17 The political economy of coal

Lessons learnt from 15 country cases

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Introduction

This integrated volume has analyzed the political economy of coal for a broad set of countries differing in multiple dimensions, including their levels of economic development, their political systems, their technological capabilities, their endowments with coal and their renewable energy potentials. For a broad classification, we have grouped countries into four categories, namely (i) countries phasing out coal, (ii) established coal users, (iii) countries phasing in coal and (iv) countries oriented toward coal exports.

In this synthesis chapter, we pull together the key insights that can be derived from the individual case studies. The fact that these studies were conducted on the basis of a unified analytical framework (see Chapter 1) allows us to carry out a comparative assessment. The country studies are organized along key objectives relevant for political and societal actors. In this regard, Figure 17.1 shows the share of studies in which a certain objective is discussed (not accounting for the relative importance of individual objectives), sorted by country groups. ‘Security of supply’ (73%), ‘climate and other environment’ (60%) as well as ‘affordability’ and ‘support for regional industrial development’ (both 53%) are relevant objectives in most countries. Some notable differences arise when comparing the relevance of objectives across various country clusters: countries that phase in coal seem to be especially concerned about affordable electricity prices. Maintaining revenues and industrial development are important factors for exporting countries, whereas employment is most relevant for established users. In countries that phase out coal, climate change mitigation seems to rank high on the agenda when it comes to coal investments, while it is of little importance for countries that currently phase in coal. Finally, private profits seem to be influential for all countries, most significantly for established users and to a lesser extent in those phasing out coal.

Those objectives are weighted differently by political and societal actors. Hence, objectives stated by policy makers and in official documents do not necessarily reflect the actual underlying reason for the chosen energy policy design. For instance, official policies might state that coal is preferred as it constitutes a reliable and affordable source of energy, whereas in reality, the

Figure 17.1 Key objectives as stated in case studies by country groups.

Note: Phase-out countries comprise Germany, Bulgaria, Chile, the United States and the United Kingdom; Established users comprise China, India and Turkey; Phase-in countries comprise Kenya, the Philippines and Vietnam; Exporting countries comprise Australia, Colombia, Indonesia and South Africa.

decision for coal is mainly driven by the influence of vested interests. We will discuss the mechanics of how stated objectives become relevant for the politics of coal in the ‘Objectives (stated)’ section for affordability of energy supply, energy security as well as climate change mitigation and local environmental concerns. The ‘Vested interests: politics and incumbency’ section will look into the important role of vested interests that promote coal production and use and how specific actors influence energy policy in their self-interest, often to the disadvantage of other actors and social objectives. In the ‘Structural factors’ section, we discuss how multilevel governance and the regulation of the power market influence how important political economy factors play out in the energy policy making of countries.

Finally, we conclude by linking these observations to individual country groups and discuss implications for the design of coal phase-out policies.

Objectives (stated)

This section discusses in detail how the objectives most frequently mentioned in stakeholder interviews and hence in individual case studies (affordability, security of supply as well as climate change mitigation and local environmental concerns) are important for the political economy of coal. *Affordability* is at the core of energy policy making in most countries. Yet, concerns about affordability can result in very different policy decisions, both supporting new coal investments and contributing to a fast phase-out, depending on the country context. The intermittency of renewables may indeed favor coal in countries with weak governance and difficulties to access capital. Nevertheless, several case studies included in this volume suggest that *energy security* might often be used as a pretext to favor vested interests. *Climate and other environmental concerns* dampen coal use only in a few high-income countries. However, with sufficient backing from civil society, the prospect of local pollution can affect energy policy formulation.

Affordability: capital costs and human resources

Providing affordable electricity is a key objective of energy policy in most countries. Cheap electricity prices are seen as a key means to ensure competitiveness of the domestic (energy-intensive) industry. In addition, the political leeway to increase prices for households is often very limited, particularly in low- and middle-income countries. Policy makers fear losing popularity, protests or even loss of power when increasing electricity prices. At the same time, prices are often too low to cover the energy system costs, leading to implicit subsidies to ‘keep the lights on’ (quote from the Vietnam case study), which often have substantial impacts on public budgets.

