From Coal to Renewables: Changing Socio-Ecological Relations of Energy in India, Australia and Germany.

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> "What we do over the next ten years will determine the future of humanity for the next ten thousand years".
> – Professor Sir David King, former chief scientific advisor, UK Government, BBC News, 10.5.2019

In May 2019, announcing an urgent UN Climate Action Summit for September that year, the UN Secretary-General António Guterres called for a moratorium on new coal-fired power plants by 2020, and noted that "if all coal power plants currently under construction go into operation and run until the end of their technical lifetime, emissions will increase by another 150 gigatonnes, jeopardizing our ability to limit global warming by 2°C" (UN, 2019). As Guterres stressed, an immediate exit from coal-fired power is the key priority in confronting the climate emergency and achieving the Paris climate goals. We argue in a forthcoming publication (Goodman et al., 2020), that there is conflicting evidence as to whether or not the world has really reached "peak demand" for coal as an energy source. Projections from industry bodies and corporations such as the IEA, ExxonMobil, BHP Group and BP identify apparently contradictory energy trends. BHP Group predicts that coal will "progressively lose competitiveness to renewables on a new build basis in the developed world and in China", but still be competitive in India and other emerging markets (McKay, 2019). The BP World Energy Outlook states that "renewables are the largest source of energy growth, gaining at an unprecedented rate", but acknowledges that world demand for coal is unlikely to decline unless governments take much more decisive action to curb emissions (Macdonald-Smith, 2019). The IEA remarks that despite the rapid growth of renewables, the pace and scale of energy transition, "is not in line with climate targets" (IEA, 2019). These narratives of a surging global energy transition, and stubbornly intractable demand for fossil fuels, exist side by side.

This chapter reports on three countries, Germany, India and Australia, which the Climate Transparency organisation (2018) claims are unlikely to meet their immediate Paris Agreement targets. Germany *is* decreasing emissions, while Australia and India are

increasing. Just because we may need a transition does not mean it will occur, or occur in the manner in which we need it to occur. Consequently, as Kern & Rogge argue, the pace of energy transitions and whether they can be sped up is a key academic and policy question (Kern & Rogge, 2016: 13).

In the following discussion, we understand transition as involving both a process of contesting the meaning, legitimacy and use of fossil fuels, especially coal, and of building a social and political constituency for transition to a relatively decarbonized society, powered by renewable energy. Energy transition is not simply a technocratic process, it is inevitably bound up with energy governance, which according to Szulecki is at a crossroads, facing a "third industrial revolution" (Szulecki, 2018: 21). Kern & Rogge, point out that while in the past "energy transitions have not been consciously governed", today a wide variety of social groups are actively engaged in attempting to build transition towards low greenhouse gas emission energy systems (Kern & Rogge 2016: 13). The transition opens up possibilities for public input into energy decision making, design and implementation, as well as generating new conflicts.

In the following discussion, we analyse the governance of energy transitions from the ground up, drawing on findings from a comparative research project on the contestation of coal mining in Australia, India and Germany, and a new project on energy transition in the same countries. All three countries are coal-dependent, with the state being heavily involved in coal extraction as a developmentalist project; all are parliamentary democracies, although with very different characteristics; and each is engaged in different processes of decarbonisation, delay, and energy transition. In each case, the pace of this transition, and its sufficiency, is heavily intertwined in social struggle, issues of political acceptability, and cultural sense-making, as well as relying on technological innovation and fit with existing economic systems. Those in the coal-industrial complex have exerted their influence to inhibit change and recognition of a need for change in all three countries, but state policies on energy transition vary widely. Germany has committed to an ambitious policy of "full decarbonization of the economy" by mid-century and "the transition to an energy system in which energy supply is almost fully based on renewable energies" (Fabra et al., 2015, 51). India's Draft National Electricity Plan foresees that 57% of total electricity capacity will come from non-fossil-fuel sources by 2027, although it is expected that coal use will continue to expand (Government of India, 2016; McKay, 2019). Australia has experienced rapid

growth in renewable investment in recent years, driven by the private sector, but while industry commentators describe this as "a once-in-a-lifetime change in the energy supply paradigm", the same commentators fear new investment may "fall off a cliff" when the current Renewable Energy Target expires in 2020 (Macdonald-Smith, 2018). Since the demise of the National Energy Guarantee in 2018, Australia has had no coherent long-term national energy policy, and investors have been in a state of uncertainty.

