobs losses might hit disadvantaged people and communities. Therefore, in terms of poverty and inequality reduction, alongside overall changes in the number of jobs, it is important to understand: i) what type of jobs are created; and ii) who would benefit from them. This is in line with many international manifestos, such as the ILO guidelines for a just transition to meet sustainability in a socially equitable way (ILO, 2015), and the Climate Action for Jobs Initiative to operationalise those guidelines. These aforementioned initiatives aim to understand the scale, quality and inclusiveness of shifts of jobs away from fossil fuels.

We present here a brief explanation of the main concepts, and a summary of the research and policy issues in relation to this topic.

3.1 Framework: energy transitions, net changes in jobs and distributional employment implications

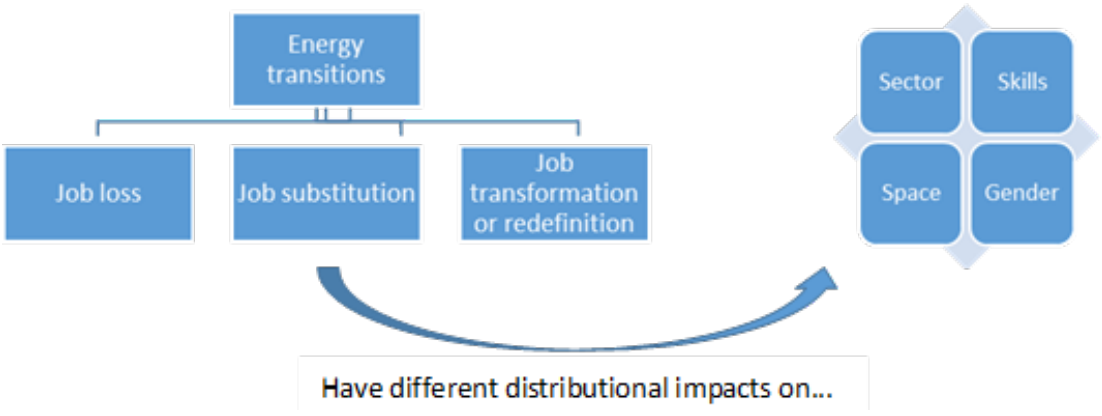
Before looking at the evidence, some conceptual clarifications are necessary. First of all, net changes in jobs are the overall result of four processes: job loss, job creation, job substitution, and job transformation or redefinition (see Figure 1). While job loss and job creation are usually at the centre of attention, the other two categories are also important. Job substitution means that the same objective is performed by a new job; job transformation occurs when workers do not lose their jobs but need to change their skills and tasks. It is crucial that these differences are acknowledged if energy transitions are to be socially just.

Secondly, changes can occur in jobs directly involved in the energy industry, in those indirectly involved (such as component manufacture), and also induced energy jobs, as a consequence of the macroeconomic effects of the energy transition (IRENA [International Renewable Energy Agency], 2020; Sharma & Banerjee, 2021).[5] Due to methodological reasons, most studies focus on jobs in the energy industry, and a large proportion also considers indirect jobs.

In addition, the distribution of jobs created and lost can be analysed through different dimensions. First, the space dimension can be considered (Sharma & Banerjee, 2021). On the one hand, there are occasions when the effects will be concentrated; this is the case, for example, for coal-mining communities that would be strongly impacted if coal mines were to close. In other cases, the effects can be more spatially sparse. A second dimension is workers' characteristics, namely education and skills; it is critical to understand which type of workers are more in danger, as well as which skills and tasks will be more in demand by the new jobs created. As a third category, it is important to understand which sectors will be most impacted by the energy transition. While jobs directly involved in the energy sector are most easily identified as affected by transition, it is more difficult to identify induced and indirect jobs. Fourth, and equally important, there is a gender dimension. Women are often excluded in the energy industry and in energy policy, thereby rendering their circumstances invisible (Mang-Benza, 2021). Not only do men and women have different energy needs, as women are more likely to engage in unpaid household work and therefore depend more on affordable and reliant energy (EIGE [European Institute for Gender Equality], 2017), but an energy transition that fails to consider all possible consequences for women might entrench gender and broader socio-economic inequalities. It is important to provide new skills and employment for women in an industry that is male-dominated.

These definitions matter in particular to the design of policies that address distributional effects, as we will explain later. For example, the sectoral or geographic concentration of job losses can have significant effects on the political economy, as geographically concentrated workers are more likely to be organised into trade unions.

Figure 1: Employment effects and distributional dimensions to be considered in an energy transition



Source: Author

5 Here we focus on energy rather than green jobs.

3.2 Energy transitions and jobs: evidence on actual experiences and simulations

What does evidence on the effects of energy transitions on jobs reveal? To answer this question, we can rely on different strands of evidence. The first involves actual experiences, most of them in advanced economies. This evidence, nonetheless, focuses on just a few (high-income) countries and a few policies; earlier studies have focused in particular on pollution control regulations, such as the Clean Air Act of the United States. This empirical literature broadly agrees that clean energy transitions will have a net positive impact on labour, meaning that the new green jobs created in renewable energy (RE) sectors will more than compensate for the jobs lost in fossil fuel ones. But this positive net effect of environmental policies on employment has been found to be small (Popp, Vona, Marin, & Chen, 2020). In addition, studies find job losses concentrated in polluting industries (Kahn & Mansur, 2013) and among unskilled workers (Marin & Vona, 2019; Yip, 2018).

There is no solid evidence reporting the effects of energy transitions in the job market in low- and middle-income countries (LMICs). In the absence of adequate data for ex-post analysis, simulations therefore need to be considered; this means that a range of methodologies have had to be used to examine potential impacts on jobs.[6] Some studies look at a global perspective and estimate the number of net jobs created. If the world meets the 2-degree target by 2050, there might be an increase in direct energy jobs from today's 18 million to 26 million. Malerba and Wiebe (2020); Montt et al. (2018) estimate that there will be a net job increase of 0.3 per cent by 2030, equal to 18 million net jobs. The main reason for this net increase in jobs is that expenditure on renewable energy creates more jobs compared to the equivalent expenditure on fossil fuels; it has been estimated that US$1 million spent on the renewable sector creates 7.49 jobs, and the equivalent spent on the fossil fuel sector creates 2.65 jobs (Garrett-Peltier, 2017).

Following Figure 1 in the previous section, we summarise the distributional impacts along the four dimensions of interest (space, skills/education, sectoral and gender). In terms of sectors, while fossil fuel extraction jobs will decline dramatically, renewable energy jobs will expand rapidly. By 2050, it has been estimated that around 84 per cent of all direct energy jobs could be in solar and wind generation and the manufacturing of the respective energy technologies (Pai, Emmerling, Drouet, Zerriffi, & Jewell, 2021). Ram, Osorio-Aravena, Aghahosseini, Bogdanov and Breyer (2022) find that, in the context of an accelerated uptake of renewable energy, direct energy jobs associated with the power, heat, transport and desalination sectors will increase substantially, from about 57 million in 2020 to nearly 134 million by 2050. One of the main reasons for this increase in jobs is that value chains in renewables and sustainable technologies are found to be more labour intensive than extractive fossil fuels. In a more poverty-focused analysis, Malerba and Wiebe (2020) estimate that (using national rather than the international poverty line) 20 per cent of workers in a sample of middle-income countries (MICs) live in poverty. This is especially true in agriculture, where the percentage rises to 35 per cent.[7] What might also be relevant is that the sectors that will see the biggest gains in jobs from an energy transition are also the ones with the highest rates of in-work poverty (see Figure 2).[8] In fact, the majority of

