



Top-down or bottom-up? Norwegian climate mitigation policy as a contested hybrid of policy approaches

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Abstract

It is widely accepted that the Paris Agreement implies a shift in global climate mitigation policy from a top-down approach focused on global distribution of emission cuts and international cost-effectiveness to a bottom-up approach based on national efforts. Less is known about how this shift at the global level trickles down and manifests in national climate mitigation policy. Norway is in this respect an interesting example, since it has long been portrayed as an important driver of an international top-down approach. In this paper, we demonstrate that Norwegian policy cannot be characterised as a ‘pure’ top-down regime; policy instruments and measures directed at specific technology investments and deployment to complement cost-effective (international) policy instruments have been an explicit government ambition for a long time. Second, by using the case of biofuels, we analyse how the two approaches have been combined in practice over the past decade. Using the notion of ‘hybrid management’, we demonstrate that the top-down approach has left a lasting imprint on Norwegian mitigation policy, but also that this approach has increasingly been challenged by bottom-up thinking, leaving Norwegian climate mitigation policy as a contested hybrid of policy approaches. We conclude that inadequate institutional arrangements for productively managing the tensions between the two approaches have hampered progress in Norwegian policy in curbing domestic emissions. We expect that Norwegian climate mitigation will become increasingly hybridised in the coming decades, and suggest that cultivating hybridisation can be a productive approach for policy progress.

Keywords Climate mitigation policy · Cost-effectiveness · Environmental effectiveness · Hybrid management · Biofuels · Norway

1 Introduction

The Paris Agreement from 2015 marks a shift in global climate mitigation policy from top-down to bottom-up (Andresen 2015; Falkner 2016; Sabel and Victor 2017). This implies a shift from a global distribution of emission cuts to a focus on nationally determined

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contributions towards a global effort (Hovi et al. 2014 p. 167). The focus of this paper is to study how this shift at global level manifests in climate mitigation policies at national level, using Norway as the example.

It is often argued that Norwegian climate mitigation policy is oriented towards a top-down approach. In the negotiations under the United Nations Framework Convention on Climate Change (UNFCCC), Norway has pursued international cost-effectiveness as a key principle of regulation at global level since 1991 (Andresen and Butenschøn, 2001; Tellmann 2012). In line with this principle, Norway has been an important actor in establishing international emissions trading systems such as the Clean Development Mechanism (CDM) (Asdal 2011, 2014; Nilsen 2001). Flexible mechanisms have become a main ingredient in the Norwegian policy mix, in combination with a lack of clear domestic targets. In other words, Norway has historically been more occupied with meeting its climate targets at international level than with making substantial cuts at home.

As such, Norway seems to be a deviant case compared with most other countries in Europe (Boasson 2013; Eckersley 2016; Boasson and Lahn 2017). In a comparison of institutional design and climate policy ambitions in the UK, Germany, France, Denmark, Sweden and Norway, 'Norway emerges as a clear climate-policy winner as regards the Minimizing Societal Costs dimension' (Boasson 2013 p. 56), where a top-down policy framing and cost-effectiveness are key.

In 2008, however, all but one of the political parties in the Norwegian parliament entered a cross-party parliamentary climate settlement (Hermansen 2015) which included domestic sectoral climate mitigation action plans. A major point in the settlement was that parties found it 'realistic' to set the target of cutting domestic greenhouse gas emissions (GHGs) by 15–17 million tonnes of CO₂ equivalents by 2020 compared with a modelled future reference level. This would mean that about two-thirds of Norway's planned emissions reductions (30% by 2020 compared with 1990 levels) would be made domestically (Klimakur 2010 p. 24; Hagem 2012). A gradual phase-in of biofuels was explicitly mentioned as a measure to be strengthened.

However, such an approach is not necessarily compatible with the principle of international cost-effectiveness, as it narrows the scope of possible emission cuts and may lead to higher abatement costs. The Climate Settlement, which was renegotiated in 2012 and lasted until 2020, indicates that the Norwegian position on climate mitigation policy has become less oriented towards a top-down approach and is thus not as 'pure' as often anticipated (cf. Boasson 2015; Boasson and Lahn 2017). In fact, it marked a breakthrough for a Norwegian domestic-based bottom-up approach, implying that a scholarly characterisation of Norwegian climate mitigation policy should take this into account and focus more on how modifications and combinations of different approaches have occurred in practice. Importantly, though, influential Norwegian economists still support a global top-down approach, focusing on cost-effectiveness, and argue that this should ideally stay 'pure' and not be combined with a nationally oriented bottom-up approach.

In analysing the tension between these two main approaches, we draw on what Latour (1993) calls 'processes of purification', and when assessing the available space in which different policy approaches could be deliberatively negotiated, we focus on Miller's (2001) notion of 'hybrid management' (cf. Wehrens et al. 2014). We study how hybrid management is performed and what happens when proponents of the top-down approach act against hybridisation. The case is the Norwegian Climate Settlement, and our example is biofuels.

Our aim is threefold: (i) to develop a typology for analysing national climate mitigation policy portfolios post-Paris, (ii) to characterise the current Norwegian climate mitigation

policy mix more accurately and (iii) to more specifically improve the understanding of how the two approaches interact in practice, including actors' purified and hybrid strategies, and how these interactions are handled by existing institutional arrangements.

In a wider perspective, understanding the dynamics of domestic climate mitigation policymaking is of crucial importance, since all countries party to the Paris Agreement are to develop plans for fulfilling their nationally determined contributions (NDCs) for collectively reaching the targets set out in the agreement. The fact that Norway was central in establishing the principle of cost-effectiveness on the global climate policy scene, including in the Kyoto Protocol (Anker 2018; Asdal 2011), makes it interesting to study how this policy principle has evolved on the national scene, and not least since the Paris Agreement. Furthermore, Norway is also a deviant case in respect to emissions. Unlike many other countries in Europe, Norwegian GHG emissions in 2019 were only slightly lower (about 2%) than in 1990, while other northern European countries have reduced their emissions significantly in the same period (Sweden (29%), Denmark (38%), Finland (26%), the UK (43%) and Germany (35%) (EEA 2022).

In the following section, we introduce our methodology. Next, we explain in more detail the top-down and bottom-up approaches and develop a typology for the analysis, followed by an introduction to the notion of hybrid management and its analytical potential for studying configurations of climate mitigation policies. Against this backdrop, we characterise and discuss the history and status of Norwegian climate mitigation policy; first, how this has been portrayed in the literature, which has largely focused on the top-down approach, and second, how the top-down and bottom-up approaches have manifested in Norwegian climate mitigation policy, more precisely the official image given in the Climate Settlement from 2008. We then explore the specific case of biofuels to illustrate the increasing policy attention given to the bottom-up approach, including two important government reports supporting opposite approaches. Next, the outcome of these two reports in actual policy-making is discussed, and the two approaches as well as conflicts and negotiations between them are analysed to assess 'purity' and 'hybridity' in Norwegian climate policy i.e., how the current mitigation policy can be characterised as a contested hybrid configuration of the two approaches. Finally, we summarise and conclude our results.

