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Distributional impacts of mining transitions: learning from the past

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Introduction

In 2018, the Intergovernmental Panel on Climate Change (IPCC) released the special report *Global Warming of 1.5°C*. In it, the authors call for "far-reaching transitions in energy" that are "unprecedented in terms of scale", in order to keep temperatures from rising 1.5°C above pre-industrial levels and avoid a daunting outlook for people and the planet (IPCC 2018, p.17).

Dramatic changes in energy systems – as well as deep reductions in emissions and reduced reliance on fossil fuels – will inevitably affect distinct social groups differently, producing winners and losers.

Dramatic changes in energy systems – as well as deep reductions in emissions and reduced reliance on fossil fuels – will inevitably affect distinct social groups differently, producing winners and losers. The importance of this social dimension in a transition was affirmed in 2018, with Heads of State adopting the *Solidarity and Just Transition Silesia Declaration* at COP24 (Levaii and Vallejo 2018).

However, in order to address the social risks associated with low-carbon transitions, we must first understand them (Mabey et al. 2017). This includes looking at distributional impacts, or how policy interventions will affect different groups in society (Fell et al. 2019; UK Department of Treasury 2018).

Existing research has been mostly on fiscal measures (Green 2018; Mackie and Haščič 2019; Somanathan et al. 2014). There is little empirical evidence on the actual distributional impacts of mine closure and decline, particularly in regard to the type of measures designed to address them[1] (Strambo et al. 2019).

Past energy transitions suggest that these impacts will be unevenly distributed across society and potentially disruptive. It is thus necessary to plan and implement strategies that address these uneven impacts (Fouquet 2010; Spencer et al. 2018). Increasingly, policymakers are turning more and more attention to socio-economic effects, particularly in regions that are highly dependent on coal for energy or export revenues (Sartor 2017; Wiseman et al. 2017).

This paper examines the distributional impacts of historical mine closure and decline, in order to inform current and future energy transition planning. It is based on a systematic map[2] of published peer-reviewed academic literature on the social, economic and political impacts of declining extractive-based economies (see Strambo et al. 2019).

Specifically, we focus our analysis on the financial, psychological and labour-related impacts of mining closure and decline on gendered identities in mining communities and on youth. This focus is due to the frequency of cases within the literature that mentions these impacts on these groups. Our analysis looks at the vulnerability of these impacted groups on the individual, household, national and regional scale, as well as by income, race, ethnicity, age, locality (place of origin), gender and disability. We then discuss the effectiveness of implemented policy responses and initiatives in supporting these two social groups.

Methodology

This paper is an output of a study that systematically mapped socio-economic impacts of mining closure and decline (see Strambo et al. 2019 for more details). That study analysed 157 peer-reviewed academic and grey literature published in English and Spanish languages up to September 2017. The process for gathering literature involved: i) the design of a protocol with a search strategy and criteria for evaluating the relevance of the literature under review; ii) the implementation of the search strategy and the screening of search results to identify relevant

1 The methodology used for this assessment is described in detail in the appendix that accompanies a related SEI publication on mining transitions (Strambo et al. 2019).

2 Systematic mapping is a method used to describe the state of knowledge across a wide topic of interest, in a robust, comprehensive and repeatable way (James et al. 2016). The method helps to reduce bias and allow consistency and replicability in a literature review.

studies; iii) the coding of these following a pre-defined framework; and iv) the synthesis of the review's results.

This paper analyses the literature identified by the study as pertaining to the distributional impacts of declining or closing extraction industries. The research questions that we address in this paper are:

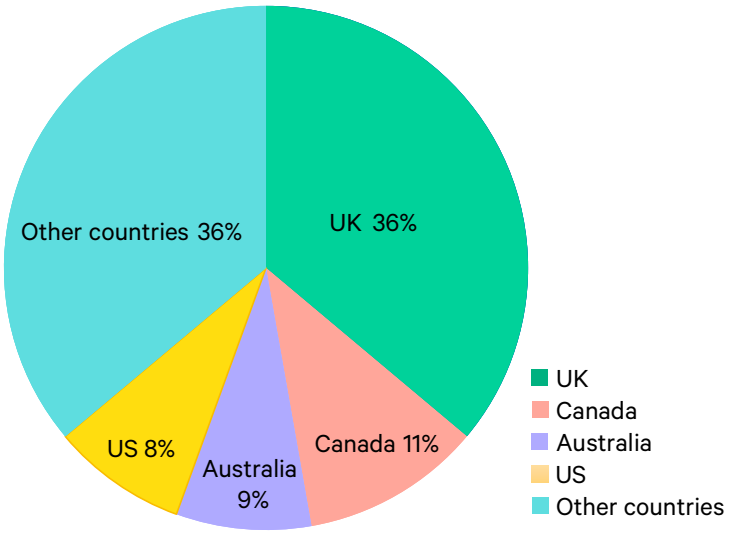
1. What have been the documented distributional impacts of past declines in natural resource extraction, disaggregated by gender and by age?