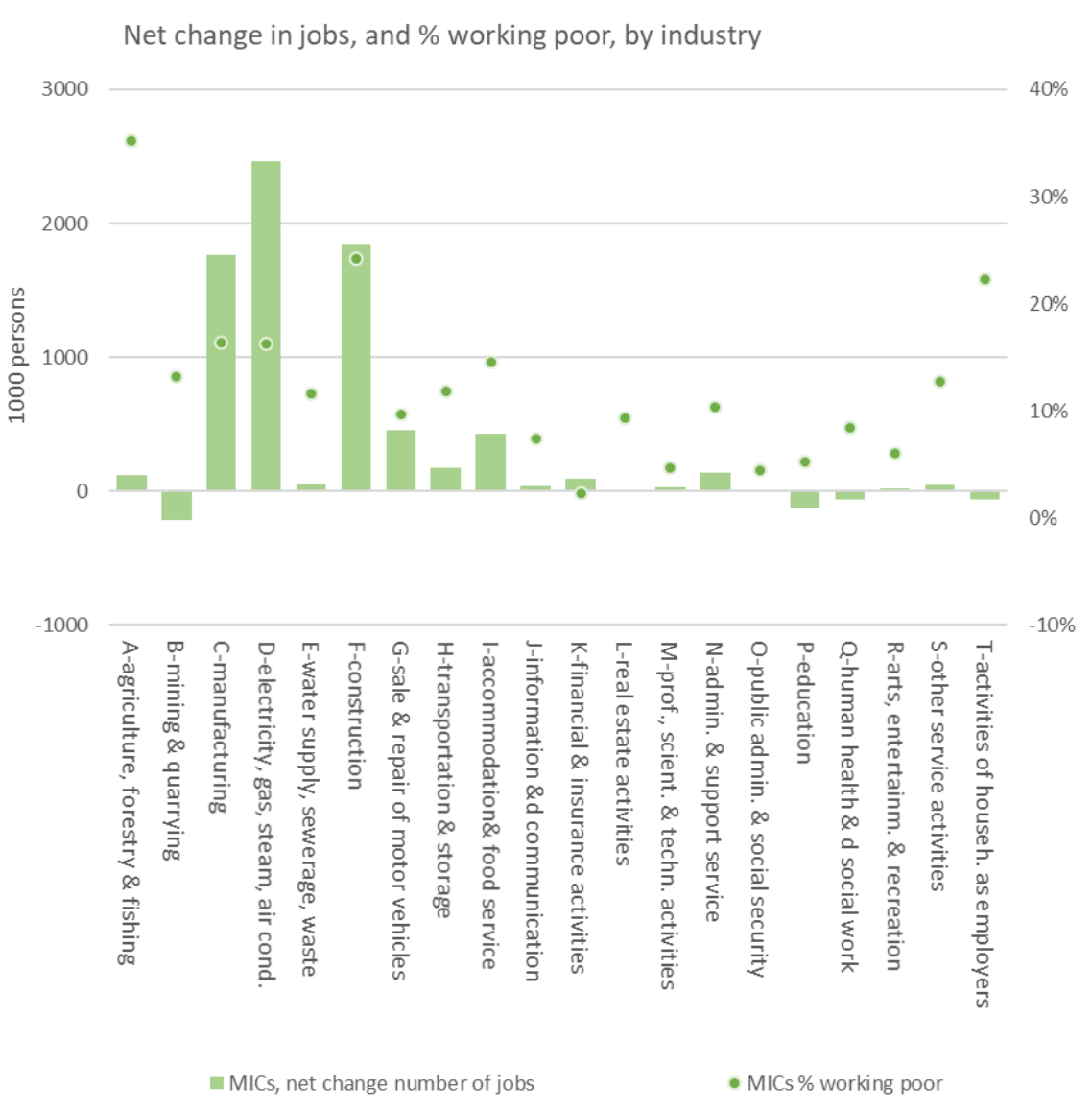
6 These methods include computable general equilibrium models or macro-econometric models to quantify overall shifts in employment in the economy; input-output models; energy systems models.

7 Around 13% of the global workforce lives in extreme poverty (most of them in informal employment), while a further 8% are in moderate poverty; trends are improving though.

8 The five MICs considered in the study are Brazil, China, India, Taiwan and South Africa.

the jobs increase will be in the sectors of manufacturing, construction and electricity.[9] Apart from agriculture, these sectors show overall relatively high in-work poverty rates (especially construction, with almost 30 per cent). This needs to be considered, as even if it is the case that jobs created that are specifically linked to renewable energy production are of better quality than those in construction or manufacturing, the majority of jobs in the supply chain for renewable energy (a proportion of the direct jobs) and auxiliary job creation (indirect jobs) might not be of better quality. Therefore, the type of jobs created is critical, as having a job does not necessarily mean being out of poverty (and being covered by social protection).

Figure 2: Jobs created from energy transitions and current poverty rates, by sector (for MICs only)



Source: Author's elaboration based on ILO and Malerba and Wiebe (2021)

9 Therefore, reforming the construction sector in order to mitigate climate change can contribute to reducing poverty. In fact, around 111 million people (7% of the global workforce) work in the construction sector, with the majority of them in LMICs.

From a geographical perspective, while most countries will see net job increase, China and countries that export fossil fuels, such as those in the Middle East, could witness net job losses (Pai et al., 2021). This is especially important for communities within those countries that heavily depend on the production and export of fossil fuels. On the contrary, sub-Saharan Africa experiences the highest growth in total energy jobs created across the world, increasing from around 2 million in 2020 to 12 million by 2050. As most of the energy infrastructure is yet to be built in this region, there is massive potential for developing renewable energy and creating jobs for the local populations (Ram, Osorio-Aravena, Aghahosseini, Bogdanov, & Breyer, 2022).

From a skills perspective, the disaggregation of jobs by the associated formal educational requirements underscores some important points. One of them is that energy transition can create opportunities for people with a range of skills and educational levels; low-skilled jobs are projected to see the largest relative changes; this is probably because the proportion of low-qualified labour is greater than average in the sectors investigated (Malerba & Wiebe, 2020). The prevalence of jobs requiring a primary or secondary level of education rather than those requiring academic credentials also points to the central role of workplace learning (IRENA, 2020). Many jobs in the renewable energy sector can be accessed with on-the-job training to ensure that workers have the necessary skills.[10]

From a gender perspective, the construction and mining sectors remain largely male-dominated, with women earning less (In the construction sector the average difference is 17 per cent less than men). The gender wage gap is widest among workers with the lowest income (ILO, 2020). On the other hand, jobs in the renewable energy industry are of better quality than those in the fossil fuel industry, and offer women better representation (Garrett-Peltier, 2017).

3.3 Importance for low- and middle-income countries

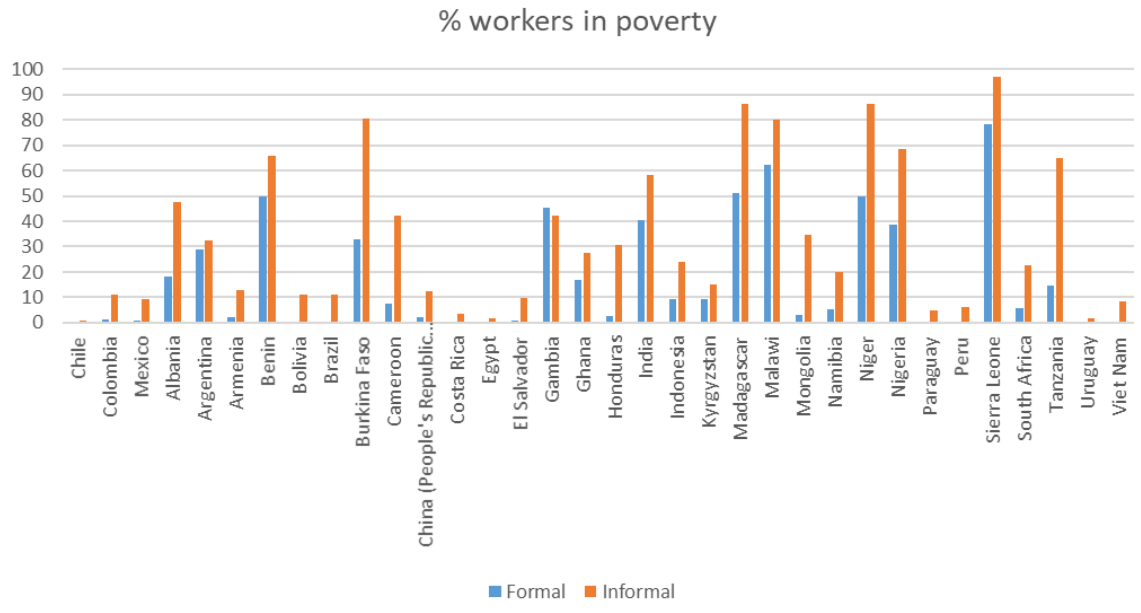
The aforementioned issues are critical in the context of LMICs. The reason is not just that (extreme) global poverty is concentrated in those countries and that within-country inequality is increasing (Gradín, Leibbrandt, & Tarp, 2021), but it also relates to the particular features of the labour markets in LMICs (Hafstead et al., 2018). On the one hand there is high unemployment and low productivity, with a larger proportion of people engaged in agriculture and self-employment. The high incidence of self-employment is primarily driven by the lack of sufficient wage employment opportunities available, with the cost of waiting for a (formal) wage job too high for most people. In addition, just energy transitions entail different types of job disruptions (job loss, creation, substitution and transformation), which are more difficult to address in the context of LMICs due to significant misalignments in the labour markets (IRENA, 2020), including: *temporal misalignments*, meaning that job losses precede job gains, which leads to the potential for unemployment; *spatial misalignment*, where the creation of new jobs is in a different region or area; *educational and skills misalignments*, meaning that skills required for new jobs do not match the ones of the current workforce and especially those of the people who would lose their job. In general, labour is far less mobile across sectors than in industrialised

10 It should be noted, however, that referring to "lower" skills in a formal sense does not mean that many jobs in factories or in construction do not entail valuable practical skills.

countries (Hafstead et al., 2018). Given these features of labour markets, assuring justice in energy transitions is much more difficult in LMICs than in advanced economies.