2 Methodology

In this heuristic in-depth case study (George and Bennett 2005), we will use the example of Norwegian biofuel policy to describe the current character of Norwegian mitigation policy as a case of the broader class of national mitigation policy. The written empirical basis consists of official documents (reports and policy documents), scientific reports, scholarly literature and media coverage.

More specifically, official Norwegian reports on climate mitigation in the period 2006 to the present (3 in total; see supplementary material for details) have been analysed. This type of report is commissioned by a ministry, which also defines the mandate and the selection of members and secretariat, often consisting of experts from academia, bureaucracy and sometimes interest groups. Other types of official reports, commissioned by ministries but written by bureaucrat experts in underlying directorates (7 in total; see supplementary material for details) have also been analysed. High-profile official reports often result in a white paper from the government. A white paper signals the government's stance on a matter and often includes suggestions for policy response. A white paper is usually presented

to the parliament, which processes the white paper in the relevant parliamentary standing committee, followed by plenary voting in parliament. All white papers in the period 2007 to the present have been analysed (5 in total; see supplementary material for details). The analysis of these documents constitutes the backbone of the paper, which seeks to characterise Norwegian mitigation policy in light of the two approaches, particularly how this is expressed through the example of biofuels.

Biofuels was selected as an example since it was hypothesised to be well suited to illustrate the tensions and hybridity between the two approaches because of well-known regulatory hurdles associated with it. This became evident through interviews and media coverage.

The written basis has been complemented with eleven personal semi-structured interviews with civil servants, politicians, scientists and NGOs with key knowledge about these processes, either as experts in commissions, parliamentarians or close observers. In addition, participant observation has been conducted at several public events with key actors. Combined, this material enabled us to conduct process tracing of the regulation of biofuels as a proxy for the evolution of Norwegian mitigation policy over the past 15 years.

3 Bottom-up, top-down and in-between: a framework for analysing climate mitigation approaches

Our point of departure is that global climate mitigation policy has gone from a top-down design (Kyoto) to a bottom-up design (Paris), which warrants more scholarly attention to climate mitigation policies at national level. However, and importantly, the global picture is still of vital importance because the Paris Agreement contains global collective targets, for instance the temperature target. In other words, understanding the dynamics at national level, which in the aggregate make up the global level, is crucial. In this paper, we will argue that the concepts of top-down and bottom-up also make sense for analysing climate mitigation policy at national level.

Climate mitigation policy consists of multiple dimensions (Boasson 2015) at both national and global levels. The bearing principle for top-down policy design is that all resources are scarce, and targets therefore should be met in a cost-effective way. The bottom-up approach, on the other hand, directs attention to emission sources and seeks to curb emissions from these sources in an environmentally effective way.

Most potential policy instruments and measures are assessed before being implemented. Starting with assessments at the global level, it is widely accepted that the Intergovernmental Panel on Climate Change (IPCC) produces the most authoritative assessments. When IPCC Working Group 3 on mitigation assesses the potential of different policies, it assesses studies that apply both top-down and bottom-up methodologies, which the IPCC defines as follows:

Bottom-up studies are based on assessment of mitigation options, emphasizing specific *technologies* and *regulations*. They are typically *sectoral* studies taking the macro-economy as unchanged.

(...)

Top-down studies assess the *economy-wide* potential of mitigation options. They use *globally* consistent frameworks and aggregated information about mitigation options and capture *macro-economic* and market feedbacks. (IPCC 2007 p. 8, bold in original, italics added)

According to the IPCC, ‘bottom-up studies in particular are useful for the assessment of specific policy options at sectoral level, e.g. options for improving energy efficiency, while top-down studies are useful for assessing cross-sectoral and economy-wide climate change policies, such as carbon taxes and stabilisation policies’ (IPCC 2007 p. 8). In between these two broad classes of models, there are many different sorts of hybrid models combining elements from each set of model class.

Economic policy instruments (e.g. carbon taxes), which are often a key focus in top-down studies, are indirect and as such in theory more cost-effective (the market will find the best solutions), but less predictable regarding emission levels and technology choices, and may be challenging in terms of political feasibility. Regulatory policy instruments (often included in bottom-up studies) such as technological standards are direct policies and as such more predictable regarding adoption of new technology. Regulatory instruments may therefore be more environmentally effective in terms of emission levels but may be less cost-effective than, for example, a carbon tax (IPCC 2007 p. 747). In terms of professions and expertise, the top-down approach is associated with economics and rational actor theory, while the bottom-up approach is more closely associated with engineering, sociotechnical transformations, and law. The two approaches are summarised as ideal types in Table 1.

The IPCC clearly acknowledges that different types of policy instruments and measures may be combined (IPCC 2007 pp. 747–765) in and across different policy contexts, but does not provide any concrete advice on the ideal configuration of top-down and bottom-up elements other than acknowledging that top-down and bottom-up elements may complement each other. In the next section, we will introduce some concepts that can be used to study configurations of approaches, including combinations and tensions between them.

4 Hybrid management of different framings

In their studies of technical controversies, Callon and colleagues (Callon et al. 2009) argue that protecting strong boundaries in a situation of uncertainty and conflict (such as climate policy), i.e., to *purify* or distinguish between different kinds of knowledge and/or social groups, will only serve to increase the level of conflict. In contrast, *hybrid management* aims to curb conflict and implies to ‘coordinate activities taking place in multiple domains’ (Miller 2001 p. 487). This involves taking differences and conflicts seriously and supporting social arrangements where such management may take place, through cultivating *hybrid forums* (Callon et al. 2009 p. 35; cf. Laurent 2017). Creating space for coordinating activities within hybrid forums implies to expand the middle ground between existing frames of knowledge and between social groups. However, such space is often lacking when conflicts are well established and long standing, and the support for such coordination work is often weak in situations where purifying actors repeatedly present purified knowledge claims and expect others to jump on the bandwagon (Sundqvist 2014).

The two approaches of top-down and bottom-up could be understood as expressions of two different *framings* of the same problem, i.e., how to best (most effectively, cost-effectively and so on) cut GHG emissions. The notion of framing signifies how issues are defined, interpreted and organised. Before sorting out what knowledge is right and what is wrong, relevant and less relevant, we need to ask questions about ‘what is going to count as relevant knowledge in the first place’ (Jasanoff 2003 p. 395). Asking such basic questions is a way to identify framings. In short, what is relevant, for whom and for what reasons?