2. How have distributional impacts been mitigated in the past?

The 33 publications reviewed for this paper explore a total of 36 individual country case studies, the geographic distribution of which is shown in Figure 1. A significant proportion of this literature – 36% – examines the distributional impacts of downsizing on coal workers in the United Kingdom (UK).

This paper highlights the distributional impacts by gender and by age, although we note that other impacted social groups, such as migrant groups and low-income households, have also been considered in the literature.

Figure 1. Country case studies represented in the literature. Included in the "other countries" designation are Austria, Chile, China, Democratic Republic of Congo, Iran, Norway, Romania, Russia, Slovenia, Spain, Sweden, Turkey and Ukraine.



Gendered distributional impacts

Men and women hold distinct professional and social roles in mining communities during periods of mining activity. For example, in the UK, mining communities typically held to narrow gender roles: men as miners and women as wives and mothers of miners (Bennett 2015; Power 2008). Coal miners were mostly male, with social networks established through their occupation. The job also served as a core pillar of masculine identity in mining areas (Murphy 1989; Perchard 2013). For example, lodge banners – commissioned by unionized, male and working-class miners – idolized miners as physically strong, hard working men; women and children were rarely included (Scott 2009). The self-perception of masculinity is also summed up by the words of a former British miner: "I was a coal miner and proud of it. A man's man, a miner's man" (Perchard 2013, p.88).

In the UK, from the 1950s to the 1980s, women had limited economic opportunities and typically worked in factories, coal pit canteens and/or as homemakers in mining families (Bennett 2004; Bennett 2015). Despite their economic disempowerment, women nonetheless showed solidarity with men, and perceived the social structures and sense of community from coal mining as important for family welfare and financial stability (Bennett 2004). In fact, women were considered as vital in forming the social networks, connecting with other members of the mining community in the early days of forming a pit village (Power 2008). However, the prevailing gender norms in mining communities meant it was difficult for women to break out of their expected roles and responsibilities to leave and pursue education, develop external social networks, or find employment opportunities outside of their communities (Power 2008). Gender norms were entrenched and reinforced in extractive industry communities, such that women were strictly limited to domestic, reproductive work (Marshall 2008).

The decline of the coal sector brought new experiences and roles for women. Some became activists resisting mine closure, gaining respect from male miners as a result (Bennett 2015; Murphy 1989). In the US, women have instead spearheaded anti-coal movements, driven to action by the socially and environmentally destructive mountaintop removal mining in the Appalachia region (Manuel 2009; Shepherd-Powell 2017). In the words of a woman from a coal mining family and mining activist:

> *"Deep mining used to be economically beneficial to the area because it takes a whole lot more people to mine coal underground than it does on surface. You go out on these mountaintop removal sites, and there's nobody there. … I came back in the early 80s, and I drove over what they call Fox Gap, which was one of my favorite places to go, and when I got to the top of the mountain, I looked on the other side and it was gone (Shepherd-Powell 2017, p.186).*

Arguably the greatest change in gender roles came from societal change brought about by economic restructuring. In the UK, after the 1984–85 pit closures, gender roles were gradually redefined as the economy shifted from an industrial to a service-oriented economy. As men's economic activity declined in former coalfields, women had to step up and act as breadwinners; they became waged workers, and employers soon identified them as sources of cheap labour (Bennett 2004; Bennett 2015).

This shift created new challenges and a double burden for women (Haney and Shkaratan 2003). While the social structure of the workplace changed, the patriarchal structure within mining communities and households remained the same, and women became increasingly responsible for both productive and reproductive work. In Ontario, Canada, women in the former mining towns of Atikokan, Hearst, Hornepayne and Red Rock took on more paid work as mines closed and declined, but were still expected to take on household responsibilities (Olivier 2012). Within former coalfield areas around North Nottinghamshire, UK, women became caregivers to husbands and fathers who suffered from mining-related respiratory diseases and from mental illness as a result of unemployment and debt. The cases of domestic violence and abuse against women also rose (Bennett, 2004).