One reason for these issues, and a critical feature linked to poverty and inequality, especially in developing countries, is informality. The World Bank has estimated that in emerging and developing economies, the informal sector accounts for about a third of GDP and more than 70 per cent of employment (Ohnsorge & Yu, 2021).[11] Large informality has implications for social protection coverage as well as for poverty and inequality. In terms of the former, the coverage of social insurance and unemployment benefits (but social protection as a whole) is much lower in informal settings. In addition, even the few employed in offices and factories are mostly not covered by government-run job-security programmes and are not receiving any form of protection from job loss. In terms of poverty and inequality, informality usually means lower wages and no protection, resulting in higher levels of poverty and inequality. As we see from Figure 3 below, new Organisation for Economic Co-operation and Development (OECD) data shows that poverty rates among informal workers are much higher than the ones among formal workers. This is especially the case for women, who are more often in situations of workplace vulnerability than are men, and tend to earn lower incomes (ILO, 2018).

Figure 3: Percentage of workers in poverty, by country and informality status



Source: Authors elaboration based on OECD data

A decent job is defined by ILO as one that

> involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men. (ILO, 2016a, p. 3)

11 In this regard, a higher proportion of women than of men are in informal employment in LMICs (ILO, 2018, p.20).

To ensure that such jobs are created, employment needs to be formalised in order to increase the share of workers with social protection coverage; this is especially important for the protection of women and their livelihoods. In parallel, along with the formalisation of jobs, there needs to be an increase in social protection for the informal sector through different contributory and non-contributory mechanisms. The ILO has estimated that worldwide only 3.6 per cent of GDP is spent on public social protection to ensure income security for people of working age.

4 The role of social protection programmes for jobs in just transition

The previous section has conveyed two main messages. First, poor and low-skilled people (in specific sectors and communities) might be impacted by job losses and might also be hindered from taking advantage of new jobs; this might, as a consequence, increase inequality. Second, the type of jobs created is critical, as having a job does not necessarily mean being out of poverty (and being covered by social protection). A significant share of the global workforce lives in extreme poverty (most of them in informal employment). Moreover, female low-skilled workers are more often unemployed or out of the labour market than are male low-skilled workers (EIGE [European Institute for Gender Equality], 2017).

Social protection schemes can help in addressing these two issues and ensure a just transition. In particular, such policies can help to minimise job losses and provide unemployment insurance (preventive function); provide income support (protective function); improve the employability of workers in sensitive sectors (promotive function). In addition, building an integrated social protection system that goes beyond isolated flagship programmes will have a better scope to make energy transitions inclusive and just. This means that, for example, social protection should not be restricted to compensating those in poverty for their income shortfall, but aspires to have a broader developmental role.

In the next section, we present the different instruments of social protection and their importance for poverty and inequality in LMICs; subsequently, we discuss how they can be best used to address job issues in the context of a just transition.

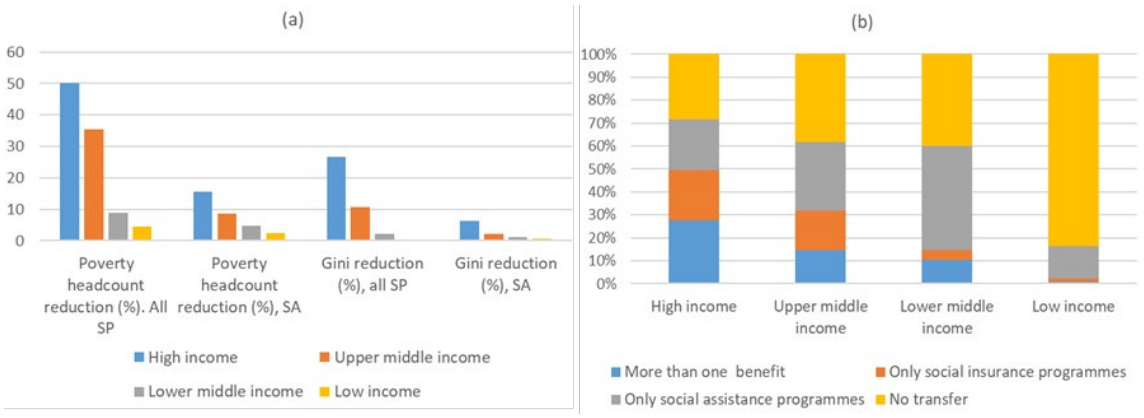
4.1 Social protection programmes

Social protection (SP) schemes comprise different instruments, namely social assistance, social insurance and labour market policies. The instrument most widely used currently in the context of LMICs is *social assistance* (SA), i.e. non-contributory transfers. Social assistance is particularly useful in informal contexts and where poverty is widespread, such as in Africa, and has the highest levels of coverage of all the social protection instruments, covering 45 per cent of the total population in lower-middle-income countries and 15 per cent in low-income countries (see Figure 4(b)). Yet, as the transfer amounts are so small, and targeting mechanisms do not reach the poorest, the aggregate effects on poverty reduction are insignificant. Figure 4(a) shows that social assistance has been found to substantially decrease poverty and inequality in the short term, especially in high-income countries, where poverty is reduced by around 15 per cent (social protection as a whole has

the effect of reducing poverty by around 50 per cent).[12] Figure 4(a) also shows that proportional reductions in inequality are smaller compared to reductions in poverty; in particular, when just social assistance is considered, the change in low-income countries is negligible.

The second instrument of social protection is *social insurance*, which unlike social assistance is contributory; it supports individuals in the event of contingencies and shocks such as illness, injury, disability, old-age and unemployment. Given the significant level of informal employment practices in lower-income countries, this instrument does not reach a large proportion of the population, and the poorest in particular. A third instrument is represented by labour market policies, both active (improving employability) or passive (such as unemployment benefits).[13]

Figure 4: Percentage reduction in (a) poverty and inequality and (b) coverage achieved by social protection instruments in different economic groups



Source: Author's elaboration based on ASPIRE data (World Bank, 2022)

4.2 Employment-related social protection programmes for just transitions

Social protection policies comprise different instruments, all of which can have a role in just transitions to avoid energy transitions increasing poverty and inequality through their effect on jobs. It is not enough to know that energy transitions will have a positive net effect on the *number* of jobs, as new jobs do not necessarily mean better jobs or lower poverty rates. Given the heterogeneous effects of energy transitions on employment, we summarise the use of different social protection mechanisms in Table 1, which shows the overall effectiveness of different programmes for poverty and inequality, its potential importance for just transitions and further notes.

12 Similar poverty reduction potential applies to LMICs when considering also longer-term effects, including behavioural responses; reduction of the poverty headcount ranges from a reduction of about 4 to almost 9 percentage points (Bastagli et al., 2019).