Rather than focusing on national policy frameworks – or the lack of them – our research, drawing on local ethnographies conducted over five years from 2014 to the present, seeks to understand what the process of energy transition means to those caught up in it, in specific contexts. In our forthcoming book (Goodman et al, 2020), we investigate how the contestation of coal extraction, and recognition of climate change, could be delegitimizing coal, calling into question the social, political and cultural meanings which have underpinned its value as a developmental commodity since the Industrial Revolution. Contests over coal are also contests over narrative, and as the Trilateral Group on European Structural Change has noted, creating a "narrative for change" is a necessity if large-scale energy transitions are to be successful (Heinrich Böll Stiftung, 2018).

In these concrete local contexts, the success of transition also involves recognition of potential problems with renewable energy, the social ways of organising and installing it, and the building of resistances to the transformation. In all instances, the ways that people are identified or rejected as 'stakeholders', exerts an important influence on the pathways of transition. Formal processes of identification of stakeholders, consultation, and planning may well exclude poorer and more marginal people who are most likely to be severely hurt by ecological catastrophe. We also investigate the extent to which contestation of new or expanding coal mines is framed in relation to energy transition. The motivations of the individuals and communities involved in these contestations are not necessarily expressed in terms of energy policy, energy democracy, energy transition, or climate action, although in some cases they are. However, the process of contestation may open up new possibilities and social spaces for participation by citizens in the control and preservation of their own lives, and lead to new awareness of the forces opposing them. We point to the kinds of support and hindrance available to people; legal, regulatory, civic, and others. We ask whether transition to a sustainable energy future, in the context of climate change (where relevant) provides an "alternative narrative" to (continuous) development through coal burning.

As part of our attempt to explore how public input and public involvement should be designed, structured and organized so that it facilitates the transition towards a more sustainable energy future, we make some preliminary comparisons between relations of renewable energy transition and coal contestation. We point to those contexts where renewable energy is implemented: in an imposed manner similar to coal mining and generates protest; affects land or water use, wildlife, or encroaches on residential areas; and seems to aim to preserve existing patterns of social power and exclusion.

It cannot necessarily be assumed that the forms of governance which emerge through a transition to renewable energy will necessarily be successful, beneficial or more democratic. Similarly, in Kern & Rogge's terms, not all the actors engaged in "active attempts to govern the transition towards low energy carbon" may continue to support that transition if they feel excluded from the process or disappointed by its particular implementation (Kern & Rogge 2016: 13). Without awareness of this, the process risks being unsuccessful at huge cost to us all.

Germany

Our research in Germany focussed initially on the Lausitz coal-mining region in Eastern Germany, and specifically on Kerkwitz, Atterwasch and Grabko, three villages close to the Polish border. Since 2007 the villagers have been fighting a proposed expansion of the nearby Jänschwalde lignite mine, owned at the time by the Swedish company Vattenfall. Vattenfall had lodged an application to extend the area of the mine by 2,000 hectares, which, if approved, would have enabled the mining of an additional 200 million tonnes of lignite over 20 years, and necessitated the demolition of the three villages.

After the initial shock, local opposition grew quickly. Several citizen initiatives formed to monitor the Jänschwalde-Nord mine-planning process, generate strategies of resistance, and promote protest. They initially tried direct democracy, and in 2007 mine opponents collected more than the 20,000 signatures required for a popular petition (*Volksinitiative*). The state parliament of Brandenburg was forced to debate the mine extension, but without any tangible result. Over time, the villagers and their supporters in the region settled on a strategy of low level, repetitive protest, which we have described previously as a strategy of passive and active waiting, or waiting and delaying (Műller, 2019; Műller and Morton, 2018).

