6

Phase III

The Politics of Mitigation Policy Outcomes

6.1 Introduction

This chapter explores the hitherto understudied politics of climate mitigation policy outcomes, understood as policy effects and wider political implications, largely during the 2008 to 2018 period. It claims that outcomes matter, that they are deserving of greater analytical attention, and examines why by considering their roles in (re-)formations of climate politics over time. If Chapter 5 revealed how political and socio-material institutions shaped policy, this chapter is more focused on how mitigation policy choices shape politics. The political roles of mitigation policy outcomes have been under theorised in climate mitigation research, partly because they are often disguised within, rather than seen as distinct aspects of, wider processes of feedback that connect policy to politics. Given the proliferation of mitigation policy, policy outcomes are taken here as important to how a growing range of societal groups experience mitigation policy and, relatedly, to how they develop opinions about it. These, then, feed into new climate debates, framings, and contestations. Studying outcomes is also a way of thinking through how policy and politics remake one another in ways that can be positive and/or negative for accelerating mitigation and/or keeping it on political agendas.

The politics of policy outcomes can be understood as a phase of mitigation politics given that we cannot study outcomes, or their political, social, and policy ramifications, until after policies have been debated, decided, and implemented. In essence, the aim of policy is to deliver the social outcome of limited global warming but, as seen in Chapter 5, a range of different ways of attempting to meet that aim has emerged, each with different sets of implications. Chapters 4 and 5 both referred to mitigation policy debates and framings which evoked *perceived* emissions-related and socio-economic outcomes of policies. Possible outcomes were narrated as much to contest mitigation policies, by predicting a range of negative socio-economic outcomes, as to argue for emissions reduction. The timeframe of this chapter makes it possible to consider *actual* outcomes.

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Indeed, research exploring mitigation policy outcomes had started to be produced by the end of this timeframe. Again, like in Chapter 5, the emphasis is on countries with climate mitigation strategies in place and on the energy sector.

Public policy research on feedback between policy and politics provides a basis for conceptualising policy outcomes, whilst some climate politics research has already applied associated insights to climate mitigation. Building from this research, this chapter offers a categorisation of mitigation policy outcomes, that separates outcomes according to whether they are emissions or non-emission related. This takes account of the fact that although climate mitigation policies are designed to reduce emissions, there are other wide ranging and very uneven – often un-intended – socio-economic, technological, and ecological mitigation policy outcomes. This chapter also offers further sub-categories of outcomes – GHG emissions reduction; establishing low emissions alternatives; building capacity and learning; negative socio-economic outcomes; positive socio-economic outcomes; and policy co-benefits. Each sub-category is explored in relation to policy decisions taken, related outcomes, and how they contribute towards (re-)shaping political debates and mitigation policies.

This phase of (re-)constructing climate politics occurred within a turbulent global context. Arguably, 2008 marked the start of a new political era, one heavily influenced by the financial crisis, economic recessions, and policy responses centred on austerity and its socio-economic impacts (Ciplet et al. 2015). Impacts included economic and social decline, real wage decline, rising inequality, and, ultimately, growing electoral successes for, mainly right-wing, populist parties. Some attempts were made, in the US, EU, and some Asian countries, to shape post-crisis economic recovery around green investments and growth (Katz-Rosene & Paterson 2019). For example, in South Korea 79% of the economic stimulus package was dedicated to 'green economy' projects, forming the basis of their green industrial strategy (ibid). Green aspects of economic stimulus packages were, however, limited in scope whilst the 2008 to 2015 period presented many challenges to climate mitigation. Dupont et al. (2024) document the extent to which the pace and ambition of EU climate policy slowed post-financial crisis – whilst others have repeated this for the UK (Carter & Pearson 2022). UN COP Umbrella Group members re-considered their ambitions in consideration of the absolute priority of economic recovery (Vogler 2016: 69), whilst the 2009 Copenhagen UN COP failed to produce a binding agreement.

On one level, then, the global financial crisis mattered for mitigation politics because, as seen in Chapter 5, mitigation was becoming deeply intertwined with other public policy areas and because climate mitigation was perceived as being in competition for public resources. The latter part of this phase also saw the emergence of the 'post-truth' era. As part of this, the still dominant framing

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of science-informed climate change fell victim to wider rounds of attacks on 'experts'. With many sections of society within OECD countries experiencing lower wages and living standards, well-funded anti-mitigation coalitions were able to utilise anti-expert narratives and to prioritise, once more, the notion of climate mitigation as representing economic and social costs.

After an initial, small reduction in global emissions in 2008–2009, associated with recessions, emissions bounced back strongly from 2010 onwards, not least due to strong economic growth in China and India. In turn, evidence of rebounding emissions and a realisation that a wider range of nations needed to commit provided some stimulus for agreement at the UN Paris COP of 2015. Paris was a considerable change of gear in multi-level mitigation governance, in agreeing on the aim of a 1.5°C limit to warming, in extending national responsibilities to 196 countries, and in setting up the nationally determined contribution (NDC) system (Vogler 2016; Jordan et al. 2018). In many senses, the Paris Agreement marked an overt acceptance of the notion that nation-states have convening power that is important to delivering on global mitigation targets (Death & Tobin 2017). The timeframe covered in this chapter, then, includes both low and high points for mitigation policy – and an increasingly complex material, social, and political landscape.

6.2 Outcomes and Why They Matter Politically

Public policy research, particularly that applies historical institutionalist concepts, has identified and explored dynamic inter-relationships between historic policy constructions and later rounds of politics and policymaking (Weir & Skocpol 1985; Skocpol 1992; Pierson 1993). This interest in connecting policymaking with politics has more recently been applied to improve understanding of climate mitigation and sustainable energy transitions politics (Jordan & Matt 2014; Lockwood 2015a; Meckling et al. 2015; Schmid & Sewerin 2017; Roberts et al. 2018; Beland & Schlager 2019; Rosenbloom et al. 2019; Schmid et al. 2019). This research explores how mitigation policies, once created, contributed towards a reshaping of the material, social, and political conditions within which subsequent mitigation policy decisions were made – with some emphasis on processes of policy feedback. My interest in this chapter is to place policy *outcomes* centrally within these processes. To do so requires a greater degree of disaggregation of the relationship between policy and politics – including between outcomes and policy feedback. What matters here is: the intended and unintended outcomes of mitigation policy, whether goals were met, how outcomes were experienced, how outcomes were communicated, and how experiences were reflected back into mitigation policymaking processes.

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Policy outcomes are under-explored within climate politics research, even to some extent within research on policy feedback. The conceptualisation of mitigation politics developed in this book, however, suggests that outcomes are politically important. This is not least because policy choices are social to the extent that "they have, or are likely to have, direct or indirect consequences for others" (Hay 2007: 70). This infers that policy outcomes are core elements of politics as social interaction. Mitigation policy outcomes, in turn, shape the capacities, interests, and beliefs of a wide range of actor groups (Pierson 1993) – including government elites, corporations, civil society groups, and citizens. This is partly because they have resource and incentive effects on target groups, by rewarding some and disincentivising others (Pierson 1993; Beland & Schlager 2019). As we saw in Chapter 5, renewable support policies were designed to incentivise the production of low emissions alternatives to fossil fuel energy – but, according to how the policy was designed, rewarded different groups.

Thinking about inter-relationships between policy outcomes, policy, and politics over time also brings us back to questions about politics as an agency. Weir and Skocpol's conceptualisation of state capacity includes "the ability of the state to implement official goals, especially over the actual or potential opposition of powerful social groups" (1985). This, as suggested in Chapter 3, links politics as agency to the capacity of the state to implement new goals and policies that can deliver the right outcomes to meet those goals, given that opposition is so often situated in the embedded nature of high emissions. Weir and Skocpol also, however, highlight the fact that policies can have, sometimes intentional, outcomes for future state capacity to the extent that any new administrative resources are made available by those policies (see also Skocpol 1992; Pierson 1993). This returns us to understanding of politicisation as implementing new bureaucratic and knowledge capacities.