13 Some definitions also include social care services as a category, including "for those facing social risks such as violence, abuse, exploitation, discrimination and social exclusion'"

Table 1: Summary of social protection instruments for jobs for a just transition

Policy		Importance for just transitions	Limitations
Social assistance	Cash transfers	Highest coverage among social protection instruments in LMICs	Needs to be linked with ALMPs to have significant effects on employment outcomes for the energy sectors
Social insurance and passive labour market policies	Unemployment benefits	Gives a steady income flow in case of job loss and during the search for a new one	Low coverage: Due to informality not many workers are covered by social insurance in LMICs
ALMP	Vocational training	Can improve employment	Best if done inside the firm.
	Employment subsidies	Effective in tackling temporary (short-term) labour market shocks and keeping individuals active	Short-term effects only; limitations in promoting sustainable employment unless they are combined with other interventions
	Self-employment and micro-enterprise creation	Effective both at increasing the probability of employment and improving incomes	Long-term success of these policies is uncertain. It can also push households into deeper cycles of poverty and indebtedness.
	Employment services/ matching	Can signal skills and education levels	Little evidence of impacts on employment, unless interventions are linked to a (large) increase in new job opportunities. It currently has limited use in LMICs, where job search is done informally
Integrated social protection	Integrated graduation programmes	Theoretically, yes, as participating in activation programmes can be costly and time-consuming, and very often individuals simply cannot afford to do so	There need to be improvements in the supply side
	Cash for work/public works	Short-term effects on employment; it is more important for income support than for skills upgrading	No impact on the probability of employment in the medium-long term, or that the intervention locks participants into lower-quality job
	Combination of social assistance and ALMP	Participating in activation programmes can be costly and time-consuming, and very often individuals simply cannot afford to do so. Also helps the targeting of ALMPs at the poorest	Need to be carefully designed (for example aim for formal employment rather than self-employment); depends on certain key implementation features (governance system, targeting and linkages between, the income support and activation components)

Source: Author

Social assistance (upper part of Table 1) policies can address employment issues in just transition in two main ways. One is to provide a buffer in the case of unemployment and lack of unemployment benefits (formal insurance). A second is through investment in human capital and skills that can then enable people to apply for the new jobs and participate in the opportunities created by the energy transition. This can happen as a result of education

components of social assistance, such as conditional cash transfers that require school attendance; but it can also be a result of an income effect, where the transfer allows human (and physical) investments at the household level. This is especially needed for women, who are already underrepresented in the energy industry due to a gender gap in technology and engineering skills. In addition, contrary to the predictions of economic theorists, there has been no adverse effect of social assistance on labour participation (Banerjee, Hanna, Kreindler, & Olken, 2017; Barrientos & Malerba, 2020).

Social insurance is, unlike social assistance, a contributory scheme; it provides support in the event of contingencies such as unemployment. In relation to energy transitions, it can be used for periods of unemployment to give a steady income while looking for a new job. On the negative side, the coverage of social insurance is low in lower-income countries, especially due to the significance of their informal economies.

Labour market policies (central part of Table 1) can be divided into two main categories: passive and active. Passive policies are concerned with providing replacement income during periods of joblessness or job search, and work in a similar way to social insurance. Active labour market policies (ALMPs) can be important for re-skilling and connecting workers to new jobs created by the energy transitions. Here, we focus on ALMPs, looking at different issues and misalignments arising in the labour market. Despite their potential importance, the ILO has estimated that spending on ALMPs does not exceed 0.6 per cent of GDP in any region.[14]

ALMPs are made of different sub-components. One set of ALMPs looks at the demand side – trying to raise workers' employability by enhancing their skills. This set includes *vocational training* and *education programmes,* which have been found to be effective in improving employment (Escudero, Kluve, López Mourelo, & Pignatti, 2019), but their coverage remains low.

Another set of ALMPs looks at the *supply side* – increasing the demand for jobs. This includes *employment subsidies* to firms to employ new workers and *public works*. Research has concluded that these policies have not worked very well, especially in the long-term (Escudero, López Mourelo, & Pignatti, 2020). More specifically, activation measures designed to increase labour demand (such as public works) can be effective in tackling temporary labour-market shocks and keeping individuals active in the labour market, thereby counteracting employment disincentive effects. However, they might find limitations in promoting sustainable employment unless they are combined with other interventions (McCord & Slater, 2009). For example, existing evidence on the medium-term effects of public works finds either no impact on the probability of employment or that the intervention locks participants in lower-quality jobs (Escudero, 2018). These results suggest that the human capital accumulation component of these interventions is generally extremely limited and does not result in an improvement in the characteristics of the job found.

Self-employment and micro-enterprise creation programmes have been found to be effective both by increasing the probability of employment (Almeida & Galasso, 2010; Klinger & Schündeln, 2011) and improving incomes. However, as with public works, the

14 It is interesting to note how spending patterns differ by region. For example, sub-Saharan Africa spends the most on public works, and South Asia on employment subsidies. Employment services are, on the other hand, more prioritised in richer regions.

long-term success of these policies is questionable and is very dependent on local demand; in a few cases it has been shown how self-employment as a labour-market policy is pushing households into deeper cycles of poverty and indebtedness.

A third set of ALMPs looks at the connection between the demand and the supply side, to overcome market frictions. Studies have been more critical on the effectiveness of *job-search assistance*, especially in Latin America, where a high share of the hiring is done using informal mechanisms, such as recommendations and personal contacts (López Mourelo & Escudero, 2017). Studies on the impacts of search and matching services also tend to find little evidence of impacts on employment, unless interventions are linked to a (large) increase in new job opportunities. As for wage subsidy programmes, potential displacement effects mean that personalised services should be prioritised based on need and vulnerability. Services that assess capabilities can nonetheless be valuable, particularly in contexts where education systems might not be as effective in signalling skills and ability (McKenzie, 2017).

A final type of social protection policy is represented by *integrated social protection programmes*, which merge cash transfer with labour activation components. Graduation programmes aim to sustainably "graduate" individuals out of extreme poverty through an holistic package of support. Usually graduation programmes include a cash or food transfer, and services such as training or labour market intermediation. Similarly, there is a growing trend, especially in Latin America, where labour-market activation components are increasingly included in the conditional cash transfer programmes (CCTs) operating in the region. In general, these employment-related services have been provided either directly by the CCT programmes themselves or indirectly by facilitating the access to other programmes that include a labour market activation component (Cecchini & Madariaga, 2011). These interventions are based on the premise that, despite the crucial role of CCT programmes in providing income support during periods of economic instability, monetary transfers alone are not enough to reduce poverty in a sustainable manner.

There are many ways to integrate social assistance and labour market policies, which depends on the economic situation of a country. First of all, the integration of policies increases with a country's level of development, as does the variety of policies used. At the same time, ALMPs in emerging economies are rarely promoted as independent interventions (i.e. without a connection with income support programmes) (ILO, 2016b). Secondly, the higher a country's level of development, the more prevalent is the use of unemployment insurance within an integrated approach. On the other hand, in lower-income countries**,** where unemployment insurance schemes do not exist, the integrated schemes typically take the form of social assistance programmes that incorporate activation measures (Asenjo, Escudero, Liepmann, Pignatti, & Tabasso, 2019).

Do integrated combinations work? Theoretically, yes, as participating in active labour market policies such as activation programmes can be costly and time-consuming, and very often individuals simply cannot afford to do so. Moreover, income support also facilitates the search for adequate employment, reducing the pressure on individuals to accept any job they might be offered, regardless of its quality. Overall, the limited evidence has indicated that approaches exploiting the complementarity between ALMPs and income support are effective in improving the labour market perspectives of vulnerable workers while reducing some of the unintended negative effects these policies might have when implemented in isolation. Studies have also underlined that reducing dependency on monetary transfers through programmes that include labour market activation components is beneficial for

participants' labour market trajectories and it therefore constitutes a satisfactory exit strategy to more universal cash transfer programmes (López et al., 2017). Nonetheless, integrated approaches need to be carefully designed (for example aim for formal employment rather than self-employment). In addition, the empirical evidence suggests that the success of such approaches depends on certain key implementation features, including a transparent and inclusive governance system, appropriate targeting to ensure the participation of those in greatest need, and sufficient intensity of, and strong linkages between, the income support and activation components.

In summary, it could be beneficial to adopt integrated programmes at least in the short term. This would mean starting with social assistance programmes, which have the largest coverage in LMICs, and add labour market activation components.

5 Policies for a just transition for all: environmental fiscal reforms

While considering the impact on the number and type of jobs of the need to build and run sustainable energy systems is important, it gives an incomplete picture of how energy transitions might impact poverty and inequality. In fact, policies that incentivise and enable energy transitions through market and regulatory mechanisms (Rogge, Kern, & Howlett, 2017)[15] might affect poverty and inequality even more significantly. One of the most frequently advocated policies for energy transitions is carbon pricing (including carbon taxes and emission trading schemes) and fossil fuel subsidy reforms; these policies aim to put the right price on carbon and therefore efficiently incentivise investments in clean energy. An increasing number of countries, including LMICs, have already introduced carbon pricing schemes or plan to do so (World Bank, 2021); in parallel, subsidy reforms are part of the SDGs (Target 12.c) and were centre stage at COP26. Effects of carbon pricing on poverty and inequality can be much larger than the ones caused by job disruptions shown in the previous section. Using estimates presented in the following paragraphs, carbon taxes of the levels needed might bring into poverty more than 80 million people, whilst job losses from the measures discussed in the previous sections are in the range of 5 to 10 million.[16] Avoiding addressing justice issues within carbon pricing can also hinder their implementation; the main reason is that these policies might make prices of goods and services higher, especially in the short term, and thereby increase poverty. For this reason, social acceptability concerns are triggered as the increase in energy prices hits low-income households in particular, increasing their expenditure on energy without complementary measures to offset the burden. Many reforms, such as those implemented in Ecuador and Iran in 2019 or Nigeria in 2020, were blocked due to large-scale protests. COP26 also called for the protection of the poorest and most vulnerable with respect to phasing out fossil fuel subsidies. Therefore, not dealing with this might hinder the lead up to energy transitions analysed in the previous section.

