

Implementing the EU 2020 Energy and Climate Package in Germany

Green Champion Struggling to Adapt

Per Ove Eikeland



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December 2014



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Title

Implementing the EU 2020 Energy and Climate Package in Germany: Green Champion Struggling to Adapt

Publication Type and Number

FNI Report 9/2014

Pages

101

Authors

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ISBN

978-82-7613-684-5

ISSN 1893-5486

Abstract

This report examines Germany's implementation of the EU climate and energy policy package to attain 2020 goals: the extent to which and how these policies have been implemented to date. Germany has seen mixed implementation performance. Transposition was completed with delays for the CCS Directive and the adoption of national implementation measures under the ETS. The Renewable Energy Directive was transposed on time, but national policies and measures became contested, with repeated calls for reform. Rapid growth in renewable electricity means that Germany was on track to meet its main Renewable Energy Directive target, despite a halt in progress for renewable heat and a setback for renewable fuels in transport (not on track to meet the 10% renewables share for transport fuels). Germany was not on track as regards meeting its obligations for reducing GHG emissions, reflecting increased use of coal for electricity generation and implementation problems for policies targeting the major non-ETS sectors of transport and buildings. Our analysis shows that misfit in what Germany wanted and what was decided at the EU level does not provide a good explanation for implementation problems. The EU package design fitted well with Germany's policy preferences. Domestic politics has proved important. Implementation problems variously reflected horizontal and vertical fragmentation in the politico-administrative apparatus. State-level governments with co-decision powers were instrumental in curtailing measures proposed by the federal-level government, thus acting as a veto player. A consensual policymaking style with broad consultation dominated German energy and climate policy in the implementation period. This provided no guarantee for smooth implementation when underlying interests and opposition were strong. German implementation included a packaging approach aimed at levelling costs and benefits between the states and societal groups and thus reducing conflict. This facilitated implementation of parts of the package, but was insufficient to overcome opposition against other parts of the package.

Key Words

Germany, EU, climate policy, energy policy, EU climate and energy package, implementation

Acknowledgements

The author thanks Inga Ydersbond, Jon Birger Skjærseth, Lars H. Gulbrandsen and Torbjørg Jevnaker for their constructive comments in preparation of this report. Financial assistance from the Research Council of Norway, Grant. No. 199883/ECpack (ENERGIX) and No. 209701/CICEP-Centre for Social Science-Related Energy Research is also gratefully acknowledged. Thanks to Tanja Knittler (the German Embassy in Oslo), Hanne Marit Grønning Strand (the German-Norwegian Chamber of Commerce in Oslo), and Dieter Kunhenn (BMW) for assistance in establishing contacts in Germany, and the German Foreign Office for the invitation to meet with experts under the Energiewende visitor programme. The author is grateful for being well received by representatives of German government, industry, NGOs and academia when conducting interviews for the study.

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List of abbreviations

B100	100% biodiesel
BAT	Best Available Technology
BDBE	Bundesverband der deutschen Bioethanolwirtschaft e.V.
BDEW	Bundesverband der Energie- und Wasserwirtschaft e.V.
BDI	Bundesverband der Deutschen Industrie e.V.
BEE	Bundesverband Erneuerbare Energie e.V.
Biokraft-NachV	Verordnung über Anforderungen an eine nachhaltige Herstellung von Biokraftstoffen
BioSt-NachV	Verordnung über Anforderungen an eine nachhaltige Herstellung von flüssiger Biomasse zur Stromerzeugung
BML	Bundesministerium für Ernährung und Landwirtschaft
BMUB	Bundesministerium für Umwelt, Naturschutz, Bau und Reactorsicherheit
BMVI	Bundesministerium für Verkehr und digitale Infrastruktur
BMWi	Bundesministerium für Wirtschaft und Energie
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
CCS	Carbon Capture and Storage
CDU	Christlich Demokratische Union Deutschlands
CHP	combined heat and power
CSU	Christlich-Soziale Union in Bayern
DEHSt	Die Deutsche Emissionshandelsstelle
DIHK	Deutscher Industrie- und Handelskammertag
E10	Petrol fuel blend (10% ethanol)
E5	Petrol fuel blend (5% ethanol)
EEA	European Environment Agency
EEG	Erneuerbare-Energien-Gesetz – the Renewable Energy Sources Act
ETS	Emissions Trading System
FDP	Freie Demokratische Partei
GHG	Greenhouse Gas

GW	gigawatt
GWh	gigawatthours
IEA	International Energy Agency
IECP	Integrated Energy and Climate Programme
ILUC	indirect land-use changes
KfW	Kreditanstalt für Wiederaufbau
kW	kilowatt
kWh	kilowatthours
MW	megawatt
NAP	national allocation plan
NGOs	nongovernmental organisations
NIMs	national implementation measures
NREAP	National Renewable Energy Action Plan
PAMs	Policies and Measures
PV	photovoltaic
RED	Renewable Energy Directive
SPD	Sozialdemokratische Partei Deutschlands
SWP	Stiftung Wissenschaft und Politik
tCO ₂	tonnes CO ₂
TEHG	Treibhausgas-Emissionshandelsgesetz
toe	total oil equivalents
VDA	Verband der Automobilindustrie
VDIK	Verband der Internationalen Kraftfahrzeughersteller e.V.
VDMA	Verband Deutscher Maschinen- und Anlagenbau e.V.
VKU	Verband Kommunalen Unternehmen e.V.

1 Introduction

In 2007, Germany agreed to the EU 20–20–(20) climate and energy targets in the European Council of heads of state and government: 20% cut in total GHG emissions (compared to 1990), a supply mix with higher shares of renewable energy (20%) and cuts in consumption through higher energy productivity (20%) – all by the year 2020. In December 2008, Germany also agreed to a package of binding policies for achieving these targets. The core of this package, formally adopted in 2009, included a directive revising the EU Emissions Trading System (EU ETS) covering large industrial emitters; a decision on effort-sharing among member states for sectors not covered by the EU ETS; a directive promoting renewable energy sources; and a directive establishing the world’s first legal framework for safe carbon capture and storage (CCS). Additionally, a Fuel Quality Directive and a regulation setting standards for new cars aimed specifically at emissions reductions for the transport sector.¹

These targets and policies were to be implemented between 2009 and 2020, as a first step towards decarbonizing the EU by 2050². In late October 2014, the European Union adopted a framework for continuing the transformation process. New interim energy and climate policy targets were adopted for 2030. More specific EU policy instruments will now be negotiated, and experience gained from implementing the 2020 package will be important for the further design. Implementation studies are thus timely.

This study analyses implementation in Germany where national targets adopted before the 2020 package were more ambitious than those that were collectively negotiated and decided at the EU level. This champion role led us to expect good implementation performance in Germany – an expectation that the present study confirms only partly. We find cases of delays in transposition; disputes with the European Commission over national implementation measures; and foot-dragging by Germany in EU-level implementation of follow-up policies. Shifting the focus to *application* or implementation on the ground – observed behavioural change among groups targeted by regulations – we also observe a mixed picture. By 2014, halfway to 2020, Germany was on track to meeting its renewable energy target, largely because of high investments in renewable electricity. It was not, however, on track as regards meeting its target under the Effort-Sharing Decision. As to developments within the ETS sectors, increases in the share of coal-based power in the German market broke with the long-term trend of falling German GHG emissions and worried German politicians and policy analysts that 2020 climate targets could be missed.

¹ Policies on energy efficiency were adopted according to a different time schedule. In 2012, the EU adopted the Energy Efficiency Directive. Implementation of this Directive has not been focused in this study.

² In October 2009, the European Council, including Germany, agreed to support an EU goal to reduce GHG emissions between 80 and 95% by 2050 compared to 1990 levels (European Council, 2009).

Analysing implementation performance for individual parts of the EU package constitutes a first step towards the chief aim of this study: to explore *whether and how implementing a package of conjoined energy and climate policies affected implementation performance*. Did the ‘package approach’ at the EU level improve or impede implementation performance in Germany, or did it have no impacts at all?

The literature offers few studies of implementation of conjoined EU energy and climate policies and whether/how larger packages of policies makes a difference for implementation performance. However, earlier studies focusing on single policies or comparing implementation performance for various same-sector policies in Germany can provide useful theoretical and empirical background information for this analysis, as presented in the next section.

This study has applied a case-study design with process-tracing and pattern-matching as key analytical techniques. Data sources include national and international statistical databases, national and international newspapers/newsletters, governmental publications, a series of focused expert interviews (see list at the end of the report), and relevant academic studies. Multiple data sources have been applied for cross-verification of data.

2 Analytical framework

2.1 National implementation of EU policy

‘Policy implementation’ in our context refers to what happens after a bill becomes law at the EU level, i.e. the full process of translating law into action (see Treib, 2008; Bardach, 1997). EU member states have here main responsibility, while EU legislation can also prescribe implementation measures to be adopted by comitology at the EU level. Implementation at the national level will take various forms, depending on the type of EU policy instrument to be implemented. EU directives lay down certain goals that must be achieved in every member state. The national authorities are required to adapt their laws within a specified date, but are free to decide how to do so as long as their legislation indicates how goals are to be achieved. National authorities adopt official texts to incorporate directive provisions into national law, and transmit them to the European Commission for scrutiny and approval. If these are approved, the member states have formally transposed the directive. In contrast to directives, EU regulations have binding legal force on individuals throughout every member state as soon as they are passed. National *governments* do not have to take action themselves to transpose EU regulations. An EU decision may require authorities and individuals in member states to do something or stop doing something, and may also confer rights on them. EU decisions are addressed to specific parties and are fully binding.

Implementation at the national level can be conceived as of as a stage-based process. For EU directives, the formal transposition process typically involves national governments (and administrations) preparing and proposing transposition measures in the form of amendments to or new laws, policies and measures (PAMs) complying with demands under EU legislation. Next, national legislators (typically parliaments) will, if necessary, discuss and enact the new laws. This finalizes the formal transposition process (legal incorporation), if the outcome is accepted by the European Commission. After such acceptance, implementation at the national level may or may not continue with the adoption of additional follow-up policy measures aimed at assisting compliance (or over-compliance) with the goals set in EU legislation. National administrations at various levels, depending on the distribution of competencies, will be involved in policy development and enforcement, ensuring that target groups change their behaviour as required, by applying national laws and regulations (Treib, 2008). Such application constitutes the ultimate test of national implementation performance. That said, behavioural change may also occur independent of EU policy implementation – for instance, if societal practices already conform to the status required; or it may, on the other hand, not necessarily result in compliance with EU law (Raustiala, 2000). Non-compliance may (or may not) lead to follow-up rounds of revising and adding new national policies and measures.

This study focuses on the implementation of a package of policies adopted in 2009 consisting of four directives, one regulation and one decision. The end-point for full validation of behavioural change is the

year 2020, so a complete assessment of application cannot be made until then.

2.2 Explaining implementation performance

Goodness of fit

EU implementation theory literature offers various approaches to explaining national implementation performance. Recurrently applied is the ‘goodness of fit’ framework, which essentially focuses on how the relationship between EU demands and the national policy legacy creates more, or less, pressure on the member states to adapt. The framework is based on the historical/sociological institutionalist-derived assumption that the ‘stickiness’ of deeply entrenched national policy traditions and administrative routines will function as institutional filters for EU-initiated reforms (Treib, 2008). Essentially, the ‘goodness of fit’ hypothesis assumes that domestic governments, administrations and parliaments are motivated by the desire to protect these status-quo policy legacies and to upload their national policy models to the EU level (Hèritier, 1996; Hèritier et al., 1996). If uploading fails, these actors will, according to this hypothesis, then seek to veto agreed-on measures when these enter the implementation stage (Börzel, 2002). The hypothesis has been criticized for weak explanatory power, for excluding actor interests, and for being static and top-down (Treib, 2008). However, it has been modified and operationalized in various ways and is still regarded as a powerful and parsimonious explanation (DiLucia and Kronsell, 2010). Studies of implementation in Germany in the field of environmental policy have pinpointed several sources of misfit held to create adaptation pressures and implementation problems: misfit in ambitiousness of standards, in paradigms and administrative traditions, in preferred policy instruments (Börzel and Risse, 2003; Wurzel, 2003), and in environmental principles (von Seht and Ott, 2000).

Here we will hold that implementation performance for the EU 2020 energy and climate package in Germany reflects ‘distance’ between what the German government sought to upload in the EU negotiations and the final negotiated outcome (what Germany would have to implement) back in 2008. The policy positions taken by Germany then would indicate what the country was prepared and not prepared to implement, and the ‘distance’ would indicate the degree of adaptation pressure. We expect wide distance to affect implementation performance negatively, and vice versa: that narrow distance would facilitate implementation.

We further propose that the strategy of simultaneously negotiating a *conjoined* policy package may affect policy outcomes differently from negotiating policies separately. Negotiating a bundle of policies is more resource-demanding and complex, and is open for trade-offs (like renouncing a priority position in one policy field to gain in other fields), thus impacting on the distance between policy position and policy outcome. If German negotiators accepted a greater distance between policy position and final outcome in one policy area as a concession to minimize the distance in other areas, we may expect impacts on implementation

performance – notably, poor implementation for policies where sizable concessions were given.

Next, we investigate another source of potential misfit stemming from policy bundling at the EU level: the underlying strategy of balancing and creating synergies between overarching aims: fighting climate change, care for concerns of competitiveness by the traditional energy-intensive industries, spurring innovation and new green industries based on more energy-efficient production/use of energy and renewable energy, and improving security of supply by, for instance, spurring investments in indigenous renewables and reducing consumption of imported fossil fuels. We expect implementation in Germany to be facilitated if such balancing of concerns was needed also for Germany (the national energy-economic situation), and if domestic-level *perceptions* prevailed that a balanced achievement of overarching concerns could be in fact be realized nationally by the package. By contrast, no objective need for balancing overarching aims, and subjective perceptions that the package would not facilitate the balanced realization of aims, are factors expected to affect implementation performance negatively.

Domestic politics

The lack of general explanatory power of the ‘goodness of fit’ hypothesis has led scholars of EU policy implementation to explore more thoroughly explanations grounded in *domestic politics*. Essentially, the domestic politics framework sees policy outcomes as a function of bargaining between governmental actors, and between governmental actors and societal interests. Studies have focused on the role of actors (governmental actors, societal actors), and the relationships between actors, including the institutions that channel societal actor influence on governmental actors. Scholars inspired by this framework have explained the implementation performance of EU member states in terms of the existence of governmental ‘veto players’ (Risse, Green Cowles and Caporaso 2001; Heritier 2001; Heritier and Knill 2001)³, pressure on national governments from below (reform-eager and reform-reluctant societal groups) or even from above (the European Commission) (Risse, Green Cowles and Caporaso 2001; Heritier and Knill 2001; Bähr, 2006; Mastenbroek and Kaeding, 2006). Within this framework, more specific underlying factors facilitating good implementation performance have been identified: an acceptable distribution of implementation costs among societal actors and a political culture (policy style) conducive to arriving at acceptable distributive solutions (Risse, Green Cowles and Caporaso, 2001; Heritier, 2001; Heritier and Knill, 2001). Treib (2003), acknowledging that governments are derived from political parties with different policy preferences, shows the latter to have explanatory power for implementation performance.

A less ‘political’ but more dynamic domestic explanation is found in legal/administrative studies that see implementation performance as

³ Tsebelis (2002) defines a *veto player* as an individual or collective actor whose agreement is necessary in order for the legislative status quo to change.

primarily a function of member-state institutional efficiency/administrative capabilities. The ideal situation would be perfect overlap in responsibilities within domestic administrations, for negotiating as well as implementing EU policies. Some of these studies add involvement by relevant domestic actors in the preparation of national negotiating positions vis-à-vis the EU as a factor facilitating later implementation (see Treib, 2008).

Studies applying the domestic politics framework to explain EU policy implementation in Germany abound. From patterns of compliance with EU regulation across policy areas and member states, Falkner et al. (2007) noted that the framework was particularly suited for explaining implementation in Germany. In their 'worlds of compliance' typology, Germany is firmly placed in the 'world of domestic politics' group of countries'. Earlier domestic-politics studies of Germany have paid considerable attention to the federal and bicameral political-administrative structure (horizontal and vertical fragmentation of competencies) that provides for multiple governmental veto players, posing an obstacle to EU policy implementation (Knill and Lenschow, 1998; Haverland, 2000; Wurzel, 2003).⁴ However, other studies note that a tradition of consensual policymaking across the levels of government have moderated the effect of the vertical division of competencies (Börzel, 1998; Hèritier et al. (2001). Yet other studies describe a different policy style with elements of a corporatist policymaking, noting that strong alliances of German corporations/industry federations and federal ministries have typically acted as veto points for national and EU policy reforms (Bulmer et al., 2003; Karapın, 2012). The present study investigates a series of expectations derived from the domestic politics framework, focusing specifically on the role of governmental and societal actors, and their interlinkages.

Fragmentation and veto players in the German politico-administrative apparatus

We first investigate how competences for implementing EU energy and climate package policies were distributed in the government-administrative apparatus in Germany. The underlying assumption is that different governmental actors, shaped by their formal roles in the governmental machinery, may perceive problems differently and apply different criteria in deciding whether and how EU policies should be implemented. Cooperation and coordinated views will facilitate implementation, whereas fragmentation and conflict will impede implementation. Horizontally, competences may be divided/shared between several agencies at the same governmental level. Vertically, competences may be divided/shared between the federal, state and municipal levels, where

⁴ Knill and Lenschow (1998) identify vertically and horizontally distributed administrative competences in Germany, and lack of coordination as factors obstructing implementation of EU environmental directives. Haverland (2000) concludes that German bicameralism and federalism provided domestic interests hostile to EU policy (states with legislative powers through the *Bundesrat* with veto power). Wurzel (2003) has pinpointed the Chancellor and BMWi within the central government as typical veto players in German environmental policy.

lower-level governments may or may not share perceptions and preferences with the federal government of ‘national interests’. Fragmentation in competences can affect implementation performance through various mechanisms. The number of governmental actors with *de jure* and *de facto* veto power may increase when responsibilities are fragmented, impeding implementation. And even if veto players pose no problem, fragmentation in responsibilities may lessen administrative efficiency, increasing the lead times for rolling out national implementation measures.

Dynamically, governments and administrations can see shifts, bringing in implementation actors different from those that had responsibility for negotiating policies at the EU level. Such changes may increase or decrease administrative fragmentation and change veto points. In Germany, the composition of governments at the federal and state levels changed because of national elections in the implementation period, a fact which makes a dynamic perspective even more relevant.

Also implementing a *conjoint package* of EU policies could affect implementation performance by involving a larger number of governmental actors with overlapping responsibilities. The EU energy and climate package targeted sectors broadly with commitments to contribute to goal achievement. That could result in new conflicts or cooperation between sectoral administrations, spurring new constellations acting as veto players. A package approach may be expected to facilitate/impede implementation if it leads to better/poorer vertical and horizontal coordination among governmental actors at the federal, state and municipal levels in Germany.

