

Realizing a just and equitable transition away from fossil fuels



SEI discussion brief
January 2019

Georgia Piggot

Michael Boyland

Adrian Down

Andreea Raluca Torre

Key messages

- **Governments are introducing new “just transitions” policies to help workers and communities move away from fossil fuels.**
- **Most policies assume that justice goals will be achieved by helping those dependent on coal, oil and gas move into new roles; however, there is little critical reflection on what justice means in the context of an energy transition away from fossil fuels.**
- **There are a number of gaps in current just transition policies when viewed through a justice lens. For example, no policies contain measures to improve the lives of people currently marginalized in the energy system.**
- **Creating just and equitable transition policies requires collecting data on the current distribution of the harms and benefits of the energy system, and mapping out how this will change as fossil fuels become a less-prominent part of the energy mix.**
- **By taking justice considerations into account, transition policies are more likely to limit social and political resistance, win a broad consensus, and achieve effective implementation.**

Meeting agreed climate goals requires a rapid decarbonization of the global energy system,¹ which in turn necessitates a reduction in fossil fuel production.^{2,3} While limiting fossil fuel use will likely bring a multitude of societal benefits — related to reduced climate risks, sustainable economic growth, air quality and human health^{4,5} — it is important to recognize that not everyone will benefit equally from a transition to a low-carbon economy. In particular, those who rely on fossil fuel production for their livelihood, or who were anticipating using fossil-fuelled energy to meet development needs, may carry a disproportionate share of the burdens of an energy transition.

The need for a “just transition” to a low-carbon economy — namely, a transition that minimizes disruption for workers and communities reliant on unsustainable industries and energy sources — is gaining traction in climate policy and political discourse.⁶⁻¹⁰ A call for “a just transition of the workforce” was included in the preamble to the Paris Agreement,¹¹ and the United Nations Framework Convention on Climate Change (UNFCCC) secretariat has prepared a technical paper on transition planning.¹⁰ In addition, several national and regional governments have recently announced new transition planning processes, including Canada,¹² Germany,¹³ Spain,¹⁴ Scotland,¹⁵ New Zealand¹⁶ and the European Union.¹⁷

A central concern of just transition efforts is to ensure that low-carbon transitions address social and economic inequality. The UNFCCC calls for a transition that “contribute(s) to the goals of decent work for all, social inclusion and the eradication of poverty.”¹⁰ Likewise, the European Commission aims to “boost the clean energy transition by bringing more focus on social fairness.”¹⁷ And the Scottish Government is seeking a transition that “promotes inclusive growth, cohesion and equality.”¹⁵

Photo (above):
© ANDRESR / GETTY

There has been little analysis, however, of whether current transition policies meet equity goals embedded in the concept of a just transition. Will they reinforce existing inequalities, such as the under-representation of women and other marginalized groups in fossil fuel governance and employment?^{18,19} Will transition programmes simply transfer biases from one industry to another, without addressing the underlying norms and practices that drive inequality?²⁰⁻²² More broadly, are existing policies attending to the needs of those who are most disadvantaged by the energy transition?

In this brief, we consider these questions as we examine the equity dimensions of just transition policies at the national and regional level. We focus specifically on two countries — the US and Thailand — to highlight key considerations and opportunities for improving justice and equity outcomes in transition policy and planning.

Just transition policies in practice

In the context of fossil fuels, the just transitions concept manifests itself in the form of policies and initiatives to aid transitions away from coal, and to a lesser extent, oil and gas. Table 1 provides some illustrative examples of the types of support offered to workers and communities in fossil fuel transition policies.

The components of the policies in Table 1 fall into three broad categories: compensatory policies, adjustment assistance, and holistic adaptive support (following the approach of Green, 2018).^{35,36} Compensatory policies are those that simply fulfil existing obligations; examples include compensating workers for lost wages and pensions, communities for lost tax revenue, and companies for lost asset value. Adjustment assistance helps workers and communities transition to new roles, such as through re-training or economic diversification programs. Holistic support typically includes both of the other categories of support, as well as broader social assistance. This could include keeping new industries local so workers can retain existing social ties, or providing local governments and communities support for social services,

Table 1. Illustrative examples of fossil fuel transition policies

Policy and jurisdiction	Description	Transition support provided
Coal Workforce Transition Fund and Coal Community Transition Fund ^{31,32} <i>Province of Alberta, Canada</i>	Provides assistance to coal workers and municipal governments in regions affected by provincial and federal government plans to phase out coal-fired electricity.	Support for workers: unemployment and retirement bridging grants, relocation assistance, career counselling, and tuition vouchers. Grants for local governments to conduct social and economic impact studies, long-range economic planning, and local business development programs.
Framework Agreement for a Just Transition of Coal Mining and Sustainable Development of the Mining Regions for the Period 2019-2027 ³⁴ <i>Government of Spain</i>	Action plan, signed by government representatives and unions, to aid workers and regions affected by planned closure of coal mines in Spain.	Support for workers: early retirement provisions, social assistance, and re-training programs for workers to move to green jobs. Funding for business initiatives and development of mined regions. Plans for environmental restoration of mined areas.
Mine closure provisions in the 13th Five Year Plan for Coal Industry Development, 2016-2020 ³³ <i>People's Republic of China</i>	Full five-year plan outlines strategy to cap coal output and improve mining efficiency. Mine closure provisions outline steps to ensure an orderly withdrawal of mines.	Support for workers: unemployment relief, training and job placement services. Assistance with abandoned mine reclamation and redevelopment.
Oil Worker Transition Fund ³⁴ <i>Scottish Government</i>	Provides funding for oil and gas workers affected by a downturn in North Sea oil production to access training needed to transition to new roles. (Note: this is not specifically focused on transitioning away from fossil fuels; 44% of re-employed participants remained in the oil and gas sector) ³⁴	Grants to help recently redundant oil and gas workers (or those at risk for redundancy) re-train or gain new accreditations.

environmental reclamation and cultural facilities to maintain civic vitality. Ideally, governments would emphasize this third category in their policies. However, research on historical fossil fuel transitions shows that proactive, holistic policies are rare; most policy-making tends to react to a transition that is already underway, leading to a tendency for compensatory measures to cover losses, rather than forward-looking adjustment assistance or holistic adaptive support for a post-fossil-fuel economy.^{35,37}

Equity considerations for just transition policies

It is unclear the extent to which enacted just transition policies will ensure an *equitable* transition away from fossil fuels — that is, a transition that doesn't leave certain groups in society worse off, and ideally helps address existing inequalities.