Table 1 Typology of two main approaches to climate mitigation policy

	Top-down	Bottom-up
Approach:		
Dimension:		
Problem framing	Climate mitigation is a global challenge demanding a global outlook when designing policy responses	Climate mitigation is the sum of technological and behavioural mitigation actions
Guiding policy principles	All resources are scarce, hence mitigation policy targets must be met in a cost-effective way	Mitigation actions must be environmentally effective and lead to planned cuts in emissions
Methodological/analytical approach	Macro-economic model analysis of effects of introducing policy instruments and measures to meet a given target	Sectoral analysis of the potential GHG cuts (and costs) from measures and policy instruments in different sectors which in the aggregate meet a given target
Typical policy tools	Indirect: incentives, typically in the form of economic policy instruments, such as taxes and emissions trading, ‘Stick’	Direct: command-and-control, technological measures and standards, emissions standards, legal instruments, subsidies, R&D. ‘Carrot’
Level/orientation	Sector-overarching, economy-wide (horizontal)	Sectoral (vertical)
Relative strengths (and vice versa relative weaknesses)	Cost-effectiveness	Environmental effectiveness, technology adoption and predictable (direct) emission levels
Technology choice	Technology neutral, the market picks the best technology. Passive state	‘Picking winners’ i.e., choose technologies and give special advantages. Active state
Associated professions/expertise	Economics, rational actor IR theory	Engineering, law, sociotechnical transformation

Environmental effectiveness and cost-effectiveness as principles do not predict certain climate mitigation policies as such; rather, policies and responses are the product of the meaning and importance given to these principles within a specific context of framing.

Framings are simplifications, and simultaneously processes, for creating agreements, and as such they are always in principle open to challenges from alternative framings. This dynamism can be purposefully analysed with the help of the twin concepts of *framing* and *overflows* (Callon 1998). When a frame is stabilised and agreed on, no overflows exist. When a frame is questioned, it overflows and starts leaking, and risks being unable to respond to all relevant questions asked and adapt to its changing environment. The relevance of the frame and the solutions it generates are questioned. In such situations, actors defending the leaking frame often try to seal it by deleting criticism. This is a strategy Latour (1993) calls *purification*, and which Callon argues will increase conflicts.

Overflows are the rule rather than the exception, and proponents of a particular framing put considerable effort into repairing and modifying it behind the scenes so as to present it as stable and pure. The concepts of framing and overflows connect neatly to the seminal notion of *boundary work* (Gieryn 1999). To analyse boundary work means to follow the actors and see how they draw boundaries between different frames or domains of knowledge.

The concept of hybrid management is about coordination between problems, policies and knowledge located within different frames. The focus is on actors and processes, how actors negotiate tensions and coordinate differences in ways that satisfy involved actors. In short, hybrid management means to balance multiple demands (Wehrens et al. 2014, p. 7; cf. Parker and Crona 2012).

In the context of this study, it is important to take a closer look at the boundaries related to the top-down and bottom-up approaches and analyse in what ways they are maintained, supported and contested, and by whom. As analysts, however, we should not assume that hybridisation is better than purification. Rather, the analysis must be performed against the backdrop of what actors want to achieve. Since the Climate Settlement was a hybrid consisting of both top-down and bottom-up ambitions, it is important to analyse how it was developed and implemented, since it inevitably involved management of different framings. The concept of hybrid management implies allowing for a dynamic understanding of the development of national climate mitigation policies. In the following we use the case of Norwegian mitigation policy, and specifically the example of biofuels, to study how the top-down and bottom-up approaches are combined into a hybrid configuration that makes up Norwegian climate mitigation policy.

5 Norwegian climate mitigation policy as assessed by the scholarly literature

In this section, we describe how the two approaches have been characterised in the academic literature analysing Norwegian mitigation policy. Interestingly, most of these studies have an emphasis on Norway as a country where the top-down approach is particularly strong, also when compared with other countries. The bottom-up approach, however, has received comparatively little attention in the literature on Norwegian climate policy.

Norway holds the ambiguous position of being a major petroleum-exporting nation at the same time as it has the largest share of renewables in Europe and strong climate policy ambitions (Boasson and Jevnaker 2019). Oil and gas exploration have led to steadily increasing

emissions and national affluence because the petroleum is for the most part exported. Since 95–99% of Norway's electricity already comes from renewables, the mitigation potential in transforming the electricity system is small. The outcome of this multifaceted dilemma, allowing for a reconciliation of diverse interests, is that international cost-effectiveness has become a dominant principle in Norwegian climate policy (Asdal 2011, 2014; Riksrevisjonen 2010). Since the climate issue is global, it does not matter much where emissions come from or are cut, it is argued (Hovden and Lindseth 2004).

Against this backdrop, a 'thinking globally' discourse evolved (Hovden and Lindseth 2004). The principle of cost-effectiveness emerged on the Norwegian policy scene in 1991 when Norway, as one of the first countries in the world, introduced a CO₂ tax spanning several sectors. Throughout the 1990s, this policy principle gradually developed into *international* cost-effectiveness (Tellmann 2012), which is a key characteristic of the top-down framing. Ever since, international cost-effectiveness has been a guiding principle in Norwegian mitigation policy, combined with a traditional reluctance by the major political parties (Labour and Conservative) to adopt clear domestic and sectoral mitigation targets, which are key characteristics of the bottom-up approach.

Social science scholars studying Norwegian climate policy have given much attention to an 'epistemic community' (Haas 2015) of influential macro-economists in academia, government authorities and ministries (particularly the Ministry of Finance) (Asdal 1998, 2011, 2014; Nilsen 2001). This community has argued for a top-down framing of the climate issue through promoting the argument of (international) cost-effectiveness (Reitan 1998; Andresen and Butenschön 2001; Hovden and Lindseth 2004; Tellmann 2012). The tight connection between economists from the Ministry of Finance, Statistics Norway and the Department of Economics at the University of Oslo has been referred to as the 'iron triangle' (Jomisko 2015). The arguments from this epistemic community formed the backbone of Norway's international ambitions during the 1990s to establish international cost-effectiveness as a global policy principle and the push for the Kyoto Protocol (Asdal 2011). On the other hand, several scholars have also pointed to how these top-down ideas have been contested and watered down in actual domestic policies (Tellmann 2012; Boasson and Lahn 2017; Boasson and Jevnaker 2019), for instance in heavy manufacturing (Reitan 1998; Kasa 2000; Gullberg and Skodvin 2011).

Although tensions between different policy framings have been touched upon in the literature (Hovden and Lindseth 2004; Tellmann 2012; Boasson 2015; Eckersley 2016; Boasson and Lahn 2017; Boasson and Jevnaker 2019), less attention has been given to the bottom-up approach than to the top-down approach. Our ambition is to complement and conceptualise this picture, since there is a lack of studies which in empirical detail demonstrate the hybrid nature of Norwegian climate policy, its reasons, frictions, consequences and future prospects. Empirical evidence, which will be presented below, shows an increasing tendency of hybridisation in Norwegian climate policy.