In low- and middle-income countries currently investing in coal, this leads to (financial) pressure to build the cheapest option. Despite falling costs of renewables, coal – at least in the short term – often is (or is seen as) the cheapest

option to build new capacity. Against this background, short-term objectives, for example, to satisfy fast growing energy demand, are also weighted much higher than longer term objectives, for example, related to environmental protection. Various reasons can be identified in this regard:

First, most low- and middle-income countries face high capital costs. Weighted average costs of capital for energy investments were frequently stated to be above 10% (e.g., in Indonesia and Vietnam). Given very fundamental differences in the financing structure of renewables and coal, high capital costs favor coal, which is – on a per MW basis – less capital-intensive (Schmidt 2014). This bias might be exacerbated by regulations that favor coal over renewable alternatives and hence increase risk premiums and capital costs for renewable energies (RE). For instance, in Vietnam, coal-fired power plants receive long-term price guarantees, whereas RE producers need to rely on short-term contracts. Likewise, in the Philippines, utilities are shielded from the risk of rising world market prices for coal, as they are entitled to pass them on to consumers. Furthermore, coal is an established technology and policy makers are confident that they can handle an energy system built on coal. Additional capital (both human and physical) requirements for building an energy system based on renewables (including storage and managing intermittency) are regarded to be uncertain, more difficult to manage and arguably more costly.

Despite other factors relevant for explaining ongoing investments in coal, it also gets clear from the case studies presented in this book that coal is phased out (or not phased in) when it is not financially viable. For example, cheap natural gas has led to an unexpected decline of coal use in the United States that could not even be stopped by massive political support. A similar story could be told for the United Kingdom, where gas, cheap renewables and a carbon tax have made coal unattractive, leading to a fast phase-out of coal in the country. It is also interesting to watch out for future coal investments after the Covid-19 crisis. While in China the economic recovery seems to depend on significant new investments in additional coal capacity, many other countries have halted their investment plans. In some countries that had previously planned to increase their capacities, the tide for coal has turned. For example, in Vietnam, coal investments have been stopped in favor of alternatives (Manila Times 2021).

Energy security: security of supply and independence

In countries with abundant coal resources, energy security is frequently stated as an important objective that justifies scaling up coal-fired capacities. Energy security in this regard refers to multiple aspects, including import independence and reliable electricity supply. For instance, in Indonesia, coal is portrayed as an abundantly available domestic energy resource that can be tapped to decrease dependence on energy imports. Similar arguments have been brought forth in many countries, including Australia, Turkey and South Africa, as well as Colombia (which currently uses very little coal, despite being among

the world's top exporting countries). Hence, in these countries, coal indeed advances energy security, as recoverable reserves are sufficient to meet domestic energy demand for decades, without having to rely on imports and being subject to fluctuations of world market prices.

It could be argued that alternative energy sources also perform well in terms of energy security, as renewable power is produced locally and is not exhaustible. Nevertheless, many low-income countries would still need to import energy technologies, such as solar panels and windmills. Even though this argument also holds for coal power plants, technological availability is secured by established providers that frequently offer favorable terms, in some cases related to declining domestic markets for coal-fired generation capacities and supported by the government. The activities of developers from China, Japan and South Korea in South-East Asia as well as the build-up of coal-based infrastructures in countries that are part of China's Belt and Road Initiative are good cases in point. Furthermore, dependence on coal imports seems unlikely to provide a serious concern, as global coal markets are well integrated with a large number of suppliers. Hence, importers are probably less affected by market power of supplying countries than it is the case for example, oil and gas.

For the reasons mentioned above, in coal-rich countries, the notion of coal as a domestic energy source that guarantees independence from energy imports does not seem to be grounded in economic reality. Rather, based on the evidence from the case studies, we presume that import independence might well be brought forth as a pretext to adopt policies that aim at ensuring employment in coal mining, profits for private actors as well as revenues for regions in which coal is produced and consumed.