Key proponents calling for the inclusion of a just transition in climate policy — such as trade unions and the International Labour Organization (ILO) — view the necessary energy transition as a window of opportunity to improve social, environmental and economic outcomes for all members of society. They argue that “managed well, transitions to environmentally and socially sustainable economies can become a strong driver of job creation, job upgrading, social justice and poverty eradication.”²³ This goal is echoed in the UNFCCC's guidelines for a just transition, which call for an inclusive transition that reduces inequality, and pays particular attention to historically disadvantaged groups such as women, youth, indigenous and tribal populations.¹⁰

However, for the most part, existing policies (such as those in Table 1) focus on compensating workers and communities directly affected by fossil fuel transitions, rather than on the broader gender and social equality concerns. For example, in Canada, researchers have highlighted that policies focused on fossil fuel workers are likely to reinforce inequality. Women and migrants are over-represented in indirect, supportive roles to the sector — such as lower-paid service work and unpaid care work — but since they tend to be under-represented in the sector itself, they would not be covered by proposed worker compensation and re-training policies.³⁸⁻⁴⁰

Transition planning also rarely acknowledges the human rights and other social concerns that may result from a rapid shift in energy sources. If not managed carefully, a transition to alternative energy sources can bring its own suite of social ills. For example, the rush to build new hydropower energy sources has raised a number of human rights issues, such as the forced resettlement of communities.⁴¹

Moreover, transition policies tend to ignore the potential cascading impacts of industry closure, such as how the loss of jobs in one industry might flow on to affect others. One example is given by gendered effects of men's unemployment in former coalfields of the UK in the 1980s and 1990s. When coal jobs dried up, there were significant flow-on effects for women in mining regions, such as displacement from manufacturing jobs as unemployed male workers sought out new professions, the need to take on the “double-duty” of paid employment and domestic care to fill holes in household budgets, and psychological impacts resulting from a disruption to home life.⁴²⁻⁴⁴

These examples serve to remind us that the impacts of energy transitions extend far beyond just those felt by workers directly employed in the coal, oil and gas industry. Transition planning must include a broader set of actors and issues. There is unlikely to be a universal policy approach that ensures an equitable transition in all contexts, given that transitions will look different based on the structure of the industry, workforce and community in each fossil-fuel-dependent region. However, principles of energy justice can help illuminate factors that are important to consider in all contexts when developing and implementing policies.⁴⁵

One of these principles is *distributive justice*, or the fair allocation of the costs and benefits of a transition. There are a number of important distributive justice questions raised by a fossil fuel phase-down, such as: Which coal mines, oil fields and gas reserves should close first? ⁴⁶ Who

THE CONCEPT OF A "JUST TRANSITION"

The idea of a just transition was born in the labour movement, as trade unions attempted to reconcile the need for good work with the need to increase environmental protections.⁶⁻⁹ The concept provides a shorthand for talking about protecting workers and communities affected by transitions away from damaging industries, and ensuring that a new “green economy” brings decent work, improves human well-being, and addresses widening social and economic inequalities.²³

Since the combustion of fossil fuels is the largest contributor to global emissions,¹ much of the focus of a “just transition” in the context of climate change has been on supporting a transition away from oil, gas and coal production and use.²⁴ However, it is worth noting that the concept of a just transition has been applied far more widely.

The idea was originally conceived as a means to help atomic and chemical workers transition to safer and cleaner jobs, and was modelled on policies designed to support soldiers returning from war.^{9,25} It has also been applied to other major societal shifts, such as adaptation to climate change impacts (e.g. drought in the agricultural industry),²⁶ and transitions associated with the automation of the workforce.^{27,28} Further expanding the concept, women's rights advocates have suggested that the idea of a just transition could be applied more broadly to address the gender division of labour and, in particular, transform unequal responsibilities of reproductive work.^{21,29,30} We limit our discussion in this brief to policies focused specifically on the transition away from fossil fuels, but the principles discussed may have relevance for these related forms of transition.

should be compensated for losses? How can transition planning account for non-financial losses, such as loss of culture or identity associated with industry closure?^{47,48} What types of assistance is needed? And how should support across companies, workers, households and communities be distributed to ensure that the existing unequal relations of gender, race, class, age and ability are not exacerbated?³⁶ There are no simple answers to these questions — it depends in large part on the way fairness is defined, and the criteria used to determine distribution. For this reason, justice scholars argue that an important component of justice is the process through which decisions are made about how costs and benefits are distributed.^{45,49}

The *procedural justice* dimension of a fossil fuel transition involves consideration of whose interests and what issues are taken into account in transition planning, and who gets to participate and hold power in decision-making forums. The broad spectrum of interests with a stake in transition planning includes people working in related industries, as well as households and communities that are dependent on fossil fuel revenues. It also includes those who will be adversely impacted by fluctuations in fossil fuel prices as a result of transition reforms, such as low-income households or those struggling to gain energy access. Moreover, an equitable transition planning process should also take into account inter-generational justice concerns, such as the impacts of decisions made today on future generations, or the need to support those historically harmed or marginalized in fossil fuel development.^{39,50,51}

An equitable transition policy should attend to both the distributive and procedural justice dimensions of transition planning. The policy development process should be participatory and designed to ensure the representation of historically marginalized voices, interests and issues in transition plans. What this looks like in practice, however, depends on a number of context-specific factors, including the history of fossil fuel development, the current structure of the industry, the energy mix and availability of alternatives, and existing gender and social inequality norms. To illustrate some of these issues and considerations in transition policy development, we now discuss equity and just transitions in the US and Thailand — two countries with very different fossil fuel development trajectories but equally pressing needs to consider equity and justice in current transition pathways.

Equity and just transitions in context

United States

The US is the global leader in fossil fuel extraction and use. It is currently the world's largest oil and gas producer and consumer, and is the third largest coal producer behind India and China.⁵² Mining and extracting fossil fuels employs around 900,000 workers; the majority of this workforce is in oil and gas production, which employ 510,000 and 312,000 workers respectively, while coal mining employs 74,000 workers.⁵³ While renewable energy use is growing, fossil fuels still make up around three-quarters of the total US energy mix.⁵⁴ Transitioning away from these fuels will therefore entail a major shift in US energy planning and investment.