6 Norwegian climate mitigation policy: bottom-up and top-down

In 1972, Norway was the first country in the world to establish a ministry of environment, and 2 years later, Gro Harlem Brundtland became Minister of the Environment. From 1984 to 1987, Brundtland chaired the World Commission on Environment and Development, which resulted in the well-known report *Our Common Future*, in which the concept of sustainability was coined (Anker 2018). In 1989, under prime minister Brundtland, Norway was the first country in the world to adopt a unilateral climate target (Hovden and

Lindseth 2004) to stabilise national GHG emissions at 1989 levels by the year 2000. In 1995, however, 1 year before Brundtland left office, this national stabilisation target was officially abandoned. The Brundtland era could thereby be described as a period with a strong national focus — including a national target — based on the awareness of global challenges.

In 2005, a new red-green coalition government — consisting of the Labour Party, the Socialist Left Party and the Centre Party — took office and launched its political platform (the Soria Moria Declaration). After pressure from the minority parties (the Socialist Left and the Centre Party), the new political platform included an ambition to introduce sectoral climate mitigation action plans, i.e., a bottom-up approach. In June 2007, the government presented a white paper on climate mitigation including these sectoral mitigation plans. Promotion of biofuels was specifically mentioned as an important measure.

Thus, during one decade, from 1995 to 2005, the top-down approach strongly dominated Norwegian climate mitigation policy. However, this is a shorter time span than is usually recognised. After this period, the top-down approach has still been a point of reference in the public and political rhetoric, but in practice, it has been adapted to bottom-up initiatives and fixed national targets regarding emission cuts both ‘home’ and ‘away’; in other words, a hybrid.

Throughout 2007, the climate issue gradually climbed higher up the political agenda, both in Norway and internationally (Hermansen 2015), and late that year, the political opposition challenged the coalition government to enter into a cross-party parliamentary climate settlement to secure long-term climate policies less vulnerable to changes in government. Part of the motivation was to make sure that Norway did its fair global share of emission cuts domestically and intensified the societal transition to a low-carbon society; in other words, a bottom-up approach was argued for. After tough negotiations both within the coalition government and with the opposition, a climate settlement was agreed by parliament in early 2008 in which politicians decided to cut GHG emissions by 30% by 2020 compared with 1990 levels. Approximately two-thirds of these cuts were to be made domestically, more specifically 15–17 million tonnes CO₂ equivalents (Klimakur 2010 p. 24).

Importantly, the Climate Settlement marked a break with the long-standing Norwegian tradition of avoiding fixed domestic mitigation targets, which is central within the top-down approach, contingent on access to flexible mechanisms abroad. An important argument put forward by, for instance, the two smaller parties in the coalition government, expressed concerns over the environmental effectiveness of existing top-down policies, both internationally and nationally (Norwegian GHG emissions reached an all-time high in 2007; by contrast, Norway’s neighbouring countries and the EU had declining emission curves).

Despite this break, the top-down approach was still clearly reflected in Norwegian policy documents. In the first chapter of the Climate Settlement from 2008 (and in subsequent white papers from 2012, 2015, 2017 and 2021), the overarching principles for Norwegian climate mitigation policy are laid out. The chapter opens by stating the importance of the ‘polluter pays’ principle (e.g. through carbon pricing), implicitly indicating that a top-down economic policy instrument is given primacy (Climate Settlement 2008 p. 1). This is followed up in the next sentence, where the parties agree that climate policy must be arranged in such a way as to yield the ‘greatest possible emissions reduction for the cost’ (ibid.), which implicitly points toward calling for cost-effective cuts abroad. This principle is then violated in a clause stating that climate policy must be geared towards ‘substantial emissions reductions both in Norway and abroad’ (ibid.).

In sum, Norwegian climate policy is portrayed in the Climate Settlement as aiming to combine the two approaches of top-down and bottom-up, but with a clear preference for the former. The bottom-up approach is viewed as a complement which can be employed in the case of market failures or inadequate market information (NOU 2009 p. 98) but also, as seen above, with the aim of achieving domestic cuts. It is, however, important to note that it is not clear from the Settlement how the approaches should be combined.

The same tendencies are easily traceable in subsequent policy documents. In March 2015, the Norwegian parliament approved a new white paper on climate mitigation (White Paper 2015), accompanying Norway's Nationally Determined Contribution (NDC) submitted to the UNFCCC and setting out new climate targets for the period 2020–2030. Briefly put, Norway decided to aim at tying its climate mitigation efforts to the EU system (40% cut by 2030 compared with 1990 levels) without specifying how much would be cut domestically. In both the white paper and the NDC, several bottom-up initiatives are mentioned as important focus areas in Norwegian climate mitigation policy, such as reduced emissions from the transport sector, carbon capture and storage (CCS) and development of low-emissions technologies in the industrial sector. However, Norway also assumes access to flexible mechanisms, either through the EU or UNFCCC, to meet the targets. Norway also makes it explicit that it supports flexible mechanisms in a post-Kyoto agreement i.e., what became the Paris Agreement. In sum, core elements of both approaches are clearly indicated in Norway's 2015 NDC (White Paper 2015).

What has been described above is the official Norwegian climate mitigation policy. However, influential economists from the academic community have been critical to the Climate Settlement, and particularly to the target of cutting two-thirds domestically (Hagem 2012). From this perspective, it is often argued that all GHG emissions should be subject to a maximum uniform (preferably global) carbon price. Double regulation — including, for example, subsidies for technology development and deployment — should ideally be avoided to maximise cost-effectiveness. Intervention in specific sectors may negatively affect the effectiveness of economic policy instruments, and public policy should strive to be technology neutral. Necessary technological development which is not taken care of by the market should ideally be supported by economic instruments such as R&D primarily geared towards international innovation, not domestic business development. A core argument in neo-classical economics, which has been very influential in Norwegian climate mitigation policy, is that the top-down approach ideally should be as pure as possible and not be combined with bottom-up approaches.

In the next section, we will zoom in on the example of biofuels to illustrate, analyse and discuss Norwegian mitigation policy as a contested hybrid of policy approaches.

7 The example of biofuels

Several examples could be used to illustrate the hybrid character of Norwegian climate mitigation policy, such as policies for phasing in more electrical vehicles (EVs) or carbon capture and storage (CCS). However, we have chosen the example of biofuels since this topic is underexplored in scholarship on Norwegian climate policy. Road transport is Norway's third-largest emitting sector, after petroleum extraction and industry. Between 1990 and 2015 emissions from road transport rose by 36.6%. Since then, emissions from the sector have decreased, and biofuels have played a decisive role in the reduction. Biofuels have a direct, immediate and demonstrable effect on reduced

emissions in Norway, but they are also controversial regarding effects on global emissions (environmental effectiveness), sustainability and cost-effectiveness, and thus are suited to illustrate the tensions between bottom-up and top-down concerns, not least the hybrid zones where these concerns meet.