Women also experienced discrimination in the workplace. In the UK, after mine closures, women were often employed in low-wage, part-time work at the bottom of the job hierarchy (Bennett 2004). Similarly, in Russia, Ukraine, and Romania, as coal mining declined, women entered the workforce driven by their husband's unemployment and found that they could only obtain low-paying work, due to their lack of experience and competitive skills. Women older than 35 also found it particularly challenging to find work (Haney and Shkaratan 2003).

Gender-related distributional impacts have a lasting impact after mine closure. Ten years after pit closures in Nottinghamshire, UK, for instance, a women's centre found that women still suffered from closure-linked stress, high unemployment rates, marital breakdowns, domestic violence,

and sexual abuse (Bennett, 2004). For men, the masculine culture in mining – which was once a source of pride – prevented them from seeking assistance from family and community. For instance, the predominant "lonely mountain man culture" in the former mining town of Stekenjokk, Sweden promoted strong male gender norms. Under this culture, men were hunters and fishermen who were self-sufficient and independent; they were expected to overcome challenging situations by themselves, thus hindering them from seeking help (Nygren and Karlsson 1992). Concepts of masculinity can also make it difficult for men to transition to new, non-traditional sectors of employment (Neil et al. 1992).

Distributional impacts by age

Youth[3] lack experience and skills, making them disadvantaged workers (Haney and Shkaratan 2003). Mine closures have a significant impact on employment opportunities for those entering the job market – mainly young people. In Russia, Romania, and Ukraine, the closure and decline of coal mines led to a scarcity of overall jobs and quality jobs; this changed career prospects for youth, leading to out-migration, particularly of young men (Haney and Shkaratan 2003).

Similar trends have been documented in other former mining communities. The Turkish city of Keçiborlu, which was formerly dependent on sulphur mining, experienced youth out-migration spurred by high unemployment rates (Gümüş and Adanalı 2014). Similarly, in the UK, the rate of youth unemployment was relatively high after pit closures in 1984 and 1985 (Bright 2011; Murphy 1989). In Northern Ontario, both youth and young families left. This region also suffered the "brain drain" effect, where youth could not return to their hometowns after pursuing higher education due to a lack of relevant jobs (Olivier 2012).

Figure 2. Summary of distributional impacts of mining closure and decline, focused on gender and age. Social impacts on men and women include both psychological and physical health effects. Economic impacts include those that are labour-related, while political impacts include increased political activism among women. Impacts on youth are shown in orange and include migration, unemployment and political activism/disengagement.

3 The United Nations uses the word youth for persons between the ages of 15 to 24 for statistical consistency (UNESCO 2017). Within the literature review, authors use the term loosely without clearly defining an age frame. For this reason, we use the word youth if the authors have referenced a group directly as "youth."

The closure of mines – and its influence on future employment prospects – can affect the socio-political attitudes of youth in both the short- and long-term. Immediately after the 1984–85 pit closures in the UK, some regions found that youth resisted the anti-mine movement – in some cases, violently (Murphy 1989; Perchard 2013). In the longer term, a survey of youth from former coal pit communities in Doncaster showed that more than 40% wanted to move away, nearly a decade after pit closures (Thorleifsson 2016). Today's youth in UK post-mining communities also show anti-establishment attitudes; this traces back to an era where coal mining communities strongly resisted efforts by the State to quell protests against mine closure (Bright 2011; Marshall 2008).

Implications for energy transition policy and planning

Discussions within the literature on mine decline and closure focus primarily on the economic impacts and less so on the distributional impacts for different social groups (Caldecott 2017; Strambo et al. 2019). The research that does examine distributional impacts includes some suggested policy interventions. This section reflects on these interventions – particularly those needed to achieve a just and equitable transition – as well as on their limitations.

Inclusive and fair economic opportunities

Worker retraining programmes, worker compensation, and relocation support are common interventions to support unemployed workers and stimulate economic growth post-closure (Caldecott 2017; Johansson et al. 1992; Karbownik and Stachowicz 1994; Taylor 2015). However, the implementation of these measures has had limitations in terms of social equity goals.

Job placement programmes, such as the Job and Career Change Scheme in the UK (Murray et al. 2005) or the Community Futures element of the Canadian Jobs Strategy (Kendall 1992), are often part of governments' response to mine closure and decline (Strambo et al. 2019). However, resulting opportunities for former miners may well be part-time or short-term positions (Strangleman 2001), options that do not replace the long-term security and benefits provided by full-time jobs. Pensions, paid leave, healthcare, and other benefits are typically only provided to permanent employees of a company and exclude temporary and outsourced employees, as well as informal labour such as migrant workers, construction workers and service employees (Beatty 2016). The low wages, limited advancement opportunities, unpredictable working hours, and lack of pension contributions put part-time workers in undesirable working conditions and limit their future career prospects (Aassve et al., 2006; Bennett, 2004)

When women are the majority of part-time workers, they become vulnerable to the inequities of part-time work (Aassve et al. 2006; Blackwell 2001). In the UK and Canada, part-time work is primarily done by women who consider it preferable to full-time work so as to balance productive work with reproductive work (i.e. housework and raising children) (Beatty 2016; Olivier 2012).