Other mitigation policies, like buildings energy efficiency, can have both emissions reduction and societal redistributive outcomes – the latter by reducing the exposure of households to high energy prices, energy poverty, and/or illnesses associated with living in cold and/or damp homes (Selvakkumaran & Limmeechokchai 2013; Warren 2014). Such policies can also have politicisation effects, in social interaction and deliberative terms, if those in society affected by them become more aware of mitigation policies and more able to (re-)think what they mean for them (Pierson 1993; Lockwood 2015a). However, it is by no means a given that citizens will gain this level of policy-political awareness, particularly in the absence of education, communication strategies, and/or well-funded anti-mitigation campaigns designed to increase confusion about mitigation. To the extent that mitigation policies do reduce emissions, in absolute terms and/or versus what they otherwise would have been, this can be considered politicisation in both state capacity and social interaction terms.

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Changes in capacities, interests, and beliefs resulting from outcomes have further political effects which "either strengthen or weaken support for mitigation policies, causing positive or negative feedback effects and divergent policy paths" (Lockwood 2015a: 87; see also Jordan & Matt 2014; Lockwood et al. 2017). This suggests two stages or rounds of policy outcomes, those related more directly to policies, discussed above, and those that emerge because of policy outcomes and associated changes experienced by different societal groups. Mitigation policy outcomes can be experienced directly, that is, through job losses resulting from the coal phase out, or new jobs associated with green industrial policy, or understood via media communications about others' experiences. This is important, not least because coalitions for and against rapid mitigation, and their alignments, can and do change with time (Roberts et al. 2018), whilst policy outcomes, experiences, and perceptions thereof become part of their deliberations and realignments. Just transitions literature too emphasise the political importance of how different groups in society experience climate mitigation policy – with just transitions, emphasising distributive justice, being "an attempt to align climate … objectives with the material concerns of workers, frontline communities, and marginalised groups" (Harry et al. 2024).

It is partly through these political processes that mitigation policy can either become entrenched, through positive feedback in response to policy outcomes or undermined, through negative feedback (Lockwood 2015a). Sustaining a particular policy development path politically, via positive feedback processes, is a key interest of policy feedback literatures, whilst this can be done by creating new constituents with interests in that policy path (Pierson 1993; Meckling et al. 2015; Roberts et al. 2018). At the same time, however, creating new path dependencies around certain policies can also have deliberative depoliticising effects, to the extent that this (temporarily) renders viable alternatives implausible and/or harder to take up. Feedback literatures are also interested in how policy feedback effects are "conditioned by policy design" (Beland & Schlager 2019: 184). Chapter 5 made much of the importance of differentiating between policy designs in relation to differences in how policy benefits are distributed. Different types of mitigation policies, then, have different shaping effects on climate politics. Policies designed to redistribute the costs and benefits of processes of mitigation will, as long as beneficiaries are aware of this, be more likely to create positive feedback for sustaining mitigation on political agendas (Meckling et al. 2015; Roberts et al. 2018; Lockwood 2021).

Lastly, on conceptualising mitigation policy outcomes, it is worth noting that within climate politics research there have been tendencies to focus on outcomes as either dispersed, long-term, and less visible or as including negative near-term, more visible social and ecological outcomes. Stokes, in her excellent analysis of

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feedback (2016), explains the complexity of mitigation politics according to this split. There are some key differences in her analysis of the types of outcomes being considered. Negative outcomes are often socio-economic in nature and more near-term and/or tangible, whilst positive mitigation policy outcomes, like emissions reduction and avoided climate change, tend to be less tangible and longer term. This makes it harder to gain broad political support for emissions reduction policies. I use these distinctions as a starting point to categorise outcomes in the analysis below – that is, the two main sections are organised according to mitigation and non-mitigation policy outcomes.

6.3 Mitigation Outcomes and Political Feedback

Much of the social and political debate and discussion about mitigation outcomes have been ex ante – that is analysis and or opinion that estimates or otherwise speculates on, *potential* impacts of policies – in this phase, however, it is possible to identify ex post outcomes (see Hoppe et al. 2023). The idea is not to measure outcomes of policies, but to consider their variety, which groups in society they affect and how, and their political implications.

Policies like putting a price on carbon have quite direct implications for GHG emissions, by incentivising high emitters to reduce. Many mitigation policies, however, like green industrial strategies or reductions in demand for high emissions energy or transport, have somewhat indirect relationships to emissions reduction. They are more focused on enabling social, market, or technological system changes that might *allow* for emissions reduction. Such policies are sometimes referred to as having proximate emissions drivers (Hoppe et al. 2023). The first sub-section is focused on policy outcomes that can be directly associated with processes of reducing GHG emissions, whilst the second explores proximate emissions. The third sub-section explores proximate drivers that can be associated with policy outcomes as capable of building administrative capacities to mitigate, a core aspect of politicisation in deliberation and agency terms.

6.3.1 GHG Emissions Reduction

Climate mitigation policy goals, partly because they were partly framed by climate science, are focused on emissions reduction. Although this framing has proved unhelpful within climate policy circles in terms of taking into account of wider political and ecological implications of climate policy (Kuzemko 2015; Newell & Simms 2020), GHG emissions remain the key metric upon which the success of mitigation policy is measured. Clearly, then, when global emissions fail to fall this can raise questions about both the efficacy and legitimacy of ongoing climate mitigation policy.

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In absolute emissions reduction terms, climate mitigation policy had failed during the timeframe of this chapter. In 2008 global GHG emissions were 47.58 billion tons, rising by 2018 to 52.83 billion tons – with a small dip down in 2009 because of the financial crisis (Our World in Data 2024a). It is also important, however, to disaggregate between regions given that some countries, often those with mitigation policies in place, did reduce emissions. From 2008 to 2018 EU emissions fell from 7.86 billion tons to 7.39 billion tons – they had bounced up in 2010, post the immediate hit of the financial crisis but otherwise posted year-on-year declines (ibid). Two years later, the EU met its 20-20-20 emissions reduction target of a 20% reduction versus 1990 – this time with help from the Covid-19 pandemic. From 2008 to 2018, the US also managed to reduce territorial emissions – from 6.87 to 6.31 billion tonnes.

China and India, as might be expected given their UNFCCC status as non-Annex 1 countries, exhibited high emissions growth – of 35% and 43%, respectively. By 2018 Chinese emissions had reached 12.65 billion tons, over 80% of the OECD total. Importantly, however, measured in emissions per capita – the highest emitters in 2018 continued to be OECD and/or fossil fuel-producing countries – that is, Australia, Saudi Arabia, Canada, Oman, and the US. It is also politically relevant that China and India's growth in emissions were impacted by the movement of higher emissions manufacturing and other industrial processes towards transitioning and developing countries as part of wider processes of globalisation (Vogler 2016).

Reviews of climate mitigation policies suggest that many did contribute towards reducing emissions, with some arguing that a delinking between economic and GHG emissions growth is possible (IEA 2016; Maamoun 2019; Hoppe et al. 2023; Stechemesser 2024). Hoppe et al.'s review of GHG emissions outcomes of mitigation policies concluded that the weight of evidence suggests that emissions are lower than they would otherwise have been without mitigation policy – in fact, by a factor of several billion tons of CO^2 per year (2023). Another large-scale review, this one looking at emissions from 2005 to 2012, found that the "Kyoto Protocol reduced the GHG emissions of Annex B countries by 7% on average compared to a no-Kyoto synthetic scenario" (Maamoun 2019). Policies most often cited as contributing towards lower emissions were: phase out of coal in electricity; energy efficiency and demand reduction; and support for renewables as alternatives to fossil fuels (Hoppe et al. 2023). There has also been some emphasis on the efficacy of policy mixes (Stechemesser 2024), that is, combining complementary mitigation policies, a theme to which I return in Chapter 7. At the same time, policies in other areas also had significant implications for GHG emissions growth – that is, transport and industrial strategies to boost economic growth, particularly in middle-income countries, and

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those to expand access to electricity in developing countries which resulted in high growth in demand for often high emissions forms of electricity (IEA 2019). These trends continue at the time of writing, 2024, with India projecting a near doubling of electricity demand by 2030 (Dutta & Oberoi 2023).