The US government previously recognized that fossil fuel extraction and consumption would need to be phased down to meet climate goals. Under the previous US administration, the government introduced the 2015 *Clean Power Plan* (CPP) to limit emissions from power plants, and mapped out a longer term *Mid-Century Strategy* (MCS) for decarbonizing the US economy.^{55,56} Embedded in both of these policies was an acknowledgement of the need to provide transition support to certain segments of the population: the CPP “recognize[d] the fact that, in many cases, employment gains and losses ... would be expected to affect different sets of people,”⁵⁵ while the MCS acknowledged that “additional support may be needed for low-income households and Americans who are particularly reliant on a high carbon economy.”⁵⁶ The MCS pointed to the *Partnerships for Opportunity and Workforce and Economic Revitalization Plan* (POWER+) as a model for what this transition assistance should include. As proposed, POWER+ included programs to promote development in communities reliant on coal extraction, as well as support for health and retirement benefits for coal miners and their families.⁵⁷

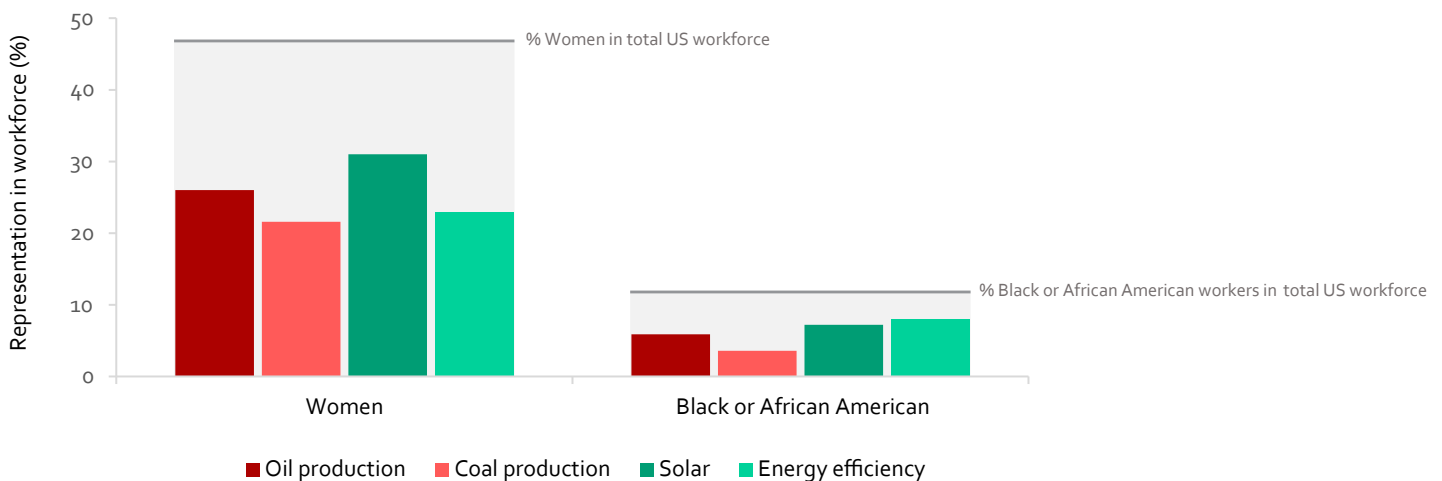
The POWER+ Plan included a number of elements that could be viewed as contributing to both distributive and procedural justice. Substantively, support focused holistically on the whole community — not just the workers — and it included environmental remediation in addition to social and economic assistance. Procedurally, the federal government explicitly chose to “abandon an outdated, top-down approach to investing in communities” in favour of partnering with communities to identify development priorities.⁵⁸ This resulted in a diverse set of transitional programs — including creating food, tourism and forestry enterprises, expanding broadband internet access, and providing support for substance abuse — that met locally appropriate development needs.

The transition planning approach pursued under the last US administration did, however, contain some significant gaps from an equity perspective. Just transition programs were largely reactive — responding to an existing decline in the underground coal industry — rather than creating a comprehensive vision for transitioning away from all types of fossil fuels. This meant that transition planning for oil, gas, surface coal mining, and other related industries was largely ignored. This is unfortunate, because earlier transition planning in these sectors would both help ensure younger workers have ample time to build skills needed to transfer to other industries, and help avoid training new workers for disappearing roles. It would also allow time for companies to shore up pensions and remediation funds, and experiment with alternative business models while they remain profitable.⁵⁹

Another limitation of the government’s transition approach was that the administration based plans on an assumption that growth in the clean energy sector would offset any future job losses. The Clean Power Plan emphasized the provision of energy efficiency and renewable energy opportunities as the key response to the economic impacts of a coal transition.⁵⁵ While it is true that renewable energy and energy efficiency jobs have been steadily growing in the US,⁵³ these jobs are not necessarily located in the same place as disappearing fossil fuel jobs.^{60,61} The energy transition would therefore contribute to a broader trend of geographic disparities in economic opportunity in the US.⁶²

Moreover, a failure to proactively plan the transition means there is a missed opportunity to address existing gender and racial inequalities in the energy sector. Clean energy jobs in the US appear to follow similar patterns of exclusion as those identified in the fossil fuel industry, whereby women and black or African American workers are under-represented in the workforce (Figure 1), and in positions with decision-making power.^{22,63} While the government has enacted green jobs programs that aim to support disadvantaged workers — for example, the Minority Worker Training Program⁶⁴

Figure 1. Proportion of women and Black or African American workers employed in fossil fuel extraction compared with solar and energy efficiency jobs in the US



Source: 2018 US Energy and Employment Report⁵³

— these programs mostly focus on training for entry-level jobs, rather than addressing structural barriers to participation in the energy workforce, and equitable access to decision-making forums. The lack of a comprehensive transition planning process means that there has been no clear opportunity to think holistically about how the fossil fuel transition could be planned in a responsive way to remediate historic inequality in the energy sector.

“Societies must be inclusive, providing opportunities for decent work for all, reducing inequalities and effectively eliminating poverty. This entails that no one is left behind, as articulated in the 2030 Agenda for Sustainable Development, including indigenous and tribal peoples, people with disabilities, women, youth and other persons, peoples, groups and communities in vulnerable situations.”

UNFCCC Technical Paper on Just Transitions¹⁰

It seems unlikely that a more comprehensive transition planning process will happen in the US under the current administration, which is pushing for increased fossil fuel development, and is stepping away from climate commitments.^{65,66} (It is notable, however, that despite commitments to expand coal production, the government continues to support economic diversification programs in coal-dependent regions.)⁶⁷ This nearly unwavering support for fossil fuel development risks leaving workers, communities and assets stranded if and as the world moves away from fossil-fuelled energy.⁶⁸ It also highlights the significant political barriers that can prevent just transition planning. In the absence of federal leadership, it has largely fallen to sub-national governments and civil society to plan for energy transitions. While an array of programs have begun to develop at the community level,⁶⁹ the risk is that transition planning will become a patchwork regime that leaves some regions, sectors or social groups behind.