This section explores how distributional justice within countries can be addressed through social protection programmes when carbon pricing and subsidy reforms are introduced. This policy mix is defined as *environmental fiscal reform*. While carbon pricing and fossil fuel

15 Carbon pricing is also used in all long-term integrated assessment models.

16 This was calculated using PovcalNet, by assuming a 3% incidence and following the methodology from Sumner, Hoy and Ortiz-Juarez (2020).

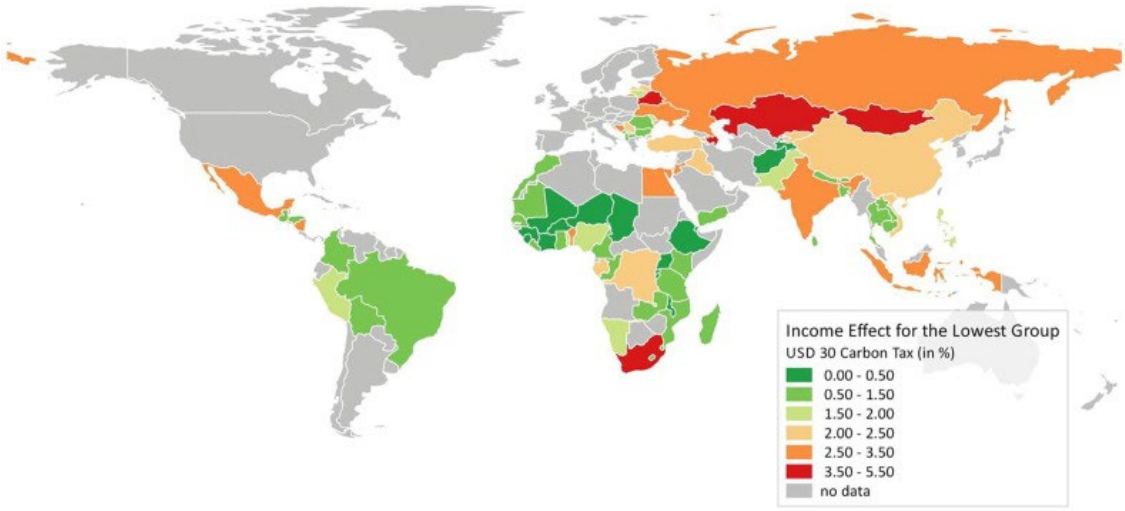
subsidy reforms alone are not sufficient to achieve climate mitigation goals, they represent a potential mechanism to reduce poverty and inequality in the short-term, when combined with social transfers in a socially balanced policy design. The section also outlines how international coordination is needed and can even strengthen distributional justice.

5.1 National level

From a national perspective, one solution is to implement environmental fiscal reforms, where revenues from carbon pricing and the removal of fossil fuel subsidies are used for social expenditures. In high-income countries, the tax revenue is used to reduce other distortionary taxes (income and labour). But this approach offers less potential in LMICs due to high income tax exemption thresholds and because the poorest part of the population works in the informal sector. Thus, recycling the tax revenue directly towards households through social protection schemes, namely cash transfers, is key to ensuring a socially just transition.

What is the evidence on the impact of carbon pricing on poverty and inequality in LMICs? Methodologically, the short-term effects of these policies can be analysed through ex-ante simulations; this is critical, as no adequate carbon pricing has been implemented yet in lower-income countries. Studies show that a carbon tax of around US$30–40/tCO$_2$ would increase poverty by around 1 per cent and increase the expenditure of the poorest households (if they want to maintain their consumption level) by between 1 an 5 per cent, as shown in Figure 4 (Dorband, Jakob, Kalkuhl, & Steckel, 2019). From an inequality perspective, there is a different distributional outcome in LMICs compared to high-income countries (where studies usually find regressive results, as poorer people are more affected relative to richer people), which is related to energy-use patterns. In poor countries, the expenditure share for energy increases with income; carbon pricing would therefore be progressive (Budolfson et al., 2021) as long as other important consumption items are not exceptionally carbon intensive (Steckel et al., 2021); this applies in particular if returns on capital are included in the simulations.

Figure 5: Percentage reduction in income of the extremely poor (those living on <US$2.97 a day) represented by a carbon tax of US$30/tCO2

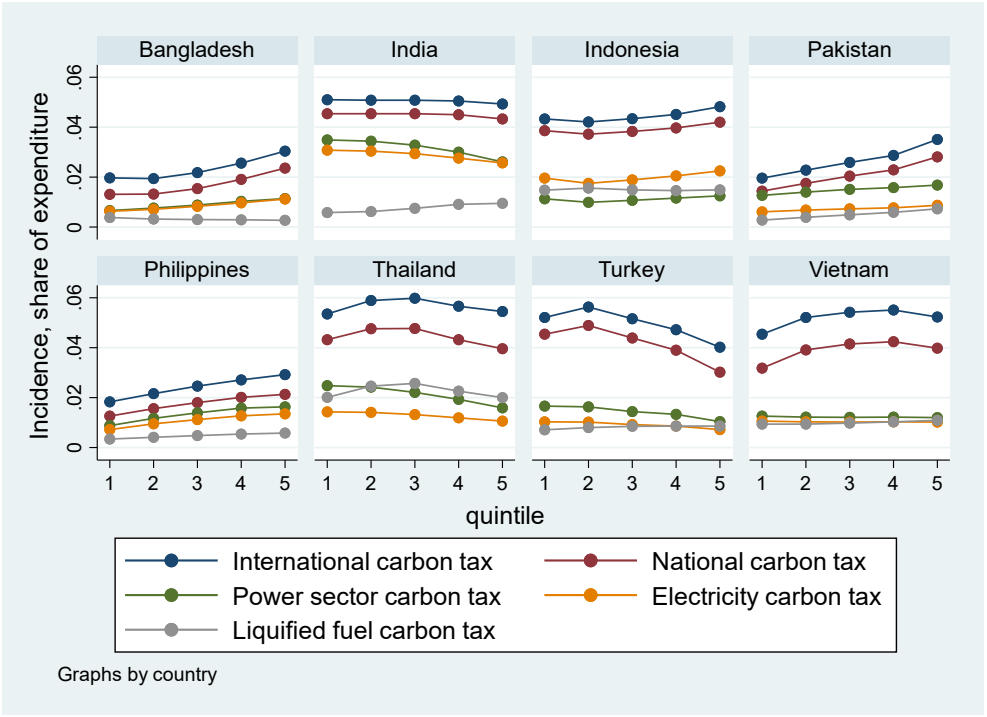


Source: Dorband et al., 2019 (Published under CC BY-NC-ND)

In addition, the sectoral focus of the tax is critical (Figure 6). A recent study (Steckel et al., 2021) on Asian countries has estimated that a national economy-wide carbon price would be progressive in five countries, neutral in one and mixed or regressive in two (Thailand and Turkey). Hence, whether a certain policy is progressive or regressive, as well as the ranking of different policy instruments with regard to their distributional effects, depends on the specific country context, and especially on the carbon content of production and on the share of household expenditure represented by different items. In addition, taxes on electricity and heating fuels (energy taxes), are regressive, but small in absolute terms. Conversely, transport fuels are progressive in countries with lower GDP per capita, while slightly regressive in wealthier countries.

In terms of employment, Metcalf (2021) suggests that there would be job shifting in response to a carbon tax, but overall employment is likely to be relatively unchanged and could, in fact, rise (in line with the previous section, which considered climate mitigation as a whole). Ward, Steckel and Jakob (2019) find that impacts on industrial competitiveness are highly heterogeneous across regions and economic sectors. The competitive position of Brazil, Japan, the USA and advanced economies of the EU is likely to improve, whereas industries and labour markets in newly industrialising Asian economies and in Eastern Europe are likely to experience substantial adverse impacts.