To better ensure equitable access to transition measures, governments should broaden the base of eligibility for social protection benefits and re-training programs. Job placement programmes for a just transition will need to ensure both that benefits are provided to part-time workers and their families and that men and women have equal access to opportunities in the job market and to post-closure support measures (Piggot et al. 2019).

Revitalizing post-mining localities

The emergence of new economic sectors can take several years, if not decades (Hospers 2004; O'Faircheallaigh 1991), and attracting a new industry from elsewhere can be very difficult (Neil et al. 1992). Diverse strategies that address different impacts of mine closure are necessary to revitalize post-mining localities (Caldecott et al. 2015; Harfst et al. 2012; Neil et al. 1992). It is

also important for those affected to actively partake in rebuilding their communities (Campbell and Coenen 2017). Therefore, some towns have encouraged the growth of small and medium enterprises (SMEs) to revitalize their local economies, including Kiruna in Sweden (Liljenäs 1991), the Ruhr Valley in Germany (Taylor 2015), and affected coal communities in Ukraine (Lovei 1998), Poland (Dołzbłasz 2012) and the UK (Turner 1993). These opportunities, however, do not necessarily benefit all workers, as SMEs are typically highly dependent on skilled workers (Martinez-Fernandez 2008; OECD 2005).

To diversify the economies of former mining communities, governments may need to offer targeted technical training, financial incentives such as grants or tax incentives, and skills development to support small and medium enterprises – in addition to investing in infrastructure. For instance, in Outokumpu, Finland, the Ministry of Economic Affairs and Employment provided specific entrepreneurship training and courses after the mining industry declined in the 1980s in an effort to spur new economic activities. But such programs need to be targeted to meet the needs of affected communities. In the Finnish case, the Ministry's endeavour provided few job opportunities; most of those that were created ended up being in another geographical area. Furthermore, only a few of the people who benefited from the entrepreneurship grants had previously worked in the mining industry (Tykkyläinen 1991).

Indigenous people and migrants may be barred from accessing entrepreneurship promotion programmes due to discrimination based on class and/or culture. Nationality also may prevent them from accessing certain programmes intended for citizens (Ghomashchi 1997; Haney and Shkaratan 2003; Marshall 2008; Murphy 1989). Stimulating entrepreneurship should not be the only economic recovery and diversification strategy. Counting on entrepreneurs favours a specific segment of the population: those who have enough social and financial resources to take the risks associated with launching a business.

For many, relocation or out-migration is a strategy for coping with the impacts of mining decline and closure. However, historical cases suggest that migration choice may vary by social group and mobility can be constrained by a variety of factors, including age, homeownership, type of work and social relationships. In the UK, manual labourers in mining towns were less mobile, compared to professional labourers. Former miners didn't move out of coalfield regions at all. There are several reasons for this immobility. First, miners are not reabsorbed into the labour market after unemployment, and thus remain unemployed longer than the rest of the population. Second, they lack the motivation to migrate, coming from a sector where mobility is not as strongly associated with career progression as it is for professional occupations. Third, miners may be unable to sell their homes, due to rigidity in the housing market (Hollywood, 2002). Older workers may also be less likely to move because they have deeper ties to the local area (Hollywood 2002).

Similarly, native residents of a mining community are more likely to stay in mining towns post closure. For instance, in the iron-ore mining town of Manitouwadge, Canada, native or long-term resident households were more likely to remain in the town following mine closure (Johnston and Lorch, 1996). Women also tended to be more reluctant to migrate as they were more attached to their homes, due to their involvement in reproductive work (Pini et al. 2010).

For those who cannot or choose not to relocate, relevant stakeholders – including government, the private sector, and community organizations – should make an effort to foster robust economies and social networks in former mining areas. One possible support measure would be to provide transport subsidies for workers to commute on a regular basis (Haney and Shkaratan 2003). However, as mining towns are often located in remote areas, this is not always possible (Sartor 2017). Relocation measures need to better support members of the community that face greater difficulties in moving. Relocating often entails a complete change in living conditions, including changes in social life and community. As these changes can have negative effects on the mental and physical health of individuals, governments should consider assistance that goes beyond financial and logistical support to include social integration and psychological support (Ryff and Essex 1992).