Thailand

On the global stage, Thailand is a relatively small player in terms of fossil fuel production: it currently extracts around 1% of the world's natural gas, and less than 0.5% of the world's oil and coal reserves.⁵² In Southeast Asia, however, Thailand is an important energy player, accounting for 15% of the region's natural gas production,⁷⁰ and Thai energy companies are investing in new fossil fuel development projects across the region.^{71,72} Fossil fuels — particularly natural gas — dominate Thailand's power supply, constituting almost 90% of electricity generation.⁵² However, domestic fossil fuel reserves are no longer adequate to meet growing consumption demand: the latest predictions (as of 2017) are that proven oil reserves will be depleted within two years and natural gas within five years, at current production rates.⁵² Domestic coal reserves are greater but plans to expand and build new power plants have met resistance that has halted their development in recent decades.

In contrast to the US case presented above, Thailand lacks any formal just transition policies and programmes. However, Thailand is planning for a reform of its energy system, which may have transition impacts. The *Thailand Integrated Energy Blueprint 2015-2036 (TIEB)* lays out pathways for re-shaping the country's energy mix to ensure long-term security.⁷³ While the TIEB includes a commitment to more ecological energy sources, and seeks to increase renewable energy production, it nonetheless also targets an increase in either natural gas or coal power generation. The 2015 *Power Development Plan (PDP)* — one of five individual plans that make up the TIEB — targets an increase in the share of coal in the energy mix, from 20% in 2014 to 20-25% by 2036. Various groups have pushed back on the planned expansion of fossil fuel generation, and policy-makers are currently in the process of updating the PDP.⁷⁴ In a 2018 draft PDP (awaiting finalization and Cabinet approval at the time of writing), the government had scaled down its domestic coal development plans, but had substituted it with an increase in natural gas power generation.^{75,76}

The TIEB and PDP articulate Thailand's plans for shifts in the energy system but do not explicitly consider any resulting justice or equity implications, such as the impacts on workers in disappearing oil and gas extraction roles, or on households who may have difficulty adapting to changes in energy sources or prices. To support affected groups, the next iteration of the TIEB and PDP could include workforce transition measures,²³ and strategies to re-deploy fossil fuel subsidies to aid low-income households through the energy transition.⁷⁷

While there is no integrated planning on this issue at the national level, several international, civil society and private sector entities are undertaking initiatives at the local level to create green jobs and develop green skills. One non-governmental organization, the Border Green Energy Team, provided technology training and financial support for renewable energy innovations within ethnic minority communities along the Thailand-Myanmar border; these social groups have been largely marginalized in terms of access to government support and basic services.^{78,79}

Just transition planning could also address existing inequalities within the Thai energy system. For example, future energy plans and their implementation could include gender-responsive measures that address existing imbalances in the energy workforce, where male employment outweighs female employment by an estimated ratio of 3:1,⁸⁰ and women tend to be confined to administrative, financial and human resource functions, rather than technical or operational-oriented positions.⁸¹ Moreover, it could provide for more representative leadership in Thailand's energy governance systems. At present, all seven members of the board of directors, and all but three of the 44 executive officers at the Electricity Generating Authority of Thailand (EGAT) are men, and just two of 15 current executives at the Department of Alternative Energy Development and Efficiency (DEDE) are women.⁸¹ Gender is just one dimension of making the energy sector more inclusive; reforms could also address possible inequities concerning race, class, age and ability, for which more data is needed to understand representation in the workforce.

Given that Thailand is expanding its energy development beyond its own borders, a just-transition-focused TIEB could also take into account transboundary justice concerns.⁸² Human rights advocates have been pushing the government to introduce stronger regulation and enforcement to prevent human rights abuses in extraterritorial investments, with outbound energy investments (such as new coal developments) being an area of particular concern.⁸³ At present, the government has focused on incorporating rights issues into a *National Action Plan on Businesses and Human Rights*.⁸⁴ To reinforce that this is particularly pertinent for energy investments, a commitment to protect human rights could also be incorporated into national energy plans.

In terms of procedural elements of a just transition, the government has been taking some steps to open up its energy planning process. For example, it committed to re-drafting the PDP after academics and civil society criticized the plan for overestimating reserve margins in order to justify new coal development.⁷⁴ In drafting the 2018 PDP, the government held public consultations in key locations, and appears to have taken concerns about new coal plants into account.^{75,76} The government is also opening up power production to smaller players through policies that enable them to access the grid.^{85,86} This will help decentralize the energy system, which is currently dominated by big industry players like EGAT.

The first signs of a transition in Thailand are emerging, yet there are few indications that plans are being put in place to ensure it is a just and equitable transition. Such a transformation in policy direction would require policy-makers to overcome several barriers, including a lack of coordination between public and private energy institutions, fragmented governance systems, and limited transparency and accountability. These obstacles mean progress is often slow and planned reforms are left unfulfilled; they also inhibit transition planning, as they give powerful interests an opening to resist decarbonization.^{82,87}

It remains to be seen how energy planning will evolve after expected democratic elections in 2019 — the first since the military coup of 2014. However, at present, the energy future of Thailand remains contested,⁸⁸ and the extent to which a transition might be socially just or equal is unclear at best.

Avoiding the unjust transition

The US and Thailand cases demonstrate that developing energy transition plans that take into account both climate imperatives and social justice concerns is a challenging endeavour. There is no simple recipe for a just and equitable energy transition. There are, however, some principles that might help national and regional governments avoid an unjust transition.

First, governments need to develop long-term energy transition strategies that align with both agreed climate goals, and commitments to improving social equality. For most countries, this means planning to phase out new fossil fuel development, based on the recognition that further development will likely strand workers, communities and assets as more aggressive climate policies take hold.^{1,2} Ideally, these long-term transition strategies should align with other national development plans focused on social and economic development (such as green job policies,⁸⁹

and plans for advancing gender equality).⁹⁰ Moreover, proactive planning, in a comprehensive way that includes all relevant stakeholders, will help increase the likelihood of an orderly, rather than disruptive, transition.