Societal group affectedness

Societal groups may experience differing costs and opportunities/benefits from national implementation of EU policies. We may expect societal groups that see high adaptation costs and low benefits/opportunities to oppose policy change; conversely, groups that see low adaptation costs and new opportunities can be expected to endorse change. Aggregated, we expect national implementation performance (transposition and application) to reflect the distribution of cost and benefits among societal groups. We expect concentration of adaptation costs, combined with distributed benefits/opportunities in a member state, to have the potential for negative impacts on implementation performance. Since groups that see high cost-concentration and few opportunities will view on-the-ground implementation (application) as problematic, we may expect them to resort to campaigning against policy reforms as main ‘implementation strategy’. The situation may be different if groups that see high adaptation costs also see new benefits/opportunities, or if national implementation policies lead to distributed costs and benefits/opportunities.

Dynamically, the cost–benefit picture for societal groups may shift. External events, like the economic crisis and technological breakthroughs, may impose new costs or bring new opportunities. Cost–benefit distribution concerns at the point when policies are implemented could differ from those that existed when EU policies were negotiated. Also

implementation of a *conjoint package* of policies may change the cost-benefit picture for societal actors, as decision makers get potential new trade-off opportunities when designing implementation measures. Affected sectors can be compensated for high burdens related to one instrument by low burdens connected to implementation of other policy instruments, or by additional side-payments that are expected to improve implementation performance. By contrast, if a policy package exaggerates cost-concentration – where actors within one sector sees the burdens of many policy instruments accumulating without any form of compensation – we expect opposition and poorer implementation performance.

Relationship between the government and societal actors: policy style

Societal actors play a role in implementation as those who apply national regulatory measures, but they may also act as stakeholders, affecting national implementation policies and measures through consultation. Studies have shown that national policymaking and policy-implementation alike tend to follow standard operating procedures as a national *policy style*. Richardson (1982:13) defines national policy styles as: ‘...the interaction between (a) the government’s approach to problem solving and (b) the relationship between government and other actors in the policy process’. A distinction is made between a consensual policy and an authoritative style of imposition (Richardson, 1982; van Waarden, 1995), the former referring to the inclusion of target groups in formal or informal consultations in policymaking, and the latter referring to top-down policymaking, with no access for target groups. Also often embedded in the concept are certain national affinities for particular substantial policy instruments (Howlett, 1991; Vogel and Kun, 1987). van Waarden (1995) here distinguishes liberal-pluralist regulatory styles (favouring market instruments) from etatist styles (favouring command-and-control instruments) and corporatist styles (favouring associational solutions).

The connection between national policy styles and implementation performance is thus not a unidimensional one. If the national tendency to choose specific substantial policy solutions is highlighted, we may expect implementation to be facilitated by EU policies allowing the continuation of national solutions, much in line with ‘goodness of fit’ argumentation. If, however, procedural aspects are more in focus, expectations will concern whether and how access for societal actors to government policymakers may affect implementation performance. Mechanisms linking the two would here include ‘policy legitimacy’. A consensual policy style that can secure broad consultation among affected societal actors would facilitate implementation through high policy legitimacy. The flip side of the coin is the potential trade-off between higher policy legitimacy and lower policy ambitiousness (Skjærseth and Wettestad, 2008: 22). An authoritative imposition style with no prior consultation could deteriorate policy legitimacy. It may increase the chance of more ambitious policies in the short run, since policymakers will not need to listen to stakeholder concerns, but poorer legitimacy may punish governments in the longer term (no re-election), with repercussions for later policy ambitiousness. For a corporate policymaking style we will

expect to see implementation (ambitiousness of policies) reflecting the interests of the industry interests selected for consultations. Policy legitimacy may be high or low, depending on the representativeness-/importance of these industries in terms of national value creation.

As to dynamics, we expect broad societal consultations (including all important target groups) in Germany in the policy-formation stage (connected to EU-level negotiations) to improve implementation performance in the later transposition and application stages. This factor will be conditioned by actual success of the German government in uploading its national policy positions at the EU level. The effect of poor representation for affected target groups in EU policy negotiations may, on the other hand, be moderated if they are included in the later policy implementation stage.

Implementing a conjoint package of policies may affect implementation performance because there will be a higher potential number of affected societal actors that can claim a stake in policy implementation. Under conditions of consensual policymaking, new broader alliances of public and private actors may agree or clash on ambitious national reforms – the former expected to improve implementation performance; the latter, to impede it.

3 Baseline energy and climate policies in Germany

3.1 Domestic and EU drivers of baseline policies

Baseline policies in Germany must be understood in relation to domestic and EU drivers. Duffield and Westphal (2011) identify three overarching goals as domestic drivers: to provide affordable energy prices that would secure industrial and economic growth (*Wirtschaftlichkeit*); environmental protection and sustainability (*Umweltverträglichkeit*) and security of supply (*Versorgungssicherheit*).

The former has been a constant goal. Its saliency reflects a national industrial structure of manufacturing industries in value chains with energy-intensive basic materials industries that provide a high proportion of total national value added and employment. National coal resources (anthracite or hard coal and lignite) were fundamental inputs in national industrial development, reflecting poor domestic resources of other fossil fuels. From the 1950s, the German hard-coal industry faced increasing competition from imported coal, oil and natural gas, accelerating the closure of mines and lay-offs.⁵

Concern with physical security of supply had seen shifts, depending on events in the international energy market (Duffield and Westphal, 2011). German energy-import dependencies increased substantially in the 1990–2007 period: the ratio of net imports/total primary energy supply was up from 48% in 1990 to around 60% in 2007, when nearly all the oil, 80% of natural gas and 1/3 of the coal needed for balancing the energy system was imported. The rapidly increasing international oil prices in the early 2000s, reflecting a tighter demand–supply balance, focused attention on national vulnerabilities, as did the 2006 Gazprom gas supply cut to Ukraine, which had repercussions also for supplies to the European Union.

Environmental protection evolved as premise for energy policy from the 1970s, initially aimed at reducing air pollution from German coal plants. Concerns about nuclear radiation were reinforced by the 1979 Three Mile Island accident and 1986 Chernobyl disaster, followed by increasing demands for phasing out nuclear power from the national energy system. At that point, also the climate-change issue began to feature on international and national political agendas, with societal demand for policies to stimulate emissions reductions.

Beyond such overarching goals, baseline policies were shaped by domestic actors and institutions with deep historical roots. The German ‘ordo-capitalist’ economic development model emerging after the Second World War structured fundamental state–society relations with a bearing

⁵ The number of operating mines plummeted from 146 to 12 in the period 1960–2000, 2006 output was down to 20.7 million tons, from 150 million tons in 1957, and the number of employees was reduced from 610,000 as late as 1977 to well under 50,000 in recent years (Deutsche Welle, 31.01.2007). Surface-mining the shallow lignite brown-coal resources remained competitive, however, as the coal was utilized mostly in power plants near the mine, because of high moisture content and weight.

also on national energy and later climate policies. Under this model, private industries enjoy basic commercial freedom, while the federal state have important functions in supporting industrial development, protecting the labour force, and securing welfare for the population. Provision of long-term investment capital by semi-private industrial restructuring banks (such as Kreditanstalt für Wiederaufbau) and generous state resources for industrial and technological R&D became central instruments for government execution of this industry-enabling role (Vitols, 1997). Tripartite negotiations involving the government, major industry associations and trade unions became an important mechanism for settling policies, which led scholars to classify Germany as having strong neo-corporatist elements in policymaking (Katzenstein, 1987; Vitols, 1997).

In the German federal administrative apparatus, responsibilities for energy and industry policies became tightly connected in one unit, the Ministry of Economic Affairs (Bundesministerium für Wirtschaft und Energie – BMWi), reflecting the importance of affordable and secure energy for national industry development. Right up to the 2007 baseline for this study, the mix of energy and climate policy instruments adopted by the German government clearly reflected this industry-supportive role. Technology standards (demand for best available technology) were combined with generous funding programmes to reduce the financial burden. Voluntary agreements on greenhouse gas (GHG) emissions reductions were negotiated and agreed between industry associations and the government, as were a series of agreements aimed at improving the competitiveness of and ensuring continued market uptake of coal, the primary energy source where Germany had a strong national resource base (Storchmann, 2005).

The basic providers of affordable energy in Germany, the energy supply industry, evolved with a mixture of private and municipal ownership and a hierarchical structure. There were a few major electricity generation and gas import utilities at the top, supplying regional wholesale utilities; and several hundred local electricity and gas distribution utilities.⁶ Energy utilities at all levels enjoyed exclusive monopoly positions, regulated by private demarcation contracts and local government area licenses. The major utilities enjoyed a prominent position in the national energy-industry associations that were partners with the federal government in negotiating energy and climate policies. Local utilities had good access to policymaking at the local and regional levels, being revenue generators for municipal governments. In the 1990s, German energy policy became challenged by the EU internal energy market project, which encountered heavy scepticism from German utilities. Germany's policy position was one of hindering too-strict EU harmonization of market rules: the government was instrumental in watering down the 1996 Electricity and 1998 Gas Market Directives. In 1998, Germany implemented these directives through revision of its energy law. Market liberalization

prompted a drop in energy prices and spurred industry restructuring that by 2007 (baseline) had reduced the number of national majors to four integrated electricity and natural gas utilities that were also highly integrated downstream through acquisitions of local utilities.⁷

A long period of relative political consensus in German energy policy was challenged when the major utilities decided to invest in nuclear power in the 1980s. The German anti-nuclear movement became one of the strongest in Europe. Local civil obedience protesters were clamped down by the police, causing deep distrust in the major utilities, its allies in the federal government. Nuclear power split political parties and a new Green Party (established in 1983) became the first of its kind to win seats in a national European parliament. As opposed to this political rift, considerable party-political consensus concurrently evolved on the need for political responses to the climate-change problem.⁸ Ambitious national climate policy goals were agreed in the late 1980s when the government set the goal of cutting GHG emissions by 25% by 2005 compared to 1987.⁹ A lower steering goal came as part of Germany's commitment under the 1997 Kyoto Protocol (21% reduction by 2008–2012 (1990 as base year).

The government's energy and climate politics became closely interlinked. Conservative-liberal coalition governments of CDU (*Christlich Demokratische Union Deutschlands*), its sister party CSU (*Christlich-Soziale Union in Bayern*), and FDP (*Freie Demokratische Partei*) argued that the threats of global warming made continued use of nuclear power a paramount solution (Laes et al., 2014). The leading opposition party, SPD (*Sozialdemokratische Partei Deutschlands*), opted for a gradual nuclear power phase-out and replacement with coal-based power. The new Green Party (*die Grünen*) called for a fundamental transformation of the German energy system towards greater local citizen control, advocating energy savings and support for local initiatives to commercialize renewable energy technologies, giving voice to the mistrust of central government and the major energy utilities (ibid.). An early manifestation of the call for greater local control and the dislike of nuclear power was the establishment of the feed-in tariff system by the Bundestag (the Federal Parliament) in 1991 to support renewable energy production by independent producers.¹⁰ This system combined regulatory command, prescribing priority feed-in to the grid for non-utility producers of

⁷ Mergers and acquisitions reduced the number of major suppliers to four in electricity supply (from eight in 1998) and five in natural gas (from eight in 1998). Acquisitions by these remaining companies in turn reduced the number of regional wholesale and municipal distribution companies

⁸ In 1990, an inter-ministerial working group of parliamentary groups of parties in government and in opposition, agreed that early action on climate change was needed (precautionary principle) (Laes et al., 2014).

⁹ A Parliament-appointed investigative commission (Enquete Commission) recommended that Germany should cut its GHG emissions by 30% from 1987 to 2005 and by 80% by 2050.

¹⁰ A group of German Bundestag members, representing different political parties but joined in their interest in developing local renewable energy resources, proposed and managed to get through feed-in legislation with support to independent producers of renewable electricity (Lauber and Mez, 2004).

renewable-based electricity, with economic support to independent producers, paid as a tariff per kWh at a rate linked to the average sales price for electricity, to be paid by the grid operators, with the costs passed on the consumers.

Further manifestations came with the 1998 general elections that brought in two consecutive coalition governments of the SPD and the Green Party. The new government strengthened German climate policy, adopting an environmental tax reform in 1999 and new, more ambitious GHG emissions reduction targets in 2002. The latter set 40% GHG reductions before 2020 if the EU as a whole committed to a 30% reduction within the same timeframe (Karlseng, 2006). Reforms of the national renewable electricity feed-in tariff system (the 2000 Renewable Energy Sources Act – Erneuerbare Energien Gesetz, EEG – with further amendments in 2004), made tariffs fixed for a 20-year period, calculated as the average annual difference between the German electricity exchange price and the politically decided feed-in tariff for each individual technology. This was done to accommodate the drop in average power prices, and thus amount of support available, seen after liberalization of the German electricity market. A cost equalization scheme entailed even distribution of costs among German grid operators to be passed on to the consumers in the form of an equal surcharge per kWh, although an exemption for energy-intensive industries was secured after intense lobbying (Suck, 2005). Now also German utilities were included as eligible renewable electricity producers under the system (Eichhammer et al., 2001).

Under parallel negotiations at the EU level for the 2001 Renewable Electricity Directive, Germany accepted a non-binding target of 12.5% share for renewables in total electricity generation by 2010, replaced nationally by the more ambitious 20% target within the same timeframe (Lauber and Mez, 2004). Similarly, the government set national targets exceeding the 5.75% share for biofuels to which it was committed under the 2003 Biofuels Directive (Eikeland, 2005). Tax exemptions for biofuel refiners and blenders were adopted as main instruments to promote market uptake of the fuel. A feed-in tariff-like system was introduced also for the support of energy-efficient combined heat and power plants (CHP), entitling municipal power producers to a minimum compensation from the grid operator for electricity generated in CHP plants (Eichhammer et al., 2001). Government reforms made investments in renewable electricity more lucrative, and tax exemptions prompted quick uptake of biofuels in Germany's transport sector.

Within the consecutive red–green coalition governments 1998–2005, a new division of labour was determined for the BMWi and the Ministry of the Environment (BMUB),¹¹ which became headed by representatives of SPD and the Green Party, respectively. The latter ministry took over responsibility for renewable energy policy from the former in 2002, after

¹¹ Reorganisations have added and subtracted policy areas from the Federal Ministry of the Environment. Currently, the German name of the Ministry is Bundesministerium für Umwelt, Naturschutz, Bau und Reactorsicherheit with the acronym BMUB.

allegations of foot-dragging in executing reform proposals and for supporting the utilities' call for replacing the feed-in tariff system with tenders (Lauber and Mez, 2004; Suck, 2005). The German feed-in tariff system was heavily attacked by the major utilities, which requested the National Constitutional Court to annul the law. In 1998, the German utility PreussenElektra (predecessor of E.ON) brought the national system in for evaluation by the European Court of Justice for possible breach of EU state aid rules. The competition service of the European Commission joined in the case, pleading the Court to expand the concept of state aid to situations where no specific state resources were involved (Lauber, 2007). In parallel, the EU Commission was drafting the 2001 Renewable Electricity Directive with an EU-harmonized trade-based support system (electricity certificate trading) intended to counteract distortions in the internal energy market. The German government lobbied intensely against the proposal. When the Court in 2001 settled that the German feed-in tariff system should not be considered illegal state aid, and that it would be compatible with the electricity market directive because of its clause allowing derogations in cases of public service obligations, the European Commission (DG Energy) shelved its proposal, accepting the right of the member states to decide support systems for themselves.

While the SPD–Greens government presented new opportunities for the renewable energy industry, it also continued to give considerable concessions to the energy-intensive industries and the coal industry. These industries were firmly opposed to the EU Emissions Trading Directive proposed in 2001, and their position guided the German government's efforts and success in altering the European Commission's draft design ((Michaelowa 2003: 37; Hatch, 2007:21, Eikeland, 2013). In designing the first National Allocation Plan (NAP) under the Directive, the government decided to allocate abundant free allowances to the power sector and agreed on allocation principles that favoured investments in emission-intensive coal-based power, as compared to power based on natural gas (Pahle et al. , 2011). Aiming for opportunities to continue using coal in the long term, the government (here: BMWi and the Ministry of Research) initiated two public–private partnership R&D programmes: COORETEC focusing on increasing conversion efficiencies and development of CCS technologies, and GEOTECHNOLOGIEN, investigating opportunities for CO₂ storage in Germany. The programmes supported industrial initiatives already initiated for demonstrating CO₂ sequestration at German coal plants and converting underground gas storage facilities to CO₂ storage sites.

After the general elections in 2005, a grand coalition government of CDU/CSU and SPD took power, with Angela Merkel as Chancellor. With SPD a partner in the prior nuclear phase-out decision, this was upheld as basis for new energy policy development. The government also upheld high climate policy ambitions, reiterating the conditional 40% emission reductions target (by 2020), while applying the more immediate 21% Kyoto Protocol target for 2008–2012 as direction for policymaking (Karlseng, 2006). Policies guaranteeing generous support for renewable electricity were maintained in 2007, whereas tax exemptions for biofuels were scrapped and replaced with rules mandating fuel suppliers to ensure

that 5% biofuels were blended in. The reasons quoted for the shift were losses experienced in the government revenue base and signals from the EU Commission that biofuels were over-subsidized in Germany. German farmers and biofuel manufacturers retorted that this would curtail further biofuel market development, since a 5% share of the market had already been taken (Reuters News Services, 8 December 2005). In parallel, the government scaled up its funding of CCS research and demonstration projects, as well as granting permits for the construction of new, more energy-efficient, coal-power plants.

In designing its national allocation plan for the EU ETS phase II, the government adopted new rules instructing the power industry to obtain parts of its allowances from auctioning in order to reduce the huge windfall profits that had been noted, while only partly correcting the adverse incentives in favour of coal rather than natural-gas power investments (Pahle et al., 2011). The European Commission was not content, however, and decided in 2006 to require further downsizing of the German cap, and scrapping what it called unfair exemptions for new energy-efficient coal-power plants.¹² German utilities held this would set a stop to industry investments in more energy-efficient coal power plant technology (Eikeland, 2013). The German Minister of Economics (Michael Glos of the CSU) rejected the EU demands and declared that Germany would not comply. Also the Minister of the Environment, Sigmar Gabriel (SPD), with formal responsibility for implementing the scheme, voiced concerns that emissions trading might become an investment killer. (See ENDS Europe, 4 January 2007.)

3.2 Summary

By 2007, (when the EU 20-20-20 targets by 2020 were adopted) Germany had already established ambitious targets and various policy instruments for GHG emissions reductions and renewable energy. The size of the German economy and its carbon-intensive energy supply¹³ still made Germany the major emitter of CO₂ in the EU-27 (21% of total emissions in 2004).¹⁴ However, Germany had seen falling emissions and CO₂ intensities for all sectors over a long period of time,¹⁵ due to the

¹² Junior Minister of Economics, Joachim Würmeling, stated 'It is up to the member-states to decide how they fulfil their obligations under the Kyoto Protocol', and added that the government was not worried about possible legal action by the Commission over its NAP as this would take years to resolve (ENDS Europe, 4 December 2006).