There were, however, important political ramifications of failures to bend the global emissions curve and of the growing gap between mitigation policy and emissions reduction targets. Evidence of failures to limit global warming emerged as the centre-point of the evidence base for coalitions pushing for further mitigation policy within this timeframe (Rosenbloom et al. 2019). The rapid growth in China and India's emissions, and their scale in absolute terms, had been a significant motivation behind the 2015 Paris UN COP agreement to commit to nationally defined contributions (NDCs) (Meckling et al. 2015; Vogler 2016; Rosenbloom et al. 2019). Scientific knowledge about anthropogenic climate change, including evidence of climate change, connections between emissions and warming, and potential societal outcomes of climate change, had rapidly expanded. This culminated in the highly influential IPCC report 'Global Warming of 1.5°C' focused on socio-ecological impacts, which spared little detail (2018). Towards the end of this period, the rapid growth in youth climate advocacy, concentrated in the International Youth Climate Movement, also explicitly articulated increased scientific evidence of policy failures to reduce emissions as the basis for successful arguments for accelerated policy ambition. Youth climate advocacy and the IPCC 2018 report have been cited as reasons for adopting 'net zero' climate targets. These successful politicisations of climate policy failure were, then, based on outcomes of earlier decisions to expand deliberative capacities in climate science and GHG emissions measurement. Both supported the ability of pro-mitigation coalitions to make more informed judgements about the lack of capacity of existing policies to meet targets. Failures of existing policies to reduce emissions were also, however, used by those in favour of greater investment in expensive but as yet unproven technological solutions – such as geoengineering (Vogler 2016: 30).

6.3.2 Establishing and Embedding Low Emissions Alternatives

Given the dominant framing of climate mitigation since Kyoto as enabling movement away from high emissions whilst also promoting economic development, there had been a policy emphasis, seen in Chapter 5, on developing low emissions alternatives. This was on the understanding that alternatives needed to be available and affordable before phasing out high emissions services and goods, to avoid social or economic interruptions. There was also a political view that investing in alternatives would result in low emissions growth and jobs (Breetz et al. 2018; Meckling et al. 2015). Renewable energy policies, such as research and

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development (R&D) funding, renewable feed-in-tariffs (FiTs) and/or auctions, and renewable obligations, were designed to provide incentives and resources for generators of renewable electricity. These policies, in turn, would put in motion processes that would bring the costs of low emissions alternatives down and make them more accessible and affordable.

There was a strong socio-technical argument behind policy support for low emissions alternatives – new (niche) socio-technical inventions cannot initially compete with proven, deeply embedded, and well-resourced alternatives (Unruh 2000; Geels 2002). There were significant barriers to entry, especially given incumbent power, resources, access to decision-makers, and social dependencies on high emissions products and services. Indeed, EVs and solar PV have both been workable technologies for over 100 years without disrupting fossil fuel transport or electricity generation regimes. On the whole, customers remained, generally, more interested in uninterrupted and affordable key services – like transport, communication, light, heat, cooking, and so on – than whether the fuel source was clean or otherwise. As such, niche alternatives needed support until they could overcome barriers and, according to socio-technical transitions (STT) theory (Geels 2002), disrupt incumbent regimes.

By 2017 we can see the outcomes of renewable policy support schemes. More renewable energy capacity was being added worldwide than from all fossil fuels combined, accounting for more than 25% of global electricity generation (IEA 2019), whilst the EU had also met its 20% renewable energy target by 2020. Globally, there was considerable variation in renewable energy generation growth – linking quite closely to whether countries had renewable support policies in place or not (IEA 2016). These ranged, in 2018, from 69.6% share of primary energy consumption from renewable sources in Norway to Brazil at 45%, Sweden at 42%, Germany at 17.7%, China at 12.8%, and the US lagging behind at 8.9% – with no data available for a wide range of countries (Our World in Data 2024b). The electricity sector had been the focus of renewable development, with the use of renewables in the heat and transport sectors lagging quite far behind. Brazil as an outlier had implemented an early energy transition, based on government mandates, towards ethanol, derived from sugarcane, for transport – in 2018, 73% of cars could run on a mix of ethanol and petrol (Newell & Simms 2020). Countries with low-risk feed-in-tariffs in place, like Germany, Denmark, and, later, China, tended to see more rapid growth in distributed renewable generation, including household (roof-top) solar. Germany, with its generous FiT, had 1.5 million rooftop solar systems installed as of 2016 (Sovacool et al. 2020a: 3), whilst by 2014 nearly half of the renewable generation capacity was owned by small- and medium-sized groups, including local governments, community energy groups, and households (Burger & Weinmann 2014).

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Although not enacted for climate change reasons, energy efficiency policies in place across many fossil fuel 'consumer' countries since the oil shocks of the 1970s and early 1980s, had already contributed towards significant improvements in energy intensity by this timeframe (IEA 2016). Likewise, China's energy efficiency policies of the 1990s were less about reducing emissions and more about ensuring security of supply in a rapidly growing economy, and they had resulted in relative improvements (Yi-Chong 2018). Energy demand reduction was revived in the 2000s – this time more often in relation to climate mitigation, for example as part of the EU's 20-20-20 climate package. The EU met its, arguably quite soft, 2020 target of an efficiency improvement of 20% versus what it would otherwise have been. This, again, was a result of a range of new policies – including EU-wide efficiency standards and regulations and member-state household energy efficiency policies, including financing and subsidy programmes for home insulation.

Non-emissions-related policy outcomes associated with building efficiency policies varied, also, in relation to policy design. Research comparing German and the UK policy suggests that in Germany the availability of very low-cost funding combined with the long-term nature of policy meant that there was a build-up over time of small-scale efficiency industries and installers, as opposed to the UK's 'stop-start' approach with high-cost insulation funding for households (Kuzemko et al. 2016a; Johnstone et al. 2021). Other analysis, looking at policy outcomes from another angle, has argued that pulling back on policy support for energy efficiency and renewables in the UK, in 2013, resulted in a severe slowdown in onshore wind expansion and energy customers, households and businesses, left more exposed to fluctuating energy prices in later crises (Evans 2022).

Beneath statistics on growth in renewables and relatively increased energy efficiency sit some further insights into mitigation policy outcomes that are important to understanding their political importance. STT research on mitigation policy outcomes highlight ways in which policy support for innovation establishes new pathways and lays foundations for further development and speeding up transitions (Meckling et al. 2015; Kern & Rogge 2016; Schmidt & Sewerin 2017; Rosenbloom et al. 2019; Kivimaa & Rogge 2022). Policy outcomes like experiments, technological learning, lowering technology costs, diffusion, and new skills and business models all have their parts to play in building capacity for, and embedding, low emissions alternatives. Take, for example, Norway's targeted EV policy, which included subsidies and tax exemptions from purchase tax and VAT, and free charging. The strong uptake in personal EVs there was facilitated by the learnings associated with experimentation and diffusion, including improved reliability of EVs, diffusion of skills, and early demonstration of EV uptake on a large scale (Sovacool et al. 2020a: 9). Wider use of EV's

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also resulted in other social benefits, including noise and pollution reduction, more rapid electrification in buses, shipping, and aviation, improved energy security, thereby sustaining mitigation policy support. In these ways, improved availability and affordability of low-emissions alternatives brought new societal actors into this lower emissions transport regime – exemplifying improved social interaction with sustainable transitions.

Domestic policy support has also had politically important international sustainable transition outcomes. Perhaps the most oft-cited examples are the extent to which German, Danish, and Chinese (in particular) industrial policies, launched in the previous phase of climate politics, had managed to kick-start renewable electricity product manufacturing and facilitate significantly improved availability and affordability worldwide (Breetz et al. 2018; Sovacool et al. 2020a; Johnstone et al. 2021). Indirectly contributing to the fact that, by 2018, solar PV and onshore wind were already cost-competitive with fossil fuel-generated electricity in a wide array of markets (IEA 2019). Green industrial strategies had, relatedly, underpinned the emergence of a global clean tech market, that also included energy efficiency products and services, and a global clean energy 'race' (Lachapelle et al. 2017). By 2017 the world market for renewables and energy efficiency were worth $290 billion and $310 billion, respectively (IEA 2019). Unsurprisingly, new clean tech companies were also starting to provide employment. Globally, by 2017, renewable energy employment had reached 10.3 million jobs (IRENA 2018). In India, whose clean energy industrial policy took off in this time frame, it was estimated that the wind industry was creating around 40,000 jobs per year (Lockwood 2015a: 95). By the late 2000s other East Asian countries, not least South Korea, were also starting to launch green industrial strategies.