Biofuels were explicitly mentioned by the red-green coalition government in its 2005 political platform, which stated that the government would ‘initiate an introduction programme for use of biofuels in line with EU Directive 2003/30/EC’ (Soria Moria Declaration 2005 p. 25, authors’ translation). The first step in realising the government’s ambitions for biofuels came with the revised national budget in spring 2006. Starting from 2007, bioethanol would be exempted from road-use tax and CO₂ tax (St.meld. 2006 p. 68), like biodiesel, which was made exempt from road-use tax and CO₂ tax in 1991 (Fevolden and Klitkou 2017 p. 8). This was an intervention in a top-down policy instrument (tax) for the purpose of supporting specific technologies, and as such was incompatible with a pure top-down framing. The motivation for the 2006 road-use tax exemption for bioethanol was to reduce GHG emissions from the transport sector by increasing the share of biofuels in transportation, since combustion of biofuels is accounted as climate neutral in the Kyoto Protocol (St.meld. 2006 pp. 75–76).

The move to increase the share of biofuels was followed up in a white paper on climate policy presented in June 2007. The basis for this white paper was an official Norwegian report titled *A Climate-Friendly Norway*, which had been commissioned by the previous minister of the environment from the bottom-up friendly Christian Democrats. The red-green government, which took seat in October 2005, thus ‘inherited’ this bottom-up report from the previous government and started preparing a white paper. In the white paper, the government declared it would initiate hearings for a proposed regulation stipulating that at least 2% of annual fuel sales should be biofuels with effect from 2008 and should rise to 5% in 2009, with further progression from 2010 (White Paper 2007 p. 69). When the opposition and the government negotiated a climate settlement based on the white paper, they agreed on this proposal (Climate Settlement 2008 p. 8). A regulatory measure took effect in April 2009 requiring biofuels to constitute 2.5% of total fuel sales (Fevolden and Klitkou 2017 p. 7), known as a minimum proportion target for biofuels. In other words, there was cross-party consensus to phase in biofuels in the transport sector using bottom-up measures. In addition, as a consequence of the Climate Settlement, the mitigation potential in the transport sector was to undergo a more thorough assessment in a report titled *Klimakur 2020* (Climate Cure 2020, hereafter CC).

An important aim of the CC initiative was to apply and combine both bottom-up and top-down methodologies. The CC report, published in 2010, produced the most thorough and integrated knowledge assessment to that date in Norwegian climate mitigation policy. In the following, and in the light of the two approaches, we study how biofuels are treated in the CC report as well as more broadly in the governmental system, and focus on what combinations were achieved in practice.

7.1 Bottom-up biofuels...?

In the CC report, biofuels were listed as the measure that could deliver the largest and quickest emissions reductions in the transport sector (Klimakur 2010 pp. 80–117). More precisely, the report identified a mitigation potential in the transport sector of 3–4.5 million tonnes of CO₂ equivalents by 2020 compared with 1990, more than the targets in the Climate Settlement (2.5–4 tonnes), but it stated that ‘this requires very strong policy instruments,

large investments and/or transfers and strong political will' (Klimakur 2010 p. 80, authors' translation). The report discussed whether the CO₂ tax (i.e., a top-down policy instrument) would be set at a high enough level to alter transport behaviour (Klimakur 2010 p. 111), and acknowledged that a minimum proportion target, i.e., a sectoral bottom-up regulation, may be needed to obtain substantial emission reductions, partly because the environmental effectiveness of this bottom-up regulation is more certain (Klimakur 2010 p. 116).

The most common way for fuel retailers to meet a minimum proportion target is to blend biofuels into conventional fuels. The CC report presents blending of biodiesel as the bottom-up measure that can yield the largest GHG reduction (Klimakur 2010 p. 89). Such bottom-up regulations, however, are usually considered less cost-effective than a top-down approach such as a CO₂ tax (Klimakur 2010 p. 111). A minimum proportion target implies picking a winner and indirectly subsidising this alternative by giving it special advantages in the form of a guaranteed share of the market, regardless of whether it is commercially competitive or not. Similarly, lifting taxes from a subset of commodities, such as removing road-use tax from biofuels while keeping taxes on conventional fuels, is also considered an indirect subsidy, since biofuels are given special market advantages. This measure, however, is not discussed explicitly in the CC report.

7.2 ... or top-down taxes?

In May 2008, in parallel with the ongoing CC process, an official Norwegian report was commissioned by the Ministry of Finance (FIN), which is widely known as one of the foremost proponents of a top-down approach (Asdal 2014). The FIN report can be seen as a counter-report to the previous official Norwegian report on climate mitigation policy from 2006 (NOU 2006; see Jomisko 2015), which largely had taken a bottom-up approach, and consequently was strongly criticised by top-down proponents for being overly optimistic about technology and too little concerned with international cost-effectiveness (Bruvoll et al. 2007 p. 8).

The FIN report (released in June 2009) discusses the advantages and disadvantages of the two methodologies. However, it soon becomes clear that it basically takes a strong stance in favour of a top-down framing: 'Since a sufficiently tight cap on a quota system (or similar taxes) fully regulates the negative external impact related to GHG emissions, subsidies are a weaker alternative for dealing with this external impact' (NOU 2009 p. 98, authors' translation). In other words, economic policy instruments are considered the first and best alternative, while subsidies are considered suboptimal. However, it is acknowledged that in special cases bottom-up instruments may sometimes be needed to handle deficiencies, or leaks, in the top-down framing.

From the top-down perspective, it is generally considered better to 'tax the bad' than to 'subsidise the good'. Subsidies in one sector may have unintended consequences in other sectors or abroad and may eventually undermine the original intentions of the subsidy. Top-down approaches generally can be applied with greater precision than bottom-up approaches, it is argued. Biofuels are explicitly mentioned as an example of how sectoral models are unable to consider unintended effects across sectors:

Central effects that are not taken into account in micro models [bottom-up] can for example be that the increased use of biofuels causes increased use of labour and land, which in turn could lead to a shortage of labour in other sectors and rising food prices. (NOU 2009 pp. 31–32, authors' translation)

The regulatory measure of a minimum proportion target of 2% biofuels is explicitly mentioned as a subsidy:

For example, it can be argued that the requirement on fuel retailers that biofuels should account for a certain percentage of total fuel sales is equivalent to a subsidy on the use of biofuels and an additional tax on fossil fuels. (NOU 2009 p. 112, authors' translation)

Hence, although the report does not explicitly criticise the Norwegian biofuels policy after the Climate Settlement, the policy is implicitly portrayed as a suboptimal arrangement because its effects on the climate and the environment are unclear (potentially leading to increased tropical deforestation and/or having negative impacts on food production), it scores low on cost-effectiveness (because it is essentially a form of indirect subsidy, simultaneously limiting the potential of a pure top-down approach), and it does not contribute substantively to R&D with an international innovation potential.