Mine opponents intervened in the slow mine approval processes, said to take an average of six to ten years, whenever possible. For example, in 2011, they objected to the environmental impact assessment and, throughout the planning process, partook in the *Braunkohlenausschuss*, an assembly of delegates from the relevant city councils and civil society, with an advisory function to the state government. The *Braunkohlenausschuss* includes both proponents and opponents of the mine, and requires constant negotiations and discussions. The sheer bureaucratic tedium of the planning process, and the uncertainty of its outcome, took a toll on the morale of the villagers, but it also gave them time in which to organize, form alliances, build solidarity, and develop their own rituals of resistance. For example, the *Sternmarsch*, in which mine opponents walk from one village to another, became a ritual every first Sunday in January. The *Dorffest*, the village fête in Atterwasch, enhanced the *Sternmarsch* as another repetitive form of protest, taking place on the last day of every October since 2012.

These local rituals were complemented by the input of the *Lausitzer Klima- und -energiecamp* (Lausitz Climate and Energy Camp), which entered the local protest in 2011. Local actions not only built local constituencies, but lead to two major protest actions, expanding those constituencies and placing the anti-coal mine narrative in a global context. One action, was the human chain against coal in 2014, when 7,500 protesters linked hands to form a chain from Kerkwitz to Grabice, eight kilometres away in Poland on the other side of the river Neisse. The second major protest, was *Ende Gelände* ('closed ground') in May 2016, when protesters occupied part of the Welzow-Süd open cut lignite mine and the nearby Schwarze Pumpe power plant, forcing the plant to significantly reduce its operations. *Ende Gelände* was one of twenty simultaneous protests on six continents organized by 'Break Free from Fossil Fuels', a global campaign against fossil fuels (https://breakfree2016.org/).

Both *Ende Gelände* and the human chain protest explicitly linked local protesters with national and transnational climate activists, drawing a clear connection between the local contestation of coal and coal's centrality to climate change. They also demonstrated the need for an energy transition, which the villagers argue they are already living, through the local installation of solar panels, biogas plants and small wind turbines. For the residents of these three villages, the energy transition is integrated into the fabric of German rural life and the *Energiewende* provides an alternative narrative to the one of coal as the driving force of the

local and nation-wide economy (Morton and Müller, 2016). 'Playing for time' while this energy transition gathers momentum gives their endurance a wider narrative meaning.

This strategy proved successful. In March 2017, EPH, the Czech energy company which had bought all Vattenfall's coal mines and power plants in the Lausitz, announced they were abandoning the extension of Jänschwalde-Nord. The villagers had won. We are not suggesting that the villagers' resistance alone lead to this outcome: EPH portrayed its withdrawal as purely economic. But through their various forms of organization, participation, and protest, mine opponents were able to make input into energy decision making, design and implementation. They became 'relevant stakeholders' in the process, against resistance which would have excluded them.

One of the ironies that emerges from our preliminary fieldwork in Brandenburg, in the region of Niederer Fläming, is that similar strategies of waiting and delaying may be used to oppose renewable energy, albeit in different actor constellations. Local opponents of wind energy do not stage protests with anywhere near the scale and regularity of the anti-coal activists in the Lausitz. But planning processes for wind farms have become highly complex, involving local, regional and federal government, and subject to legal challenge. Local activists against (particular) wind farms intervene in the planning and installation process whenever possible. Some of our interviewees formed a party, got into local parliament, becoming better informed and more able to scrutinize wind park planning. Their take on renewable energy is by no means a dismissive one; wind critics opting immediately for coal or nuclear energy are rare. But the number of wind parks being built in close proximity to residential spaces render issues of the visual appearance of wind turbines in the landscape, sound and infrasound, or the blinking of warning lights at night important. In practice, wind opponents often take up the (administratively predetermined) narratives of protection of the local environment, the forest, and local fauna, particularly birdlife, to justify their opposition. This, as well as administrative requirements, extends the approval process for a wind park, so it can take about three years from application to decision. Including the planning and construction period makes a likely total of six years, or more, for building; a single wind turbine can take as long as a (quick) approval procedure for an open-cut coal mine.