One of the core arguments in climate mitigation policy feedback literatures is that enabling the creation of low emissions economic interests would support keeping mitigation on political agendas through positive feedback (Meckling et al. 2015; Schmid & Sewerin 2017; Roberts et al. 2018; Rosenbloom et al. 2019; Schmid et al. 2019). This is on the basis that just as interest groups shape policy, so too can policy (re-)shape interest groups (Pierson 1994). Incumbent energy companies have long been able to exercise political power, due partly to their role in providing essential goods and services, but so too should low-emissions companies that grow with policy support be able to gain political influence (Beland & Schlager 2019). Low emissions businesses started to provide essential goods and services, but also contribute towards meeting emissions reduction and, sometimes, other national public policy goals. Beneficiaries of mitigation policies have formed new, low-emissions constituencies which, in turn, have mobilised in support of subsequent rounds of mitigation policymaking (Jacobsson & Lauber 2006; Meckling et al. 2015; Prinz & Pegels 2018; Roberts et al. 2018; Rosenbloom

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et al. 2019). Low emissions constituencies, as they became more established also organised into interest groups, such as the International Renewable Energy Association (IRENA), the Solar Energy Industries Association (SEIA), the Clean Energy Labour Council; or German and Californian green energy unions (Prinz & Pegels 2018; Brown & Nelson 2023).

Political coalitions in favour of climate mitigation can thus be supported by newly financially powerful actors with a stake in mitigation (Newell & Paterson 2010; Newell 2021), just as they can be supported by the legal system if emissions reduction targets are made legally binding. Schmid et al.'s analysis of policy feedback and climate advocacy coalitions demonstrated how German mitigation policy kick-started new industries that then increased the size and actor diversity of renewable energy advocacy coalitions (2019). They also found, interestingly, that fossil fuel and nuclear- based coalitions became relatively less influential. In this way, just as incumbent interest groups shaped policies, as seen in Chapter 5, so too have mitigation policies re-shaped interest groups and advocacy coalitions. It is also true to say that it is important to distinguish between types of mitigation policy, their direct constituencies, and overall mitigation policy. Some business groups have developed interests in supporting *particular* mitigation policies, like traders in support of ETS or clean tech manufacturers in support of subsidies, but they might object to others. Just as citizens might indicate an interest in reducing emissions but be unwilling to support policies that prove economically costly to them. This can imply greater tendencies to differentiate between mitigation policies.

Not all mitigation policies are, then, the same in their implications for actor groups. For example, we have seen that renewable support policies incentivise new actors, whilst putting a price on carbon, either via an ETS or tax scheme, penalises high emissions actors (Meckling et al. 2015; Schmid et al. 2019) – albeit mitigation policy costs, either way, are often passed on to consumers. To the extent that policy benefits are not concentrated in the hands of a few, however, it is more likely that "… green industrial policy nurtures a political landscape of interests and coalitions that benefit from a transformation to low-carbon energy use – even when polluting industries might oppose it" (Meckling et al. 2015: 1170). Pursuing an ETS scheme to price carbon can bring in new constituents, like banks that profit from trading (Newell & Paterson 2010), whilst taxes, though they can be socially less regressive, are more visible to groups that pay for relevant products like petrol – see France's 'Yellow Vest' movement (Sunderland et al. 2020). Hence arguments that it is politically 'easier' to introduce low emissions support mechanisms than to penalise existing industries (ibid.; Schmid et al. 2019). Designing policies, then, that explicitly extends the benefits of mitigation, with a greater emphasis on distributional outcomes, is

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politically important (see Colgan et al. 2021) – an insight that Section 6.4.2 below engages in more depth. It can underpin politicisation in collective choice terms, by creating conditions for maintaining mitigation as a policy goal.

The focus in this sub-section on creating low emissions constituents has taken us away, however, from some of the complexities involved in reducing emissions discussed in Chapter 5. It is not enough to develop low emissions alternatives if they do not replace high emissions systems. In 2018, as a reminder, fossil fuels continued to dominate energy use – oil accounted for 32%, coal 27%, and gas 22% of world energy consumption (Enderdata 2018). STT thinking had been that the diffusion of niche technologies would disrupt incumbent regimes and encourage a breakdown in the forces supporting the status quo (Geels 2014), albeit with the strong warning that such transitions can take many decades. Although arguments were starting to emerge about technological and political power shifts from incumbent to low emissions systems, with some emphasis on the roles of distributed renewables and electrification (Kuzemko 2019; Brisbois 2020; Newell 2021), there had been very few concrete examples of renewables disrupting fossil fuels. The most notable shift had been between fossil fuels – from coal to gas for electricity generation. There are some phase-out examples, however. The heavy financial losses suffered by German utilities that had delayed too long in investing in renewables (Kuzemko et al. 2016a), the comparative gains by municipal, community, and local owners of renewable assets (IEA 2019), the transition of the Danish national gas company, DONG, to a renewable electricity company, Ørsted, and political decisions to phase out coal in some countries and regions – including Spain, Portugal, Germany and the UK, and the Canadian states of Alberta and Ontario.

6.3.3 Building Policy Capacity and Learning

Building on insights in Chapter 3 about politicisation as agency and as deliberation, this sub-section explores mitigation outcomes in relation to changing capacities to learn about, deliberate, and better understand climate mitigation as a policy problem. This a question relatively less well covered in climate policy feedback research – but highly relevant when thinking about how policy choices and outcomes shape climate mitigation politics over time. Relevant here, also, are questions about political capacities to identify and communicate mitigation policy outcomes.

To take any issue beyond initial recognition of its salience and of the need for collective public policy choice requires "the presence of coherent bureaucratic organisations staffed by well-trained, experienced, and respected officials" (Pierson 1993: 604). The inference here, of course, is that administrative capacities are central to deliberating and formulating policy. Others have written about the inabilities of

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state actors to respond to crises, for example, the 1970s oil shocks or 2000s energy crises, as underpinned by a scarcity and fragmentation of bureaucratic expertise (Ikenberry 1988; Kuzemko 2013). The work of Theda Skocpol also suggests that decisions to form new state administrative groups can pave the way for further rounds of policy in that area (Weir & Skocpol 1985; Skocpol 1992), to the extent that they create new bureaucratic and deliberative capacities.

Chapter 4 documented some of the first climate administrative and deliberative institutions created at the global level, whilst Chapter 5 pointed towards the growth in national-level climate institutions. Although not linear, these institutions did provide some foundations for further expansions in the timeframe of this chapter. The work of Rosenbloom et al. (2019) and Mildenberger (2021) points towards specific climate institutional expansions in the United States, even if the first Trump administration set some of it back. Dupont et al. have mapped the establishment of similar administrative capacities in the EU over time, with phases of expansion coinciding with increased targets for emissions reduction (Dupont et al. 2024). At the sub-national level, early measures responding to pollutants and/or oil crises in California had paved the way for the creation of a strong regulatory infrastructure and energy efficiency regulations which, in turn, decoupled profits from sales volumes for utilities and underpinned support for renewables (Meckling et al. 2015: 1171).

Decisions in the EU, on human rights and to make aspects of mitigation legally binding (not least meeting targets), paved the way for legal challenges to government policy. The first being the 2015, landmark, lawsuit brought on behalf of the environment advocacy group, Urgenda, against the Dutch government, which sued them for not doing enough to protect its citizens from climate change (BBC 2024). Since then, globally, 55% of cases have had a direct 'climate-positive' ruling, with significant knock-on effects in terms of public policy reputations and political pressures (LSE 2024). The growth in legal action to hold governments to account for emissions reduction has also coincided with a marked build-up in dedicated legal capacity and knowledge, sometimes within ENGOs, about laws and how to use them to pursue increased mitigation.