However, one important dimension in which coal might indeed outperform renewables is reliability. In many countries, coal has been praised for the ability to produce baseload electricity. This is even the case in countries that need to import coal, such as Vietnam and the Philippines. Integrating intermittent renewables into the electricity system poses not only technical and financial, but also administrative as well as institutional challenges. Besides storage and back-up capacities, such as pumped hydro plants or natural gas turbines, governance frameworks, such as spot-markets, to ensure their sufficient provision will be required. This obstacle to RE deployment seems likely to be most important for countries with low institutional and regulatory quality, which can be expected to prefer coal as an energy source that is less demanding in terms of governance.

Climate and other environmental issues: emissions and externalities

In most countries, climate change mitigation and other environmental concerns, such as local air pollution, are important, but not central arguments in the energy policy discussion. For instance, many countries which are highly vulnerable to climate impacts, such as Vietnam or India, acknowledge the need to rapidly reduce global greenhouse gas emissions. Nevertheless, responsibility for

emission reductions is frequently attributed to high-income countries, which account for the lion's share of historical greenhouse gas emissions and at the same time dispose of the financial means to shoulder the costs of clean energy generation. In addition, in countries in which deforestation has so far been the dominant driver of greenhouse gas emissions, energy policy is often misaligned with climate targets. For instance, in Indonesia, the ministry of the environment oversees climate policy but can mainly implement forestry measures, while energy policy is decided elsewhere.

Climate change mitigation is mostly a key concern in countries in which there is a high awareness of the dangers of unchecked global warming and a high willingness to avoid this. This can partly explain the ambitious coal phase-out instigated in the United Kingdom in connection with the country's national climate strategy as well as high costs of Germany's coal phase-out for the public budget. In a similar vein, climate considerations likely play an important role in emerging economies that are vulnerable to climate change and at the same time feature low costs to transition to clean energy sources. A good example is Chile, for which the domestic energy transition is a way to provide momentum for global efforts to reduce emissions.

Other environmental considerations, such as ambient air pollution or water use, seem to receive rather low attention in national energy plans unless there is outspoken resistance from civil society against specific projects. For instance, in Kenya, local opposition has mobilized to prevent the Lamu power plant due to the fear of impairing natural habitats and wildlife, which would also entail serious consequences for the local tourism industry. Likewise, in Vietnam, local communities opposed to air pollution have successfully blocked plans to erect coal plants. However, local environmental concerns may also hinder the adoption of RE, for example, in relation to land requirements for solar and wind.

Vested interests: politics and incumbency

Across all countries under study, it has become evident that the politics of coal is indeed a story of vested interests. Vested interests are often closely connected to regional actors and interests, independent of the governance structure. That is, regions (and regional actors) are found to play an important role in energy policy making independent of their constitutional role. Across countries, we identify four major ways in which actors influence energy policy in their self-interest, often to the disadvantage of other actors and social objectives, using arguments connected to (i) jobs, (ii) regional development, (iii) royalties, and (iv) lobbying and bribery.

Coal, in particular coal mining, is frequently connected to (locally concentrated) jobs. In many cases, those jobs are located in economically weak regions where alternative employment opportunities are scarce. While in most countries coal only accounts for an insignificant share of total employment on the national level, it can be very relevant for specific regions. For example,

in the Eastern Indian regions of Jharkhand, Odisha, Chhattisgarh and West Bengal more than 10 million livelihoods are thought to depend directly or indirectly on coal-related activities. In some districts, more than 50% of the population derive their income from coal-related activities. This often leads regional policy makers to strongly make the case of keeping or even expanding coal. The argument is not only relevant for countries that export and/or phase in coal, but also in countries that phase out coal. In Germany, concerns about job losses have dominated phase-out discussions. The absolute number of about 20,000 direct coal jobs at stake seems rather moderate. Yet, a large share of these jobs is located in economically disadvantaged areas of eastern Germany with mounting discontent with the political system, such that phasing out coal has become a highly contentious issue. In a similar vein, in the United States the market-driven decline of the coal industry has contributed to populist sentiment in coal states.