Local residents in Niederer Fläming – as in other areas with a high density of wind farms – bear some of the costs of renewable energy production, through the impacts outlined above,

and through slightly higher electricity prices. While, some individuals leasing their land for wind farms also profit financially, national and state governments have installed mediation agencies and redistribution mechanisms to cushion the distributive effects of costs and profits from renewable installation. These procedures allow whole villages rather than single landowners to benefit financially from wind farms, and tensions between 'stakeholders' can be discussed with neutral experts. However, anything worth naming 'energy democracy' still seems far away, especially with legislative changes, such as the replacement of feed-in tariffs with reverse auctions, which favour larger players over energy cooperatives (*Bürgerenergie*) and increase corporate control over the grid and energy production.

India

Initial fieldwork in India spanned three years (2014 to 2016) in the central Indian state of Chhattisgarh. Research focused on three villages in Sarguja district, two of which, Salhi and Ghatbarra, were particularly affected by the Parsa East Kete Basan (PEKB) mine and its extensions, and the third, Madanpur, was the site of protest movements against this expansion. Due to intense Government surveillance, our trips were necessarily short in duration and planned around particularly important events (Ghosh, 2018). We focused on the ways in which villagers used legal and democratic processes to assert their rights and sought to understand the complex, sometimes contradictory, motivations and actions of the various would-be 'stakeholders', some of whom, initially, were not opposed to the mines.

Mining in Chhattisgarh is both enabled and made complicated because much of the coal lies beneath the pristine, dense and contiguous tracts of forests (Greenpeace 2012) occupying over forty percent of the state. These forests contain perennial water sources, rare plants and wildlife species, including elephants and leopards. About a third of Chhattisgarh's population consists of Indigenous peoples (Scheduled Tribes or *Adivasis*); about ten percent of the *Adivasis* in India (Ministry of Tribal Affairs 2013). They are mostly forest dwellers depending on the forests for their livelihood. In 2009, issues over land, livelihood and resources became so fraught that trade unions, community groups and other progressive parties formed an alliance called the *Chhattisgarh Bachao Andolan* (Save Chhattisgarh Movement). *Adivasis* drew inspiration and narrative for their protests from their special status in the Indian constitution; they consider that their core rights, autonomy and dignity are set out in Article 21 and under Schedules V and VI. The struggle around their right to '*jal, jangal, jameen*' or 'water, forests, land,' as opposed to the developmental goals of coal

power, have become a test of the resilience of the Indian Constitution and its guarantees for the protection of minorities.

Opposition to the mines has mostly been mediated through the Panchayat Extension to Scheduled Areas Act (PESA 1996) and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, (FRA 2006), two landmark pieces of federal legislation which attempted to ameliorate the continuing injustices suffered by *Adivasis* and other forest-inhabiting communities since the time that the forests were 'reserved' under colonial rule. PESA mandated consultation with *Gram Sabhas* (Village Assemblies) or *Panchayats* before land recognized under the 5th Schedule of the Constitution could be acquired or alienated for development projects (Lahiri-Dutt, Krishnan & Ahmad 2012).

The FRA was co-written by *Adivasi* activists and the Preamble speaks of righting the 'historical injustice' experienced by Adivasis (Ahmad 2014). It put in place a clear legal mechanism for recognising rights at both individual and community levels for forest dwelling communities, including forest workers, who had lived in a designated forest area for seventy-five years or three generations. It recognises and vests secure community tenure on 'community forest resources' in *Gram Sabhas* or village assemblies (Ministry of Tribal Affairs, 2006, 2012). However, state authorities devised means of sidestepping these protections so that these Acts have become the focus of local and national struggles in new and potentially transformative ways. For example, in January 2015, representatives of twenty *Gram Sabhas* in Chhattisgarh met the ministers of Environment and Tribal Affairs to demand that the government stop the auction of coal-mining licences in their districts, to either the private or public sector, as they would not consent to mining. As elected representatives of local village councils (*Gram Panchayat*), they were exercising their constitutional mandate as articulated through the PESA and the FRA.