Second, transition planning should take into account both distributive and procedural justice, and consider those who will be affected throughout the whole energy system.^{91,92} In practice, this means transition planning will need to involve more than just those directly affected by industry closure (such as fossil fuel companies and workers). It also will need to include those who will be indirectly affected by changes to their local economy or environment, and those who will be disproportionately affected by shifts in energy costs or provision (such as low-income households). Opening up the energy planning process, and assisting a wider group of affected actors, will obviously involve a more significant investment of time and resources. Governments could support more holistic transition planning by redirecting fossil fuel subsidies, or using revenues generated from resource royalties, permit fees or carbon taxes to fund energy transition efforts.^{4,93}

Finally, if the aim is for a just transition, the planning process should be seen as an opportunity to remedy existing injustices in the energy system. This could include addressing issues such as the unequal participation of women and other marginalized groups in the energy workforce and decision-making processes, helping households who have struggled with energy access,⁹⁴ and improving “sacrifice zones” historically damaged by energy development.^{51,95} The first step in addressing these problems is to gather information about where inequities exist in the current energy system. This requires collecting good, socio-demographically disaggregated data (that is lacking in most contexts) in order to assess where action is most needed.⁹⁶ But data alone will not be sufficient to drive progress — responsive policies and initiatives are also needed. Organizations such as the ILO are leading the charge on creating guidance for developing more holistic transition policies — namely policies that look beyond just keeping industry or workers solvent, to also include social dialogue, social protection, and employment rights as key parts of the transition agenda.^{10,23,97}

While this brief has focused on national and regional government policy, we should end with a note of caution about the capacity or willingness of many governments to undertake meaningful transition planning, particularly in cases where the fossil fuel industry holds sway over the policy-making process.^{49,98} Civil society and businesses may need to lead where government action is lacking. Grassroots transition initiatives are developing worldwide, where communities are taking innovative action to democratize and decarbonize their energy systems.^{99,100} Promise for a just transition may lie in these diverse and diffuse local efforts, which can both provide a vision and example of what a more equitable energy future would look like, as well as lay the political groundwork for higher levels of government to take on the types of energy policy changes we’ve discussed in this brief.

Endnotes

1. IPCC (2018). *Global Warming of 1.5°C: An IPCC Special Report on the Impacts of Global Warming of 1.5 °C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty*. Intergovernmental Panel on Climate Change, Geneva, Switzerland. <http://www.ipcc.ch/report/sr15/>
2. McGlade, C. and Ekins, P. (2015). The geographical distribution of fossil fuels unused when limiting global warming to 2°C. *Nature*, 517(7533). 187–90. DOI:10.1038/nature14016
3. Muttitt, G., McKinnon, H., Stockman, L., Kretzmann, S., Scott, A. and Turnbull, D. (2016). *The Sky’s Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production*. Oil Change International, Washington, DC. <http://priceofoil.org/2016/09/22/the-skys-limit-report/>
4. OECD (2017). *Investing in Climate, Investing in Growth*. Organisation for Economic Co-operation and Development, Paris, France. <http://www.oecd.org/env/investing-in-climate-investing-in-growth-9789264273528-en.htm>
5. Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., et al. (2018). The 2018 report of the Lancet countdown on health and climate change: shaping the health of nations for centuries to come. *The Lancet*, 392(10163). 2479–2514. DOI:10.1016/S0140-6736(18)32594-7
6. Mazzochi, T. (1993). A superfund for workers. *Earth Island Journal*, 9(1). 40–41.
7. Kohler, B. (1998). Just transition: a labour view of sustainable development. *CEP Journal*, 6(2).

8. CLC (1999). *Policy on Just Transition for Workers during Environmental Change*. Canadian Labour Congress, Ottawa, Canada.
9. Rosemberg, A. (2010). Building a just transition: the linkages between climate change and employment. *International Journal of Labour Research*, 2(2). 125–61. https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---actrav/documents/publication/wcms_153352.pdf
10. UNFCCC (2016). *Just Transition of the Workforce, and the Creation of Decent Work and Quality Jobs*. United Nations Framework Convention on Climate Change, Bonn, Germany. <https://unfccc.int/sites/default/files/resource/Just%20transition.pdf>
11. UNFCCC (2015). *Paris Agreement*. United Nations Framework Convention on Climate Change, Bonn, Germany. https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf
12. Government of Canada (2018). Just Transition Task Force. https://www.canada.ca/en/environment-climate-change/news/2018/02/just_transition_taskforce.html
13. Wehrmann, B. (2018). Germany's coal exit commission. *Clean Energy Wire*, 6 June. <https://www.cleanenergywire.org/factsheets/germanys-coal-exit-commission>
14. MITEGO (2018). *Framework Agreement for a Just Transition of Coal Mining and Sustainable Development of the Mining Regions for the Period 2019-2027*. Ministerio para la Transición Ecológica, Madrid, Spain. <https://www.miteco.gob.es/es/prensa/ultimas-noticias/el-gobierno-y-el-sector-de-la-miner%C3%ADa-del-carb%C3%B3n-firman-un-acuerdo-para-la-transici%C3%B3n-justa-y-el-desarrollo-sostenible-de-las-comarcas-mineras/tcm:30-483648>
15. Scottish Government (2018). Leading the way to a low-carbon future: Just Transition Commission to advise on decarbonisation. <https://news.gov.scot/news/leading-the-way-to-a-low-carbon-future>
16. MBIE (2018). *Just Transition: Making a Just Transition to a Low Emissions Economy*. Ministry of Business, Innovation and Employment, Wellington, New Zealand. <https://www.mbie.govt.nz/business-and-employment/economic-development/just-transition>
17. European Commission (2017). No Region Left Behind: Launch of the Platform for Coal Regions in Transition. http://europa.eu/rapid/press-release_IP-17-5165_en.htm
18. IRENA (2013). *Renewable Energy and Jobs*. International Renewable Energy Agency, Abu Dhabi. <https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2013/rejobs.pdf>
19. Williams, C. L., Kilanski, K. and Muller, C. (2014). Corporate diversity programs and gender inequality in the oil and gas industry. *Work and Occupations*, 41(4). 440–76. DOI:10.1177/0730888414539172
20. Pearl-Martinez, R. and Stephens, J. C. (2016). Toward a gender diverse workforce in the renewable energy transition. *Sustainability: Science, Practice & Policy*, 12(1). 8-15. DOI:10.1080/15487733.2016.11908149
21. Acha, M. R. (2016). *Gender Equality and Just Transition*. Women's Environment and Development Organization (WEDO), New York, NY. <http://wedo.org/wp-content/uploads/2016/08/gjtransition.pdf>
22. Baruah, B. (2017). Renewable inequity? Women's employment in clean energy in industrialized, emerging and developing economies. *Natural Resources Forum*, 41(1). 18–29. DOI:10.1111/1477-8947.12105
23. ILO (2015). *Guidelines for a Just Transition Towards Environmentally Sustainable Economies and Societies for All*. International Labour Organization, Geneva, Switzerland. http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_432859.pdf
24. ITUC (2017). *Just Transition - Where Are We Now and What's next? A Guide to National Policies and International Climate Governance*. International Trade Union Confederation, Brussels, Belgium. <https://www.ituc-csi.org/just-transition-where-are-we-now>
25. Young, J. (2003). Green-collar workers. *Sierra Magazine*, July. <https://vault.sierraclub.org/sierra/200307/labor.asp>
26. ITUC (2008). *A Trade Union Review on Agriculture, Rural Development, Desertification, Drought, Land & Africa*. International Trade Union Confederation, Brussels, Belgium https://sustainabledevelopment.un.org/content/documents/tradeunion_6may_dialogue_eng.pdf
27. ITF (2017). *Managing the Transition to Driverless Road Freight Transport*. International Transport Forum, Paris, France. <https://www.itf-oecd.org/managing-transition-driverless-road-freight-transport>
28. Bykhhovskaya, A. (2017). Towards a just transition for inclusive digitalisation. *Institute of Development Studies News & Opinion*, 9 March. <https://www.ids.ac.uk/opinion/towards-a-just-transition-for-inclusive-digitalisation>
29. Women's Rights Caucus (2017). Just and Equitable Transitions in the Context of Climate Change. Submission to the United Nations Commission on the Status of Women, CSW 61. <http://apwld.org/wp-content/uploads/2017/04/Just-Transitions-WRC-CSW61.pdf>
30. UN-DESA, UN-Women and UNFCCC (2015). *Implementation of Gender-Responsive Climate Action in the Context of Sustainable Development. Report of the Expert Group Meeting*. United Nations Framework Convention on Climate Change, Bonn, Germany. https://unfccc.int/files/gender_and_climate_change/application/pdf/egmreport_bonn_final_25_november_2015.pdf
31. Government of Alberta (2017). Coal Community Transition Fund. <https://www.alberta.ca/coal-community-transition-fund.aspx>
32. Government of Alberta (2017). Support for Workers Affected by Coal Phase Out. <https://www.alberta.ca/support-for-coal-workers.aspx>
33. The People's Republic of China (2016). 煤炭工业发展“十三五”规划 (13th Five-Year Plan for Coal Industry Development). http://www.ndrc.gov.cn/fzgggz/fzgh/ghwb/gjjgh/201706/t20170605_850004.html