Figure 6: Distributional implications of a carbon tax and sectoral carbon taxes in Asian countries



Source: Author's elaboration based on Steckel et al., 2021

Two main issues need also to be considered, namely country specificity and horizontal inequalities (within income groups rather than across them and between men and women). Nevertheless, poor households in LMICs are still highly burdened by carbon taxes, as shown by the effects on poverty and the loss in purchasing power. In addition, they will be affected

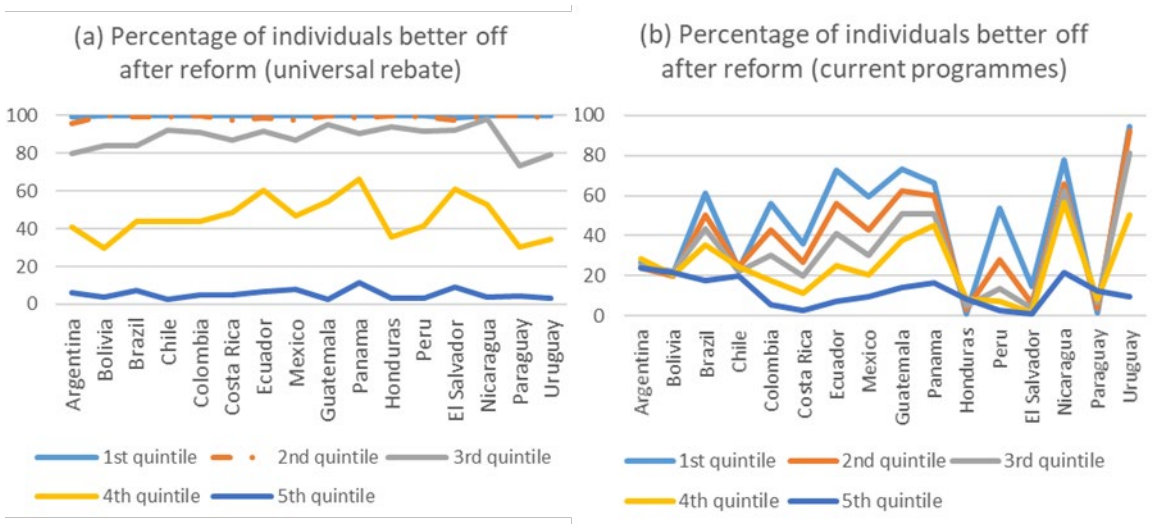
negatively by job losses, as low-skilled workers are the most vulnerable ones (Malerba & Wiebe, 2020).

On the other hand, if revenue is partially distributed back to households through *environmental fiscal reforms*, poverty could be decreased by around 1 to 2 per cent (depending on the design of the recycling mechanism) and the bottom quintile would gain compared to the status quo by around 5 to 10 per cent (Steckel et al., 2021; Vogt-Schilb et al., 2019). In addition, not all tax revenues need to be spent, leaving revenue for other functions. The policy design, including the policy sequencing, is important: social protection programmes should be in place before carbon pricing is introduced to make the environmental fiscal reform more acceptable.

One important point to be made is that it mostly depends on the design of the recycling programmes used. In Figure 7(a), we see that a universal rebate (meaning redistributing the revenue to all households in the same way) is highly progressive in the case of Latin America. Almost all individuals in the first two – the poorer – deciles are better off from the environmental fiscal reform; more than 80 per cent of the individuals in the third quintile are better off, as are around 50 per cent of the fourth quintile. Those gaining least are in the upper (rich) quintile, where a very small proportion (<5%) gain from the reform. This also means that inequality is reduced.

A different picture emerges if, instead of universal rebates, existing social assistance programmes aimed at reducing poverty, and their targeting, are considered (Figure 7(b)). On the one hand, the reform would still be progressive but less so than in the previous case. Secondly, the share of poorer individuals (individuals in the lower deciles) who gain from the reform is much lower. Both these problems are due to targeting issues of current cash transfer programmes that leave out many individuals.

Figure 7: Beneficiaries of environmental fiscal reforms (carbon tax plus cash transfers) in Latin America

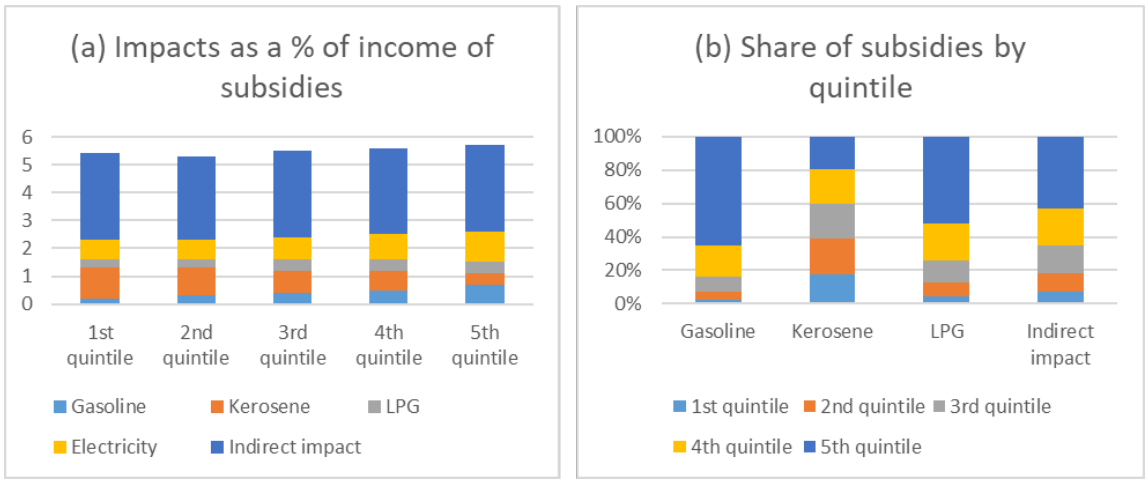


Source: Author based on Voigt-Schilb et al., 2019. 1st quintile is the poorest, 5th quintile the richest

There is similar evidence for fossil fuel subsidy reforms, where cash transfers are more efficient in reducing poverty than are economy-wide price subsidies. In Latin America and

the Caribbean, energy subsidies cost governments on average US$12 to transfer US$1 of income to households in the poorest quintile, while targeted programmes like cash transfers cost on average US$2 for every US$1 transferred to the poorest households (Feng, Hubacek, Liu, Marchán, & Vogt-Schilb, 2018). This is because richer households have a higher absolute consumption and, therefore, consume a higher share of energy subsidies. In parallel, the total, direct, and indirect welfare impacts of fossil fuel subsidy reforms are approximately distributionally neutral, with the percentage decrease in welfare being very similar across income groups, as shown in Figure 8(a). However, substantial variation across products exists. The impacts for gasoline and electricity are strongly progressive, but the kerosene impact is strongly regressive, as shown in Figure 8(b). The distribution of the impact of liquified petroleum gas (LPG) seems to differ across regions.[17]

Figure 8: Beneficiaries of fossil fuel subsidies in low- and middle-income countries



Source: Author based on Coady, Flamini, and Sears (2015)

Removing energy subsidies would also free up additional resources for social protection Nonetheless, many governments still subsidise energy. In 2017, governments in Latin America and the Caribbean spent up to USD 77 billion subsidising energy (Coady, Parry, Le, & Shang, 2019). A recent report has also estimated that the amount of pre-tax fossil fuel subsidies could "pay" for three times the annual amount required to "eradicate" global extreme poverty; on the other hand, it would cover just 63 per cent of the resources needed to globally eradicate poverty when considering the higher international poverty line of PPP$3.20 a day (UNDP [United Nations Development Programme], 2021). Franks, Lessmann, Jakob, Steckel, and Edenhofer (2018) also underlined the potential to cover financial needs for the Sustainable Development Goals (SDG) in different countries by using redirected subsidies for fossil fuels. There have already been instances when an increase in prices caused by fossil fuel subsidy reforms have been complemented by cash transfers. In Mexico, the government gradually removed the LPG subsidy while strengthening an existing social welfare programme (Oportunidades) to cushion the effects of higher energy prices on poor households (Toft, Beaton, & Lontoh, 2016).

17 As a country example, Schaffitzel, Jakob, Soria, Vogt-Schilb, and Ward (2020) found that in Ecuador a subsidy removal without compensation would be regressive for diesel and LPG, progressive for gasoline, and approximately neutral for electricity. Most importantly, they find that removing all energy subsidies and increasing the current cash transfer program would increase the real income of the poorest quintile by 10% while leaving a large share of the revenues for the public budget.

In summary, to make sure that the poorest and most vulnerable can take advantage of the opportunities and are not negatively affected by the challenges of climate mitigation policies, policy designs that reduce poverty and inequality need to be put in place to foster an inclusive transition that benefits all citizens). Therefore, while carbon pricing and fossil fuel subsidy reforms alone are not sufficient to achieve climate mitigation goals, they represent a potential mechanism to reduce poverty and inequality in the short-term when combined with social transfers in a socially balanced policy design. In particular, getting the price right would increase poverty but keep inequality unchanged. But transfers would lower both inequality and poverty.