Coal is also linked to regional development prospects (e.g., infrastructure provision) and industrialization in various dimensions. The widespread belief that coal holds positive spillovers on industrialization generates vested interests in favor of coal-fired power plants for regional governments in low- and middle-income countries, both regarding established users that continue to invest in new capacities as well as countries that phase in coal (Kalkuhl et al. 2019). Compared to alternative energy sources, such as natural gas or renewables, coal might have the advantage to contribute to the build-up of transport infrastructure, such as railways. These can bring down transport costs for other goods as well and thus spur regional development. While the link is established in the economic history literature (Fernihough and O'Rourke 2021), it is unclear whether similar effects still play a role today. The belief that coal holds positive spillovers on economic activity however seems to be strong in many countries under study.

In countries that mine and export coal, royalties are an important factor keeping coal in place. Mining regions frequently rely on royalties to meet societal goals, for example, carrying out investments to support the decentralization process in Indonesia or to alleviate the long-lasting internal conflict in Colombia. Such pronounced dependence on royalties creates strong opposition against phasing out coal mining. The prospect of shrinking export markets, for example, in the case of Indonesia or Colombia, incentivized regions to invest in new domestic coal-fired capacities to maintain a stable revenue flow from royalties. Securing revenues is hence a powerful driver of investments in domestic coal and hence stabilizing domestic demand in some countries.

Vested interests also manifest in the form of lobbying or bribery to ensure private profits. The coal industry is very often well connected to the top level of political decision makers. In this regard the coal industry is not only composed of mines and power plants but also includes the transport of coal or ashes, turbine manufacturers and landowners. Such stakeholders often exert political influence by providing political or financial support. In Indonesia, for example, the coal industry has been a major donor to the current president's election

campaign. In Vietnam, regional policy makers that are responsible for siting power plants and anchoring them in the national power development plan have reportedly accepted bribes by coal plant developers. In India, local and national politicians have stakes in coal-related businesses, including machinery suppliers, transport or ash treatment. Oligarchs that own coal assets are also reported to be members of parliament (in Indonesia, India and the Philippines) or even in the government. In addition, revolving door policies that lead to an exchange of personnel as well as overlapping interests between regulators and regulated utilities can be found in many countries.

Structural factors

Across case studies, multilevel governance and the structure of energy markets seem to be decisive political economy factors for policy making. Sub-national jurisdictions may have incentives to implement policies that are not in line with national energy and climate plans, while supra-national policies can affect countries' energy systems without dedicated national policies. Regarding the structure of energy markets, state-owned utilities seem to be particularly vulnerable to special interests.

Multilevel governance: political networks and transnational regimes

Multilevel governance can have important implications in settings in which subnational jurisdictions have a major say in energy policy making. This is illustrated by the political support for coal mining by Indonesian regions aiming to create employment, spur local economic activity and boost their public budgets by means of royalties. Likewise, in China the construction of coal-fired power plants decided by regional administrations striving to meet their economic growth targets contravenes, at least to some extent, energy and climate policies formulated on the national level. In Germany, concerns voiced by a few coal-dependent regions are a major reason for the late phase-out date.

Promoting coal to boost regional economic activity is an important objective where it contributes to addressing long lasting conflicts, including violent ones. This is for instance the case for Indonesia, where jobs and public revenues from coal mining have played important roles in stifling demands for independence following the country's move towards decentralization after overcoming the dictatorship in 1997. In Colombia, revenues from coal are used to facilitate the peace process between the government and the FARC guerilla that has been lasting for decades.

An additional aspect of multilevel governance concerns the relationship between national and supra-national policies within the European Union (EU). In this context, the coal phase-outs in the United Kingdom and Germany need to be understood as being embedded in a broader European effort, in which developments in the power sector are to a large extent determined by the development of carbon prices in the EU Emission Trading System (EU

ETS). Nevertheless, both countries decided to apply additional instruments, most importantly the carbon price floor in the United Kingdom and the coal moratorium in 2038 in Germany, to hasten the transformation of the power sector. These efforts have probably not resulted in immediate EU-wide emission reductions due to the fact that the overall amount of available emission permits is determined by the EU ETS cap, such that emissions avoided in one country will lower carbon prices and result in higher emissions elsewhere (the so-called waterbed effect). However, phasing out coal opens the perspective of adopting more ambitious climate targets in the future, such as the decision to increase the reduction target for 2030 from 40% to 55% relative to the year 1990 with the EU Green Deal. For some countries, this will likely mean that coal will not be competitive in the power market anymore. That is, countries such as Bulgaria will need to deal with the prospect of a coal phase-out that is not deliberately implemented but results from policies adopted at the European level.