-
34. Skills Development Scotland (2016). Transition Training Fund. <https://transitiontrainingfund.co.uk/>
35. Spencer, T., Colombier, M., Sartor, O., Garg, A., Tiwari, V., et al. (2018). The 1.5°C target and coal sector transition: at the limits of societal feasibility. *Climate Policy*, 18(3). 335–51. DOI:10.1080/14693062.2017.1386540
36. Green, F. (2018). *Transition Policy for Climate Change Mitigation: Who, What, Why and How?* Centre for Climate Economics & Policy, Crawford School of Public Policy, Australian National University, Canberra, Australia. <https://coaltransitions.files.wordpress.com/2018/05/transition-policy-for-climate-change-mitigation-2.pdf>
37. Caldecott, B., Sartor, O. and Spencer, T. (2017). *Lessons from Previous 'Coal Transitions'. High-Level Summary for Decision-Makers*. Institute for Sustainable Development and International Relations and Climate Strategies, Paris, France. <https://www.iddri.org/en/publications-and-events/report/lessons-previous-coal-transitions>
38. Mertins-Kirkwood, H. (2018). *Making Decarbonization Work for Workers: Policies for a Just Transition to a Zero-Carbon Economy in Canada*. Canadian Centre for Policy Alternatives, Ottawa, Canada. <https://www.policyalternatives.ca/sites/default/files/uploads/publications/National%20Office/2018/01/Making%20Decarbonization%20Work.pdf>
39. Alook, A., Hill, N. and Hussey, I. (2017). Seeking “good jobs” in the oil patch: how gender and race shape experiences of work in Alberta’s extractive industries. *CCPA Monitor*, 24(4). 28–32. <https://www.policyalternatives.ca/publications/monitor/seeking-%E2%80%9Cgood-jobs%E2%80%9D-oil-patch>
40. Dorow, S. (2015). Gendering energy extraction in Fort McMurray. In *Alberta Oil and the Decline of Democracy in Canada*. L. Stefanick and M. Shrivastava (eds.). Athabasca University Press, Athabasca, Canada. 275–92. DOI:10.15215/aupress/9781771990295.01
41. Castro, M. C., Krieger, G. R., Balge, M. Z., Tanner, M., Utzinger, J., Whittaker, M. and Singer, B. H. (2016). Examples of coupled human and environmental systems from the extractive industry and hydropower sector interfaces. *Proceedings of the National Academy of Sciences*, 113(51). 14528–35. DOI:10.1073/pnas.1605678113
42. Bennett, K. (2015). Women and economy: complex inequality in a post-industrial landscape. *Gender, Place & Culture*, 22(9). 1287–1304. DOI:10.1080/0966369X.2014.958066
43. Aragón, F. M., Rud, J. P. and Toews, G. (2018). Resource shocks, employment, and gender: evidence from the collapse of the UK coal industry. *Labour Economics*, 52. 54–67. DOI:10.1016/j.labeco.2018.03.007
44. Waddington, D., Critcher, C., Dicks, B. and Parry, D. (2001). *Out of the Ashes? The Social Impact of Industrial Contraction and Regeneration on Britain’s Mining Communities*. The Stationery Office, Norwich, UK.
45. Sovacool, B. K., Heffron, R. J., McCauley, D. and Goldthau, A. (2016). Energy decisions reframed as justice and ethical concerns. *Nature Energy*, 1. 16024. DOI:10.1038/nenergy.2016.24
46. Kartha, S., Caney, S., Dubash, N. K. and Muttitt, G. (2018). Whose carbon is burnable? Equity considerations in the allocation of a “right to extract”. *Climatic Change*, 150. 117–29. DOI:10.1007/s10584-018-2209-z
47. Carley, S., Evans, T. P. and Konisky, D. M. (2018). Adaptation, culture, and the energy transition in American coal country. *Energy Research & Social Science*, 37. 133–39. DOI:10.1016/j.erss.2017.10.007
48. Haggerty, J. H., Haggerty, M. N., Roemer, K. and Rose, J. (2018). Planning for the local impacts of coal facility closure: emerging strategies in the U.S. West. *Resources Policy*, 57. 69–80. DOI:10.1016/j.resourpol.2018.01.010
49. Newell, P. and Mulvaney, D. (2013). The political economy of the ‘just transition’. *Geographical Journal*, 179(2). 132–140. DOI:10.1111/geoj.12008
50. Mertins-Kirkwood, H. (2018). Who deserves a just transition? *Medium*, 13 April. <https://medium.com/just-transitions/mertins-kirkwood-778748c14a6a>
51. Hernández, D. (2015). Sacrifice along the energy continuum: A call for energy justice. *Environmental Justice*, 8(4). 151–56. DOI:10.1089/env.2015.0015
52. BP (2018). *BP Statistical Review of World Energy*. BP, London, UK. <http://bp.com/statisticalreview>
53. EFI and NASEO (2018). *U.S. Energy and Employment Report*. Energy Futures Initiative and the National Association of State Energy Officials, Washington, DC. <https://www.usenergyjobs.org/report/>
54. U.S. EIA (2018). *Annual Energy Outlook 2018*. U.S. Energy Information Administration, Washington, DC. <http://www.eia.gov/forecasts/aeo/>
55. U.S. EPA (2015). *Clean Power Plan for Existing Power Plants*. U.S. Environmental Protection Agency, Washington, DC. <https://web.archive.org/web/20160325042337/https://www.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants>
56. The White House (2016). The United States Mid-Century Strategy for Deep Decarbonization. https://obamawhitehouse.archives.gov/sites/default/files/docs/mid_century_strategy_report-final.pdf
57. The White House (2016). Investing in Coal Communities, Workers, and Technology: The POWER+ Plan. https://obamawhitehouse.archives.gov/sites/default/files/omb/budget/fy2016/assets/fact_sheets/investing-in-coal-communities-workers-and-technology-the-power-plan.pdf
58. The White House (2016). Fact Sheet: Administration Announces New Economic and Workforce Development Resources for Coal Communities through POWER Initiative. <https://obamawhitehouse.archives.gov/the-press-office/2016/08/24/fact-sheet-administration-announces-new-economic-and-workforce>
59. Pollin, R. and Callaci, B. (2016). A just transition for U.S. fossil fuel industry workers. *The American Prospect*, 6 July. <http://prospect.org/article/just-transition-us-fossil-fuel-industry-workers>
-