¹³ One third of total primary energy used in Germany in 2007 was supplied by oil, 25% by coal and peat, 23% by natural gas and only around 10% each for nuclear power and renewables. The electricity mix saw the share of coal at 49%, natural gas at 12%, nuclear power at 22%, renewables at 14%, and smaller shares of oil and wastes. Electricity constituted around 20% of total German energy consumption.

¹⁴ German energy supply was slightly more CO₂-intensive than that of the EU. The EU average in 2004 was 2.2 tCO₂/toe, as against Germany's 2.4 tCO₂/toe. Per capita emissions were higher than the EU average (10,187 t/capita for Germany vs. 8,180 t/capita for the EU) (European Environment Agency, 2007).

¹⁵ The very high reduction of emissions in the waste sector reflected recycling and disposal of biodegradable wastes (European Environment Agency, 2011).

effects of reunification and policies providing for fuel switching¹⁶ and higher energy efficiency (Eichhammer et al., 2001; EEA, 2010)¹⁷.

Ambitious national GHG emissions reduction targets were adopted already in the late 1980s and strengthened in 2002 (40% cuts by 2020 if the EU as a whole committed to a 30% reduction within the same timeframe). Baseline climate policy targeted different sectors and comprised different policy instruments. Historically important were traditional ‘command-and-control’ regulations, including energy-savings ordinances and best available technology (BAT) standards, as well as voluntary GHG reduction agreements for energy-intensive and energy transformation industries signed in 1995 and reinforced in 2000.¹⁸ Especially important was the use of ‘economic carrots’. These included a large number of federal and state government investment programmes for energy-efficiency measures in various sectors (including investments in CHP and CCS), and for the production of renewable energy.¹⁹ From 1990, reinforced in 2000 and 2004, the feed-in tariff system for supporting the operation of renewable electricity plants was part of the ‘economic carrot’ toolbox. ‘Economic sticks’ had a moderate place until the Ecological Tax Reform in 1999. Transport fuel taxes had long existed, but this reform introduced taxes on natural gas, heating fuels, heavy fuel-oil, and residential electricity consumption as well. In 2005, Germany introduced trading in emissions allowances as part of its implementation of the EU 2003 Emissions Trading Directive.

German energy and climate policies in the baseline were shaped by domestic and EU drivers. Corporatist elements have been noted as part of the baseline policymaking style, as indicated by the series of negotiated voluntary agreements between the government (mainly the BMWi) and national industry associations: to ensure that German coal was favoured in national electricity generation, to arrive at a schedule for long-term decommissioning of nuclear power, and to reduce industrial GHG emissions. Containing the costs of energy for German industry was a constant concern behind the preferred mix of energy and climate policy

¹⁶ The period 1990–2007 saw the share of coal in primary energy supply decreasing from 36% to 26%, a higher share for natural gas (from 16 to 23%) and renewables, first and foremost as sources in electricity generation (where the share increased from 3.4% to 14.2%). Data from IEA, German Balances 1990, <http://www.iea.org/statistics/statisticssearch/report/?&country=GERMANY&year=1990&product=Balances>

¹⁷ Eichhammer et al. (2001) ascribe the long-term falling GHG emissions to a combination of industry closures after the 1990 reunification of Germany (60% of energy-related and 47% non-CO₂ emissions) and effective national climate/energy policies (40% and 53%, respectively).

¹⁸ In 1995, the government negotiated and signed an agreement with the main industry association (Bundesverband Deutscher Industrie, BDI) for voluntary reductions of GHG emissions in various industries. The German car industry was specifically included in the 1998 EU-level collective voluntary agreement with the European car manufacturers’ association.

¹⁹ Typical of federal-level funding programmes was the 100 Megawatt wind project conducted from 1989 (Ziegler 1989), and the 1000-roof solar PV programme, co-funded by the government and the federal states in the 1991–1994 period, and extended with an enlarged 100,000-roof programme, administered largely by the Kreditanstalt für Wiederaufbau (KfW).

instruments chosen: to ensure industrial restructuring by demands for BAT, aided by abundant access to cheap investment loans, R&D funding, and programmes targeting energy-efficient production and use of energy (coal specifically), and the commercialization of renewable energy sources. Sheltering of industries became evident also in the design of the ‘economic sticks’ policy instruments. Manufacturing and coal-power generation sectors were given major rebates from environmental taxes and refund opportunities that sometimes reduced the effective tax rate to almost nil (Heine et al., 2012), and large surpluses of allowances under German implementation of the EU ETS.

However, the establishment and later reinforcements made to the German support system for renewable electricity, the feed-in tariff system, appeared independently of such negotiations with dominant industry associations and companies. Rather, the policy idea emerged locally and was proposed by backbenchers in the Bundestag, enacted *against* the will of traditionally influential industry groups. Reforms in the past decade, setting the pace in renewable electricity investments, became facilitated by the transfer of responsibility for this policy field from BMWi to BMUB. Law-drafting was now carried out in close cooperation with representatives of the renewable energy industry (Suck, 2005). Rapid market expansion of renewable electricity from 2000 reflected investments by private households, farmers and municipal energy companies – not by the major power companies.²⁰

This shows that corporatist-style policymaking did not entirely dominate baseline German energy and climate policymaking: it could be better characterized as a *bifurcated* policymaking. The shift in administrative responsibilities early in the past decade entailed more fragmentation in national energy policymaking, enabling better access to policymaking for new actors associated with development of renewable energy (Lauber and Mez, 2004, 2007; Karapın, 2012; Bulmer et al., 2003).²¹ In addition came centre–periphery conflicts in the form of disagreements between governments at the federal and state levels. State governments, co-legislators in federal law-making through the Federal Council, voted on several occasions to curtail federal government law-making in the baseline period (Lauber and Mez, 2004).

The European Union played an increasing role as an arena for German climate and energy policy in the baseline. Germany evolved as an active

²⁰Even by late 2013, the major four German utilities still owned just 7% of national renewable energy capacity (Energy Transition – the German Energiewende Blog, 29 Oct 2013).

²¹Bulmer et al. (2003) document how local municipalities and state-level governments (being owners of local power undertakings) and owners of local power undertakings, fearing losses of revenues from abolishing local monopoly rights in power distribution, teamed to lobby various ministries (including the Ministry of the Environment) at the federal level for a veto of EU-induced energy market reforms. Industrial associations that supported market reform linked up with the more reform-willing Federal Economics Ministry. Initially, the former group prevailed, whereas the Economics Ministry at a later point redrafted legislation so as to circumvent the constitutional requirement of Federal Council assent, successfully implementing market reforms, although after first giving major concessions to local level interests.

supporter of ambitious GHG emissions reductions and renewable energy targets at the EU level. On the other hand, Germany put on the brakes when the European Commission drafted its flagship energy and climate policies. Germany contributed to curtailing effective internal energy market policies that would dismantle national anti-competitive practices. Further, it contributed to stopping the adoption of a EU-centralized system for trading in emissions allowances with cap and rules for allocation set at the EU level; and, likewise, the adoption of an EU-level harmonized market-based system for supporting renewable electricity.

4 German positions in negotiations of the EU 2020 climate and energy package

The 2005 European Council meeting at Hampton Court called for more ambitious and integrated energy and climate policy integration in the EU (Eikeland, 2012). In 2006, the Commission responded by proposing a new Strategic Energy Review for Europe and launching consultations on how a future strategy should look. In these consultations, the German government called for a policy package that gave high priority to fighting climate change, to revising the EU ETS and to the adoption of binding EU-level targets for renewable energy (Eikeland, 2012). Anticipating the upcoming Strategic Energy Review, German Minister of the Environment Sigmar Gabriel in late 2006 highlighted the development of new climate and energy policy as a priority for the spring 2007 German EU presidency.

The European Commission presented its Strategic Energy Review in January 2007 alongside the ‘20-20-20 by 2020’ energy and climate target structure. German government representatives signalled firm support for pursuing the three targets but Environment Minister Gabriel specified that his primary preference was a higher unconditional GHG emissions target of 30%.

In January 2008, the European Commission formally adopted what was to become known as the energy and climate package. The inner core of the package consisted of proposals for amending the 2003 Emissions Trading Directive, a new Renewable Energy Directive, the Effort-Sharing Decision outlining national targets for emission reductions in non-ETS sectors, and a CCS Directive outlining requirements for member states to ensure that future storage of carbon would be properly regulated and monitored for safety and environmental integrity. Two additional transport-related proposals were launched as integral to the package: a regulation setting mandatory CO₂ emissions standards for car manufacturers, and an amended Fuel Quality Directive aimed at lowering CO₂ emissions from the fuel production.

Revision of the ETS

In late 2006, Environment Minister Gabriel promised firm leadership of the German EU presidency in redrafting the EU ETS. However, his leadership was questioned by MEPs who noted the pending conflict between Germany and the Commission on national allocation plan for the second trading period (2008–2012). Shortly thereafter, Gabriel announced that Germany had accepted the Commission’s demands for cuts in the national cap on allowances, to the great displeasure of Germany’s energy-intensive industries.²² To compensate industries for the cuts, the German government announced that it would accept a

²² German energy-intensive lime and glass companies said they would take court action over the European Commission’s refusal to accept provisions in the German NAP II guaranteeing free allowance allocations to new installations for 14 years (ENDS Europe, 20 February 2007).

doubling of the national limit set for international credits under the system, sending Germany right to the top of member states that allowed the highest shares for external credits.

During 2007, Gabriel mooted firm support for auctioning as main allocation principle for a revised ETS in order to prevent governments from using the ETS as a way of influencing industrial competition; he also suggested recycling auctioning revenues into cleaner technologies (ENDS Europe, 1 June 2007). Concerning the January 2008 energy and climate package proposal, he termed it 'very balanced' and 'economically viable' – provided that the ETS Directive would let energy-intensive industries exposed to international competition (steel, aluminium, and cement producers) continue to receive CO₂ allowances free of charge. His colleague, Economics Minister Glos (CDU), held a different tone: stating that the EU should not dictate rules (EurActiv, 24 January 2008), and urging Gabriel to demand extra allowances as compensation for the national decision to phase out nuclear energy (Deutsche Welle, 2 April 2008).

A central part of the Commission ETS proposal was free allocation of allowances to sectors subject to risks of carbon leakage. To retain some incentives for these industries to invest in more carbon-efficient technologies and processes, however, the Commission proposed a benchmarking system. Only the most carbon-efficient industrial installations would be awarded 100% free allowances under this scheme. The Commission pledged to identify sectors at risk of carbon leakage by comitology no later than 30 June 2010.

However, the German government called for immediate identification of carbon-leakage sectors and design of the benchmarking system. Chancellor Angela Merkel put all her weight in on this issue, but lacked support from other European leaders. The March European Council concluded that appropriate carbon leakage measures would be taken only if international negotiations on a post-2012 climate agreement should fail (ENDS Europe, 14 March 2008). Chancellor Merkel did not accept this. In bilateral talks between Chancellor Merkel and French President Sarkozy in June 2008, the two agreed that EU industry sectors at risk from 'carbon leakage' should be identified by 2009 (ENDS Europe, 10 June 2008).

On its own initiative, the German government now joined forces with like-minded British and Dutch governments in assessing and proposing criteria for identifying industrial sectors at risk. This was an initiative that eventually became endorsed by other member states as well (ENDS Europe, 11 September 2008).

It also served to speed up the work of the European Commission. In a September 2008 'non-paper', the Commission outlined a methodology very much in line with the German-led plan – reiterating, however, that exact details of industries at risk and thresholds for free allowances would be decided by the comitology procedure in the future (ENDS Europe, 18 September 2008). German Environment Minister Gabriel pronounced this completely unacceptable, warning that if the question was not settled by

the new ETS law, his government would give exposed industries 100% free allowances until an international climate agreement imposed similar carbon costs on competitors outside the EU (ENDS Europe, 20 October 2008). Considerable support for this was voiced among his fellow environment ministers at their October 2008 meeting, but most ministers held that sorting out the details should be postponed, so as not to delay a deal on the new directive (ibid).

In November, the European Commission published a first preliminary assessment of industries at risk, based on plotting a measure of industry exposure to international trade intensity against the extra costs of CO₂ emissions relative to product prices. Germany disagreed and proposed selecting industries on the basis of the simpler formula ‘carbon intensity as a proportion of gross value added’, and excluding international trade intensity, something that would increase the number of sectors eligible for free allocation (ENDS Europe, 31 October 2008). The French presidency now took steps to accommodate the EU Commission and German proposals, putting forward specific thresholds for defining industrial sectors at risk of carbon leakage.²³

Besides compensating direct costs of allowances, Germany was instrumental in bringing in another carbon leakage provision into the ETS Directive, the right for member states to compensate sectors exposed to international competition for indirect costs of the EU ETS in the form of higher electricity prices. To get a deal through, the Commission promised to implement this provision through new state aid guidelines.

Germany also had strong opinions on the proposed common auction platform for the EU-level emissions trading system. Here, Germany, Poland, the UK and Spain won through with their demand for an opt-out clause, to allow the use of national trading platforms (ENDS Europe, 4 December 2009).

During the negotiations, the European Parliament added a proposal for allocating auctioning revenues from the ETS New Entrants Reserve to carbon capture and storage (CCS) demonstration projects (what became the so-called NER 300 mechanism). The German environment minister was initially sceptical, while the economics minister and Chancellor Merkel supported the idea (Boasson and Wettestad, 2013). Most member-state governments were sceptical, but rewriting the proposal to include funding of renewable energy demonstration projects broadened the circle of those that accepted the mechanism. Negotiations among the member states eventually revolved around the number of allowances to be included in the funding mechanisms, and whether the EU Commission or the member states should have the final say on the selection of projects

²³ Under the French proposals, the principal sectors at risk would be those whose carbon-related costs increased by an amount greater than 5% of gross value added, and whose ‘trade intensity’ with non-EU countries was above 10%. The thresholds would be applied to a graph plotting carbon-induced cost increases against the level of exposure to international trade, to create four categories of carbon leakage risk. Sectors in each category would qualify for a different quantity of free allowances in the revised EU emission trading scheme (ETS), (ENDS Europe, 1 December 2008).

for ETS funding (ENDS Europe, 17 December 2009). Most member states, including Germany, wanted national control, and that line prevailed in the negotiations.

A related issue that led to considerable debate was the recommendation of the Commission to let ‘at least 20 per cent’ of government revenues from auctioning allowances be used to fund climate-related activities. The Environment Committee of the European Parliament proposed that this be increased to at least 50%. However, in February 2008, the EU finance ministers rejected such earmarking. The German environment minister strongly supported earmarking, as did the Economics Minister Glos and Chancellor Angela Merkel (ENDS Europe, 20 August, 2008).

Time was growing short for finalizing the design of the benchmarking system and EU-wide allocation rules, so Germany accepted that work should continue through the comitology procedure. In December 2010, EU member-state experts agreed on 52 product benchmarks, one heating benchmark and one fuel benchmark, all formally adopted in April 2011 after comitology procedure. Also drafting state aid guidelines for compensation of indirect costs of the EU ETS was postponed. In May 2012, the European Commission adopted new state aid guidelines under which member states may compensate electro-intensive users for part of the higher electricity costs expected to result from the EU ETS. In these processes, Germany won acceptance for more of its demands than had been expected, according German governmental sources.²⁴

The CCS Directive

According to the CCS Directive, member states were to establish institutional structures to provide for environmentally safe storage of carbon (this would entail making inventories of national storage sites, and establishing authorization and monitoring systems). It also instructed the relevant national authorities to ensure that operators in the closing process carry out safe sealing of injection points, and to maintain a liability period for operators after closure, for monitoring, and to take measures in case of CO₂ leakage. These national authorities were granted discretion in determining the liability period for operators, but the Directive specified that no less than 20 years should be considered a normal minimum.

The Directive did not instruct the member states to make use of this decarbonization option, but rather aimed at reducing regulatory uncertainty regarding investments. However, it also instructed member states to ensure that operators of large combustion plants would have to assess the technical and economic conditions necessary for future application of CCS and set aside space for CCS equipment in case of a positive assessment (Article 33, amending the Large Combustion Plan Directive). Parallel policy measures – funding made available through EU Economic Recovery Package, and allocation of auctioning revenues

²⁴ Interview, Jan Scharlau, BMUB, 4 June 2014, Berlin.

under the EU ETS Directive – further showed the Commission’s intentions of contributing to the commercialization of CCS technology.

The non-bindingness of this low-carbon option, and its balanced view of environmental and industrial concerns, made the CSS Directive generally non-controversial. The main controversy concerned the issue of funding CCS projects proposed under the ETS Directive. The German government was generally positive to creating an EU-level framework for investors in CCS. German companies had pioneered pilot projects on coal power-plant capture and storage, and parallel national energy and climate policy papers indicated that Germany should apply for EU funding of two to three demonstration projects on German soil.

The Renewable Energy Directive

In EU pre-package consultations, the German government was strongly in favour of binding renewable energy targets (Eikeland, 2012), as proposed by the Commission in its January 2007 package (20% share of total energy consumption by 2020), and supported by the European Council in March 2007 – surprisingly, since several member states had warned against such targets. The Council collectively accepted binding targets, on condition that differentiated national targets be established with due regard to fair and adequate allocation, taking account of different national starting points and potentials (Council of the European Union, 2007).

The Commission started drafting a new directive, with major tensions in the bureaucracy as to what should be proposed. Towards the end of 2007, the draft appeared to propose a mandatory EU-level trade-based certificate system to replace existing national support schemes, in order to facilitate trade among member states so as to minimize total costs.²⁵ The German government lobbied hard for an opt-out clause. A draft version prepared in late December 2007 marked a compromise, allowing member states to opt out of trade in guarantees of origin only if they achieved a set of interim targets. If they failed to reach these interim targets, member states could not hinder trade in guarantees of origin between persons within the Community (Toke, 2008). New lobbying by the German government and like-minded governments finally convinced DG TREN to include a full opt-out clause, in order to reduce the level of controversy in subsequent deliberations with the Council and Parliament. Thus, the final proposal did not include any mandatory use of trading mechanisms at the company level. Instead, it specified a series of flexible mechanisms that member states could employ to assist in achieving national targets, and recommended the member states to make use of joint solutions in order to minimize costs.

On another much-debated part of the Renewable Energy Directive, sustainability standards for biofuels, the German government took a

²⁵ Specifically, the draft proposed that ‘guarantees of origin’ – the verification papers adopted in 2001 for control that electricity accounted as ‘renewable’ would actually be so – should be developed into tradable certificates (Toke, 2008:3).

supportive position. The German energy minister even proposed that sustainability criteria be extended to biomass production generally, and that this should be written into the Directive (ENDS Europe, 28 February 2008).

Effort-Sharing Decision

The Effort-Sharing Decision process focused on setting national targets for emissions reductions in the member states for sectors not covered by the EU ETS. In the January 2008 proposal, Germany was given the target 14% reduction in 2020, compared to 2005, reflecting the general principles for effort-sharing to which Germany agreed. Germany accepted this target, which also prevailed in the final decision.