The villagers have three sets of grievances: that due compensation is not received for land acquired for mining, nor is rehabilitation mandatory; that land acquisition is often unsafe, illegal or coerced, and contrary to the wishes of the *Gram Sabhas*; and that socio-ecological change caused by the mines, such as pollution of the waterways and impact on wildlife, is not ameliorated. Their strategy of opposition is through their constitutional rights: withholding consent at the *Gram Sabha* level, applying for individual and community forest rights, contesting environmental and other violations before the National Green Tribunal and taking

cases of malfeasance and misappropriation to the courts. In addition, there are civil actions, protest meetings, demonstrations, participation in *Panchayat* elections and alliance-building at state and national level to force *Adivasi* rights onto the political agenda. These actions reinforce and create an active narrative of Adivasi political identity.

Despite these struggles, abrogation of rights is common. Fifty percent of claims under the FRA are rejected and provisions in the Act that explicitly mandate the determination of rights prior to displacement are violated with impunity. However, many proposed mines are under legal challenge in 2019 or remain heavily contested and delayed by other means. In February 2019, the Federal Environment Ministry gave provisional approval for the Parsa mine in the Hasdeo-Arand, breaching the conditions that there would be no more mining approvals in the forest. 150 *Gram Sabhas* in the area met to declare their opposition, planning a march to the state capital with the slogan of "keep your promises", "*Vaada Nibhaao*", directed at the new Congress government. The villagers and activists seem to know that their actions, at most, will delay rather than stop mining operations in a context where illegal appropriation of land and despoliation of forests is increasingly common. However, as in Lausitz, delay could help in the long-term, but there seems little sense that a renewable transition could relieve the pressure or change the politics.

As well as approving more coal mines and mine extensions, however, the Indian government is taking a leading role in promoting renewable energy. In Pavagada, in Karnataka, where our current research is taking place, 13,000 acres of land has been leased by many private players for roughly three decades from *Adivasi* and other villagers. Work on the solar park began in October 2016 with 600 MW of power commissioned by 31 January 2018. However, the villagers do not have copies of the lease documents, nor have the companies established the infrastructure (schools, colleges and dispensaries) which had been promised as part of the agreement. Most importantly, there is no certainty that, at the end of the lease, the land now covered with a massive number of iron rods embedded in concrete to support the panels will be remediated or farmable. In this situation, there seems little room for public input into energy decision making, design or implementation. Thus far, it would appear that neoliberal monetization and the drive for profits creates very similar problems for local communities to those generated by the fossil fuel sector, and works against their active participation in energy governance.

Australia

The Hunter Valley, defined by the large catchment of the Hunter River, forms part of the coal-rich Sydney and Gunnedah basins in New South Wales. Coal mining has been significant since the beginning of the NSW colony over 200 years ago. The Aboriginal people of the region, Wanaruah and Gomeroi, are not known to have used coal but there are Dreaming stories about the rock. Early mines, producing thermal coal that fed state-owned power generators, were underground, and required a large labour force. They were the main employer in many towns and villages, coexisting with substantial agricultural land use, such as cropping, dairying, pastoralism, and more recently, winegrowing and horse-breeding.

By the 1960s, coal, along with iron ore, became part of a burgeoning export industry supplying growing East Asian economies. This increase in demand led to large-scale open-cut mining and investment by transnational companies, which began to have notable impacts on other rural industries, and on local lives. Nowadays, more than two-thirds of the upper Hunter Valley is under mining exploration leases, and another 20% is occupied by mines. From the air, much of the area looks like a gigantic coal pit.

As coal became the dominant export, NSW state planning regulations became progressively more centralised. Conflicts about new and expanded coal projects have intensified, with rural producers and residents providing strong opposition to encroaching destruction of land. Coal policy continues to be expansionist, progressively taking power away from local people and councils in support of coal mining, despite an increasing threat to limited water supplies and local residents (Connor 2016). There are now more than 40 open-cut coal pits in the Hunter Valley, greatly reducing viable agricultural land use and impacting air quality, health, visual amenity, noise, light, biodiversity and water supply, the last of pressing concern given the current severe drought (McManus and Connor 2013). Wanaruah people's sacred sites and heritage are consumed by mining: "We are copping an absolute hammering from industry at the moment," one Traditional Owner exclaimed. Implementation of the conditions of consent are lax and the NSW Environmental Protection Agency only weakly acts against breaches.