There were several particularly interesting administrative and deliberative capacity developments on the international scale as IGOs and other global bodies sought to further entrench mitigation. The International Energy Agency (IEA) refocused its analysis away from energy security to global energy transitions (Vogler 2016: 16); the UN, EU, and some domestic governments, expanded emissions monitoring capacities to enable NDC processes; numbers and sizes of multi-level (subnational and transnational) mitigation groups, like C40 Cities (C40), expanded (Bulkeley et al. 2014); and IRENA was created, in 2009. Although the idea for an international renewable energy agency was originally tabled in 1981, at a UN

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conference in Nairobi, it was not until 2008, with the costs of solar and wind dropping rapidly, that there was sufficient support to establish the agency (IRENA 2024). IRENA was the first intergovernmental organisation dedicated to promoting renewable energy and they, in turn, became central to gathering data on renewables, demonstrating their cost effectiveness, showcasing successes, and providing a vital repository of information about successful renewable energy policies, training, and skills. Today, IRENA is central to underpinning the growing importance of renewable energy globally through publicly available key reports – not least on renewable employment and skills, the size and potential of global markets, and the geopolitics of renewable energy. Much of this provided additional capacities for mitigation policy deliberation and, potentially, improvement.

Some of these capacity expansions can be directly associated with policy decisions, experience, and processes of learning. As discussed above, technological experimentation and learning underpinned advances in wind and solar PV, but so too was there a degree of mitigation policy learning as an outcome of the wide variety of policy programmes established over the previous decade or so. Arguably, for many involved, the full complexity of reducing global emissions only become apparent over time, through engaging in learning-by-doing (Jordan 2008). Just as climate science insights into the potential social implications of climate change have been used to motivate political action, it is more possible to make climate mitigation policy if in possession of information about public policy processes, power relations and incumbency, and about mitigation policy design and outcomes. This information could only have been made available through active engagement in processes of mitigation policymaking, identifying tensions and opportunities, figuring out how to respond, and collecting relevant data and information about policies and outcomes.

Recent research, on the interface between climate science and policy, has documented the growing policy advocacy strategies of various scientific expert bodies (Zaki & Dupont 2023). This can be related with processes of learning about how to have greater political agency, and as a response to outcomes such as policy failures to mitigate successfully. One organisation that has exhibited policy learning in this sense is the IPCC. Its Fifth Assessment Report, finalised between 2013 and 2014, provided scientific input into the Paris Agreement, arguing strongly for a limit of global warming to 1.5°C – which was subsequently accepted as an 'aim'. This marked a turning point in how the IPCC expressed itself – moving from consistently qualified language of 'probabilities' to including language and imagery that made more direct socially significant claims – thereby upping the political 'ante'. Their ability to do so was, in turn, enabled by improved scientific understanding resulting from dedicated deliberative capacities. This new approach was, as suggested above, most evident in its 2018 Special Report, which set out

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in no uncertain terms the social effects of global average temperatures rising to 1.5°C above pre-industrial levels (IPCC 2018). By the time it was produced, the report was able to assess over 6,000 peer-reviewed publications on actual climate change impacts – showing that it was already affecting people, ecosystems, and livelihoods globally. This forcefully underpinned the argument that every bit of warming, every choice, and every year matters to people all over the world. The report argued that global emissions must halve by 2030, and reach net zero by around 2050, and was used as the evidence base by subsequent rounds of 'net zero' commitments at national, and regional/EU, scales (Clark 2023).

The size of the evidence base upon which the UN could rely was boosted by the turn that the IPCC had made towards including a wider range of social science inputs. Around this, the IPCC took the decision to frame the next, Sixth Assessment Report specifically in the context of sustainable development and efforts to eradicate poverty. This would involve including, for the first time, an entire chapter on the social aspects of climate mitigation and reference to a wider variety of policy solutions (IPCC 2018 and 2023). This decision was, in turn, enabled by a quite rapid increase in political science and sociology research and publications on climate mitigation. These changes suggest an organisation moving from sitting on the 'science' side of the 'science-politics' boundary, whereby an organisation provides scientific information and leaves it to policymakers to decide what to do with it, towards the 'solutions oriented', more politically engaged, side (Beck & Mahoney 2018). This move took place within the specific context of insufficient mitigation action, the growing evidence base of actual climate change impacts, social and economic costs and risks, and rapidly expanding, multi-level networks of climate think tanks, transnational groups, and governing bodies. This can be viewed as another round of politicisation in terms of raising the salience of climate change, mitigation as a policy approach, but also connecting climate change to social outcomes.

One last aspect of climate mitigation policy learning as one outcome of previous rounds of policy choices takes us to the iterative nature of making long-term structural changes and the sequencing of policy over time – whether it be in energy, transport, agriculture, or industry (Meckling et al. 2015; Rosenbloom et al. 2019). Much of the research on dynamic relations between material and technical aspects of systems and policy, and on how policy generates a change in systems and vice versa, has been developed in relation to energy (Meckling et al. 2015; Kitzing & Mitchell 2014; Geels & Turnheim 2022; IEA 2024b; Tooze 2024). For example, as noted above, one of the energy system outcomes of policy was the greater proportion of electricity being produced from renewable sources, whilst policies, like those to expand the number of EVs and to switch to electricity-generated heat, were underpinning the electrification of energy. The

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important outcome to note here is the learning that emerged about the ways in which these mitigation policy outcomes placed new demands on policymakers – it wasn't enough to have successful policies to engender low emissions technological change, but those policies needed to be accompanied, in time, by new sets of mitigation decision making. This, as suggested by Tooze, is a move from the need to incentivise and support low emissions capacity to the need to develop whole systems management (2024).

For example, the expansion of weather-dependent/intermittent wind and solar PV requires greater capacity for electricity storage, like batteries in homes and large-scale grid storage; greater demand flexibility, like companies and/or households making decisions to support lower demand at times of lower electricity output; and international electricity interconnections. These, in turn, require policies to enable grid infrastructure redesign, new market and regulatory/price changes, as well as new support structures to further develop and disseminate opportunities for flexibility, and storage devices and technologies. The technical and system aspects of this temporal dynamic are encapsulated in the IEA's work that sets out the six phases of variable renewable energy integration (2024d). The complexity of required inter-related and dynamic systems of policies (mixes) should not be underestimated, but it was only possible to understand the details of what subsequent policy requirements might be, by initially expanding renewable generation. Other learnings had started to emerge as renewables started to supply higher percentages of electricity and as electrification started to take off. These include the different energy geopolitics associated with renewable versus fossil fuel-based energy – both in terms of potential boosts to energy security and of explosions in demand for critical materials and cleantech manufactured goods required for a global build-out of renewable systems (IRENA 2019). These varied new insights point towards a need for sustained political deliberation of mitigation policy as well as policy flexibility – to adjust, alter or drop existing mitigation policies and implement new ones to take account of technical, economic, and social changes resulting from previous rounds of policy (Rosenbloom et al. 2019).

What was also becoming more evident was that policy support for early technological development could be reduced as the cost competitiveness of the technology, that is, onshore wind and solar, improved. This is another important aspect of policy sequencing over time, not least as it can free up space for subsidies to be created to support subsequent rounds of technology development. Insights were starting to develop over this time frame into instances of regulatory capture in low emissions technologies – whereby some new, low-emissions constituents have been against reducing support for their technologies (Rodrik in Meckling et al. 2015: 1171). This has implied more active management of rent provision management (IEA 2016; Meckling et al. 2015), but not away from low emissions

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transitions just from those technologies that can now compete. This serves the political purpose of keeping a lid on mitigation policy costs and to ensure that benefits are not captured by certain corporations with consumers, largely, paying the costs. Relatedly, expensive mitigation policies, especially those no longer justified in innovation and diffusion terms, can be, and are, actively used by coalitions against mitigation to fuel public discontent with/support for mitigation (Lockwood 2015a; Rosenbloom et al. 2019). This is not to say that these lessons are always taken on board and that sufficient policies are in place to address the next phase of technical issues – far from it – but that some policymakers have become more aware of the need for subsequent policies over time and that learning and research now exists to support thinking through such temporalities.