Car emissions regulation

It was the German Minister of the Environment, Jürgen Trittin of the Green Party, who in 2003 had called on the EU to establish legislation replacing the former voluntary agreement with a mandatory approach to make car manufacturers reduce CO₂ emissions from their new-car fleet (Gulbrandsen and Christensen, 2014). The 1997 voluntary agreement had 'urged' manufacturers to deliver new cars with an average 140 gCO₂/km emissions in 2008 and 120 g in 2012. Trittin proposed making the latter goal mandatory for all European car manufacturers – an approach supported by other environmental ministers, and endorsed by EU Environment Commissioner Stavros Dimas in 2006 (ibid).

His colleague in the Commission, Enterprise and Industry Commissioner Verheugen (of German nationality) did not agree with making uniform standards mandatory for all manufacturers, claiming that this would unfairly punish manufacturers of large, high-performance vehicles in Europe, typically those made in Germany (Gulbrandsen and Christensen, 2014). He instead launched an 'integrated approach' that would entail responsibility for emissions reductions to be shared among car manufacturers, tyre-manufacturers, fuel suppliers, repairers, drivers and public authorities.

Germany's Minister of the Environment, Sigmar Gabriel, came out in support of a binding but not manufacturer-uniform EU target, and that sustainable use of biofuels should be included as a measure available for target achievement (ENDS Europe, 23 January 2007). This annoyed his colleague in the German government, Economy Minister Michael Glos of the centre-right CSU party, who declared to German newspapers: 'the plans conducted by Greek EU commissioner Dimas and environment minister Sigmar Gabriel against the German car industry have to be urgently stopped' (ENDS Europe, 30 January 2007).

The integrated approach was included when the European Commission in February 2007 launched its strategy for new legislation: mandatory average standards for new cars sold in the EU; an average 130g CO₂/km target by 2012 to be achieved through car-manufacturer improvements in motor technology and additional 10g to be achieved by softer 'complementary measures'. The strategy outlined additional investments

in research towards an indicative goal of 95g CO₂/km target by 2020. However, the strategy was silent on burden-sharing, on whether the standard should be uniform for manufacturers, and if not, how to design a system of non-uniform standards.

Subsequent meetings in the Council of Ministers showed that a majority of member states supported the integrated approach to mandatory targets, but that opinion differed greatly on preferred design of burden-sharing between different types and sizes of cars. Ministers representing countries home to small-car manufacturers opted for a flat-rate emissions limit (France, Italy), whereas those with national manufactures of larger cars, typically Germany, opted for differentiated standards according to size/weight of the car fleet.

Signalling the high political stakes, heads of state became deeply involved in further negotiations, with bilateral talks between leaders showing disagreement on how the burden-sharing scheme should be further designed. In December 2007, French President Sarkozy accepted the demand by German Chancellor Merkel for differentiated standards for small and heavy cars, while maintaining that the latter should still exhibit a far larger reduction rate than the former – a point contested by Merkel (Deters, 2010).

When the European Commission in December 2007 adopted its formal proposal for a new car regulation, it included a burden-sharing arrangement far closer to the preferences of Germany than those of France. Further bilateral talks between Merkel and Sarkozy led to a deal in June 2008 whereby the Commission proposal on burden-sharing was accepted, while also introducing a postponement for the phase-in of targets, greater leeway in the penalties applied to producers, and for specific eco-innovations to be given greater weight in the integrated approach (ENDS Europe, 10 June 2008).

The European Parliament unwillingly accepted these changes but added a demand that also the indicative target of 95g CO₂/km for 2020 should be made mandatory. The German government accepted this, on condition that the European Commission should first conduct a review of the legislation in 2013 and present details for meeting this target (ENDS Europe, 2 December 2008).

The Fuel Quality Directive

The Fuel Quality Directive amendments proposed by the European Commission in January 2007 aimed, like preceding amendments, at sharpening emissions standards to combat air pollution. New to the Directive were requirements for fuel suppliers to reduce lifecycle carbon emissions. Its Article 7a stipulated that fuel suppliers would have to reduce emissions by 1% annually in the period 2011–2020, amounting to 10% reduction from 2010 to 2020 (ENDS Europe, 17 January 2007). This included supply of all fuels, but the proposal paid special attention to biofuels, which had seen strong growth in market shares in many member states since the adoption of the 2003 Biofuels Directive. Acting on studies indicating great variation in lifecycle emissions of biofuels, the

Directive proposed that sustainability criteria for biofuels should be developed at the EU level. To facilitate further market uptake of biofuels, the Directive proposed to allow new petrol and diesel blends with a higher share of biofuels, to be developed in cooperation with the European Committee for Standardisation.

The ensuing debate revealed major disagreements on lifecycle targets for fuel suppliers and whether/how EU-level biofuel sustainability criteria should be included in the Directive. The European Parliament demanded EU-level sustainability criteria, and that account should be taken of indirect land-use changes from biofuels when assessing lifecycle emissions reductions. The Parliament also demanded that quantitative emissions savings from biofuels (as compared to fossil fuels) should be specified in order to be counted against the 10% target set in the parallel Renewable Energy Directive for the share of renewable energy in total transport fuel consumption. The oil industry lobbied successfully to get the lifecycle emissions reduction target for fuel suppliers reduced to 6%, with another 4% reduction subject to technology development and the reduction from using the Clean Development Mechanism.

The German government had an overall active and supportive stance to the proposals during the negotiations, being among the few countries that had pioneered sustainability standardization for biofuels at the national level. Müngersdorff (2009) characterizes Germany as mainly representing the environmental side in the negotiations and for having particular weight in the Council meetings because of its significant national biofuel industry— and thus not only the necessary expert knowledge but also considerable interest in the topic. Germany was against a proposal, mooted in the negotiations, for scrapping the 10% target for biofuels in the Renewable Energy Directive until EU-level sustainability criteria had been adopted (*ibid.*).

The 2009 Fuel Quality Directive as finally adopted included many design details of how to calculate lifecycle GHG emissions from various biofuels, but failed to specify whether and how indirect land-use changes (ILUC) from biofuel production should be accounted for. It was also grossly underdeveloped concerning methods for calculating lifecycle GHG emissions from conventional fuels, specifically on default values for emissions from different fuels and fuel qualities.

These issues were subsequently taken up for comitology consultations that proved very demanding. Methods for calculating ILUC values were difficult to agree on, with negotiations stretching far into the implementation stage for the Directive. Another problematic issue was whether (and when) to add a default value for emissions from oil sands, distinct from that for conventionally produced oil. Germany was a staunch supporter of ILUC standards and kept a low profile concerning default values for emissions from oil sands, abstaining from the vote on this issue.

5 Implementation: 2009–2014

German implementation was conducted under shifting coalition governments in the period 2009–2014. Sub-section 5.1 gives a brief timeline outlining the main energy/climate policy orientations of these governments, as background information to the more detailed presentation of implementation processes in sub-section 5.2. The EU package contained various EU policy instruments that were highly interlinked and partly overlapping. Aimed at achieving a 20% reduction in GHG emissions, the package included the EU ETS Directive and the Effort-Sharing Decision. The former aimed at cutting emissions from energy-generating installations, setting reduction targets and allocation rules at the EU level. The latter aimed for emissions cuts in non-ETS sectors (transport, buildings, agriculture and waste treatment), setting national binding reduction targets but otherwise no requirements as to specific national instruments. The transport sector was specifically targeted by four of the six policy instruments: the Effort-Sharing Decision (with transport one of the main emitting non-ETS sectors), the Renewable Energy Directive (binding targets for a 10% share of renewable fuels and sustainability standards for biofuels); the Car Emissions Regulations (applying directly to car manufacturers and thus not subject to legal transposition, setting individual company emissions standards for new cars based on weight); and the Fuel Quality Directive (requesting governments to facilitate the introduction of new biofuel blend standards – complying with given sustainability standards, and fuel suppliers to ensure lifecycle emission reductions of CO₂ for all fuels sold). The latter three are all mentioned in the Effort-Sharing Decision as ‘assisting’ instruments for emissions reduction cuts in the non-ETS sector of transportation. The present report thus presents all transport-related implementation data under the heading Effort-Sharing Decision, even when related to the Renewable Energy Directive, national policies in support of cutting emissions from cars (Car Emissions Regulations) or fuels (Fuel Quality Directive).

5.1 Implementation timeline: shifting governments and their general energy/climate policy orientations

Implementation of the EU energy and climate package took place under shifting German federal and state governments in the period 2009–2014.²⁶ Initial steps were taken by Angela Merkel’s CDU/CSU and SPD grand coalition government, which was also in charge of negotiating the package. This government in many ways anticipated coming EU legislation, and adopted policies that paved the way for later implementation. Immediately after the EU Council had agreed on the 20-20-20 targets back in 2007, the government’s *Meseberg Declaration* stated that

²⁶Elections to the German state parliaments, non-coordinated in time with federal elections, gave variously overlapping and differing political party majorities in the Parliament and Federal Council during 2009–2013. The CDU/CSU/FPD majority in the Parliament saw absolute majority in the Federal Council only until 7 October 2010. The CDU/CSU/SPD majority in the Parliament from 2013 has a majority also in the Federal Council, but so has also an alternative majority of SPD and the Green Party.

Germany would spearhead the new EU integrated package approach with a national 29-point Integrated Energy and Climate Programme (IECP) aimed at balancing the three objectives of security of supply, economic efficiency and environmental protection. Under this package, the government proposed policy measures deemed nearly sufficient for reaching the national 40% GHG emissions reduction target already set up by the previous SPD–Green Party government, promising additional measures if the EU would raise its ambitions to 30% by 2020. The package also proposed new higher national targets for energy productivity and renewable energy, the latter specified as sub-targets for various sectors: increase the share of renewables in electricity consumption to 25–30% by 2020 (12% in 2006); to 14% in heat consumption (6% in 2006); and to 17% in the consumption of transport fuels (6% in 2006). A 10% share of biogas fed into the natural gas grid was set as target for 2030. The overall energy efficiency target set was to double national energy productivity by 2020 compared with 1990. A sub-target here involved doubling the share of electricity generated in combined heat and power plants (CHP) to 25% by 2020 (Federal Environment Ministry, October 2007). The ambitiousness of these targets largely exceeded those adopted for the EU as a whole.

The 2007 Meseberg Declaration anticipated new car emissions regulations, stating that the government would work for the 120 g/km-standard proposed by the EU (10 grams to be achieved by measures outside the vehicle). The government also pledged to work for a reformed EU-level ETS to include air traffic and shipping, and to provide incentives for CCS, where the goal was to take the lead in EU technology development by constructing two or three demonstration plants on German soil.

Policy measures adopted by the government in two sub-packages during 2007 and 2008, in parallel to negotiating the EU package, targeted broad sectors of the German economy. Such measures included new or amended legislation and a series of new or amended programmes that raised the level of government funding for energy efficiency and renewable energy measures aimed at cutting emissions and increasing the use of renewable energy in ETS as well as non-ETS sectors. Acknowledging that governmental funding from tax revenues and reallocations within the federal budget made the level vulnerable to political negotiations, the government proposed including revenues from the sales of the emissions certificates, expected to increase after 2009, reflecting planned higher levels of auctioning (10% of total allowances) under the German second National Allocation Plan (NAP II). The auctioning revenues would be placed in a special National Climate Initiative fund, to support national and international climate-mitigation projects.

Important in the Meseberg Declaration were the links to the government High-Tech Strategy adopted in 2006, promising upscaling of coordinated public–private funding of innovation, and aimed at upholding Germany's standing as the world's leading export nation for mechanical and automotive engineering products and other technology fields in the new globalization era. According to this strategy, Germany cannot compete as to costs, and pioneering innovation in new resource- and energy-efficient

production processes, products and service markets would be needed in order to maintain a competitive advantage. Innovation in electromobility was specifically mentioned as important for the national competitiveness of the automotive industry, followed up with a National Plan for Electromobility in 2009.

After Bundestag elections in 2009, Angela Merkel formed a new conservative–liberal coalition government (CDU/CSU and FDP). In autumn 2010, this government produced a new energy policy declaration, called the Energy Concept (Federal Ministry of the Environment Nature Conservation and Nuclear Safety, October 2011). The focus was now extended to the *long term*, staking out a national transition towards a renewable energy-dominated energy system by 2050. The major change from the preceding government policy package was the decision to postpone the phase-out date for nuclear energy that had been decided back in 2000, as a measure to contain the costs of the energy transition. The Energy Concept report formulated long-term 2050 targets for the share of renewables in total gross energy consumption (60%), electricity supply (80%), reduction in primary energy consumption (50%), reduction in final energy consumption (40%) and electricity consumption (25%). A key measure was the doubling of the annual rate of energy-retrofitting for buildings (2% of existing buildings per year).

The Energy Concept report launched a broad but gradual reform of national renewable energy policies, replacing the feed-in tariff system with a market-adapted system (direct marketing, market premiums and tendering). Major reasons were given as being the escalating costs to consumers, as well as the security-of-supply challenges entailed in a growing volume of intermittent renewables and parallel challenges for conventional baseload power capacity. Continuation of CCS technology investments (upholding the goal of at least two EU-funded projects on German soil) was deemed important to ensure a future for German coal-based power generation.

The Energy Concept report further stated that the National Climate Initiative Programme would be continued, expanded with new government programmes for funding energy-efficiency investments – like making new buildings climate-neutral by 2020, and progress in the pace of refurbishing existing buildings. Higher pressure would be put on industries for energy savings; and action could not be documented (e.g. by installing proper energy management systems), relief from national eco-taxes would be withdrawn. Generational fairness in financing sustainable energy was emphasized as a guiding principle, implying that budget allocations would be kept in check, complementing the new energy and climate fund with payments by power-plant operators, and, from 2013, more revenues from auctioning emission allowances. The Electric Mobility Strategy was strengthened, with the addition of a new 2030 target of 6 million vehicles on German roads by 2030.

Acknowledging the contentious nature of various energy issues (end-date for nuclear power, deployment of renewable energy, electricity grid expansion, CCS acceptance), the Energy Concept report stated the need for consensual policymaking. A new policymaking model was launched,

where all affected ministries would form a strategic group to provide inputs to reports co-drafted by the ministries of the environment and economics/energy. Business groups and NGOs would be invited to provide inputs through the Forum for the Integration of Renewable Energy, and hearings would be conducted with legislative groups, federal states and unions. Online information platforms and dialogue forums on ‘sustainable energy supply’ would be established to ensure transparency, seen necessary for higher acceptance of various technology solutions.

The decision to postpone nuclear phase-out was met with massive protests, escalating when hundreds of thousand people took to the streets after the March 2011 earthquake in Japan, tsunami flooding and the ensuing meltdown at the Fukushima nuclear power plant. Execution of the Energy Concept was hastily altered with a new eight-bill energy transition policy package (hence called *Energiewende*) adopted on 6 June. This policy package reinstated the 2022 nuclear phase-out date and proposed the immediate closure of eight reactors; moreover, it proposed changes to the renewable energy support system, more authority to the Federal Network Authority in coordinating and accelerating state-crossing infrastructure, further unbundling of national transmission systems, transferring all revenues from auctioning of emissions allowances to the energy and climate fund, and providing the states with a climate protection clause that would give them more authority to stipulate legal provisions in the use of renewable energy and CHP.

The subsequent grand coalition government (CDU/CS and SPD) formed after the 2013 elections, the third government of Chancellor Angela Merkel, upheld the 40% national GHG emissions reduction target for 2020 and announced in its coalition agreement that it would work to get this target adopted by the EU as a whole for 2030. The agreement also upheld the triple goals – climate and environmental compatibility, security of supply and the affordability of power – as being equally important, adding that, with further expansion of renewables, the cost efficiency of the overall energy infrastructure must be borne in mind, including grid expansion and the necessary backup capacities. The government parties agreed to continue the *Energiewende*, upholding ambitious targets for renewable electricity, now formulated as legally binding corridors for expansion: 40% to 45% by 2025 (replacing 35% by 2020 and 50% by 2030 under the Renewable Electricity Sources Act), 55% to 60% by 2035 (replacing the previous goals of 50% by 2030 and 65% by 2040).

For further governance of the *Energiewende*, the government decided on organizational restructuring: to let BMWi take over control from BMUB, including the renewable energy policy portfolio. Reforms of the Renewable Energy Sources Act (EEG), promised by Easter 2014, would include a stepwise approach towards greater market integration of renewable electricity producers. Now the European Commission sought to influence these reform measures, deciding in December 2013 to start formal in-depth investigation of German discounts of feed-in surcharges for energy-intensive companies and electricity producers. Chancellor Merkel responded that her government would continue to argue for the legality of the system and its necessity for Germany to remain a strong

industrial location (*German Energy Blog*, December 18, 2013. The Commission simultaneously published new ‘Draft Guidelines on Environmental and Energy State aid for 2014–2020’, aimed at preventing decarbonization of the energy supply from curtailing the integration of the EU internal energy market. In spring 2014 the German government closely coordinated its national reforms with national responses to EU-level processes (details below).

5.2 Closer scrutiny of Implementation Processes

5.2.1 The Renewable Energy Directive (RED)

Part of the national integrated climate and energy policy package proposed by Germany’s grand coalition government in 2007, anticipating EU legislation and enacted by the Bundestag in 2009, were changes in national policies concerning renewable electricity, renewable heat and renewable transport fuels. The long-existing Renewable Energy Sources Act (EEG), providing for a feed-in-tariff system to promote renewable electricity, was amended with higher tariffs for specific technologies, except for solar PV where more rapid tariff degression rates were decided. To shelter major energy-intensive companies from paying the general feed-in-surcharge, a new ordinance was introduced giving large rebates to German energy-intensive companies. A new Renewable Energy Heating Act instructing house-owners to cover heating needs partly by renewable energy (or alternatively ensure better isolation/or heat from CHP); and the Market Incentive Programme that provided investment support was upscaled (€426 million in 2009, from 237 million in 2008), (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, July 2013). Policies for supporting renewable transport fuels were significantly altered (to be further addressed under the heating Effort-Sharing Decision).

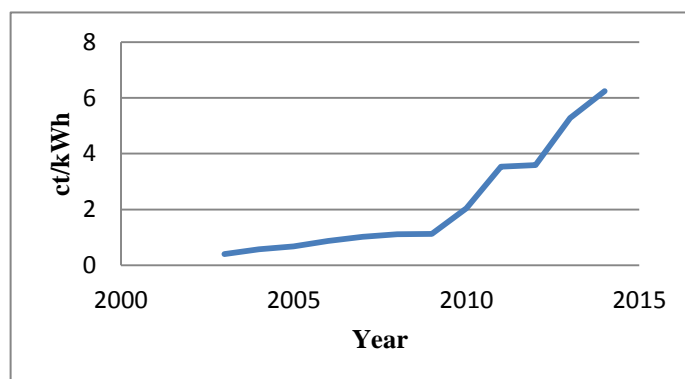
The subsequent CDU/CSU/FPD government became responsible for final transposition of the Renewable Energy Directive (RED), submitting the National Renewable Energy Action Plan (NREAP) to the European Commission on time in 2010. The report outlined German implementation as principally the continuation of existing national policies, but noting that amendments to the feed-in tariff system would be carried out in 2012, with reference to its Energy Concept in the making. The NREAP did not specify any use of flexible cooperation mechanisms in German renewable energy policy. RED suggested that member states could use such mechanisms voluntarily in order to reduce implementation costs in case of over-compliance with target trajectories in the period up to 2020.