60. Haerer, D. and Pratson, L. (2015). Employment trends in the U.S. electricity sector, 2008–2012. *Energy Policy*, 82. 85–98. DOI:10.1016/j.enpol.2015.03.006
61. Carley, S., Evans, T. P., Graff, M. and Konisky, D. M. (2018). A framework for evaluating geographic disparities in energy transition vulnerability. *Nature Energy*, 3. 621–627. DOI:10.1038/s41560-018-0142-z
62. EIG (2016). *Distressed Communities Index*. Economic Innovation Group, Washington, DC. <https://eig.org/wp-content/uploads/2016/02/2016-Distressed-Communities-Index-Report.pdf>
63. Eftimie, A., Heller, K. and Strongman, J. (2009). *Gender Dimensions of the Extractive Industries*. The World Bank, Washington, DC. <https://openknowledge.worldbank.org/handle/10986/18236>
64. NIH (2015). *The Economic Impact of the Environmental Career Worker Training Program*. National Institute of Environmental Health Sciences, Washington, DC. https://www.niehs.nih.gov/careers/hazmat/wtp_ecwtp_report_508.pdf
65. The White House (2017). President Donald J. Trump Unleashes America's Energy Potential. <https://www.whitehouse.gov/the-press-office/2017/06/27/president-donald-j-trump-unleashes-americas-energy-potential>
66. Galik, C. S., DeCarolus, J. F. and Fell, H. (2017). Evaluating the US mid-century strategy for deep decarbonization amidst early century uncertainty. *Climate Policy*, 17(8). 1046–56. DOI:10.1080/14693062.2017.1340257
67. U.S. EDA (2017). *Assistance to Coal Communities*. U.S. Economic Development Administration <https://www.eda.gov/coal/2017/>
68. Burrow, S. (2017). Towards a just transition, with no stranded workers and no stranded communities. *OECD Insights Blog*, 23 May. <http://oecdinsights.org/2017/05/23/climate-towards-a-just-transition-with-no-stranded-workers-and-no-stranded-communities/>
69. Just Transition Fund (2018). <http://www.justtransitionfund.org/>
70. ASEAN Centre for Energy (2017). *The 5th ASEAN Energy Outlook, 2015-2040*. ASEAN Centre for Energy (ACE), Jakarta, Indonesia. <http://www.aseanenergy.org/resources/the-5th-asean-energy-outlook/>
71. Ariffin, E. (2018). Thai energy companies growing abroad. *The Asean Post*, 11 August. <https://theaseanpost.com/article/thai-energy-companies-growing-abroad>
72. Setboonsarng, C. and Gloystein, H. (2018). Thai energy companies roll out expansions across Southeast Asia. *Reuters*, 11 April. <https://www.reuters.com/article/us-thailand-energy-companies-analysis/thai-energy-companies-roll-out-expansions-across-southeast-asia-idUSKBN1H125>
73. Ministry of Energy (2015). *Thailand Power Development Plan 2015-2036*. Ministry of Energy, Bangkok, Thailand. <http://www.eppo.go.th/index.php/en/policy-and-plan/en-tieb/tieb-pdp>
74. Rujivanarom, P. (2018). Renewable energy should be focus of new power plan: expert. *The Nation*, 25 June. <http://www.nationmultimedia.com/detail/national/30348517>
75. Praiswan, Y. (2018). Power bills set to drop. *Bangkok Post*, 18 December. <https://www.bangkokpost.com/business/news/1596030/power-bills-set-to-drop>
76. The Nation (2018). Thailand steps away from coal. *The Nation*, 14 December. <http://www.nationmultimedia.com/detail/opinion/30360369>
77. ADB (2015). *Fossil Fuel Subsidies in Thailand: Trends, Impacts, and Reforms*. Asian Development Bank, Manila, Philippines. <https://www.adb.org/publications/fossil-fuel-subsidies-thailand-trends-impacts-reforms>
78. Anuchitworawong, C., Leangcharoen, P. and Thampanishvong, K. (2012). *Green Growth and Green Jobs in Thailand: Comparative Analysis, Potentials, Perspectives*. Friedrich EbertStiftung, Bangkok, Thailand. <http://library.fes.de/pdf-files/bueros/thailand/O9423.pdf>
79. ILO (2010). *Skills for Green Jobs in Thailand: Background Country Study*. International Labour Organization, Geneva, Switzerland. https://www.ilo.org/skills/pubs/WCMS_142473/lang-en/index.htm
80. National Statistical Office (2016). *Labour Force Survey 2016 (Q2) - Employed Persons by Industry for Whole Kingdom by Sex: 2010-2016*. National Statistics Office, Ministry of Information and Communication Technology, Bangkok, Thailand. http://web.nso.go.th/en/survey/lfs/lfs2016_tab_q2.htm
81. Resurrección, B. P. and Boyland, M. (2017). *Gender Equality in Renewable Energy in the Lower Mekong: Assessment and Opportunities*. United States Agency for International Development, Washington, DC. <https://www.sei.org/publications/gender-equality-renewables-mekong/>
82. Middleton, C. (2012). Transborder environmental justice in regional energy trade in mainland South-East Asia. *Austrian Journal of South-East Asian Studies*, 5. 292–315. <https://aseas.univie.ac.at/index.php/aseas/article/view/435>
83. Suk, W. (2018). Reckoning with human rights violations in Thailand's extraterritorial investments. *The Diplomat*, 17 July. <https://thediplomat.com/2018/07/reckoning-with-human-rights-violations-in-thailands-extraterritorial-investments/>
84. Ministry of Justice (2018). *Draft Thailand National Action Plan on Business and Human Rights*. Ministry of Justice, Bangkok, Thailand. <https://globalnaps.org/country/thailand/>
85. Praiswan, Y. (2018). Power plan makeover to encourage small traders. *Bangkok Post*, 5 July. <https://www.bangkokpost.com/business/news/1497566/power-plan-makeover-to-encourage-small-traders>
86. Praiswan, Y. (2018). Transplant a man with a plan. *Bangkok Post*, 24 October. <https://www.bangkokpost.com/business/news/1563526/transplant-a-man-with-a-plan>
87. Sirasontorn, P. and Koomsup, P. (2017). *Energy Transition in Thailand: Challenges and Opportunities*. Friedrich-Ebert-