6.4 Non-Mitigation Outcomes and Political Feedback

Mitigation infers significant change to high-emissions economies and societies and, as such, a wide range of non-emissions outcomes, including in environmental terms. The focus of this section, however, is on exploring socio-economic policy outcomes and their positive and negative implications for mitigation politics. As a reminder, historical institutionalist research on policy feedback suggests that there are both positive (self-reinforcing) and negative (self-eroding) relationships between climate mitigation policy and the political contexts within which new rounds of mitigation decisions are taken. Looking back at this timeframe allows us to see how wide-ranging non-emissions outcomes had become, perhaps not surprising given inter-relationships between mitigation and other policy areas explored in Chapter 5. What also becomes apparent, however, is the degree to which outcomes differ according to the types of mitigation policy implemented. There is a greater emphasis on wider public experiences of climate mitigation than the experiences and responses of the élite stakeholders analysed in Section 6.3.

6.4.1 Negative Socio-economic Outcomes and Political Feedback

Mitigation policy can cause major, intended or unintended, social backlash not least given the degree to which high emissions cultures and norms are embedded socially (Paterson 2010; Bulkeley et al. 2016; Patterson 2023; Stark et al. 2023). Partly as a result, questions of how to avoid alienating societal groups through the non-emissions effects of mitigation policies have recently emerged as a theme in politics of transitions research. Negative experiences of mitigation policy outcomes, like job losses or unfair distributions of policy costs, can make subsequent mitigation policy development politically challenging. Just

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as positive outcomes can bolster support, partly by creating new constituents, negative outcomes can embolden existing, and/or support the mobilisation of new, groups against climate mitigation (Rosenbloom et al. 2019: 172). It is these kinds of political outcomes that some, reviewed in Chapter 2, seek to avoid when they advocate for sheltering climate mitigation policymaking from wider democratic processes.

It follows that the design of policy matters, whilst poorly designed policy instruments, that do not take account of wider socio-economic outcomes, can alienate electorates and contribute to distrust in government (Hay 2007; Lockwood 2015a; Meckling et al. 2015). Time is important – mitigation as a goal needs to stay on political agendas whilst, as we have seen already, policymaking becomes more, not less, complex with time. Relevant here, too, is the fact that so much emphasis, in policy terms, has been on the relatively easier processes of making low-emissions alternatives available and affordable, which can be expansionary in employment and growth terms. High emissions phase-out is more closely related to negative outcomes – including the stranding of associated infrastructures and assets. Here questions of how the benefits and costs of changes associated with mitigation are distributed become key considerations (see Aklin & Mildenberger 2020; Sunderland et al. 2020).

In this section, I explore two broad categories of negative feedback: the social and political effects of the movement of energy above ground associated with the shift to renewables; and the costs of mitigation and how they are distributed. Firstly, whilst fossil fuels tend to be accessed below ground in specific locations, and coal and gas generated power centred in fewer large-scale facilities, wind and solar electricity generation is distributed across varied landscapes. This places it within the view of citizens not previously exposed. Gas has been largely distributed via underground pipelines whilst the shift to renewables and electrification requires new transmission and distribution grids. This is one of the most directly visible and, therefore, tangible mitigation policy outcomes. Policymakers' decisions to expand onshore wind resulted in new wind generation farms in specific localities, which in most jurisdictions required local planning permissions and approvals (Bridge et al. 2013). Depending on the policy design, attitudes towards the change of visible landscape can be soured by feelings of imposition and/or a lack of local benefit from the siting of new generation or transmission (Batel & Devine-Wright 2018). Objections can range from concerns about environmental impacts, for example on bird populations, to concerns about property value, identity, cultural issues, and land use. Indeed, land use emerged as a significant energy transition issue – expansions of lower power-density renewables, within the context of rapid electrification, present significant competition for land (Bridge et al. 2013; Stokes 2016: 290;

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Kuzemko et al. 2024). (Re-)forestation, to maintain or create carbon sinks, increased demand for biofuels, and the critical material extractions required to build-out renewables can also place local, sometimes indigenous, agricultural demands in competition with mitigation policies (Lockwood 2015a; Bridge & Faigen 2023; Kuzemko et al. 2024; Lang 2024).

There has often been a strong sense within local contestations that plans made elsewhere are imposed, with little consideration of the benefits or harms experienced within localities. This can be exacerbated by the sense that benefits are experienced by actors outside of localities and/or that they are distanced and long-term (Stokes 2016: 960). Local contestations can be politically important to the extent that planning is refused, thereby slowing renewable growth. Indeed, by the early 2020s planning was considered in many European countries to be one of the biggest obstacles to low emissions transitions (European Commission 2022). In instances where building a renewable electricity project proceeded, despite local objections, it has led to electoral issues for the party in (national or local) government at the time and subsequent policy pull-backs. For example, Stokes (2016) shows that voters in Ontario, Canada, living near wind farms punished the provincial Liberal government electorally. Objections to onshore wind and solar arrays in the UK contributed towards a de facto reversal in renewable policy by the Conservative government in 2013, given that the rural groups objecting were core to their electoral base (Carter & Pearson 2022).

Policy design is an important factor when considering such issues of social acceptance. In one approach, renewable siting decisions in India made use of government-owned land to reduce possibilities for opposition and avoid the necessity for broader social interaction in the locality (Lockwood 2015a). Whilst this means that renewables were built, increasing the possibility of meeting social policy goals and of new low emissions constituents, this is also depoliticising to the extent that local social benefits or harms were not considered. In other approaches local communities, as individuals or community energy groups, have been given opportunities to directly invest in, and profit from, new renewable generation there, which has led to higher perceived local advantage and approval (Lockwood 2015a; Kuzemko 2019; Teladia et al. 2023). For example, in Denmark, renewable support policies were aimed at and resulted in a wider distribution of electricity generation ownership. Widespread ownership, in turn, created new constituents contributing towards positive feedback effects for Danish renewable policy (Eikeland and Inderberg in Roberts et al. 2018: 306). Albeit there have been relatively few examples of community energy targeting minimum-income social groups (Teladia et al. 2023). Another way of thinking about the visibility of new renewables is to consider the benefits that demonstration, and/or peer-to-peer learning, can have on (previously unsure) local communities. In some city

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localities household retrofit projects, that include insulation and renewable generation, have been designed to act as both 'normalisers' of seeing solar PV panels on rooftops as well as demonstrations, through opening houses up for visit days, of the benefits of living in an insulated home with direct, renewable electricity supply (Kuzemko & Britton 2020; Hiel 2023).

Poorly designed policies, in technical or financial terms, can have less overtly visible outcomes in localities, but none-the-less have social and political implications. In the early years of China's wind policy some of the new generation built was of low quality and there was insufficient grid investment (Lockwood 2015a: 95). This resulted, over time, in poor turbine performance and failures, insufficient maintenance, and a lack of grid access at a time when reliable and affordable electricity access was a core growth policy. Policy later shifted towards feed-in-tariffs to fix some of the issues. In India accelerated depreciation, a policy used to support various industries including renewables, was held responsible for almost half of India's forgone corporate tax revenue (Bandyopadhyay 2013 in Lockwood 2015a: 95). As a result, those interested in tax reform more broadly focused their objections on renewables policy – indirectly effecting the politics of mitigation. Policy changes, again, followed from these experiences – in 2012 the allowance for wind investments was dramatically reduced and the generation-based incentive cut – leading to a sharp slowdown in investment.

Negative socio-economic outcomes can also be categorised according to who bears the costs of mitigation policies. Sensitivity to fossil fuel taxes as a form of putting a price on carbon has been widespread, albeit so is right-wing opposition to taxes in general (Levain et al. 2022). At the same time, given the extent and spread of fossil fuel subsidies, publics in many countries have long been purchasing fossil fuel products at discounted rates (Lockwood 2015b; McCulloch 2023). This clearly raises the visibility of any attempt to phase out those subsidies as doing so usually leads to higher prices for consumers. For some, objections to higher prices are more clearly a distributional issue. For example, objections by the Yellow Vest movement in France to fuel taxes sit within the wider context of their overall interest in higher taxes on the wealthy and a minimum wage increase. Objections, then, to mitigation policies are not necessarily anti-climate but are often pro-distributional policy (Levain et al. 2022).