Policy development and on-the-ground implementation for renewable electricity

By 2010, on-the-ground implementation was progressing rapidly as regards renewable electricity – hardly surprising, since market risks for investors had been removed by the feed-in-tariff system that granted priority access to the grid and a guaranteed market-price-independent payment for 20 years. Growth rates were especially high for solar PV

installations: total capacity increased from less than 4 GW in 2007 to above 17 GWh by 2010. The share of renewables in total electricity consumption increased from around 14% to 17% in the period. This spectacular implementation success also caused worries, however. Growing volumes of renewables also meant growing costs for German consumers, as reflected by the sharply increasing surcharge paid per kWh to maintain the feed-in tariff rates.

Figure 1. Annual feed-in surcharge per kWh, for German household consumers



Source: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (July 2013) Renewable Energy Sources in Figures, National and International Development

This led to pressure for reform of feed-in tariffs, specifically for reducing the tariffs for solar PV production. While tariff-rate adjustments (degression of rates) to accommodate technology cost reductions were already part of the system, these had clearly not kept pace with the massive technology cost reductions experienced in this technology, giving investors excellent profits. In early 2010, the federal government therefore proposed more rapid degression rates for solar PV tariffs. This was largely accepted by the Bundestag, but the solar industry objected, and governments at the state level were lent an ear. When state government representatives met in the Federal Council to vote on the proposal, a majority demanded that the proposed tariff degression rates be moderated, and voted for mediation with the Bundestag. The compromise entailed slower degression rates finally enacted by the Bundestag and endorsed by the Federal Council in May 2010.

In autumn 2010, the government adopted its Energy Concept agreement (postponing nuclear phase-out), which also signalled more fundamental reforms of national renewable energy policies in 2012. Continued growth in solar PV investments spurred the government in its reform work. In early 2011, it proposed to speed up further downward adjustments of the solar PV feed-in tariffs – this time after first settling and agreement with the solar industry. Amendments agreed by the Bundestag in February included downward adjustments of solar PV tariffs and reduction of the green power privilege for utilities that had formerly been exempt from paying the surcharge if they supplied electricity originating at least 50%

from renewable energy sources (*German Energy Blog*, 25 February 2011).

The March 2011 Fukushima meltdown in Japan changed the atmosphere for government work on more fundamental reforms. Revoking its 2010 decision to postpone the nuclear phase-out and deciding the immediate shut-down of eight nuclear power reactors also meant more focus on renewable energy in a low-carbon energy transition. Part of the eight-point post-Fukushima package of energy and climate policies was a bill for amending the legal framework for the promotion of electricity generation from renewable energy sources that also included proposed changes in the Renewable Energy Sources Act (EEG). To start preparing a more fundamental reform aimed at greater market integration of renewable electricity producers, the government proposed an alternative *optional* market-premium system that investors could choose instead of traditional feed-in tariffs. Amendments to the Renewable Energy Sources Act (EEG) included further reduction in feed-in tariffs for solar PV, simplifications of rules for support to biomass – but also higher feed-in tariffs for certain technologies (offshore windpower, hydropower and geothermal energy).

Both the Bundestag and the Federal Council welcomed the nuclear phase-out package and responded swiftly, to get a deal settled before the summer recess. On 1 July 2011, the Bundestag endorsed the package, following amendments by the Environment Committee.²⁷ Federal Council expert committees proposed various modifications to the EEG amendment bill, but in its final voting, the Federal Council this time decided not to involve the Mediation Committee, because of the tight time schedule (*German Energy Blog*, 8 July, 2011).

The amendments, like those before, did not slow down investments in solar PV, however. Now, the major volumes of renewables dispatched also came with more profound effects on the German electricity market, where wholesale spot market prices began a downward trend. In the period 2011 to 2014, wholesale prices on the Leipzig power exchange EEX fell by 32% (Bloomberg, 3 January 2014). Particularly sharp price reductions were seen in peak-price hours (daytime peak demand), reflecting the high combined output from solar and windpower plants during these hours. Also frequently observed were short periods of negative wholesale prices, when demand was low and output from wind and solar power generation plants very high. In these periods, grid stability became challenged. Producers of renewable energy had no incentives to cut down production because of guaranteed payments and priority dispatch. Producers of conventional power faced negative prices, entailing that they had to pay for getting their power dispatched in the market, caught in the dilemma of whether to pay or bear the costs of stopping/restarting their plants.

²⁷ The provision on self-consumed solar energy (Section 33 para 2 EEG) was extended. The capacity limit of 500 kW was kept and not reduced to 100 kW. Other Environment Committee amendments related to onshore windpower feed-in tariffs. Cuts of certain tariff bonuses contained in the previous version were now revoked.

The falling and more volatile prices caused comprehensive problems for the incumbent utilities, however. Lower peak-load prices made their peak-load plants (mainly gas-powered plants) lose operation time and revenues needed to cover investment costs. The utilities therefore started mothballing and even planning early retirements of plants. In response, the government intervened with a ban on early retirement of certain plants, in order to maintain sufficient reserve capacity for periods with poor weather conditions for solar and windpower generation. For the utilities, such stranded asset costs came on top of the now unavoidable nuclear power plant decommissioning costs after 2011 phase-out decision. According to *The Economist* (12 October 2013), Germany's top utilities, E.ON and RWE saw net income from conventional power generation fall by a third from 2010 to 2013. The effect on company profits and share values was harsh: E.ON saw share prices fall by 75% from the peak in 2008. In 2013, RWE recorded a net loss for the first time since the Second World War (RWE Press Release, 4 March 2014).

For most German electricity consumers, however, falling wholesale prices did not mean lower power bills, because of higher feed-in surcharge rates. Paradoxically, this rate increased because of the falling wholesale prices, since it was calculated to cover differences between the fixed feed-in tariffs and the wholesale price. These spiralling surcharge levels became the main justification for a new proposal in early 2012 that was agreed between the ministers of the environment and economics/energy, entailing an immediate cut in solar PV feed-in tariffs by 20% and additional monthly reductions from May 2012. The proposal meant that operators of plants commissioned after 9 March 2012 would not receive guaranteed feed-in payments for all electricity generated, but would be required to get some revenues via direct marketing, starting from January 2013.²⁸ It was also proposed to empower the Ministry of the Environment (BMUB), in cooperation with the Ministry of Economics/Energy (BMWi), to issue ordinances for speeded-up tariff adjustments, should investments in solar PV installations deviate from a proposed target corridor of 2,500 to 3,500 MW annually. This corridor was in turn proposed reduced monthly from 2014 to reach the range 900 MW to 1,900 MW by 2017. The proposal also suggested extending the right of the government to issue similar ordinances to producers of renewable energy other than solar PV (*German Energy Blog* March 1, 2012).

The Bundestag endorsed large parts of the proposal, with minor adjustments in technical details and timetables – scrapping, however, the provisions that would have given the government competencies to issue ordinances (thereby reducing the influence of the Bundestag). Opposition parties, first and foremost the Greens, voiced great dissatisfaction with the bill. These parties were part of coalition governments in a majority of the German states, and thus held the majority of representatives in the Federal Council, which objected to the bill and invoked mediation with the Bundestag when voting on 11 May. Voting results showed that more than two-thirds of the representatives were opposed to the bill, including

²⁸ 85% for small-scale plants up to 10 kW, and 90% for those above this limit.

some representing CDU/FDP coalition governments. According to the German Constitution, this meant that also the Bundestag had to muster a two-thirds majority to reject the objection by the Federal Council – a majority not held by the governing parties CDU and FDP. Consequently, the Bundestag entered into negotiations, knowing that amendments would not become legally binding unless a compromise could be found (*German Energy Blog*, 11 May 2012).

The compromise reached in late June entailed reductions in proposed cuts in feed-in tariffs for some groups of solar PV installations. It also entailed accepting the proposed annual corridors for new solar PV capacity, but the proposed degeneration of these was dismissed. A final 52 GW cap for solar PV set at 52 GW was accepted. When this cap is reached, investors in solar PV will no longer receive feed-in tariffs. During negotiations in the Mediation Committee, the federal government pledged a new support programme (loans at reduced interest rates) for decentralized storage facilities, giving PV investors better opportunities to match production with real demand in the market. The moderated bill was subsequently approved by the Bundestag and Federal Council, imposing some new control over German PV investments (*German Energy Blog*, June 27, 2012).

As promised in the 2010 Energy Concept, the federal government continued debating more fundamental reforms of the Renewable Energy Sources Act (EEG). Clear disagreements were publicly revealed early 2013, however, when the Economics Minister Philipp Rösler and Environment Minister Peter Altmaier aired different timetables for such reforms. Rösler called for immediate reform to contain observed spiralling costs, whereas Altmaier proposed postponement till after the autumn elections, in order to secure the broadest possible national consensus. During summer 2013, the European Commission entered the debate, stating that it planned to investigate whether reduced feed-in surcharge rates for selected electricity-intensive manufacturing enterprises and rail operators in Germany represented a breach with EU state aid rules.²⁹ The Commission also stated that that repayment of past exemptions would be assessed (*German Energy Blog*, 14 July 2013).

During the campaigns for the September 2013 elections, political party programmes differed significantly on preferred strategies for the continued transformation of the German energy system. The government parties (CDU/CSU and FDP) opted for exposing producers of renewable electricity to market prices. FDP opted for full replacement of the feed-in tariff system with a system of fixed markets premiums, entailing that

²⁹The surcharge could be limited upon application for manufacturing enterprises if the electricity purchased from an electricity supplier and used by the enterprises themselves amounted at least 1 GWh at a certain delivery point in the last fiscal year and the ratio of the electricity costs to be borne by the enterprise compared to its gross value added was at least 14%. For consumption exceeding 1 GWh up to 10 GWh the EEG surcharge is limited to 10%. It is further limited to 1% for consumption of more than 10 GWh up to 100 GWh and amounts to 0.05 ct/kWh for a consumption exceeding 100 GWh (see Section 41 EEG). 2,357 companies reportedly applied for EEG surcharge limitations in 2014 (2013: 2,055 applications), *German Energy Blog*, July 12, 2013.

producers would face market risks and adopt production to swinging prices. SPD and the Green Party, on the other hand, stated that the future goal – energy supply based fully on renewable energy sources – could not be reached with a full free-market approach, and called for reforms of the planning approach instead. Party programmes also differed as to preferred solutions for containing and distributing costs. Most parties endorsed the idea of reducing general electricity taxes to compensate consumers facing high feed-in surcharges. The FDP proposed funding such tax-cuts over the state budget, whereas SPD and especially the Green Party wanted exempted companies to take a higher share, referring to the investigation underway in the European Commission.

All parties agreed that higher volumes of renewable electricity warranted heavier investment in grids and demand-side management to balance their variability, but they disagreed on *how* to speed up grid development. CDU/CSU and FDP promoted an incentive-based regulatory framework. SPD and the Green Party promoted a planning model with a stronger role for the federal state as direct investor and operator of a ‘German Grid Company’. The Left Party (*die Linke*) called for full socialization of the national grid. The parties also acknowledged that owners of conventional power plants faced challenges in generating sufficient revenues for keeping capacity as back-up for intermittent renewable energy production. The Green Party and the Left Party demanded an immediate ‘capacity remuneration mechanism’ to enable further expansion in renewable electricity capacities. The CDU/CSU, the FDP and to a certain extent also the SPD, saw no urgent need for a capacity mechanism, and advocated mid-term adjustment of market design (*German Energy Blog*, September 9, 2013).

With increasing pressure on Germany, from the European Union and neighbouring countries, for adapting the *Energiewende* so as to avoid negative effects outside its national market, party programmes began paying attention to the issue of national vs. all-EU solutions. All the political parties found the EU’s limits of German energy policy challenging to deal with. They disagreed on whether reliable supply of affordable energy could best be accomplished on the EU or local level. CDU/CSU and FDP focused on accomplishments made in German market coupling. The Green Party and SPD blamed the government for insufficient cross-border interconnection. The Green Party focused on the need for a European capacity market and EU statutes to pull Europe out from coal power, while the Left Party proposed the rather extreme solution of closing access to the German market for other European countries until they abandoned nuclear power.

During the election campaign, the major national industry associations called on the new government to undertake a comprehensive reform of national renewable energy policies. The German Industry Federation (*Bundesverband der Deutschen Industrie e.V. – BDI*) held that energy costs should be the top concern of the new government, together with a new market-based approach for supporting renewable energy and energy efficiency (direct marketing and payment for grid connection costs by the renewable electricity producers, and a market premium deciding the level of support except for non-mature technologies, with the EU ETS the

preferred main tool). Noting previous disagreements between the federal and state-level governments, BDI called for more coordination between the federal republic and federal states in further deployment of renewables. BDI further held that the profitability of conventional power plants should be secured, and that the establishment of a new capacity remuneration system should not be rushed (*German Energy Blog*, September 20, 2013). The German Electricity and Water Industry Association (*Bundesverband der Energie- und Wasserwirtschaft e.V. – BDEW*) and the Federation of German Engineering Companies (*Verband Deutscher Maschinen- und Anlagenbau e.V. – VDMA*) shared these views on reform of the feed-in tariff system but pressed harder for a ‘market for secure capacity’ to acknowledge the importance of non-volatile, flexible power plants for security of supply, adding that offshore windpower could play an important role here. VDMA called for a special Offshore Wind Power Act, separate from the EEG reform, to incentivize investments and cost reductions (*German Energy Blog*, September 11, 2013). The German Renewable Energy Federation (*Bundesverband Erneuerbare Energie e.V. – BEE*) rejected that the market premium model proposed by BDI would lead to lower costs; that around half of the renewable plants were already engaged in direct marketing; and that the existing feed-in tariff system had proven superior efficiency around the world for getting renewable energy into the market (*Bundesverband Erneuerbare Energie e.V.*, September 2013).

In their coalition talks, the new CDU/CSU and SPD government agreed on general guidelines for further reforms: to reduce the surcharge level paid by consumers for renewable energy expansion and to ensure greater market integration of renewables. The coalition agreement set the timeline for a stepwise reform: first introduce mandatory direct marketing for new renewable plants with a capacity of 5 MW; then extend this in 2017 to all plants. As of 2018, the appropriate level of financial support would be decided by auctioning, provided a pilot project in 2016 proved auctioning to reduce costs. Further details came in January 2014: cuts in average financial support across all technologies from the existing 17 ct/kWh to 12 ct/kWh for new installations by 2015; expansion of target corridors also for other renewable electricity than solar PV, combined with adjustable financial support if expansion targets were exceeded or not reached (‘breathing caps’). The national target for offshore windpower would be reduced from 10 GW to 6.5 GW capacity by 2020 (from the earlier target 25 GW to 15 GW by 2030), and no targets would be set for hydropower or geothermal energy. Removing entirely the green electricity privilege for power companies and requiring automobile manufacturers to pay part of the surcharge (to finance grid expansion) was proposed, so as to redistribute the obligations to pay for the *Energiewende*. The government referred to the ongoing revisions of state aid guidelines underway at the EU level and its intentions of influencing these so that they would reflect national realities and ensure future competitiveness of electricity intensive industries (*German Energy Blog*, January 24, 2014). However, unresolved internal government disagreements remained, so three ministries – BMVI (transport and infrastructure), BMEL (food and agriculture) and BMZ (economic cooperation and development) – issued a separate statement specifying that the old support regime should still apply for certain biomass plants.

In February, the BMWi sent out draft bill for broad public consultation, with parallel action before the General Court of the European Union against the Commission investigation. This was a move intended to safeguard Germany's position if dialogue with the Commission should fail – the deadline for challenging the Commission's decision would be 3 March 2014 (*German Energy Blog*, March 6 2014).

Based on the consultations, the BMWi published a new draft bill 1 April, circulating this to top-level municipal and other associations, with a tight review schedule of only one day (*German Energy Blog*, 2 April 2014). The following day (2 April), Chancellor Merkel and economics/energy minister Gabriel (who had served as environment minister in the first Merkel government) held informal meetings with the 16 state leaders. Afterwards, Gabriel declared that a high degree of consensus had been reached. The state leaders had endorsed further pressure on Brussels for keeping feed-in surcharge reductions for energy-intensive companies. Concessions by the BMWi included promises that self-generators would still be entitled to a discount in surcharge payments and that conventional plant owners should pay more than generators of CHP and PV; higher target corridors for offshore windpower (only additional capacity in future plant replacement would count against the target); a lower depression rate for tariffs to offshore windpower; and some concessions to biomass-based plants. All in all, Gabriel calculated that the concessions would amount to no more than a 0.2 ct/kWh higher surcharge by 2020 (*German Energy Blog*, 2 April, 2014).

On 8 April, the government adopted a draft bill outlining the future surcharge exemption scheme, a day before the European Commission announced *its* proposal for new state aid guidelines. The draft bill and the guidelines had undergone major revisions from initial drafts, following considerable debates between the German government, German industry associations and the Commission – debates where also governments and industry associations of other member states were active. Great care had been taken to achieve compatibility of the German draft bill for support to renewable energy with the future state aid guidelines as far as possible because the Commission's consent was needed to the German system detailed in the new bill.³⁰ The next round of consultations focused specifically on this new surcharge exemption scheme.

In early May, the government sent its final proposal for reforms to the Bundestag for first reading, and also Federal Council committees and state governments started assessment work. The Federal Council committees requested about 100 changes, discussed by the council in plenary session on 23 May. The outcome was a demand list of 23 changes to the main bill (19 amendments and four resolutions) and eight for the proposed surcharge exemption scheme. These included upward adjustments in support-eligible quantities of renewables, support thresholds and *de minimis* clauses, and support rates, as well as pushing forward the starting dates for elements of the reform element (*German Energy Blog*, May 23, 2014). The federal government rejected nearly all the proposed

³⁰ Interview with Joachim Hein, BDI, 6 June 2014, Berlin.

amendments, however, reminding the Federal Council of the 1 April agreement with the state premiers.

In early June, the Bundestag held comprehensive expert hearings.³¹ Voting was postponed, however, interrupted by an intervention by the European Commission, which was not satisfied with the proposed surcharge payment scheme. Specifically, it requested that not only new but also existing autoproducers of renewable electricity should pay parts of the surcharge from 2014 – one of the concessions that the federal government had granted to the federal state leaders (*German Energy Blog*, 24 June 2014). The government made additional adjustments, in line with some but not all of the Commission's demands. On 27 June, the Bundestag voted on the reforms. A majority gave its full backing, after heated debate where representatives of the Green Party branded the reform a 'demolition ball' aimed at the Renewable Energy Sources Act (*German Energy Blog*, June 27, 2014). The Federal Council gave its acceptance on 11 July, clearing the way for reforms to enter force on 1 August 2014. Despite loud critical voices, the Federal Council decided not to appeal the Mediation Committee – it stated though that a new round of amendments was to be expected (*German Energy Blog*, July 11, 2014).