The international community can also be relevant for coal investments in various ways. First, China is not only an important role model for many newly industrializing countries; the country and its public institutions also actively engage in facilitating coal investments. Chinese companies offer turnkey solutions, including financial solutions and cost-competitive technology. In this regard, Chinese-made power plants are often significantly cheaper compared to technology developed in other countries. Chinese investors have also been reported to aggressively pursue new coal investments (e.g., by bribing local decision makers in Vietnam). The Chinese government's announcement to no longer invest in coal in other countries could hence play an important role for the prospect of transitioning away from coal in these countries. Second, most countries have a keen interest to boost their reputation and international standing. An important reason for South Africa to adopt a carbon price in the power sector despite its carbon-intensive energy system might have been the objective to act as a reliable partner in the international arena. Similarly, India announced ambitious renewable targets, partially to improve the international standing of its newly elected government. However, the impression given in official documents does not need to match developments on the ground. For instance, Vietnam had plans to massively ramp up coal power plants, despite the country's Green Growth Strategy, which probably was adopted mainly to make donors keep disbursing development assistance. Likewise, Colombia has frequently emphasized its role as a climate champion by highlighting the low level of domestic emissions, thus ignoring the adverse climate effects of its large-scale coal exports.

Structure of energy markets: competition and subsidization

The structure of energy markets seems to be a decisive factor determining which energy source is used to generate electricity. In the past, liberalized power markets had favored coal as the least cost option, at least in the absence of policies that take into account the social costs associated with greenhouse gas emissions and air pollution from coal combustion. This situation has changed in recent years, as renewable energy technologies and natural gas (often from

shale gas) have become significantly less expensive. Hence, coal has quickly been replaced by cheaper alternatives in countries with a liberalized energy market, including the United States, the United Kingdom and Chile (most importantly by natural gas and renewable energy). Dedicated policies to either make coal economically less attractive or to support clean energy sources may speed up this process. With a carbon price from the EU ETS as well as generous feed-in-tariffs for RE, Germany features both elements. In this setting, coal might be driven out of the market well before the official phase-out date in 2038, despite the country's relatively low potential of low-cost RE. In countries with attractive RE potentials and liberalized energy markets, coal can only maintain its market share with targeted support from policy makers, as is the case in for example, Australia or Turkey. Nevertheless, such support is amenable to criticism and risks to be withdrawn in times in which budgetary discipline is required.

By contrast, in countries where energy markets are highly regulated (often including state-owned, vertically integrated utilities) vested interests resist coal phase-out. One may suspect that certain power market regulations are deliberately designed in ways that favor investments in coal. For example, in Vietnam independent power producers were guaranteed a fixed price over 20 years for coal, but only for one year for renewable energy. When this policy was reformed recently (i.e., after the case study for this book had been finalized), the country saw a massive uptake of renewable energy and increasingly discusses to forego the announced coal investments. In Turkey, electricity generated from lignite is provided a feed-in tariff. However, once there is sufficient political support for an energy transition, state-owned enterprises might even accelerate the transition away from coal.

While deregulating energy markets can be a means to curtail the influence of vested interests and pave the way for competitive alternatives, equalizing liberalized energy markets with no coal would be wrong. In the Philippines, privately owned conglomerates owning the generation, distribution and transmission infrastructure are found to favor new coal investments. If liberalized, energy markets hence also need to be protected from market power.

Outlook and conclusions

The stylized facts discussed in this chapter offer a number of key insights that could help to devise policies to facilitate coal phase-out. Arguably, these policies will need to take into account specific country circumstances. In the following, we discuss policy implications based on the broad classification scheme, summarized in Table 17.1.