This points towards a distributional politics of mitigation – whereby the varied distributions of mitigation policy costs and benefits across electoral units, and perceptions of fairness, link to levels of contestation and voting behaviours (Stokes 2016; Aklin & Mildenberger 2020; Bolet et al. 2023; Bickerstaff et al. 2024). It has been common practice for the cost of some mitigation policies, that is, subsidies for renewables in India, Germany, and the UK, to be passed onto consumers. This can be seen as regressive to the extent that there is no means

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testing, but also because in some countries, for example Germany, households pay a larger proportion of the cost than industry (Kuzemko et al. 2017). Indeed, subsidies and other support mechanisms for high emissions industries, manufacturing, and coal sectors, are seen as having slowed the pace of the transition in Germany (Johnstone et al. 2021). There are, however, ways of offsetting the household impacts of higher prices using social policy. In Germany, although household energy prices per unit are relatively high, overall energy costs are not because of the high levels of building insulation that resulted from the successful energy efficiency policy, whilst some households on welfare receive state contributions to energy bills (Kuzemko et al. 2017).

Other groups in society that can be more directly affected by mitigation policies are those that make money from, are employed by, or are otherwise associated with high emissions industries. Arguably, however, beyond effects for coal companies, where there were a few phase-out policies in place, outcomes such as 'stranded assets' and/or lower demand for fossil fuel products were more debated than directly experienced within this timeframe. Employment in coal was the area where there were more directly experienced impacts, albeit not all of these were mitigation related. The European Commission estimates that coal jobs in the main European coal countries, Czechia, Germany, Spain, the Netherlands, and Poland, had fallen by nearly 1 million by 2018 – with only 38,000 coal mining jobs remaining (European Court of Auditors 2022). Loss of employment can be high profile electorally and matters to parties on the right and left of political spectrums. Approaches that highlight the cultural political economy of fossil fuel livelihoods bring into focus questions of cultural norms, community identities, and the lasting social imaginaries of fossil fuels in many countries. These cultural aspects exacerbate job losses, making them a political focus for some voters, even though coal had been in decline since the late 1980s and relatively few people remain directly employed in OECD countries (Bolet et al. 2023). In countries like China, Russia, and India, which maintained higher levels of coal production, potential job losses are central to deliberations about just transitions. Resource nationalism, energy security, and local cultural identity factors long underpinned Polish objections to coal phase out (Bridge et al. 2018; Szulecki 2020), whilst early (2003) attempts to phase out coal in Ontario were resisted on the grounds of unemployment and reliability of energy supply (Rosenbloom et al. 2019: 712).

Cultural and real experiences of the coal phase out are, of course, harnessed by anti-mitigation groups and RW Populist leaders alike. Potential and real job losses have been politicised as part of election campaigns – seeking political advantage from opposition to mitigation policy and associated negative outcomes. In the US, appeals to left-behind workers in the first and second Trump

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Presidential election campaigns successfully utilised narratives blaming the climate 'hoax' for the loss of American jobs. Similar narratives, about attacks on fossil fuel jobs and economies, have formed the basis of RW Populist campaigns in Brazil, the Philippines, Germany, and Australia – again with certain degrees of success (Darian-Smith 2022; Marquardt et al. 2022). This is partly why active fossil fuel phase out is considered politically far more complex than creating new, low-emissions markets.

But, again, evidence of different approaches to policy design to account for these kinds of contestations also emerged during this timeframe – taking us back to questions of politics as *choice*. The 1980s UK coal mining jobs decline had taken place, albeit not with climate goals in mind, within an atmosphere of coercion and with little or no public policy support for communities facing mass unemployment. The spectre of that 'transition' looms large in the politics of the UK just transitions debates today (Paterson 2024; Stewart 2024). Much later, however, by 2021, €12.5 billion of EU just transitions funds had been targeted at contributing to socio-economic and energy transitions in regions with declining coal industries (European Court of Auditors 2022). Denmark initiated aid packages to ensure local jobs for existing skill sets of oil and gas employees – via electrification and CCUS projects (IEA 2023b). An associated trend had also emerged in some places of learning from early policy mistakes. In 2018 the 'coal commission' was set up in Germany to overcome political stalemates that had built up over the question of coal phase-out – with some successes in addressing coal stakeholder concerns and shifting the debate from 'whether' to 'how to' phase out (Hauenstein et al. 2023). Ontario learned from its early mistakes in coal phase out design, ultimately implementing a process that worked with stakeholders, including unions, and citizens that resulted in the single largest GHG emissions reduction measure in North America by 2018 (Rosenbloom et al. 2019: 712).

Others have also found that policy packages, that recognise potential social conflict and include social measures, that is, to support the re-skilling of fossil fuel workers, increased popular support for phase out policies (Bergquist et al. 2020). Analysis of regional coal phase out policy in Spain highlighted the extent to which the political party responsible for just transitions strategies, whereby affected municipalities received €250 million of support and investment, received an electoral boost in regions where coal phase out policies were implemented (Bolet et al. 2023). The notion that areas most affected by coal phase out would reward the party responsible might seem counter-intuitive to many, but social engagement in the process of policy design did indeed support that outcome. Policy design, then, can incorporate politicisation as social interaction both through greater policy participation for directly affected stakeholders and through learning to devise policy that better balances social and mitigation outcomes.

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6.4.2 Positive Socio-economic Outcomes, Political Feedback, and Policy Design

This sub-section makes a distinction between exploring outcomes by focusing on the costs of mitigation policy, with an eye to reducing political backlash, and notions about designing mitigation policy that has *benefits* beyond emissions reduction. Section 6.4.1 touched on just transitions policies developed to ensure that negative socio-economic outcomes for those directly affected by mitigation policy are reduced. To some extent, this approach assumes the need to shelter policymaking from backlash against socio-economic policy *costs* experienced societally, a view that underpins some arguments for depoliticisation. Depoliticising climate mitigation to avoid backlash can, however, obscure deliberation about secondary benefits vital to securing more socially positive mitigation policy. The emphasis here on exploring mitigation policy benefits infers a more expansive view of politics and policy explicitly moving away from the focus on costs seen anti-mitigation and some pro-mitigation narratives. Co-benefits associated with policies designed to, directly or indirectly, reduce emissions extend across sectors and policy areas and have also been both unintentional and intentional (Floater et al. 2016: 13–14). The relationship, explored in Chapter 5, between mitigation goals and other public policy goals becomes relevant again, to the extent that socio-economic outcomes of mitigation policy can affect abilities to meet other goals. This is not about focusing on benefits at the expense of costs, but about recognising both sides in questions of distribution. This, in turn, has to do with change needing to be socially positive, not just acceptable, to initiate broader public engagement to improve social outcomes.

Debates about policy co-benefits also incorporate ideas about the political effects of policies being in part related to how they are formulated and can suggest designing policy with the active intent to deliver wider benefits (Weir & Skocpol 1985; Lockwood 2015a; Cameron et al. 2018; Roberts et al. 2018; Chatterjee et al. 2022; Finn & Brockway 2023). For example, when exploring a variety of outcomes related to policy design, Weir and Skocpol pointed to differences between outcomes of 1930s agricultural support policies in Sweden and the US (1985). Sweden had implemented reforms that supported small farmers and helped to cement a farmer/worker political alliance, whilst the US's New Deal mainly supported large-scale farmers which meant that the broader publics did not see the benefit.

These policy outcomes according to policy design bring us back to differences between the German, Danish, and UK, and Chinese models of support for new renewables. German and Danish renewable policies were designed to engender more widespread ownership of renewable generation assets whilst UK and/or Chinese policies left ownership with large-scale corporations (Jacobsson

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& Lauber 2006; Lockwood 2015a). As a result, coalitions in support of renewables became more spread out across society in Germany and Denmark, whilst by 2012 80% of China's wind capacity was owned by state-owned, large-scale generation companies (Zhang et al. 2013: 338 in Lockwood 2015a: 96). Others claim that more distributed ownership of energy generating assets can break with the history of large-scale, centralised ownership, and by doing so contribute towards raising awareness of and knowledge about clean electricity generation, better engage communities in policy and practice, and boost energy democracy (Kuzemko 2019; Sovacool et al. 2020a; Bray et al. 2024). The more distributed and localised nature of Germany's renewable electricity generation has also contributed towards a lowering of household bills, greater energy autonomy, and improved social interaction with, and debate and awareness of energy issues (Sovacool et al. 2020a).