Also dissatisfied with the reforms, the head of the European Commission's energy service, Günter Oettinger, stated the need for Germany to proceed with new, far more fundamental reforms, taking the full step towards Europeanization of its renewable energy support system (PV Magazine, 23 July 2014). Commenting on this, Chancellor Merkel noted in her speech to the Bundestag prior to the summer recess that 'after the reform is before the reform': new reforms would soon be needed due to pressure from Brussels (PV Magazine, undated).

If we turn to implementation on the ground, however, the government reforms seem to have worked in slowing down what the government considered as a 'too successful implementation'. Table 1 illustrates this with figures for solar PV investments in Germany: we see how installation of new PV capacity first slowed down from the boom years 2010–2012, when new installed capacity had surpassed 7 GW annually, to 3.3 GW in 2013. During the first nine months of 2014, 1.6 GW had been added, with figures for August and September 2014 (after the latest reforms started to apply) more than halved compared to the same months in 2013 (*German Energy Blog*, 4 November 2014).

³¹ The list of experts heard includes representatives of the regulator, the Federal Network Agency, energy and industry associations, trade associations, economic and energy-related research institutes, renewable power plant operators, transmission system operators and conventional power plant operators (*German Energy Blog*, 2 June, 2013).

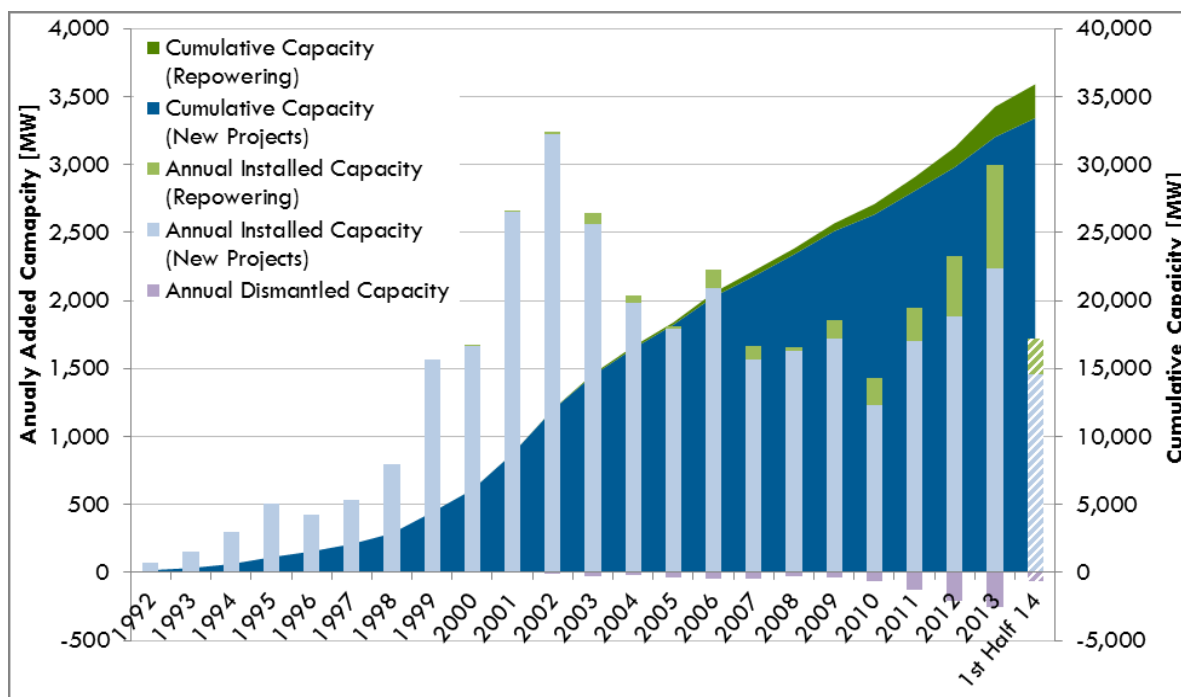
Table 1. New and total installed capacity of solar PV in Germany, 2008–2014 (MW)

	2008	2009	2010	2011	2012	2013	2014 (30 Sept.)
New capacity		4,446	7,377	7,485	7,604	3,302	1,607
Total capacity	6,120	10,566	17,943	28,428	33,032	36,336	37,947

Source: Bundesnetzagentur figures collected and presented by the German Energy Blog, 4 November 2014

As for the other main source of renewable electricity invested in, windpower, a total of 34 GW land-based capacity had been installed in Germany by the end of 2013. On top of this, Germany had installed around 900 MW offshore capacity (EurObserver, 2014). In contrast to solar PV, annual capacity-added continued to grow during 2013 and half-year figures indicate growth also for 2014.

Figure 2. Annual and cumulative installed windpower capacity in Germany, 1992–2014



Source: Deutsche WindGuard GmbH (2014).

All in all, the share of renewable energies in sourcing total electricity consumption in Germany increased from 14% in 2007 to 25% in 2013 (27% for the six first months of 2014). This shows that Germany's approach to assimilating the Renewable Energy Directive with existing national renewable electricity policies resulted in very successful on-the-ground implementation performance for the electricity sector.

Policy development and on-the-ground implementation for renewable energy in heating

The renewables targets set in the Renewable Energy Directive apply for shares of total energy consumption, however – not only shares of electricity consumption. Assessments by the European Environment Agency (2014) show that Germany by 2012 was on track to meet this wider target, largely because of the electricity transformation. By comparison, the share of renewables in German heat consumption levelled off in the period 2010–2013 at around 10%, up from 7.5% in 2007–2012 (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, July 2013). For renewables in total transport fuels, the share actually declined between 2007 and 2012 (further presentation below under the heading Effort-Sharing Decision). This indicated slow on-the-ground implementation.

The national target for renewables in heat consumption set in 2007 was 14% by 2020. This involved major policy instruments enacted in 2009: a Renewable Heating Act and extra funding of investments through the Market Incentive Programme that from 1999 had used revenues from the eco-tax to support heat generation from biomass, solar and geothermal energy, via loans from the government-owned investment bank KfW at reduced interest rates and partial debt acquittal (larger installations) or grants (smaller installations). In 2009, the Market Incentive Programme was scaled considerably up (€426 million in 2009, from €237 million in 2008) (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, July 2013).

From 2010, extra and less budget-cycle dependent funding was expected from the decision to use all ETS auctioning revenues for climate-mitigation investment measures. However, because of the collapse in allowance prices and auctioning revenues, the amount of funds actually made available did not meet initial expectations. In its budget proposal for 2010, the federal government proposed a freeze on energy efficiency and renewable heat investment programmes, in line with the general budget freeze (*German Energy Blog*, May 5, 2010). The proposal was scrapped after an appeal from the Federal Council which held that a stop in renewable heat investments would have particularly severe effects on employment.

However, funding through the Market Incentive Programme was still scaled down to €346 in 2010 and €229 in 2011. In 2011, the government proposed and the Bundestag/Federal Council accepted changes to the Renewable Heating Act, obliging owners of German public buildings to ensure that a higher share of heat consumption would be covered by renewables (up from 15% to 25%) and to extend this obligation to

existing public buildings, not only new ones. This amendment nevertheless also stipulated a hardship clause, whereby for municipalities in financial difficulties could be exempted from the obligation. In 2012–2014, federal budgets again secured incremental increases in the Market Incentive Programme, also reflecting the higher level of ETS auctioning from 2013.

Summary – implementation of the Renewable Energy Directive

Germany transposed the Renewable Energy Directive correctly and on time and complied with indicative targets for 2011-2012 under the Directive (EEA, 2013:11). Germany scored well on timeliness, reporting requirements and penalty systems established for the national sustainability standard for biofuels (required by the RED and Fuel Quality Directive). The European Commission noted, however, that the German NREAP accounted well for national measures only in renewable electricity and heat, not renewable transport fuels. Also on-the-ground implementation data show that unlike the massive growth in renewable electricity, the share of renewables in heat consumption saw a standstill and the share in total transport fuel consumption saw a reduction.

On-the-ground implementation success for renewable electricity followed from generous support to producers and priority access to the grid through the feed-in tariff system. This also resulted in escalating costs for German households and businesses, and massive losses for utilities based in power generation from conventional energy sources. Proposals for reforming the national support system were curtailed until 2014. Prevailing from August 2014, these reforms were expected to stabilize costs. After this point, we see a noticeable slowdown of investments in renewable electricity.

5.2.2 The EU ETS

On 16 February 2011, the German federal government adopted its proposal for reform of the Greenhouse Gas Emission Trading Act (TEHG) in order to transpose Directive 2009/29/EC into German law. In a press release, BMUB stated that the German Emissions Trading Authority (DEHSt), originally established as the competent national authority for implementing the market instruments of the Kyoto Protocol, would be responsible for monitoring and reporting emissions, in order to ensure a uniform standard across all the federal states (*German Energy Blog*, February 17, 2011). According to the proposal, small-scale installations emitting less than 25,000 tonnes of CO₂ equivalent per year would be entitled to apply for opt-out. An earlier draft that had set this threshold at 15,000 tonnes was altered after opposition from the German Chamber of Industry and Commerce (DIHK), (*German Energy Blog*, January 17, 2011).

The bill proposed that more than 90% of revenues from auctioning allowances should be transferred to a new special energy and climate fund, which would receive additional money from a nuclear power tax. After the March 2011 Fukushima nuclear accident and Germany's

ensuing nuclear phase-out decision, the government proposed that 100% of the auctioning revenues should flow into the fund from 2012.

The bill was not a consent bill. However, Federal Council committees recommended several alterations that included proposals for sharing revenues from auctioning proportionately between and federal and state governments and to compensate states for tax revenue losses resulting from certificate purchase costs being deductible. The Bundestag made some alterations that were accepted by the Federal Council, despite committee requests for mediation. That cleared the way for the new Greenhouse Gas Emission Trading Act in July 2011, within the deadline (*German Energy Blog*, 10 July, 2011).

This notwithstanding, the German government did overstep the 30 September 2011 deadline for reporting its national implementation measures (NIMs) to the European Commission, i.e. the draft plan for allocating allowances to the installations covered by the system in the period 2013–2020. A draft ordinance for this plan was adopted by government in late August 2011, the legal basis for the free allocation to operators of roughly 2,000 installations.

The Bundestag accepted this ordinance late September (*German Energy Blog*, August 27, 2011), but the emissions trading authority DEHSt (Deutsche Emissionshandelsstelle) was delayed in submitting the plan to the European Commission, launching infringement proceedings against Germany in late April 2012 (ENDS Europe, 7 May 2012). A week later, the DEHSt adopted its plans, which showed that around half of German installations deemed at risk of carbon leakage would receive stable annual amounts of carbon allowances throughout the period, while the rest would see a gradual fall in their allocations. DEHSt underlined that these figures could be changed by a possible adjustment by correction factor applied throughout the EU to adjust the volumes of allocations in accordance with the existing budget of emissions certificates (ENDS Europe, 11 May 2012).

The Commission did not accept the German NIMs report, claiming that Germany (as one of only two member states) would use benchmarks for free allocation that were not in compliance with the rules set at the EU level. The main issue of contention was that Germany had included a hardship clause in its national Greenhouse Gas Emissions Law, used as basis for the allocation plan. Additional allowances had been allocated to a small number of installations, justified by the principle of proportionality enshrined in the German Constitution. Another issue of contention had its roots in German misinterpretation of EU rules.³²

Germany continued lobbying for its plan, postponing the European Commission final decision to 5 September 2013 and upholding its demands for revisions of the plan (European Commission, 2013). The Commission had now undertaken a full review of all national allocation plans, and had concluded that these in sum exceeded the maximum

³² Interview with Jan Scharlau, BMUB, 4 June 2014

amount of allowances available in 2013. In response, the Commission decided a cross-sectoral correction factor as provided for in the revised ETS Directive (5.73% cut across sectors in 2013 increasing gradually to 17.56% by 2020). This decision was heavily criticized by VIK, the association representing German industrial and commercial energy consumers, as ‘an attack’ on the competitiveness and viability of the European industry, much of which was located in Germany (*German Energy Blog*, September 13, 2013).

At this point, market prices for allowances were rapidly decreasing, a trend that had started with the financial crisis, prompting the EU to discuss corrective measures. In November 2012, the Commission proposed postponing the auctioning of 900 million allowances as a measure to influence allowance prices. German ministers differed in their responses. Peter Altmaier (BMUB) voiced his support and Phillipp Rösler (BMW) his opposition to such market intervention. This indecisiveness on the part of the German government created uncertainty as to whether other member states would back the proposal, leading the EU executive to postpone preparations for voting (ENDS Europe, 30 November 2012).

Disagreements between the two German ministers continued, with no decision taken before the 2013 general elections. In early November, the new grand coalition government finally reached internal agreement on support for backloading, after massive lobbying activity. SPD was split, with the economics minister of the Nordrhein-Westfalen SPD–Green coalition government warning strongly against the measure, a position shared by the German Industry Federation (*German Energy Blog*, 7 October 2013). Fronting support was a coalition of the German Federation of Electricity Producers (BDEW), the Federation of Municipal Enterprises (VKU), and the federation of Renewable Energy Industries (BEE), (Bundesverband Erneuerbaren Energien, June 2013).

The EU ETS sectors in Germany had long been regulated by successive voluntary agreements for targeted GHG emissions cuts. These agreements were evaluated by the government in 2011, and most industry branches were found to be on track to meeting voluntary targets. This led the government to strike new deals with the federal industry association BDI and the federal association of the energy and water industry BDEW, to enter force from 2013. Under this new arrangement, companies applying for the rebate on the national energy tax must introduce certified energy management systems or audits before the end of 2015. From 2015 onwards, all industries covered by the voluntary agreement will need to prove annual energy intensity reductions with 2013 as base-year, in order to be eligible for continued energy tax rebates.

On-the-ground-implementation of the EU ETS Directive has several dimensions, whether companies regulated under the directive complied correctly with monitoring, reporting and verification rules, important for keeping the integrity of the system, and whether compliance with these rules actually brought about behavioural change that led to lower GHG emissions. This report does not assess the former. Concerning the latter, emissions from energy installations covered by the system increased by

2% in 2013, the first year when the amended directive applied. The main reason was increased use of hard coal for power generation. Emissions from the installations of energy-intensive industries that had already undertaken emissions trading in the second trading period (e.g. refineries, iron and steel and cement production) decreased by 1% (Deutsche Emissionshandelsstelle, 2014). The German Emissions Trading Authority reported 1,929 EU ETS sector installations emitting 481 million tonnes of carbon dioxide equivalents (CO₂eq) in 2013 – a quarter of all emissions within the EU ETS sector. These had a calculated annual share of 416 million tonnes of CO₂eq in the total budget (average share over the entire trading period). Installations covered included 992 energy installations and 937 industrial installations. Extending the scope of greenhouse gases (GHGs) and sectors meant that around 400 new installations became covered by the system in 2013 (ibid).

The scope of free allocation was 169 million emission allowances, with an additional 194 million allowances auctioned at the Leipzig Energy Exchange in 2012 and 2013. The sum of the reported emissions exceeded the issued allowances by 118 million emission allowances in 2013, meaning German companies were net buyers. Industrial activities had an over-allocation of 12 million allowances in 2013. Taking into account that the 2013 allocation for waste gases from iron, steel and coke production and imported heat (a total 18.5 million allowances) would be offset between installation operators, the industrial sector had a deficit in 2013 of some 6.5 million allowances. However, with about 103 million allowances transferred from the second trading period, the industrial sector still had a total surplus of 84.3 million allowances.

In 2013, the energy sector emitted approximately 323 million tonnes of CO₂ in excess of the free emission allowances allocated. The free allocation for power generation was completely replaced by auctioning in the third trading period, when energy installations obtain free allocations only for heat production. The ratio of allocation to verified emissions for energy installations was therefore only 9.5%. Operators of large power-generation combustion plants received only 8% free emissions allowances (heat generation). That means that necessary acquisition covers 92% of their liability in contrast to the last trading period, when these operators had to acquire on average 22% of emission allowances in addition to the free allocation to compensate for their emissions. The four major German energy utilities RWE, Vattenfall, E.ON and EnBW accounted for 70% of emissions not covered by free allocations. Emissions from RWE and Vattenfall installations had remained high, hardly decreasing during the 2009 financial crisis. Compared to 2012, emissions from RWE Group installations decreased by 4% in 2013m whereas emissions from Vattenfall Group installations increased by 6%. For E.ON, emissions decreased slightly, by 1% (more from coal-fired power plants and less for natural gas-fired power plants). And at EnBW, emissions rose steadily since the economic low in 2009, by 21% from 2012 to 2013.

Summary – implementation of the EU ETS Directive

Germany undertook timely and correct legal transposition of the EU ETS Directive into national legislation, but there were delays in reporting on National Implementation Measures (NIM), and I getting this NIM report accepted by the European Commission. On-the-ground implementation by sectors covered by the EU ETS, as indicated by developments in emissions during 2013, show mixed results. Emissions from the power sector increased, because more hard coal and less natural gas were used as input in power generation. Emissions from the industrial sector went down. German EU ETS sectors were regulated also by parallel agreements negotiated with the government, the most recent one entering into force in 2013, incentivizing the installation of energy management systems and, from 2015, annual reduction in energy intensities.

5.2.3 The CCS Directive

The CCS Directive instructed the member states to establish an institutional structure for making inventories of national storage sites, and establish authorization and control systems to ensure environmentally safe storage of carbon. While not directly instructing the member states to make use of this option for decarbonizing the energy system, the Directive encouraged this through additional policy measures – funding through the EU Economic Recovery Package and the NER 300 mechanism and instructions made in parallel amendments to the Large Combustion Plant Directive for operators of large combustion plants to assess the technical and economic conditions necessary for future application of carbon capture and storage. The CCS set 25 June 2011 as the deadline for transposition and 30 June 2011 as the deadline for reporting on implementation, including storage registers.

Several companies had invested in small-scale demonstration of CCS technology in Germany from the early 2000s. By 2007, major German utilities had variously developed plans for full-scale demonstration of CO₂ capture from coal-power plants and for storing CO₂ at identified underground facilities, the most promising in the states of Schleswig-Holstein, Niedersachsen and Brandenburg (Eikeland, 2013). Local concerns with safety of underground storage were strong, however.

In its 2007 integrated energy and climate package, the government pledged to continue assessing the technical, environmental and economic feasibility of CCS technologies through continued demonstration, and held CCS technologies to be fundamental to the survival of national lignite and coal-burning power stations under a tightened emissions trading scheme. Referring to agreements made at the EU level, the German government announced plans for constructing at least two or three of up to 12 demonstration CCS power stations planned to be built across the EU, and the earliest possible implementation of smaller-scale CO₂ storage projects. Taking into consideration the results of relevant R&D projects, it promised to draw up proposals for a ‘capture-ready’ standard for new power stations at the EU level.