5.2 International level

Global mechanisms that link climate mitigation with redistribution could have a stronger effect on reducing poverty and inequality compared to national ones.[18] If revenues from a global carbon tax are pooled globally and redistributed on a per capita basis at the global level, the average transfer for LMICs would be higher compared to the case of national taxes of the same size (Carattini, Kallbekken, & Orlov, 2019; Soergel et al., 2021). Carattini et al. (2019) estimate that the impact of distributing revenues internally depends on the nature of the economy and size of population. Per-citizen dividends range from US$89 in India to US$838 in Australia, at US$40 per tonne of CO_2. If pooled globally, the average pay-out would be US$189 per person. This means that lower-income and large countries such as India would be net beneficiaries of hundreds of billions of dollars per year, while richer countries would receive lower rebates. This would also mean that global poverty and inequality would be more significantly reduced.

In absolute terms, a global tax of US$30/t$CO_2$ would generate ten times the ODA budget and the funds needed to fill the global extreme poverty gap. Similarly, the gap in adequate social protection coverage is estimated at around US$700 billion (2.2% of GDP of LMICs), while global subsidies were US$5.9 trillion in 2020 (of which US$450 billion was explicit).

Given its potential, countries implement and coordinate carbon prices across them through a carbon club, defined as an open, collaborative partnership across countries that commit to ambitious climate goals and to the measures needed to reach them. In addition, it has been suggested that these climate clubs can start with a core group of countries that would expand in time; this would allow a better alignment with distributional justice and the principle of common but differentiated responsibilities, as lower-income countries would not be required to join straightaway and could become recipients of global funds (van den Bergh et al., 2020).

18 An international carbon tax would not have much different incidence (Malerba, Gaentzsch, & Ward, 2021; Steckel et al., 2021a).

6 Options to fund and expand social protection

The previous sections have made two things clear. First, just transitions need social protection systems. Second, social protection systems, and in particular labour market policies, are underdeveloped and exclude a large proportion of the poor in lower-income countries. For example, it has been estimated that just 47 per cent of the global population were reached by at least one social protection benefit. In terms of a gap to achieve social protection coverage, the gap is around just 4 per cent of GDP in high-income countries and widens to 16 per cent in low-income countries (ILO, 2021).

Currently, there are two main mechanisms being discussed at the international level to improve the situation. One is the Global Social Protection Fund, which could complement domestic resources to achieve universal social protection. This proposal is mainly carried by the ILO, with support from a number of national governments and the UN, as mentioned in the recent UN report *Our Common Agenda* (UN, 2021a). The second mechanism is the Global Accelerator for Jobs and Social Protection of the ILO and UN, launched in September 2021 by the UN Secretary General (UN, 2021b). The aim of the Accelerator is the creation of at least 400 million jobs, especially in green and care sectors; the Global Accelerator would also aim to extend social protection floors to the 4 billion people currently not covered. From the financial perspective, it has been estimated that US$982 billion would be needed to address the immediate labour market shocks of the crisis and to support a just transition and build systems, where needed; in addition, US$1.2 trillion will be required annually for social protection floors in low- and middle-income countries. a small part of this amount would come out of national resources (US$600 million), while the rest would be delivered through international finances, including financing from multi-lateral development banks and Special Drawing Rights.

The two mechanisms are also related to and can complement each other. The Accelerator needs a fund or a similar financing facility for both of its components. For the social protection component, the Global Fund for Social Protection could represent a suitable option for international transfers. It has also been suggested by the Global Coalition for Social Protection Floors that the Global Fund could commence its operations supporting between five and ten of the poorest countries with an annual amount of between US$10–15 billion (representing about 50 per cent of the estimated Social Protection Floors gaps in the poorest low-income country). In this sense the Global Fund would represent 0.5 per cent of the potential volume of the Global Accelerator and 0.8 per cent of its social protection component.

In terms of design and expansion options of different instruments, coverage needs to be considered.

From a social assistance perspective, the case has been made that a Universal Basic Income (UBI) could be the solution, but although it might help people while they are searching for a good job and therefore represent an investment in human capital, it is not really linked to labour market activation; in addition it might be very expensive, costing between 20 and 60 per cent of GDP, as estimated in the different scenarios that have been explored in recent studies (Ortiz, Behrendt, Acuña-Ulate, & Anh, 2018).

Another option to improve coverage and effectiveness of social protection systems (formal vs. informal) is to link existing cash transfer programmes to labour market policies. Starting

from, and building upon, social assistance rather than ALMPs can be the preferable option as ALMPs are still largely peripheral, with low coverage, especially in lower-income countries (Angel-Urdinola & Leon-Solano, 2013). Governments, especially those in Africa, are exploring innovative ways to extend social insurance coverage to workers in the informal economy. Innovations include the extension of legal and effective coverage; improvements in the quality of benefits and the services provided, alongside the introduction of new schemes; efforts to make contributions more sustainable while remaining affordable and flexible; ensuring the adequacy of the benefits package; and simplification and digitalisation of administrative procedures. Steps must be taken to integrate ALMPs within broader social protection and social policy frameworks. Moreover, despite the considerable expansion of ALMPs in the last decade, evidence of their effectiveness has been limited or inconclusive. As seen in previous sections, work is ongoing but there is still much to do in terms of achieving coverage and effectiveness.

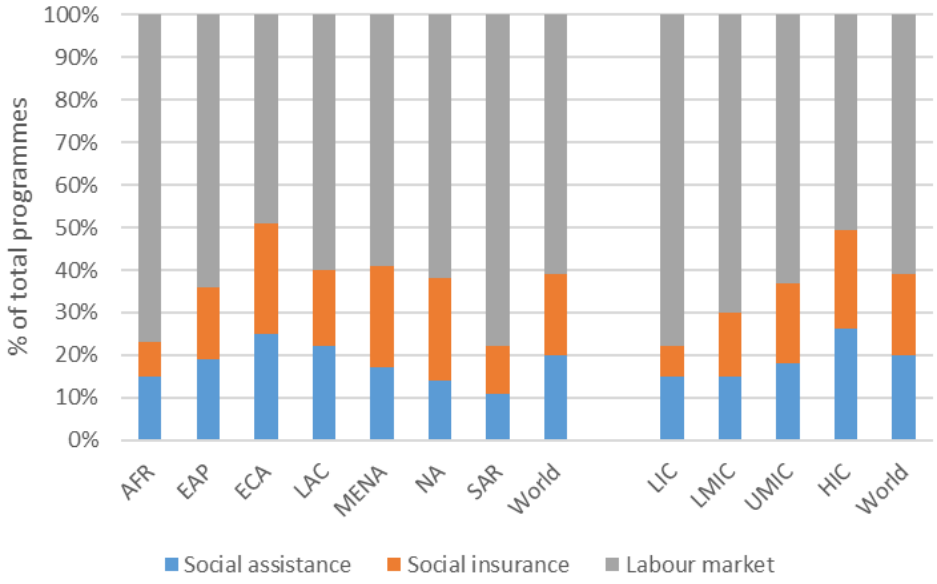
Linking social assistance and insurance, and avoiding dualistic systems, is also strongly related to the COVID-19 response, namely the problem of the "missing middle" – people working in the informal economy who are not covered by formal insurance and social protection and are not sufficiently poor to be targeted by safety net programmes. This group, which represents the majority of the population in many lower-income countries, has been hit especially hard by the COVID-19 epidemic.[19]

In addition to the issue of the missing middle, the COVID-19 response provides a starting point, given the expansion of social protection. As of January 2022, a total of 3,856 social protection and labour measures were planned or implemented by 223 economies as a response to the COVID-19 pandemic. Social assistance continues to represent the most prevalent form of support across regions and country income groups, representing 61 per cent of social protection and labour measures (see Figure 9); it is followed by supply-side labour market programmes (20%) and social insurance (19%). In terms of labour market policies, governments are increasingly directly targeting self-employed or informal wage workers, rather than households, with cash transfers. Wage subsidies were implemented mainly in higher-income countries, while in low-income countries labour regulation were prominent. Countries have also augmented training offers during the pandemic to support reallocation of workers and to upskill those at risk of displacement (OECD, 2021). At the same time, the training offer has been adapted to the COVID-situation, with 76 per cent of OECD and EU countries moving training online and 70 per cent introducing new online courses.

Despite the large number of interventions, one of the main features of the response to COVID-19 is that many social protection interventions are temporary (especially cash transfers). This therefore creates uncertainty about the future, and raises the question of whether the expansion of social protection from COVID-19 can also be used to implement the Just Transition agenda.