Research on co-benefits associated with mitigation policies report a range of ways in which they have contributed towards meeting longer-standing public policy goals. Sticking with questions of reduction of emissions in energy supply – policies in Norway to support switching to EVs have also led to reductions in noise levels and air pollution and to improved road safety (ibid). Whilst a report on the co-benefits of municipal-backed policies to reduce harmful emissions from burning coal in homes in Poland, from 2015 to 2017, reported secondary benefits as: improved well-being in terms of additional free time, improved thermal comfort, and satisfaction with place of residence (Frankowski & Herrero 2021).

In the 1990s and early 2000s, a literature emerged highlighting the emissions reduction potential of demand reduction measures, but more recently one of the largest areas of research on reported secondary benefits associated with mitigation policies focuses on demand-side measures (Chatterjee et al. 2022; Creutzig et al. 2022; Finn & Brockway 2023). Creutzig et al.'s review of 306 well-being outcomes of demand-side policy options found that 79% of policies were reported as also resulting in improved human well-being (2022). One area that stands out here is the association between certain demand reduction measures, like home insulation or walking or cycling instead of using a car, and direct health benefits. For example, clear links have been identified between living in insulated (warm, not damp) homes, the avoidance of a range of illnesses and unnecessary winter deaths, and lower costs for publicly funded health systems via lower requirements for medical services (Garrett et al. 2021; Catapult 2022). Insulated homes, particularly those also fitted with solar PV and storage, can also result in lowering household energy costs and better-insulating citizens from price volatility at times of energy crises.

Demand-side measures have also historically been adopted as a response to insecure supplies of energy on the assumption that it support a greater independence from volatile global energy markets and supply chains. This was the case in

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many OECD oil importer countries during the oil shocks of the 1970s and 1980s, whilst demand reduction was one of the three central pillars of the EU's response to Russia's second invasion of the Ukraine in 2022 (Kuzemko et al. 2022). Lower energy demand systems can have other outcomes during long processes of low emission transitions to the extent that they can provide shelter from geopolitical competition associated with clean energy and critical resource supply chains (Fletcher et al. 2024). Low energy demand systems are also cheaper to transition on the basis that they lower the need for expensive new infrastructure build-out, such as wind turbines, PV panels, batteries, and transmission grids, which, if passed on to consumers, also places downward pressure on household energy bills (Barrett et al. 2021).

Some local governments, and associated networks, have framed and articulated mitigation as a social enterprise explicitly designed as connected to welfare-related goals and as contributing towards greater equity and justice outcomes (C40 2016; March & Ribera-Fumaz 2016; Gordon & Johnson 2017). For example, projects to reduce transport emissions in Rio de Janeiro, Medellin, and Caracas were also targeted at providing mobility services for residents of favelas (Beatley 2013). There are potential political benefits for mitigation policy in linking mitigation to social goals at this scale in that it is often easier to 'see' positive policy effects within localities, albeit this applies to negative outcomes too. To the extent that positive outcomes are visible and understood to result from policy this can sustain and create support for mitigation (Kuzemko 2019).

Lastly, studies from this period have supported claims about links between mitigation measures, particularly in the development and dissemination of clean emissions technologies, and jobs and growth. Recent research found that renewable policy in Germany had created new investment opportunities and businesses and resulted in 325,000 renewable energy jobs by 2017, with predictions of 600,000 by 2030 (Sovacool et al. 2020a), whilst household retrofit companies and employment had also expanded (Kuzemko et al. 2017). Danish wind industry jobs and associated political support for the low-emissions energy transition helped to ease relations with unions and to gain their support (Johnstone et al. 2021: 8). A study on renewable energy policy in Morocco found that FiTs designed to promote local economic development and decentralised build-out of generation would lead to more jobs than large-scale, multi-national owned, desert arrays (Steinbacher 2015). A recent IEA report claims that globally clean energy contributed 10% of economic growth in 2023 – in the EU it made up 30% of GDP growth; China 25%; US 6%; and India just under 5% (IEA 2024a). Policy decisions can, and have, also been taken to recycle revenues from carbon pricing systems to support investment in new low emissions innovations and jobs, and to underpin social policy (Harrison 2013; Bowen 2015; Rosenbloom et al. 2019; 173).

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The relationship between socio-economic benefits and mitigation policy is far from straightforward, making social interaction politicisations in terms of balancing social goals highly complex. To start with, it involves an ability to think across, often siloed at the national level, policy departments, or ministries. Sometimes policies commonly associated with mitigation, such as demand reduction, are articulated and implemented in the service of other policy goals and emissions reduction can become a 'secondary' outcome. This can mean that the aim of mitigation is placed secondary to other social goals. An important aspect of broadening political buy-in for mitigation is that any benefits arising from mitigation policy need to be understood and communicated outside of policy-making circles – but initially hiding mitigation behind other goals can reduce the ability to do so. Further, non-emissions benefits that benefit special (elite) interests can entrench support for certain types of policy over others more focused on wider distributions of benefits (Meckling et al. 2017; Jordan et al. 2022).

However, explicitly considering wider societal, domestic, or local, benefits can underpin and provide an evidence base for framings of mitigation policy as including broader benefits – away from the narrow, but deeply embedded, fixations with policy costs. Clearer and more direct communication of wider benefits can also be used to counter perceptions that mitigation policy benefits are global and dispersed but costs local (Stokes 2016).

6.5 Conclusions

This chapter has revealed a variety of ways in which policy outcomes, be they emissions-related or socio-economic, have been crucial to the development of climate politics over time. Previous chapters picked up on political framings of mitigation as a potential economic and/or social cost, whilst plenty of governments have considered the political costs of transitioning their economies towards net zero emissions across each phase. In many senses, although some technology costs have fallen rapidly, underpinned in part by a range of mitigation policies in different parts of the world, the financial and political costs associated with mitigation are still perceived as high in many parts of the world. One of the core arguments here is that far more can now be known both about *actual* socio-economic benefits of mitigation policies but also, crucially, about the socio-economic costs of *not acting* (Newman & Noy 2023; Bilal & Känzig 2024), a theme to which Chapter 7 returns. This chapter, by focusing on policy outcomes as a phase of climate politics, has gone some way in revealing the *degree* to which, and ways in which, mitigation policy has had broader societal effects. And about how policy design can shape outcomes – in particular in terms of how different policies distribute costs and benefits. Insights here about the benefits of acting combined

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with the socio-economic outcomes of not acting can be used as powerful tools by advocates for further and improved mitigation policy action.

Bringing positive secondary benefits into the analysis in this chapter was not an attempt, however, to claim that all mitigation policies can have positive socio-economic outcomes and/or that all outcomes can be positive for everyone to the extent that conflict will recede. It is, instead, to argue that it has become increasingly possible with the passage of time and growth in the experience of mitigation policymaking to estimate *what* the possible negative outcomes of any given policy might be and how they can be avoided. For example, some evidence had started to emerge during this phase that including directly affected public, not just elite, stakeholders within processes of policy design can lead to enhanced political support. This, in turn, supports the ability to take negative outcomes into account, and to consider how to design and choose policies that either avoid or compensate for socio-economic damage. This might include designing policies not just as part of a sector-based policy mix, for example by combining renewable energy, storage, and demand response policies to ensure security and lower emissions, but as part of employment and skills, industrial, redistributive, and welfare policy areas. Focusing on the politics of policy outcomes has made dynamic inter-relations between policy areas more visible, whilst these relations also deepened over this phase. In some senses, it becomes increasingly difficult to separate mitigation from other policy areas given the need for all sectors to reduce emissions and for wider social outcomes to emerge from doing so. These are all themes to which Chapter 7 returns.

Mitigation, as an overall goal, largely remained subject to processes of collective choice, whilst the need to make political choices about policies in relation to outcomes had expanded. Lessons regarding the importance of policy design had further broadened out the range of policy choices that needed to be made – inferring a requirement for increased politicisations in terms of knowledge and deliberative capacities in policymaking circles. Arguably using positive feedback as a route towards politicisation in terms of keeping mitigation policy goals on agendas also requires greater deliberative capacities, as opposed to assuming away contestation and conflict through processes of sheltering policymakers from exposure to those debates. At the same time, increased evidence of and knowledge about socio-economic outcomes, and how they can be shaped through different types of policy design, provides some potential for politicisation in agency and deliberative terms.

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