The German government also pledged speedy adoption of a suitable legal framework to ensure a stable basis for investments and operation. Here the government stated its intention of including a provision in the Federal Regional Planning Act that would empower it to set binding stipulations in plans concerning spatially significant projects and measures of national significance relevant to climate protection – so as to make it possible to secure significant locations for CO₂ storage across the country. The government further stated that it was making vigorous efforts to get CCS included in the European Emissions Trading Scheme and incorporated into the post-Kyoto regime.

The government speeded up work on drafting a comprehensive law tailored to full-scale CCS. Finished on the expert level, the bill was not brought into the Bundestag, however. The government observed that planned storage projects in the state of Schleswig-Holstein were subject to comprehensive political disputes. The state-level government refused to give the necessary permits to the project developers (*Spiegel Online International*, 20 August 2010).

After the 2009 general elections, the new federal government retained the commitment to CCS, according it an integral place in German long-term energy transition as formulated in its 2010 Energy Concept. In view of local public and political opposition, however, the government re-drafted the bill, scaling down volumes of CO₂ that could be stored, to be better adapted for demonstration rather than full-scale plants. The new version of the bill limited carbon storage to 3 million tonnes per year, with no more than 8 million tonnes of CO₂ to be stored nationwide per storage operator. It further stipulated that evaluation of CCS sites must include consideration of alternative claims for ground use, and provide protection for the rights of property owners as well as possible financial compensation for affected communities (*German Energy Blog*, July 14, 2010).

Public protests against transport pipelines and underground storage intensified, very much a parallel to what had been observed in localization debates for nuclear power and nuclear waste storage plants, gathering a broad coalition of people and societal groups. The issue thus challenged local politicians' opportunities for re-election, clearly illustrated by the situation in Schleswig-Holstein and Niedersachsen. Both states had CDU–FDP coalition governments, political parties very much in favour of applying CCS technology. Both local governments were active lobbyists against the new law, with Minister-President of Schleswig-Holstein at the forefront, demanding an opt-out clause for the federal states – so that they could themselves decide not to authorize storage sites on their lands.

Major postponements in legislation followed, with a split in the federal government appearing after the CDU federal-level Minister of the Environment had apparently promised his party colleague heading the government of Schleswig-Holstein that the federal states would be allowed to opt out from authorizing storage plants (*Spiegel Online Wissenschaft*, 10.9.2010). In April 2011 came a new draft bill that included a clause allowing federal states to designate areas for CCS pilot

projects and areas banning such projects, on the basis of specific criteria. The concession given to the states of Schleswig-Holstein and Niedersachsen was now contested by the government of Brandenburg, another state that was home to CO₂ storage testing projects. Here there was lobbying in favour of the new CCS law, as it was feared that a ‘no’ from the geographically more suited North German states would put a stop to the use of coal for the future de-carbonized energy system (*Die Welt* 13 April 2011). The Bundestag approved the bill in July before its summer recess.

Germany was now threatened with EU infringement proceedings, having missed the deadline for transposing the Directive. As this was a consent law, however, approval was first needed by the Federal Council, which failed to agree before the summer recess. In September, the Federal Council voted and rejected the bill, which led to mediation with the Bundestag for a compromise.

After months of political stalemate, the Mediation Committee of the Bundestag and the Federal Council reached agreement on the bill in late June 2012. The compromise had now scaled down annual storage limits to no more than 1.3 million tons of CO₂ and a maximum storage capacity of 4 million tons of CO₂ in Germany. The agreement further extended the post-closure obligations of storage operators from the proposed period of 10 years to 40 years, increasing the risks for investors (*German Energy Blog*, June 29, 2012). In a statement for the minutes, not formally part of the recommendation delivered by the Mediation Committee, the government highlighted the European dimension of CCS technology and pledged to support the federal states in research projects intended to expand Germany’s leading position in the field of CCS research.

The CCS demonstration law was finally adopted on 24 August 2012. While the federal government had initially planned to adopt the Directive in a way that could facilitate capture and storage, and ensure the construction of at least two of the NER 300 demonstration plants on German soil, the downscaled carbon levels allowed for storage and the opt-out clause for the federal states meant that none of the initially planned demonstration plants would come on stream. Already in December 2011, Vattenfall AG, operator of the most mature plans, announced that these would be cancelled, including a NER 300-sponsored demonstration project (CO₂ capture at its Jämschwalde coal plant and exploration of storage facilities in Eastern Brandenburg).

However, Germany did report on implementing the amendment to the Large Combustion Plant Directive associated with the CCS Directive. In July 2009, authorization of a new combustion plant in Mannheim came to include setting aside land for installing later retrofit for CO₂ capture (European Commission, 2014).

Summary – implementation of the CCS Directive

Germany experienced major delays in implementing the CCS Directive. While the federal government had initially planned to adopt the Directive in a way that could facilitate capture and storage, and ensure the

construction of at least two of the NER 300 demonstration plants on German soil, the transposed Directive strictly limited the volumes to be stored under German soil and secured opt-out for the federal states in authorizing such storage. On-the-ground implementation followed from this. All initially planned CCS demonstration plants were cancelled.

5.2.4 The Effort-Sharing Decision

Being a decision and not a directive, this piece of EU legislation was not to be transposed. The direct legally binding target for Germany was set at 14% reduction in GHG emission by 2020 for non-ETS sectors (buildings, transport, waste and agriculture). Member states were free to adopt measures to achieve the targets set for them, although additional EU policies adopted as supporting measures under the package required formal government transition (e.g. the Renewable Energy Directive and the Fuel Quality Directive). The totality of policies adopted in Germany for cutting emissions from the non-ETS sectors is not addressed in this study. Our focus is on policy measures adopted for the two main emitting sectors: transport and buildings. In the period studied, Germany experienced considerable problems with the Effort-Sharing Decision.

5.2.4.1 Measures adopted for the buildings sector

Policies adopted for the buildings sector targeted fuel conversion to renewables and energy savings. The former included the Renewable Energy Heating Act, specifying that new buildings must have given shares of heating needs covered by renewable energy sources (or CHP), and associated Market Incentives Programme to support renewables investments in new buildings and for refurbishing old buildings. As these policies were part of transposing the Renewable Energy Directive in Germany, data on the implementation process have been presented above.

Similar programmes targeted energy-efficiency investments in buildings. Germany has had subsidies and preferential loans through KfW low-energy programmes since the 1990s. Also ordinances concerning thermal insulation and heating installations had long existed in Germany, but the 2002 Energy Saving Ordinance replaced these with minimum binding requirements for the energy quality of the cladding and systems engineering in buildings. The 2007 Integrated Energy and Climate Programme of 2007 set the target of 30% energy savings for new buildings by amending the Energy Conservation Act, the Energy Saving Ordinance Amendments and the Heating Costs Ordinance, the latter providing stronger incentives for tenants to save energy. Amendments were enacted in 2009 as well as extension of funding programmes for energy savings in new and existing buildings. Additional non-monetary measures included various information measures, like energy certificates of new buildings existing since the 1990s, which (in line with EU regulations) in 2009 was extended to apply to buildings newly let or sold.

The subsequent Merkel II government made energy savings, and in particular savings in buildings, a key part of its energy and climate policy agreement, the Energy Concept. Ambitious targets for cutting energy consumption were adopted for 2020 and 2050; these included the sectoral

target of doubling the building renovation rate from about 1% to 2% per year. A special energy efficiency fund was established from the general 'Energy and Climate Fund', and financing for the existing National Climate Initiative was increased, both in order to enable efficiency measures to be initiated at all levels – municipalities, companies and consumers. The level of funding was around €100m for 2011 and 2012, aiming for an increase to €300m in 2015 (Schlomann et al., 2012). In 2012, amendments to the Energy Conservation Law and Energy Saving Ordinance formalized by law the inclusion of the climate-neutral building standard that was to be met by *new* buildings by 2020, and targets for intermediate consumption cuts for the years 2014 and 2016. There was no tightening of requirements for existing buildings. Energy performance certificates, inspection and control measures were improved, in line with the recast EU Directive on the Energy Performance of Buildings (*German Energy Blog*, 14 October 2014).

As with the Market Incentive Programme (investments in renewable energy), government funding was scaled down for energy-efficiency programmes because of the economic crisis and the collapse of EU ETS allowance prices. Financing for the planned extension of the programme from 2012 had been envisaged to come solely from EU ETS auctioning revenues.³³

Implementation problems were also political in nature. The 2010 Energy Concept included a renovation roadmap for existing buildings. As part of the 2011 post-Fukushima energy and climate package, the German government proposed tax deductibility of energy-efficient building renovation to the sum of €1.5 billion. A majority in the Federal Council opposed the bill, fearing the loss of tax revenues, for which they demanded compensation from the Federation. After nearly one and a half years of negotiations, the Mediation Committee could not agree and the bill was turned down in December 2012. Only partly compensating for this failure, the federal government announced the launch a new KfW Development Bank support programme worth €300 million a year, starting in 2013.

5.2.4.2 Measures adopted for the transport sector

For emissions cuts in the transport sector, the range of measures adopted by Germany after 2007 responded variously to the Renewable Energy Directive, the Fuel Quality Directive and supportive measures for

³³ The plunge in allowance prices cut expectations about the size of the fund. The energy and climate fund received only €75m in 2011, its first year of operation, and not the €300m expected. It spent €47m; the remainder was held over for 2012. The government expected to spend €452m on the fund in 2012, instead of the €780m originally foreseen. Its funding was meant to come from auctioning EU emissions trading scheme (ETS) allowances, but these are currently only worth about €8, and not the €17 assumed in Germany's original calculations. The coalition government agreed in March 2012 to cut the scheme for renewable heat by €100m to €250m in 2012. The Social Democrat Party proposed that the government should integrate the fund into the national budget to stabilize its income, while the Greens called for aviation subsidies to be scrapped (ENDS Europe, 8 March 2012).

national manufacturers targeted by the Car Emissions Regulation. The 2007 Integrated Climate and Energy Package set a 17% national target for share of renewables in transportation fuels by 2020, well above the 10% target set at the EU level. However, after peaking in 2007 at 7.4%, the share was actually down to 5.7% by 2012 (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, July 2013). This indicates implementation problems. National policies adopted by the Merkel I Government in 2007–2009 included revisions of national measures in support of biofuels and policies to support market uptake of more CO₂-efficient cars.

Measures to ensure market uptake of biofuels

Since 2002, biofuels had been granted tax exemptions by the government as part of implementing the 2003 Biofuels Directive. This arrangement was discontinued in 2006, when the government adopted the Biofuel Quota Act that stipulated mandatory blending of biofuels into petrol and diesel, combining this with amendments to the Fuel Quality Ordinance, implementing new European fuel-quality standards intended to guarantee the safety of higher blends of bioethanol in petrol and diesels.

Some biofuels had increasingly been questioned for their sustainability ratings, and the EU package (the Directives on renewable energy and on fuel quality) demanded implementation of sustainability standards for biofuels to account against the 10% national share of renewable energy in transport fuels. Such standards had been developed in Germany before being adopted at the EU level. Germany thus experienced expedient transposition of sustainability standards, including the requirement for biofuel suppliers to document lifecycle potentials for reducing GHGs, as stipulated by the Fuel Quality Directive. The ‘Ordinance on requirements for the sustainable production of biofuels’ (Biokraft-NachV) came into effect in November 2009. To ensure compliance, unions and organizations of the German agrarian and biofuel industry in 2010 created a new certification system. In parallel, Germany implemented similar sustainability standards for liquid biofuels used in electricity generation (Biomass electricity sustainability ordinance – BioSt-NachV).

However, it proved difficult to implement the new fuel standard E10, which allowed petrol to be blended with 10% ethanol, to assist in achieving the 10% share for renewable fuels by 2020. In 2008, the German government reached an agreement with stakeholders and the national car industry to make this standard available at fuel pumps, complementing the E5 standard already there. Environment Minister Sigmar Gabriel made it clear, however, that the plan could be changed if a large number of older vehicles (more than one million) had fuel systems incompatible with the new E10 blend. This proved to be the case. While the German car industry association estimated the number of German-made cars as being well below this figure (about 375,000 vehicles), the association of international vehicle importers VDIK reported that about three million foreign cars in the German market could not run on the new blend. Thus, it was decided to postpone final adoption of the proposed new Fuel Quality Ordinance.

The Merkel II government in 2010 agreed that E10 should be available on the German market from January 2011. Fuel suppliers complied with this one month later. The new fuel was priced similar to standard petrol and slightly lower than the E5 blend, but was nevertheless frequently refused by car owners. An important reason was the signs displayed on the pumps, warning that cars would need compatibility checks to avoid being harmed by the new fuel mixture. The fuel companies had not arranged for a list of compatible cars at the filling stations, and pump owners were not allowed to give advice because of warranty issues. Indeed, car owners faced major problems finding such lists anywhere (*Spiegel Online*, 4 March 2011). Fuel customers thus opted for standard petrol or the E5 blend instead. As a result, these fuels rapidly became sold out, rather leaving the suppliers with large unsold volumes of E10.

The media blamed the government and petroleum industry for the failure. However, German consumers were also listening to scientists and green groups that pointed out how some biofuels could do more harm to the environment than conventional fuels – for instance, if rainforests were cleared to make way for fuel-crop production. These groups called for German transport policies to promote electrical cars and hydrogen fuel instead. In March 2011, the German government held crisis talks with representatives of the automobile industry, oil producers and consumer groups. Summarizing the meeting, environment minister Röttgen stated that all the parties still backed E10 as a means for protecting the climate, safeguarding the environment and providing greater energy (*Time*, March 10, 2011).

Sales of E10 did see an increase after this. The Federal Association of the German Bioethanol Industry (BDBE) reported that sales in 2013 had increased to 2.8 million tonnes, reaching a 15% share of a shrinking petrol market, up from 1.8 million tonnes in 2011 and 2.6 million tonnes in 2012. At the same time, however, sales of high-blend fuels like E85 and B100 (100 biodiesel) plunged (Green Car Congress, 4 March, 2014). All in all, this must be said to add up to poor on-the-ground implementation.

Measures to support uptake of low-CO₂-emitting vehicles

The 2007 integrated climate and energy package included proposals for policies to support the uptake of vehicles with low CO₂ emissions. These included amendments to the Act on the Levying of Distance-Related Charges for the Use of Federal Motorways by Heavy Goods Vehicles and Toll Level Regulations to differentiate the toll for low- and high-emission lorries; a time-limited environment bonus for car scrapping old cars; and amendments of the Motor Vehicle Tax Act, changing the base for taxation to CO₂ emissions levels. These proposals must be seen as measures intended to incentivize German consumers to choose low-emission vehicles and German car manufacturer to supply such vehicles. The German government anticipated the 2009 EU car emissions regulation, setting emissions limits at 120 gCO₂/km on average for the European car fleet by 2012, later extended to 95 g CO₂/km by 2020.

There were implementation problems with the amendments to the Motor Vehicle Tax. After intense debate within the government, a first draft proposal was adopted in 2008. Besides linking national car taxation closer to emissions of CO₂, and adding full tax exemption for five years for electric vehicles, the proposal entailed re-orienting the tax from a state tax to a federal one, which necessitated amending the German Constitution. The Bundestag was not happy with the proposal, however. The Green Party accused the government's senior coalition party CDU of taking the automobile industry's position of giving CO₂ rebates for large 'gas-guzzlers'. After continued discussions within the government, a new draft was agreed on. Environment Minister Sigmar Gabriel (SPD) commented: 'We managed to prevent a load of nonsense' (*Spiegel Online*, January 27, 2009). This time, the Bundestag majority endorsed the new draft, while the Green Party representatives still called it a classic case of deceptive packaging that was labelled 'climate protection' but that did little to change the status quo. The amendments made it cheaper to buy small, fuel-efficient cars, but so much more expensive for those who preferred more powerful vehicles.³⁴ Consent was now also needed by the Federal Council, since tax revenues would be transferred from the state to the federal level. The Council did not agree on the proposed compensation scheme, however. This led to mediation with the Bundestag, and compensation was finally raised to a level that could be endorsed by both chambers.

Fourteen days before the general elections in 2009, the government adopted a National Development Plan for Electric Mobility aimed at promoting research and development, market preparation and the market introduction of battery-powered vehicles (one million vehicles by 2020), aimed at turning Germany into a leading market for electric mobility. A €500 million funding programme for R&D was dedicated to electric vehicles for the period 2009–2011. The subsequent government in 2010 re-launched the plan as part of its Energy Concept, adding the longer-term goal for 2030 of having six million electric vehicles on German roads by 2030. An Office for Electromobility was now established to coordinate ministry activities. A new permanent council, the National Electric Mobility Platform, was set up, bringing together car-manufacturers, various industries, and researchers in working groups to shape a road map for realizing the goals. A total of €2 billion in state funding was made available for development work.

Car manufacturers and state governments continued lobbying for tax exemptions additional to those given in 2009 as well as other measures to stimulate market uptake of electric vehicles, referring to experiences in other European countries. On 18 May 2011, the government promised to extend the tax exemption period for electric vehicles to 10 years, but postponed adopting a bill for necessary amendments of the Motor Vehicle Tax Act to July 2012. The 10-year exemption would apply for cars purchased between 18 May 2011 and 31 December 2015. After this

³⁴ For example, automobile taxes for a 12-cylinder Audi Q7 wouldn't change at all. For the four-wheel-drive Mercedes GLK sport utility vehicle, taxes would only rise by a modest 4.7% (*Spiegel Online*, January 27, 2009).

point, the exemption period would again be reduced to five years. The Bundestag agreed to this exemption scheme in October 2012.

The government encountered wide criticism from automobile producers and the environmental movement for giving poor incentives to consumers. That had resulted in a very slow market uptake, with only about 12,000 electric cars registered in Germany as of early 2014 – there was clearly a long way to go to reach the target of one million by 2020.

A recent policy change is expected to change this picture. On 25 September 2014, the federal cabinet approved a new bill on electromobility, to apply for the period 2015–2030. Under the new law, municipalities will be given opportunities to reserve parking spaces at recharging stations for electric vehicles, provide free parking for electric vehicles, plug-in hybrid vehicles (with emissions at 50 g CO₂/km or lower) and fuel-cell vehicles; to distribute special access and transit passes in areas exposed/sensitive to air or noise pollution, and to open bus lanes for such vehicles, with the consent of the relevant traffic control authorities (EurActiv, 26 September 2014). The German auto industry has welcomed the new measures as a boost for electromobility and for manufacturers, having 17 production models made in Germany already available and 12 more to come in 2015. The industry urged implementation of these measures throughout Germany to convince potential customers, as well as further coordination of efforts among the federal government, regions, cities and municipalities (ibid). Every electric car and hybrid car emitting less than 50 g CO₂/km would entitle the industry to a super-credit under the EU car emissions regulation – so they could continue selling high-emission cars and still comply with the regulation.