19 Despite social assistance laws and regulations expressly including informal workers as beneficiaries, many such workers could not access relief measures, due to lack of information about the programmes, and bureaucratic requirements.

Figure 9: Social protection response to COVID-19



Source: Author based on Gentilini et al., 2022.

7 Conclusions and action points for just transitions

Just transitions are a central point of climate discussions. Transitions to low carbon economies should not, in fact, stop or even revert progress in reducing poverty. Nonetheless, the concept of just transitions is still vague, with no agreed definition. This is a limitation in itself, as it constrains discussions and policy proposals that could bridge the socio-economic and climate agendas. This paper has contributed to the debate on just transitions by bringing clarity to the links between transitioning towards low carbon economies on the one hand, and poverty and inequality on the other. It has done so by analysing how the concept of just transitions came about and its current use in international negotiations and agreements. This has enhanced the understanding of how different actors interpret just transitions and has identified potential research and policy gaps.

The paper then summarised the empirical evidence on just transitions, and pointed to some ways in which such a transition might be achieved. The analysis started with a focus on energy transitions and its implication for workers. The effects of energy transitions are heterogeneous and occur across four dimensions (sectors, skills, space and gender). The paper pointed out that if the variation in the impact on workers and across skills, gender, space and sectors is disregarded in favour of figures on the overall *net* change in jobs, the potential impact of energy transition on poverty and inequality cannot be fully understood. Most importantly, this paper has underlined how a proper use of social policies, and in particular active labour market policies, can make energy transitions just and help the poorest to take advantage of new jobs and opportunities. Nonetheless, the design of these policies is crucial, especially in lower-income countries, where their active labour market policies need to be improved in terms of both coverage and effectiveness.

The paper then moved beyond a narrow focus on workers, and considered energy transitions in a wider sense. This is important, as the policies that incentivise and push for energy transitions can also have impacts on poverty and inequality. One example is carbon pricing policies, which can increase energy and non-energy prices in the short-term. It has been found that the poverty effects can be larger than the ones on workers in the energy sectors. The paper has also underlined how *environmental fiscal reforms*, combining carbon pricing or subsidy reforms with cash transfers to households, can be designed as policy mixes in such a way that both social and environmental outcomes are achieved. What is clear is that if the objective is really to reduce poverty and inequality it is critical to go beyond the narrow focus on job effects of policy documents. The recently proposed EU Social Climate Fund, for example, aims to address the distributional implications of short-term increases in prices, and has been proposed as a necessary complement to the earlier proposed just transition fund, which aimed to help workers and communities dependent on fossil fuel energy production.

This paper shows also how solutions can be found in the short term, such as building on existing social assistance schemes, which are the main social protection instrument in low-income countries.

One main message of the paper is that putting social dimensions at the centre of energy transitions, and of climate mitigation more generally, is both intrinsically and instrumentally important.[20] Intrinsically, as poverty and inequality reduction are overarching goals, and three dimensions of sustainable development need to be achieved jointly, as in the 2030 Agenda. Instrumentally, the paper has underlined how not dealing with social consequences of climate policies can make them unacceptable; recent research has shown how fairness is the most important determinant of public acceptability of climate policies and carbon pricing in particular. In addition to that, recent research has also shown that, from an instrumental point of view, poverty and inequality (political, economic and cultural) tend to undermine climate change mitigation through various channels. For example, unequal wealth and political power, such as those of vested interest groups of the fossil fuel and carbon-intensive industries, often obstruct policies to mitigate climate change; it is also the case that fossil-fuel-led development is often associated with structural inequalities, corruption and unequal distribution of revenues. Linked to the previous point, exacerbated inequality leads to the failure of collective action to address inequalities, and the related erosion of social cohesion, which make transition even less attractive. These two first channels make it clear that poverty and inequality are linked very closely with the procedural dimension of justice. As a final channel to be considered, consumption inequalities and high-carbon lifestyles need to be addressed, as the richest 10 per cent of people account for around half of global emissions (the richest 1% are responsible for 17%), while the poorest half of humanity are responsible for only 12 per cent (Chancel, Piketty, Saez, & Zucman, 2021; Oxfam, 2020). It is therefore clear that reducing inequality is critical. In this sense, it is also important to state that reducing inequality through redistribution, rather than making everybody consume at the level of the richest is what would deliver mitigation goals (Malerba & Oswald, forthcoming); therefore, other

20 This comes along also the positive outcomes for poverty and inequality that climate mitigation brings; by reducing emissions and temperature increases, climate mitigation policy has important implications for adaptation and therefore impacts on poverty reduction and inequalities. By 2030 between 32 million and 132 million people could fall into poverty due to climate change (Jafino, Walsh, Rozenberg, & Hallegatte, 2020)

development paradigms such as de-growth need to be considered, as indicated in recent international reports (IPCC, 2022).

A few relevant research and policy gaps need to be pointed out. One is the need to discuss justice issues more fully in the international arena, which will have an impact on national policy processes, such as planned NDC contributions.[21] Just transition processes, through development cooperation and global mechanisms, can directly reduce poverty and create fiscal space and resources (indirect poverty reduction). While some signs are starting to materialise as just transition partnerships, more needs to be done, especially in terms of a better understanding and agreement on the fairness and ambition of climate policy at the international level, and the use of equity frameworks and ethical parameters (IPCC, 2022). This would serve also to quantify equitable international support, and consider stranded assets. This is crucial, as limited resources and access to technologies, alongside the previously mentioned inequitable distributions, constrain the capacity of lower-income countries to achieve just transitions. This is also linked to the issue that promised climate finance to poorer countries is still shy of the promises made

Another research and policy gap relates to the current narrow focus of just transitions. In fact, in many low-income countries and some regions, emissions from energy do not constitute the largest share of emissions. For example, in Africa and Latin America the highest share of emissions comes from agriculture, land-use change and forestry (ALUCF). This is crucial for two main reasons. First, this sector counts for around a quarter of global emissions, and is the main source of emissions in Latin America and Africa. Second, decreasing emissions from this sector can also improve social outcomes. For example, a recent report has shown that for Latin America the bulk of jobs from the decarbonisation of the economy would come from agriculture rather than energy.[22] This would have a significant effect on poverty reduction as poverty is concentrated in rural areas (Christiaensen & Martin, 2018), and improving jobs and economic conditions in agriculture can be much more beneficial to poverty reduction compared to new jobs in the energy sector.[23] One policy related to the ALUCF sector that is widely discussed, for example, is the re-orientation of the food system towards vegetarian diets; the question is whether people currently employed in animal-based production will be able to shift to plant-based production when demand changes (and that animal-based agricultural jobs tend to pay better than jobs in plant-based agriculture). Social protection policies would also be critical in this sector, especially in lower-income rural contexts with widespread poverty and informal economies (Lowder, Bertini, & Croppenstedt, 2017). In addition, combinations of environmental and social policies already exist in the context of land-use and forestry, such as payments for environmental services or programmes that give cash if environmental conservation outcomes are met (Schwarzer, Van Panhuys, & Diekmann, 2016).

21 For an analysis of synergies between NDCs and SDGs, see also the interactive online tool NDC-SDG Connections (Brandi, Dzebo, Janetschek, Lambert, & Sovvidou, 2017).

22 Plant-based agriculture would employ 19 million out of the total 22.5 million more full-time equivalent employees in 2030.

23 Another barrier to achieving an agricultural just transition is the formation and composition of the labour force. The seasonal (and transient) nature of agricultural labour means that participation in farmworkers' unions is low. Agricultural unions also "tend to be more representative" of farm holders than the workers they hire, who are often from marginalised groups.

In addition, considering sectors beyond energy has implication also for policies in the context of energy transitions. One example is the design of a carbon pricing mechanism appropriate for the context of low-income countries. The *explicit* carbon pricing mechanisms applied in richer economies, with their strong reliance on fossil-fuel-based energy resources, will not work as well for low-income countries, which therefore need to design and include *implicit* carbon pricing, as specified in Article 6 of the Paris Agreement; these alternative designs include mitigation and offset-generating activities, results-based climate finance[24] and REDD+.[25] These international mechanisms also serve to put a price on carbon in a wider sense, in the form of offset mechanisms, and can furthermore deliver financing to stimulate investment in sustainable land use, and for overall climate action.

24 Results-based climate finance could also enable broader application and further development of many approaches and concepts that were developed in the context of a carbon market.

25 These include the existing approaches under the Kyoto Protocol, such as the Clean Development Mechanism (CDM), those contemplated under Article 6 of the Paris Agreement, and initiatives outside the ambit of the UNFCCC.

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