First, affordability plays a key role especially for low-income countries, which are predominantly found among the group of phase-in countries and established users (and for some export-oriented countries for their domestic energy use). For these countries, adoption of low-carbon energy sources is only attractive if it does not come at higher costs than coal. The sharp price declines for renewable energy technologies could help to accelerate energy

Table 17.1 Overview of key aspects by country group as well as recommended policy options to support the phase-out of coal

	<i>Phase-out</i>	<i>Established</i>	<i>Phase-in</i>	<i>Export-oriented</i>
Affordability	Coal phase-out may be accelerated by market forces	Affordability main reason in favor of coal	Affordability main reason in favor of coal	Affordability reason to use and even increase coal use domestically
Energy security	Energy security not a major factor for coal	Energy security as a pretext to favor vested interests, some relation to grid stability	Energy security most relevant in terms of grid stability	Energy security as a pretext to favor vested interests, some relation to grid stability for some countries
Climate and other environmental issues	Important for at least some countries	Mostly important for immediate, direct impacts	Of lesser importance	Mostly important for immediate, direct impacts
Vested interests	Vested coal interests dominated by other actors	Strong vested coal interests	Vested coal interests not yet established	Strong vested coal interests
Multilevel governance*	EU	UNFCCC, BRI	BRI, International donors	BRI
Energy market structure	Mostly liberalized	State control favors vested coal interests	Mostly state controlled, high cost pressure	State control favors vested coal interests
Key policies for phase out	Carbon pricing, RE support, strengthen multilevel governance	Power market reform, institutional reforms, compensation schemes	De-risking RE investments, technical assistance to enable power grids with high RE shares	Institutional reforms, compensation schemes, support for alternative export opportunities

*: As the complexity of multilevel governance precludes general statements, we provide examples how such governance aspects are relevant for at least some countries in the respective category. In addition, sub-national issues are relevant for many countries, but highly context specific.

transitions in these countries. Nevertheless, issues related to high up-front capital costs and challenges to integrate renewables into existing grids loom large. In such situations, support from the international community, for example, with capacity building for the required regulatory environment and provision of de-risking instruments for clean energy investments, could play important roles. In most countries that have started to phase out coal, cost-competitive alternatives (including renewables and natural gas) can push coal out of the energy system even without further policy support.

Second, energy security in the sense of avoiding imports does not seem to be a major driver in favor of coal use. This is particularly true for countries phasing out coal, which are high-income countries with the technological and financial means to choose from a broad variety of energy technologies. As discussed, energy security is frequently used as a pretext to favor vested interests, which are most prominent among established users and export-oriented countries, which have abundant coal reserves. However, concerns related to the integration of renewables into existing grids are clearly relevant for countries with weak regulatory systems, which include established users, phase-in countries, as well as some export-oriented countries. In this regard, technical as well as financial assistance could be an important lever to facilitate coal phase-outs.

Third, climate and other environmental concerns are important factors for some countries that have decided to phase out coal. For all others, however, environmental concerns rank low on the political agenda, often dominated by economic concerns and the power of vested interests. In these cases, environmental considerations are likely most relevant for immediately observable direct impacts, such as local air pollution, in countries that are already heavy coal users. Provision of information regarding the social costs of coal use and strengthening civil society to effectively voice their concerns could then help to phase out coal.

Fourth, vested interests are most relevant in countries with a long-lasting legacy of coal production and use, that is, established coal users and export-oriented countries. In these settings, incumbents have accumulated substantial interests and political influence to prevent or at least delay the adoption of alternative energy sources even if these are less expensive than coal. Phasing out coal will require a combination of political reform to lower the influence of these vested interests on policy making and schemes to compensate political losers. By contrast, in countries belonging to the phase-in category, it seems politically much easier to embark on clean energy pathways if they meet central objectives, such as affordability and reliability, at least as well as coal. In countries that are on the way to phase out coal, that is, which also have existing vested interests, the balance of political power has already shifted. In these settings, coal use is being curtailed either deliberately by means of climate policy or by market forces that favor lower cost alternatives.