To sum up, in 2010 Norwegian politicians had to deal with two diverging assessments: the CC report commissioned for introducing more bottom-up initiatives and the FIN official Norwegian report basically arguing for the top-down approach. More specifically, the CC report portrayed the promotion of biofuels as the measure with the greatest mitigation potential in the transport sector, and therefore in need of strong policy instruments and of indirect subsidies to release its potential, while the official Norwegian report warned against the use of subsidies and policy actions that undermined cost-effectiveness, the prime principle in the top-down approach. According to several of our informants, the decision to place the CC report at directorate level was made so as not to make it 'too politically binding', while the opposite was the case for the official Norwegian report, which was commissioned at ministry level. As a result of strong disagreements between opposing factions in the governmental apparatus, the announced white paper on Norwegian climate policies was delayed 4 times over the course of more than 2 years. However, in the meantime, Norwegian biofuel policy was to undergo substantial changes, directed by both top-down and bottom-up initiatives.

7.3 A contested mix of instruments

When the draft national budget for 2010 was released in November 2009, just before the CC report and the FIN official Norwegian report were published, the red-green coalition government proposed reintroducing the road-use tax on biodiesel (at half the rate of fossil diesel, and with the ambition to increase it to the full rate in 2011). Thereby, the government proposed to reintroduce a top-down policy instrument that had not been in effect since being exempted in 1991. The road-use tax exemption on bioethanol, on the other hand, was upheld; a decision which the state secretary in FIN implicitly admitted was illogical (Aabakken 2009). At the same time, the minimum proportion target for biofuels, a bottom-up regulation, was increased to 3.5%, in line with recommendations from the Norwegian Pollution Control Authority (now the Norwegian Environment Agency). In addition, NOK 140 million was set aside to further intensify R&D efforts on green technologies, whereby 100 million NOK were earmarked for R&D on second-generation biofuels (Fevolden and Klitkou 2017 p. 7).

The argument used by FIN and other top-down proponents for reintroducing the road-use tax on biodiesel was that biofuels caused just as much harm in the form of traffic noise, accidents, congestion, road erosion and local air pollution as fossil fuels, and therefore should be taxed the same. Fiscal arguments were also made, for example that fuel taxes were an important source of

income for the state. In contrast to all political parties except the Labour Party, FIN claimed that the decision would not contradict the decisions made in the Climate Settlement. Furthermore, FIN argued that the positive climate effects of biofuels were promoted through the CO₂ tax exemption, which had been introduced in 1991 for biodiesel and in 2007 for bioethanol. The decision to reintroduce road-use tax on biodiesel and simultaneously increase the share of biofuels to 3.5% of the total shows the two different approaches at work at the same time.

These changes provoked much political discussion, since reintroducing the road-use tax on biodiesel would make biodiesel less competitive than fossil diesel. The Socialist Left Party and the Centre Party were against the reintroduction of the tax but were pressured by the largest party in the coalition, the Labour Party, to vote for the reintroduction of the tax, although in reality the majority of the parliament was against. This quote from the financial spokesperson for the bottom-up friendly Liberal Party largely sums up the criticism:

This is pure symbol politics. It reinforces an illogical and shaky policy of the Government. (...) The Climate Settlement clearly states that the alteration of vehicle taxes, fees and other regulatory measures in a greener direction should continue in order to affect road traffic and promote low- and zero-emission alternatives. The Government's proposal to tax biodiesel violates these obligations. (Gjestad 2009, authors' translation).

The day after the decision was made in parliament, Bjart Holtsmark from Statistics Norway, a vocal top-down proponent, published an op-ed in Norway's largest daily newspaper strongly supporting the decision to reintroduce the road-use tax on biodiesel and criticising the decision to increase the mandatory share of biofuels to 3.5% (Holtsmark 2009).

In March 2012, the white paper based on the CC report was finally released, after having been delayed 4 times due to disagreements on the approaches in the governmental apparatus. After another tough round of negotiations in parliament, the 2012 Climate Settlement was finally accepted. The main points in the 2008 Climate Settlement were sustained, including the two-thirds domestic target, although a possibility to postpone *when* the targets would be met was built in (Hagem 2012).

About 4 years later, the biofuel policy was changed again, this time by a minority right-wing government consisting of the Conservatives and the Progress Party. In January 2016 the road-use tax on biodiesel was lifted once again (but only on biofuels beyond the minimum proportion target). Simultaneously, the minimum proportion target of biofuels was increased to 5.5% of total fuel sales. In December 2016 — in an attempt to pass the draft national budget through parliament amidst a fierce debate about transport emissions and taxation — biofuel ambitions reached an all-time high: by 2020, biofuels were to constitute 20% of Norwegian fuels, whereby 8% should be advanced biofuels fulfilling the EU sustainability criteria for biofuels. The reason behind this move was essentially that Norway was not on track to reach its domestic climate targets for 2020. Consequently, the bottom-up framing was once more enhanced. In the latest 2021 white paper on climate mitigation policy, the government proposed to increase the minimum proportion target for road transport so that the amount of biofuels is kept at the same level towards 2030 (Table 2).

8 A contested hybrid: Norwegian climate mitigation policy post-Paris

Since 2009, there has been a distinct tendency to increasingly use bottom-up regulations to phase in a relatively larger share of biofuels in Norway, the prime measure being a steadily increasing minimum proportion target. The story for top-down instruments is however more complex. In the period from 1991 to the present, the road transport sector has been

heavily regulated by top-down instruments such as CO₂ tax and road use tax. Simultaneously, there has been a fierce debate about exemptions to these taxes for biofuels. Particularly, the 2010 reintroduction of the road use tax on biodiesel caused a debate lasting several years. In 2015 this decision was largely reversed (keeping the road tax only on the minimum proportion target), while from July 2020 the road use tax was fully reintroduced on all biofuels for road transport in a move to curb the use of unsustainable palm oil triggered by the 2015 road use tax relief.

The bottom line is that biofuels are given sectoral advantages while the road transport sector is regulated using economic top-down policy instruments. The case of biofuels is a clear example of how Norwegian climate mitigation policy has been increasingly hybridised over the past decade.