An integrated energy policy, which recognises climate change, is still lacking at both State and Federal level. The projected closure of the Liddell coal-fired power station in the lower Hunter Valley, when its owner AGL declared the plant uneconomical and that it was planning to transform the existing infrastructure into a renewable energy hub, lead to

attempts, by the Federal government to persuade AGL to keep it open. The NSW Minister for Energy and Environment recently stated that legislation is being prepared to prolong the life of the state's coal-fired power stations and support new mines (2GB 2019).

Conversations with local councillors in the Hunter and elsewhere, reveal that confusion and regulatory difficulties, inhibits, and sometimes stops, renewable development. In this environment, citizen involvement can be vigorous, but can also seem sporadic and uncoordinated outside of a few organising bodies which often depend on a small core membership. Townsfolk (rural and urban) can easily be split between narratives of coal as a needed source of income and township stability, and narratives of coal as destructive and poisonous. Protest against the destructive effects of coal is far more apparent than agitation for renewable energy.

Prominent examples of agitation against coal, include: the Anvil Hill coal mine protests in which locals allied with Greenpeace; the protests by horse-breeders, winegrowers and local residents against Drayton South mine extension, which used narratives of high status agriculture being destroyed unnecessarily; and the Rising Tide annual 'blockade' of coal ships in Newcastle Harbour ('the biggest coal port in the world'). Legal representatives for 'Groundswell Gloucester' managed to persuade the NSW Land and Environment Court that Gloucester Resources' proposed Rocky Hill mine would not only "cause significant planning, amenity, visual and social impacts" but that "the GHG emissions of the coal mine and its coal product will increase global total concentrations of GHGs" (quoting Judge Brian Preston). This is the first time a NSW court has recognised climate change as reason to stop a mine (McGowan & Cox 2019). The company decided not to appeal (Hannam 2019).

Citizens' organisations like 'Hunter Renewal', the 'Hunter Energy Transition Alliance' and CLEANaS ('Clean Energy Association of Newcastle and Surrounds') work to mobilise people to plan for the post-coal future of the Hunter Valley. Hunter Renewal, describes itself as a "project to bring people, businesses, and organisations of the Hunter Valley together to envision a diverse, resilient, and thriving future for our region". CLEANaS has attempted to introduce Green Bonds to the Hunter and has successfully funded a solar installation at Hunter Wetlands Centre.

Despite apparent hostility to transition from State and Federal Governments, local Councils have led the way in terms of action, with a meta-organisation of councils, the 'Cities Power Partnership', organised by the Climate Council[1]. For example, Newcastle Council, in the Hunter, has criticised the Federal Government's lack of support for renewable energy targets (ABC 2015); voted to dump fossil fuel investments (Ryan 2015); started to build a 5MW solar farm at the Summerhill Waste Management Centre using a $6.5 million loan from the Clean Energy Finance Corporation; is replacing its cars with electric vehicles; and has announced it is going completely renewable from 2020. Lake Macquarie Council has likewise led renewable energy and local sustainability programs for more than a decade (Connor 2016b).

While the Hunter Valley has few wind farms, there is a high rate of small and medium solar installation, but utility level electricity generation is almost exclusively coal based. Solar and wind generation makes a very small percentage of total generation in NSW. Given the large area of land now devastated by mining in the Upper Hunter, large renewable projects in the areas may pose a further threat to agricultural land use, as in India, while co-existence of mining and solar farms may be difficult due to coal dust impairing panel efficiency. In other areas of NSW, strong opposition to solar farms has come from heritage tourism localities where the renewable landscape is considered a negative visual amenity. This could also become a problem in the wine growing areas of the Hunter. In NSW's weak regulatory environment, neoliberal 'market based' solutions dominate energy provision. While the industry-government nexus is weaker for renewables than for coal, the protection of rural environments and communities similarly seems overridden by the imperative of accumulation.