Inclusive post-mine planning

A crucial step in addressing distributional impacts of mine decline and closure is to include a broad variety of social groups in planning for closure and its aftermath. Gender and social equality considerations are particularly important in the mining sector, as it is often associated with significant income inequality, and since mining revenues can be concentrated among those with political power (Arellano-Yanguas 2017; Loayza and Rigolini 2016). Mine closure and decline typically leads to a process of negotiation over response measures between the national (and sometimes subnational) government, the mining company and sometimes unions. Often, only the most powerful actors tend to have a seat at the negotiating table; the specific concerns and needs of social groups not directly involved may thus be left out of the discussions and response measures.

The literature presents several cases of citizen engagement and local government involvement, but it does not examine the efficacy of these responses in addressing the distributional effects of mine closure and decline. There are several examples of public participation and multi-stakeholder engagement, where citizens participated actively in creating and managing new economic activities for former mining areas (Archer et al. 1991; López Meza and Vidal Gutiérrez 2012; Sutherland 2015). Additionally, municipal and local governments have a key role in leading the charge to improve the social and physical conditions of life in communities after mine closure and decline, due to their familiarity with local issues. In the former mining town of Utrecht, South Africa, for example, community cooperation alongside support from local government enabled a transformation towards a tourism-oriented local economy that provided opportunities for all types of community members, including disadvantaged people (Binns and Nel 2001). Youth inclusion and participation are also important in planning a transition, but this is not always recognized. In Central Europe, for instance, regional planning often does not include youth participation, despite the fact that youth have high stakes and interest in planning the future of their region (Marot and Cernic-Mali 2012).

Mining companies also can play a part in mitigating the impacts of closure by engaging with the community and ensuring transparency throughout the closure process. Careful and long-term planning of mine closure and decline can help alleviate the emotional trauma associated with closure and account for other distributional impacts. Studies of mining companies' roles in Manitouwadge, Canada and Ravensthorpe, Australia, for example, show that a long-term announcement of closure can alleviate the psychological impact of mine closure and decline within mining communities (Browne et al. 2011; Johnston and Lorch 1996).

Conclusions

This review summarizes key insights from the historical documentation of distributional impacts of mine decline and closure. Two key areas of study emerge: the understanding of gender roles within mining communities and the impacts of closure on youth. We also reflect on the potential distributional impacts to various groups that could emerge in programmes to restore jobs, rehabilitate the socio-economic conditions of mining communities, and prevent out-migration.

Overall, we find that knowledge gaps remain in the literature, as there have been very few publications analysing, or even mentioning, distributional impacts. There have been even fewer papers on how to mitigate these impacts. Existing studies have primarily focused on the distributional impacts on workers from developed countries, especially the UK, and highlight the psychological and gender impacts of unemployment from mine downscaling and closure. While our review has shed light on some of the distributional impacts of a transition on workers, many questions remain for other groups beyond the labour force, including indigenous people, migrant workers, youth and the elderly. This, combined with the geographic focus of existing literature on developed countries, makes it difficult to clearly understand the distributional impacts of mine closure and decline across the globe.

A possible first step in planning for transitions is gaining a clearer understanding of the distributional impacts of mine downscaling in different locations, at different scales, and on typically marginalized and disadvantaged groups, such as those highlighted in this paper. Furthermore, this knowledge needs to translate into response measures that strive to reduce inequities and close the gap between winners and losers. This means broad access for under-represented groups in job placement, retraining and unemployment compensation programmes. With part-time job placement, efforts should be made to ensure that men and women in the workforce, as well as their families, receive equal opportunities and benefits. Public participation and inclusion of multiple stakeholders in planning are also important for redeveloping the economy of post-mining areas, so that the economy can financially and socially support the needs of resident communities.

In planning for an energy transition away from coal, it is crucial to recognise the far-reaching influence of the mining sector. The sector has drastically transformed the physical and social landscapes of our planet. A transition towards a low-carbon future requires policy responses that match the scale of transformations that mining has historically had on our society. Government actors alone cannot accomplish this task. Policy responses need to ensure that mining companies take responsibility and implement programmes to address the impacts that they have had on workers, affected communities and the environment.

Identifying and mitigating the distributional impacts of mine closure and decline is important in the transition away from coal and other fossil fuels. A more nuanced understanding of the effects of mine downscaling across society – and subsequent measures to address inequities – can help to improve the effectiveness of low-carbon transition measures. More importantly, the move away from coal – and the deep-rooted inequality of the fossil fuel sector – represents an opportunity to reduce inequalities and build a more inclusive and sustainable future.

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