However, as shown above, this hybridisation has also led to friction between the two approaches, with experts, institutions and politicians lining up on opposing sides. Furthermore, some economists, as pure top-down proponents, continue to argue that increased use of bottom-up measures to cut emissions, such as minimum proportion targets and indirect subsidies (i.e., tax exemptions), may counteract central top-down policy principles, such as limiting GHG emissions on a global scale, and have other adverse effects, such as on food security.

The increasing hybridisation of Norwegian mitigation policy may also be illustrated by several other examples, for instance policy schemes for electric vehicles (EVs). A generous incentive scheme for EVs (Fridstrøm 2021) has resulted in Norway having one of the world's largest EV concentrations per capita, currently about 9% (AFP 2021). In 2020, about 50% of new cars sold were EVs, and Norway's EV policies are garnering international attention (Fridstrøm 2021). However, the scheme also has its critics. For instance, the economist Bjart Holtmark from Statistics Norway has argued that the subsidy scheme is 'not very well thought out' (AFP 2021) as it is costly and may have unintended consequences in terms of favouring inefficient vehicles and causing noise and local air pollution, similar to the criticisms of biofuel subsidies.

The two examples of biofuels and EVs illustrate the increasing hybridisation of Norwegian climate mitigation policies over the past decade. At the same time, the examples illustrate how influential top-down proponents are reluctant to accept some core dimensions in the bottom-up approach, such as domestic and sectoral targets and policies. Ideally, they want to stay pure. According to Boasson (2013), central top-down proponents in FIN never took the two-thirds target seriously, and in the 2009 FIN official Norwegian report, there is evidence that the two-thirds target is explicitly questioned (NOU 2009 p. 90). In the following year, 2010, the Office of the Auditor General concluded that so far the contribution from the top-down policy instruments had only made a 'limited' contribution to curbing emissions (except for the petroleum sector) and that ministries paid inadequate attention to their sectoral climate mitigation responsibilities, and also raised concerns regarding 'severe challenges' in the interdepartmental work on climate mitigation (Riksrevisjonen 2010 p. 21). In sum, this highlights a problem of communication between different frames or, in other words, a lack of institutional arrangements (hybrid forums) for hybrid management.

In terms of the notion of *purification*, we can understand the economists as performing *boundary work* — arguing for a pure top-down approach that ideally should remain free from bottom-up interventions. Seen from this perspective, the scholarly analysis of Norwegian climate change mitigation policy (e.g. Asdal 2014) is correct when it identifies an epistemic community of economists possessing consensual knowledge and influencing policy, guided by the top-down approach. This community is visible in public discussions and has a tradition of influencing politics through its close connection to FIN. However, in

Table 2 An overview of key Norwegian policy decisions regulating biofuels in light of the two main approaches to climate mitigation policy

Approach:	Top-down	Bottom-up
Period:		
1991–2006	Biodiesel: exempt from road use tax and CO ₂ tax Bioethanol: road use tax and CO ₂ tax	Biofuels: no minimum proportion target
2007–2009	Biodiesel: exempt from road use tax and CO ₂ tax Bioethanol: same as biodiesel	Biofuels: 2008: 2% minimum proportion target 2009: 2.5%
2010–2015	Biodiesel: road use tax, exempt from CO ₂ tax Bioethanol: exempt from road use tax and CO ₂ tax	Biofuels: 2010: 3.5%
2016–2020	Biodiesel: exempt from road use tax <i>except</i> on the minimum proportion target (i.e., road use tax only on the minimum proportion target). Fully exempt from CO ₂ tax Bioethanol: same as biodiesel	2011: 5% (contingent on access to sustainable biofuels) Biofuels: stepwise increase to 20% by 2020 (advanced biofuels double counted) 2016: 5.5%
2021→2030	Biodiesel: road use tax on all biodiesel in road transport, exempt in construction, shipping and aviation Bioethanol: same as biodiesel From 2022: reduced rate on road use tax on biofuels in road transport compared with fossil fuels Fully exempt from CO ₂ tax	2017: 7% (whereby minimum 0.75% advantage biofuels <i>which are double counted</i> = 1.5%) 2018: 10% (whereby minimum 1.75% advanced biofuels = 3.5%) 2019: 12% (whereby minimum 2.25% advanced biofuels = 4.5%) 2020: 20% (whereby minimum 4% advanced biofuels = 8%) Biofuels: increase the minimum proportion target for road transport so that the amount of biofuels is kept at the same level towards 2030 (advanced biofuels double counted) 2021: 24.5% (whereby minimum 4.5% advanced biofuels = 9%)

practice this purified top-down position is a thing of the past, but remains as a rhetorical strategy from top-down proponents. In sum, we observe that the political initiative resulting in the 2008 Climate Settlement has led to bottom-up initiatives and hybridised policies. Several of these policies have been opposed by economists but overruled by politicians (see also Tellmann 2012).

The situation for constructive *hybrid management* has however not been ideal. There has been a lack of stable institutional arrangements to productively handle what was agreed in the Climate Settlement and to translate the key report Climate Cure 2020 into practical policies and simultaneously dealing with the criticism from economists inside and outside of FIN. The bottom-up initiatives have not been the result of deliberative negotiations between competing models leading to agreed hybrid instruments. Instead, entrenched positions have been protected and a kind of flip-flop (either-or) thinking continued. Both the Climate Settlement and Climate Cure 2020 quickly came to be seen as bottom-up initiatives (Moe 2010) and criticised as such by economists (NOU 2009; Hagem 2012). Some economists in this epistemic community have a long tradition of being involved in producing important official Norwegian reports, and more recently of dismissing the ambitions of the Climate Settlement. Powerful ministries and government authorities have protected the top-down approach rather than forming productive relationships and creating new combined policy instruments or policy packages (cf. Miller 2001 p. 487; Sundqvist 2011; Sundqvist et al. 2015). In short, the lack of space for constructive hybrid management within Norwegian governmental institutions has led to unfruitful conflicts and blocking of initiatives. Fevolden and Klitkou (2017 p. 1) report that the main cause of Norway's failure to develop a viable biofuel industry is 'inconsistent and unpredictable government incentives'.

Against this background, Norwegian climate mitigation policy could be characterised in the following way: (i) an ambition from the majority of parliament and governments to expand the bottom-up framing institutionalised by the Climate Settlement; (ii) attempted purified management by top-down proponents who influence policy through important assessments, reports and practical policymaking; (iii) a more blurry professional community behind the bottom-up approach (the Norwegian Environment Agency — responsible for Climate Cure 2020, environmental NGOs and sectoral industry interests focusing on specific technologies); (iv) lack of deliberative regulatory space (hybrid forums) for negotiating the two different approaches and the manifold policy options; (v) due to lack of support from the broader context, including top-down proponents critical towards hybrid arrangements, CC failed to become a forceful hybrid forum; (vi) on a practical level there are manifold policy options based in both approaches, but due to conflicts on principles they have never been assessed and supported from a truly 'hybrid' practical policy perspective; and (vii) the entrenched discussion continues without embracing the fact that Norwegian mitigation policy is a hybrid.