Despite hostility from governments and primarily neoliberal transition plans, renewables enjoy broad popular support, which rarely seem to translate into votes. The NSW Office of Environment and Heritage reported (2015: 49) that in the Hunter:

- 93% supported using renewables to generate electricity in NSW
- 85% believed NSW should increase the use of renewables over the next five years

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[1] The Climate Council originated when the Australian Climate Commission was abolished by the Government. It has since supported itself via crowd funding and donation, showing the popularity of climate action.

Some significant local narratives suggest less active support for renewable installation, than an expectation that coal mining is dying and that the Hunter needs to be prepared for that transition. A survey of residents of the town of Muswellbrook found:

> The only issue which received majority support (71%) was that a transition from coal would have significant effects on Upper Hunter Valley communities. While some positive impacts were mentioned, overwhelmingly concern was expressed about the economic effects of job losses and the flow-on effects of people moving from the area (Roden 2018: 1).

Opposition to coal mining in the Hunter Valley can contribute to a wider narrative process of creating an organised politics against fossil fuel energy and, indirectly, for energy transition, but it has a long way to go.

Conclusion

In each of the case study locations where we conducted research, citizens and local communities have actively participated in processes of energy governance, through the contestation of coal mining. In the Lausitz and in Chhattisgarh they were able to stop some coal projects altogether or substantially delay their commencement. In the Hunter Valley they were able to establish an important legal precedent explicitly linking coal extraction to climate change. In the Lausitz, coal opponents framed their resistance as a defence not just of their villages, but as part of the *Energiewende*; energy transition functioned as an alternative narrative to continued coal extraction as a source of economic stability and regional identity. It is less clear that such an alternative narrative comes into play in the Australian and Indian cases.

When we turn to our case studies of actual energy transition, preliminary research suggests that they, too, reveal significant problems of participation and energy governance, which cannot be glossed over. While opposition to wind energy in Brandenburg is not organized on the same scale, and does not have the same links to national and transnational environmental organizations as anti-coal activism, local people who feel they have not been given a stake in decision-making processes may actively oppose the expansion of wind energy, slowing down the pace of energy transition. In the Hunter region, while local councils have taken some important initiatives to promote a transition to renewable energy, these lack both support from state and federal government policy frameworks, and meaningful mechanisms for involving citizens in governance processes for energy transition. The latter is also true of

Karnataka, although in India investment in renewables is actively supported by the central government, but carried out by corporations in ways which appear to deliberately exclude local people from understanding, or participating equitably, in the process.

While Germany's Coal Commission has set a deadline of 2038 for an exit from coal extraction and coal fired power, and India now has an Energy Transitions Commission (ETC), which describes itself as "a unique, high-level, multi-stakeholder platform on energy and electricity sector transitions in India" focused on "decarbonising the power sector" (ETI 2018), Australia has no such blueprint and only loose coalitions of stakeholders advocating for transition. Moreover, in all three countries, the energy transition is occurring within the context of a neo-liberal policy framework and is governed by neo-liberal policy instruments such as Germany's system of reverse auctions for renewable energy or Australia's National Electricity Market. Such frameworks allow little opportunity for citizens' active participation in energy governance, and may actively work to exclude them.

Over and above these considerations, our research thus far suggests a fundamental paradox: a more democratic approach to energy governance may not be fast enough to produce the necessary transformation of national energy systems in time, but a speedier transformation may be alienating for most people, put in place without proper consultation or participation, and generate protest and disruption.

These problems may well call for an "experimental politics" in which, instead of proposing a hard line policy in advance and sticking to it no matter what, we change policies according to the full range of results we observe, particularly attending to results which were unexpected or unintended, as this attention tells us more about how the system works, and what needs to be done. Human views of reality are always partial, and we are dealing with the dynamic intersection of many complex and uncontrollable systems: ecological, climatic, economic, cultural and so on. We have to give up illusions of total control, become aware of the limits of information, the resistance of established powers, and the presence of what appears like paradoxical, or contradictory, consequences of actions. Only then are we likely to have a relatively open and successful transition.

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