Fifth, multilevel governance issues are in one form or the other relevant for all countries. Due to the heterogeneity of this category, which includes sub-national, supra-national as well as international dimensions, it is least

straightforward to relate to a certain country category. Instead, policies to phase out coal will need to be designed in a way that takes into account how national measures are implemented by sub-national entities and how they are embedded in a country's supra- and international commitments. Perhaps the most consistent conclusion that can be drawn in this regard is that countries might have an incentive to adopt climate measures to boost their international standing and derive ancillary benefits (e.g., participation in a regional trading block) even if climate change mitigation is not among their most prominent objectives.

Finally, liberalized energy markets favor the cheapest energy source. In the past, this has often been coal (at least in the absence of further environmental regulations). More recently, with cheaper low-carbon options becoming available, the tables have turned and renewable energies and natural gas have gained market shares at the expense of coal. In state-controlled markets, vested interests have a stronger influence. For this reason, state control is likely most important for established users and some export-oriented countries. Hence, supporting power market reform in these countries, that is, liberalization of the electricity market, privatization of state-owned utilities as well as unbundling of generation, transmission and distribution could provide an important impetus for clean energy transitions.

While arguably policy implications are country specific, we can provide some tentative policy recommendations, at least for specific country groups.

Countries that currently phase out coal in most cases have (cheap) alternatives available, which are more viable if power markets are liberalized. In countries with high awareness of climate change, dedicated policies, such as carbon pricing or support schemes for renewables, can further accelerate the energy transition. In this context, multilevel governance factors can play an important role to facilitate credible national plans to phase out coal.

For established users, and exporters with a significant domestic coal consumption, power market liberalization can help to keep the influence of vested coal interests in check. This is particularly true for countries in which low-cost alternatives are readily available. In addition, ways to address the political resistance of incumbent coal actors need to be identified. This might entail institutional reforms as well as forms of direct as well as indirect compensation that will reduce the adverse impacts of a coal phase-out on specific regions and industries.

For countries phasing in coal, economic costs are also a major concern. Even with high potentials for low-cost renewables, the required upfront investments in combination with high capital costs can make alternatives to coal unattractive. In this regard, the international community and donors could accelerate RE deployment by providing instruments for political as well as financial de-risking (Steckel and Jakob 2018). Furthermore, international cooperation could help to alleviate fears of grid instability by means of technical assistance and capacity building for the regulatory environment needed to be able to deal with a high share intermittent electricity.

Finally, for coal exporters, similar challenges of limiting the political influence of incumbents as for established coal users exist. However, potential solutions differ. One opportunity could consist in promoting efforts to shift economic models away from extractive industries. This might be most viable in countries in which new industries, such as the production of green hydrogen or energy-intensive industries based on cost-competitive renewable sources, can be established as alternative sources of income, employment and regional development.

To conclude, there exist numerous strategies that may facilitate coal phase-out. The key challenge consists in choosing those strategies that best address the underlying political economy that emerges from a particular constellation of actors, objectives and context factors. We hope that this integrated volume will contribute to gaining a clearer picture of the political economy factors that favor coal extraction and use and consequently help to design politically feasible phase-out policies that are adequate for the specific country context.

References

- Fernihough, A., & Hjortshøj O'Rourke, K. (2021). Coal and the European Industrial Revolution. *The Economic Journal* 131 (635): 1135–1149. <https://doi.org/10.1093/ej/ueaa117>.
- Kalkuhl, M., Steckel, J., Montrone, L., Jakob, M., Peters, J., & Edenhofer, O. (2019). Successful Coal Phase-out Requires New Models of Development. *Nature Energy* 4 (11): 897–900. <https://doi.org/10.1038/s41560-019-0500-5>.
- Manila Times. (2021). Vietnam Coal Plant Pullout – a Sign of Things to Come?, 2021. www.manilatimes.net/2021/03/10/opinion/editorial/vietnam-coal-plant-pullout-a-sign-of-things-to-come/849329/.
- Schmidt, T.S. (2014). Low-Carbon Investment Risks and de-Risking. *Nature Climate Change* 4 (4): 237–239.
- Steckel, J., & Jakob, M. (2018). The Role of Financing Cost and de-Risking Strategies for Clean Energy Investment. *International Economics*, February. 155, 19–28, <https://doi.org/10.1016/j.inteco.2018.02.003>.