In sum, the political ambition for the Climate Settlement was clearly to expand the bottom-up framing, which was followed up through Climate Cure 2020 with a menu of policy options. However, we argue that these hybrid initiatives stranded because the government failed to cultivate a deliberative hybrid forum, for instance through a joint white paper from the Ministry of Finance, the Ministry of Environment and other relevant ministries. Such a hybrid joint venture could have merged the silos between different framings — including actors, institutions, policy principles and expertise — and resulted in more stable long-term policy signals. Instead, as shown by the example of biofuels, the failure to establish a truly hybrid forum has led to unstable policies, unclear steering signals and failed targets. The ambitions in the Climate Settlement, which were followed up through the Climate Cure, were neither supported nor handled in an adequate way. The tensions between the two approaches have never been reconciled.

8.1 Coda

Norway did not meet its domestic mitigation targets for 2020 and now aims for the 2030 targets to be met jointly with the EU. On the one hand, the 2018 white paper underpinning the joint agreement with the EU implies a reinforcement of the bottom-up approach, as Norway will face tough annual cuts in non-ETS sectors such as agriculture and transport. On the other hand, the EU agreement implies a reorientation towards the top-down framing (Christensen 2018) since the EU agreement opens for full flexibility also in non-ETS sectors, similar to the ETS. In other words, Norwegian mitigation policy post-Paris is more hybridised than ever.

The open question is to what degree Norway will use these flexible mechanisms. The previous centre-right government stated in its political platform from January 2019 that flexibility in non-ETS would only be applied ‘if strictly necessary’ (Granavolden platform 2019). Interestingly, however, neither the 2018 white paper nor the 2019 government platform contained any sharp quantified domestic mitigation targets, neither in ETS nor non-ETS. That said, in May 2019, the same government commissioned a new assessment of policy instruments and measures for how Norway could meet its 2030 obligations in non-ETS sectors *domestically* — called Climate Cure 2030. The group of institutions involved was similar to that for Climate Cure 2020 (excluding the Norwegian Petroleum Directorate), but the mandate differed in that it only focused on non-ETS sectors. The resulting 2021 white paper, however, also covered ETS but primarily focused on non-ETS sectors.

The parliamentary processing of the 2021 white paper reinforced the hybrid nature of Norwegian climate policy: broad support for top-down policy instruments such as the ETS combined with a steep and stepwise increase in the CO₂ tax and no fixed domestic targets, combined with several bottom-up domestic measures, such as increasing the minimum proportion target for road transport so that the amount of biofuels is kept at the same level towards 2030, a wider sectoral scope for biofuels (construction, shipping and aviation) and continued subsidies for EVs. In October 2021, a new centre-left Government consisting of Labour and the agrarian Centre Party took seat and introduced a political platform stating a *domestic* economy-wide goal of 55% GHG reductions by 2030 compared with 1990. Simultaneously, the full climate mitigation cooperation with the EU was continued, meaning that all top-down ‘security valves’ — that is, options for cutting abroad through flexible mechanisms — were kept intact in the platform. Their potential use (or non-use) was not specified. At the same time, it is clear that Norway will have to rely on international flexible mechanisms to reach its goal of climate neutrality by 2030. Pure top-down proponents would likely argue that such a hybrid is not optimal and rather argue for a pure top-down approach. There is much to suggest that hybrid management, particularly deliberative and influential hybrid forums, seem elusive — and could also be perceived as unnecessary from some actors’ perspectives. However, from our theoretical position, such a situation is fragile since it carries the risk that new sterile and unproductive conflicts between approaches may evolve instead of reconciling, balancing and compromising different demands through deliberate hybrid management.

9 Conclusions

In this paper, we have analysed developments in Norwegian climate mitigation policy over the past 15 years by using two main approaches to climate mitigation as analytical pillars: top-down and bottom-up. We have treated these approaches as ways of dealing with

the same issue: how to mitigate GHGs. Our analysis has particularly focused on a specific point in time when the bottom-up framing was expanded by a new coalition government leading to a parliamentary climate settlement in 2008 and marking a shift in the Norwegian tradition of favouring the top-down approach. The shift was mainly politically driven, but was soon contested by critical voices within the government, primarily the Ministry of Finance (FIN). Two important reports were produced in the process following from the Climate Settlement: Climate Cure 2020 from 2010, which was supposed to integrate the two approaches, and the official Norwegian report from 2009, commissioned by FIN, which was essentially a strong argument for the top-down approach. Ultimately, policy-makers were handed two diverging reports almost simultaneously. The outcome of this whole process, as evidenced in subsequent white papers, is that the bottom-up approach has been expanded at the same time as top-down policy instruments, such as carbon taxes and emissions trading, remain of central importance.

This shift in Norwegian mitigation policy, from a dominant top-down approach to a contested hybrid in which bottom-up initiatives such as regulations and subsidies to specific technologies are mixed with top-down instruments, has not received adequate analytical attention in the scholarly literature. These significant changes started taking shape already a decade before the Paris Agreement. Post-Paris, it is of crucial importance to focus on how individual nations are dealing with their national ambitions. Norway, being well known internationally for its adherence to a global top-down approach and focusing on international cost-efficiency, is of special interest in this respect. We have used the example of biofuels to illustrate the political efforts to combine the two approaches based on the ambitions set out in the 2008 Climate Settlement.

Overall, our analysis shows that over the past 15 years Norway has taken a more bottom-up approach than previously recognised in the literature. A clear trend since 2005 is that the top-down approach has in practice been weakened, since several bottom-up measures have been implemented and sustained. However, in white papers, public discussions and scholarly works, the top-down approach still holds an important position in presenting and protecting what is interpreted by many as the official Norwegian approach to mitigation policy. Economists, the main epistemic community behind this approach, have long argued for keeping this approach as pure as possible. Similarly, some bottom-up proponents have argued for a pure bottom-up approach. We argue that such purification risks hampering progress, both for Norway and for the climate, and conclude that there is need to create more deliberate hybrid regulatory space for constructively negotiating the two approaches. The situation of not negotiating and instead arguing for purified positions may lead to unstable policies, unclear steering signals and more missed targets and opportunities.

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Author contribution EATH led the study and worked on conceptualisation, data collection, analysis, and conclusions. GS worked on conceptualisation, analysis, and conclusions.

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Data availability The interview dataset generated during and/or analysed during the current study is not publicly available due to GDPR, and interviews have been conducted under the condition of anonymity. Publicly available data may be made available from the corresponding author on reasonable request. All data except interviews are publicly available; see references.

Code availability Not applicable.

Declarations

Competing interests The authors declare no competing interests.

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