Published by:

Stockholm Environment Institute
1402 Third Avenue, Suite 900
Seattle, WA 98101, USA
Tel: +1 206 547 4000

Author contacts:

georgia.piggot@sei.org
michael.boyland@sei.org

Media contact:

emily.yehle@sei.org

Visit us: sei.org

[@SEIresearch](https://twitter.com/SEIresearch)
[@SEIclimate](https://twitter.com/SEIclimate)

Stockholm Environment Institute is an international non-profit research and policy organization that tackles environment and development challenges.

We connect science and decision-making to develop solutions for a sustainable future for all.

Our approach is highly collaborative: stakeholder involvement is at the heart of our efforts to build capacity, strengthen institutions, and equip partners for the long term.

Our work spans climate, water, air, and land-use issues, and integrates evidence and perspectives on governance, the economy, gender and human health.

Across our eight centres in Europe, Asia, Africa and the Americas, we engage with policy processes, development action and business practice throughout the world.

Stiftung, Bangkok, Thailand. <https://www.fes-asia.org/news/energy-transition-in-thailand-challenges-and-opportunities/>

88. Delina, L. (2018). Whose and what futures? Navigating the contested coproduction of Thailand's energy sociotechnical imaginaries. *Energy Research & Social Science*, 35. 48–56. DOI:10.1016/j.erss.2017.10.045
89. ILO (2018). *Pilot Application of Policy Guidelines on Just Transition towards Environmentally Sustainable Economies and Societies for All in the Philippines*. International Labour Organization, Makati City, Philippines https://www.ilo.org/manila/projects/WCMS_522318/lang--en/index.htm
90. NESDB (2018). *Women's Development in the Tenth National Economic and Social Development Plan (2007-2011)*. Office of the National Economic and Social Development Board, Bangkok, Thailand. http://www.gender.go.th/eng/policy/pdf/10th_women.pdf
91. Jenkins, K., McCauley, D., Heffron, R., Stephan, H. and Rehner, R. (2016). Energy justice: a conceptual review. *Energy Research & Social Science*, 11. 174–82. DOI:10.1016/j.erss.2015.10.004
92. Healy, N., Stephens, J. C. and Malin, S. A. (2019). Embodied energy injustices: unveiling and politicizing the transboundary harms of fossil fuel extractivism and fossil fuel supply chains. *Energy Research & Social Science*, 48. 219–34. DOI:10.1016/j.erss.2018.09.016
93. Gass, P. and Echeverria, D. (2017). *Fossil Fuel Subsidy Reform and the Just Transition: Integrating Approaches for Complementary Outcomes*. International Institute for Sustainable Development, Geneva, Switzerland. <https://www.iisd.org/library/fossil-fuel-subsidy-reform-and-just-transition-integrating-approaches-complementary-outcomes>
94. Pachauri, S. and Spreng, D. (2004). Energy use and energy access in relation to poverty. *Economic and Political Weekly*, 39(3). 271–78. <https://www.jstor.org/stable/4414526>
95. Greenberg, P. (2018). Coal waste, socioeconomic change, and environmental inequality in Appalachia: implications for a just transition in coal country. *Society & Natural Resources*, 31(9). 995–1011. DOI:10.1080/08941920.2018.1456593
96. ILO (2017). *How to Measure and Model Social and Employment Outcomes of Climate and Sustainable Development Policies*. International Labour Organization, Geneva, Switzerland. http://www.ilo.org/wcmsp5/groups/public/--ed_emp/documents/publication/wcms_613934.pdf
97. ILO (2017). *Gender, Labour and a Just Transition Towards Environmentally Sustainable Economies and Societies for All*. International Labour Organization, Geneva, Switzerland. https://www.ilo.org/global/topics/equality-and-discrimination/publications/WCMS_592348/lang--en/index.htm
98. Mitchell, T. (2009). Carbon democracy. *Economy and Society*, 38(3). 399–432. DOI:10.1080/03085140903020598
99. van Veelen, B. and van der Horst, D. (2018). What is energy democracy? Connecting social science energy research and political theory. *Energy Research & Social Science*, 46. 19–28. DOI:10.1016/j.erss.2018.06.010
100. Burke, M. J. and Stephens, J. C. (2017). Energy democracy: goals and policy instruments for sociotechnical transitions. *Energy Research & Social Science*, 33. 35–48. DOI:10.1016/j.erss.2017.09.024

Acknowledgements

This brief is an output of the SEI Gender and Social Equality Programme (<https://www.sei.org/projects-and-tools/projects/gender-social-equality/>) and the SEI Initiative on Fossil Fuels and Climate Change (<https://www.sei.org/projects-and-tools/projects/fossil-fuels-and-climate-change/>), which are funded through SEI programme support from the Swedish International Development Cooperation Agency (Sida). Sida does not necessarily share the views expressed in this material. The authors would like to thank Babette Resurrección, Sivan Kartha and Michael Lazarus, and the participants in the *Roundtable on realizing gender and social equality through a just energy transition in Thailand* for their valuable input on this work. Any errors or omissions are the sole responsibility of the authors.