‘Green’ voices criticized the government for doing too little and for heading in the wrong way by promoting heavy off-road and sports utility vehicles with German-produced electric motors. They also criticized the government for not taking a more comprehensive transport perspective, fearing that opening bus lanes for electric cars and plug-in hybrids could worsen conditions for public transport and for cyclists (ibid).

All in all, the German Automotive Industry Association VDA (Verband der Automobilindustrie) assessed that new registrations for German group cars in Germany in 2013 had reduced their average CO₂ emissions by 3.8% to 138 grams. German manufacturers offered some 880 models on the German market that emitted at most 130 g CO₂/km; and 528 models under 120 g CO₂ (Verband der Automobilindustrie, Annual Report 2014). By comparison, VDA reported that average emissions for German-made cars in 2009 had been 157g CO₂/km (Verband der Automobilindustrie, Annual Report 2010). This means that the German industry is well on track as regards compliance with the EU target set for 2015. However, meeting the 95g CO₂/km target set for 2020 remains a major challenge that, in VDA’s assessment, can be achieved only by selling a considerable number of cars powered by units other than the traditional combustion engine (Verband der Automobilindustrie, Annual Report 2014).

Summary – implementation performance for the Effort-Sharing Decision

The Effort-Sharing Decision set for Germany the target of reducing GHG emissions from its non-ETS sectors by 14% by 2020. Implementation performance evaluations by the European Environment Agency in 2013 showed compliance with the interim 2013 target, but that additional national measures would be needed for Germany to reach its 2020 target (EEA, 2013:11). New evaluations in 2014 have concluded that Germany has further worsened its prospects of reaching the 2020 target (EEA, 2014). The present study gives no full picture of implementation processes for policies covering the non-ETS sectors. Examination of selected policies covering the two major emitting sectors, transport and buildings, illustrates the problems of implementation.

Aiming to cut emissions from buildings, Germany has adopted ambitious 2020 targets, with the main policy instruments being binding standards for energy consumption/heating by renewables and investment programmes/subsidized loans to encourage investors. To make government funding less dependent on political cycles, Germany decided to make all EU ETS auctioning revenues available for national and international climate investment programmes. The economic crisis, budget control and collapse in allowance prices made the level of funding underperform compared to what was expected, slowing down investments. Government efforts at incentivizing investments in the existing building stock failed because of opposition from state-level governments fearing revenue losses.

Seeking to cut emissions from the transport sector, Germany set national goals for the share of renewable fuels by 2020 that were higher than those demanded by the EU. Further, it set ambitious goals for market uptake of electric vehicles by 2020 and 2030, and adapted policies to support market uptake of low-emission vehicles in line with new EU car regulations. Budget control led Germany to replace tax exemptions for biofuels with mandatory sales of new fuel mixtures with biofuels blended in. Lower levels of support, legislative delays and lack of information available to German consumers, making them mistrust the new fuel standard, caused slow uptake and meant a falling share for renewables in national fuel consumption. National policies aimed at supporting fuel-efficient vehicles and electric vehicles included time-limited car-scrappping schemes, amendments in vehicle taxes, linking tax levels to CO₂ emissions while retaining a 'premium' for large German cars, tax exemptions for electric vehicles, and massively upscaled government funding of R&D to support the automotive industry in advancing national electromobility. German motor vehicle taxes kept a 'premium' for high-emitting German-made cars, and recent policy shifts have been tailored to support the uptake of 'super-credit' cars, giving German manufacturers better chances of complying with EU regulations – without, however, necessarily assisting the country in meeting its commitments under the Effort-Sharing Decision.

General summary: implementation performance patterns for Germany

Germany managed to complete its formal transposition of the EU policy package, despite some delays in meeting deadlines set and after disputes with the European Commission. The Renewable Energy Directive was transposed correctly and on time. By 2013, Germany was on track for achieving its EU-set targets under this Directive, due mainly to massive investments in renewable electricity. However, the share of renewables in total heat consumption came to a standstill and the share in use of transport fuels declined. Germany has scored well on timeliness, reporting requirements and penalty systems established in implementing national sustainability standard for biofuels (required by the RED and Fuel Quality Directive), (Peters et al. 2012) On the other hand, major deviations from good implementation performance included considerable delays in transposition of the CCS Directive and reporting on national implementation measures under the ETS. We have noted problems in getting national measures in support of the Effort-Sharing Decision implemented, and non-optimal functioning of measures aimed at supporting target achievement under the Car Emissions Regulation. We have also observed that national policies on renewable energy were under constant debate, indicating instabilities for measures adopted to support implementation of the Renewable Energy Directive. On-the-ground-implementation – behavioural change in sectors targeted by the EU policy package –has shown very mixed results. GHG emissions from the ETS sectors have increased recently and emissions from non-ETS sectors are not on track to meet the 2020 target, which also threatens the nationally-set total emissions reductions target of 40%. In March 2014, the Minister of the Environment cited analyses showing that Germany would achieve only a 33% cut, and announced that a climate action programme would be launched in order to get Germany on track toward this goal. The next chapter analyses the patterns of good and less-good implementation performance on the part of Germany, as studied through the lenses of the framework set up in Section 2.

6 Analysing implementation performance patterns in Germany

How then should we explain Germany's implementation performance, with its mixture of implementation successes and problems? Our analytical framework, presented in section 2, takes account of existing main approaches with a series of expectations derived from these to guide this analysis. We proposed that observed implementation performance patterns might be explained by the degree of fit between the EU policy package and German preferences. If that failed to explain implementation performance, we proposed three alternative explanations from domestic politics: fragmentation and veto players in the German politico-administrative apparatus; societal group affectedness and reactions; and the interrelations between government and societal actors – or 'policy style'. For each explanatory approach we explore impacts from the EU package approach, reflecting the main questions put up for analysis, whether/how implementing a conjoint package of policies has an influence on implementation performance.

6.1 Goodness of fit and adaptation pressure

The 'goodness of fit' proposition leads us to expect that poor implementation performance will reflect misfit between what Germany wanted (as indicated by national positions taken in the negotiations) and what it got (as indicated by what was finally decided at the EU level). A high degree of fit between these factors would spur good implementation performance. The greater the distance between the German government positions and the final negotiated outcome, the greater would be the problems of implementation, we proposed.

Assessing first the distance in *ambitiousness of overarching policy targets* wanted by Germany and those adopted at the EU level, we find rather high goodness of fit. Germany lobbied for the three-element target structure of the package; and, to the extent that national negotiation positions deviated from what was finally decided, these point towards Germany opting for *more* ambitious targets for GHG emission reductions and renewable energy at the EU level than those that were finally adopted. Germany's negotiating position on the targets reflected that it had already adopted more ambitious national targets for GHG emissions reductions, renewable energy and energy efficiency. Out-doing the EU 20% GHG reduction target, Germany had since 2002 repeatedly formulated a national target of 40% GHG reductions by 2020, if the EU would commit to a 30% reduction within the same timeframe. This target was made unconditional by the EU after 2009. At an early point, Germany had formulated the long-term goal of 80% reduction in GHGs by 2050; it confirmed this goal in 2007 and has upheld it since then. The 2010 German government's long-term energy transformation declaration (the Energy Concept) set a band for GHG emissions by 2050 (80–95% reduction), with intermediate reduction targets to monitor: 40% by 2020, 55% by 2030, and 70% by 2040. On the other hand, Germany no earlier GHG reduction targets specified for non-ETS sectors collectively, but targets for renewable energy in the transport and heating sectors.

Germany still accepted the 14% target under the Effort-Sharing Decision, however.

As for the EU-demanded target for renewable energy – 18% share of total energy consumption by 2020 (10% specifically for the share of renewable transport fuels) – domestic targets were again more ambitious. The 2007 German energy and climate package specified various sector targets for 2020: 25–30% share for renewables in the electricity sector, 6–14% in the heating sector and 6–17% (by energy content) in fuel supply. The Energy Concept of 28 September 2010 confirmed the EU-imposed 18% target as the overarching management tool towards 2020, and added the long-term targets of 30% by 2030, 45% by 2040 and 60% by 2050. It also retained specific targets for the electricity sector: at least 35% of gross electricity consumption by 2020, a 50% share by 2030, 65% by 2040 and 80% by 2050. As to energy-efficiency targets, the goal set in 2007 was a doubling of national energy productivity by 2020 compared with 1990 – considerably more ambitious than the 20% target adopted at the EU level. In 2010, the Energy Concept translated energy-productivity goals into specific targets for reducing energy consumption: primary energy consumption to fall by 20% by 2020 and 50% by 2050; electricity consumption to fall by 10% by 2020 and 25% by 2050; heating demand in buildings to be reduced by 20% by 2020 and total primary energy demand in buildings to be reduced by 80% by 2050 – all compared to 2008 levels.

Summing up, we can definitely *not* say that Germany wanted less ambitious targets than what was decided at the EU level – rather the converse. Alone, such ‘goodness of fit’ conditions would lead us to expect good overall implementation performance, i.e. that the 2020 targets would be reached. Any complete assessment of target achievement belongs to the future. As noted above, however, assessments as of 2014, halfway in the implementation period, show ‘off-track’ tendencies for the target under the Effort Sharing Decision (non-ETS sectors) and higher emissions from the ETS sectors, indicating implementation problems. This cannot be explained by misfit between national and EU targets as such. National policies can still be adjusted to bring Germany on track towards achieving the 2020 targets, which would be in line with a ‘goodness of fit’ proposition based on ambitiousness of targets.

The ‘goodness of fit’ proposition is not supported either, when we look more closely at policy areas where Germany experienced implementation problems – first of all because of the high fit between what the German government demanded in the negotiations and what eventually became EU policies. True, early policy drafts involved considerable mismatches, but the final outputs came close to what Germany wanted, after it had exerted strong governmental influence in re-drafting and negotiating specific parts of the package. An early draft of the Renewable Energy Directive opted for a harmonized and mandatory EU-level trade-based support scheme for renewable energy. Germany, heading a group of countries opposing this, managed first to get the draft proposal changed, then, during the negotiations, to remove technical points that could gradually oblige member states to accept such a harmonized trade-based

system. Germany had considerable influence on the wording of the Car Emissions Regulations (the integrated approach, the modest level of emissions standards, and burden-sharing between manufacturers of small and heavy cars) and managed to get its positions through in negotiations with member states that opted for different solutions. As to the EU ETS Directive, Germany had a decisive role in ensuring provisions that would give energy-intensive industries continued free allowances and compensation for the indirect costs (higher electricity prices) of establishing a carbon price. The final design of the free allocation provisions and the guidelines for compensating indirect costs were negotiated after the package was adopted. In these negotiations, Germany had a lead role and managed to get many of its preferences accepted – more than representatives of the German administration had expected. And concerning CCS, the German government was a clear advocate of rules that could create predictability for investors.

Impacts from policy packaging

We also put up expectations for when a ‘package approach’ might impact on policy implementation. We proposed that negotiating many policy elements simultaneously (a package of policies) at the EU level could be demanding for the national government apparatus, and that it could and increase the likelihood that concessions would be given in one policy area (creating mismatch) in order to gain more in another policy area, leading to backlash in the implementation stage for policy areas where major concessions were given. However, our data do not indicate any major concessions given by Germany in the negotiations. Further, it appears that the resultant distance between German positions in the negotiations and final outcome was small for all parts of the package. That policy packaging affected implementation via effects on ‘goodness of fit’ is thus not supported by our data.

We also proposed that implementation problems might stem from mismatches between what the EU package formulated as a ‘balanced approach’ for achieving several *overarching* objectives (fighting climate change, improving security of supply, ensuring industrial competitiveness) and Germany’s objective interests and subjective perceptions regarding this balancing. Again, we find no reason to conclude that a strong mismatch existed at the time when the package was adopted, and thus for giving this factor a strong explanatory role for the implementation problems that have been observed. On the contrary, our data show that Germany was an uploader of the balanced approach, and that this approach matched well with the national energy-economic context. Germany had long sought to upload its ambitious national GHG emissions targets to the EU and global levels. The country had seen energy-import dependencies growing to reach 60% in 2007 (up from 48% in 1990): nearly all the oil, 80% of the natural gas and 33% of the coal needed for balancing the energy system were imported. Moreover, Germany was home to a manufacturing industry that was exposed to international competition and that had larger shares of value added than most other EU countries – affordability of energy was a historically constant policy concern. Finally, Germany had evolved as the most important market for the emerging ‘green’ industry in Europe, which

provided new industrial activity, employment and export value for the country.

The German approach to balancing several goals is visible in the national Integrated Climate and Energy Policy package adopted in 2007 and subsequent policy implementation. Germany gave high priority to fighting climate change by setting ambitious GHG emissions targets, but it accorded equally high priority to shielding its energy-consuming industry. Major energy consumers were granted exemptions from national CO₂ taxes, generous allocation of allowances under EU ETS NAP I and II rounds of allocation and support from the German government in getting free allowances and industry compensation for indirect costs (higher electricity prices) for the reformed EU ETS. Major energy-consuming companies were also exempted from the renewable electricity feed-in tariff surcharge, and received generous subsidies under national energy efficiency investment and R&D programmes, the latter providing compensation for costs imposed by environmental regulations.

The Germany government regarded ambitious EU targets for renewable energy as a combined climate-change mitigation and national industrial support measure which could expand market opportunities for new energy technology and installation industries emerging from national support policies. Ecological modernization of German industries had been formulated as a major new approach to industrial policy already under the Green–Red coalition government in office until 2005. While this approach might indicate tension between ‘old’ and ‘new’ industries in Germany, the government has managed to maintain the synergy between these, emphasizing the integrated value chains between traditional German industries providing vital input factors to emerging green industries.³⁵

While this balancing suited Germany back in 2008, interviewees for this study have noted possible dynamic shifts in government policy priorities in the implementation period. The economic crisis (although not hitting Germany as badly as many other member states) and the experience with the national energy transformation (closure of nuclear power plants and replacement with renewable energy), may have shifted short-term policy priorities to energy-cost reductions for maintaining international competitiveness for traditional industries.³⁶ This may in turn explain the somewhat delayed political response to emissions of GHG emissions increasing in Germany in 2012 and 2013 because of shifts in the electricity production mix, with a higher share for coal. In a March 2014

³⁵ This argument was included in the German government position paper on the EU compensation mechanism for higher electricity costs due to trading in emissions allowances (Government of Germany, 31 January 2012, Mitteilung der Bundesregierung der Bundesrepublik Deutschland an die Europäische Kommission Betr.: HT 582, Konsultationsverfahren, Entwurf der EU-Kommission zu ‘Leitlinien für bestimmte Beihilfemaßnahmen im Zusammenhang mit dem System für den Handel mit Treibhausgasemissionszertifikaten nach 2012’ vom 21. Dezember 2011, available at: http://ec.europa.eu/competition/consultations/2012_emissions_trading/germany_de.pdf

³⁶ Interview with Severin Fischer, 4 June 2014, Berlin.

speech, Environment Minister Hendricks called for an immediate climate action programme that emphasized the transport, heating and construction sectors, so as not to fall short of the national 2020 target (EurActiv, 11 March 2014). In early November, *Der Spiegel* reported on a disagreement over Germany's unilateral climate target between Economics Minister Gabriel and Hendricks. Hendricks opted for closing coal-powered plants to achieve the target; Gabriel wanted to save jobs even if this would delay reaching the German target (*Spiegel Online*, 10 November 2014). However, on 3 December, the government finally agreed on a new climate action programme toward 2020 (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 4 December 2014).

Summary: scant evidence of a 'goodness of fit' explanation to implementation problems

All in all, the simple goodness-of-fit proposition seems to have been disproved. Implementation problems in Germany appeared despite the good fit (short distance) between what the German government demanded and what was finally to be implemented. This conclusion also applies after examination of the possible misfits created by the EU package. Germany apparently got its preferences accepted for all parts of the package, entailing no concessions on one policy issue (higher misfit) traded for gains on other issues. Similarly, we have observed no misfit between the EU package balancing of overarching objectives (climate-change mitigation, security of supply and international competitiveness) and what Germany wanted.

This goodness of fit might lead us to conclude that Germany experienced scant adaptation pressure from the European Union. This was not entirely so, however, as illustrated by the process of reforming national policies on renewable energy. Back in 2009, the Renewable Energy Directive was adopted only after the removal of provisions that would interfere with the right of member states to decide for themselves on support measures for renewable energy. The draft had proposed mandating an EU-level scheme coordinated with policies to open up the internal energy market. The European Commission continued to put pressure on Germany to abandon its policy design, and intervened directly in the German reform process during 2013/2014. It attacked the German policy design by proposing new guidelines for state aid that would make illegal the feed-in tariff system and by preparing a case against the exemptions for specific energy-consuming companies to pay for the scheme as a breach with EU state rules. After intense negotiations, the Commission accepted a modified German scheme for exempting companies from paying feed-in surcharges: exemptions were to be granted to entire industries, and not on a company basis as before – and that actually served to make a greater number of German companies entitled to exemptions. The German government also convinced the Commission to rewrite its draft for new state aid guidelines.³⁷ The Commission accepted extended phase-in times

³⁷ Emphasised by several of our interviewees.

for replacing feed-in tariff systems with market-aligned competitive bidding systems and considerable flexibility for member states to diverge from competitive bidding practices.

Thus we conclude that there was a high ‘goodness of fit’ between what the German government wanted and what was decided at the EU level in 2008. Misfit as such cannot explain implementation problems in Germany: that expectation is very much based on an assumption that the negotiating positions taken by the German government actually reflected true government preferences, and that the government acted as a unitary agent in formulating its positions. We return to these assumptions below, in discussing explanations grounded in domestic politics for the implementation problems observed.

6.2 Domestic politics explanations

With limited explanatory power left for ‘the goodness of fit’ proposition in explaining deviations from good implementation performance, this section analyses domestic politics explanations to these deviations.

6.2.1 *Fragmentation and veto players in the German politico-administrative apparatus*

A first explanation derived from domestic politics is that national implementation performance reflected the organization of the German politico-administrative apparatus. We would expect to observe horizontally or vertically fragmented responsibilities and opportunities for governmental veto players at play in cases of poor implementation performance.

Horizontal fragmentation – impacts on implementation performance

Responsibilities for transposing and further developing implementation policies under the EU climate and energy package were shared amongst several German ministries. The BMUB was the lead ministry for most parts: both the legislation that was motivated primarily by concerns about climate change (ETS Directive, Effort-Sharing Decision, Car Emissions Regulation, Fuel Quality Directive) and the Renewable Energy Directive (where responsibility had been transferred from the BMWi in 2002). The latter ministry had lead responsibility for transposing the CCS Directive, since that injection of carbon into the earth’s crust would require changes in national mining legislation. BMWi also had a far broader say, as security of supply and industrial competitiveness were integral goals of the package. Also other ministries shared responsibilities for drafting specific measures: the package required very broad sectors of the economy to contribute to target achievement – like the Ministry of Finance, which was involved, *inter alia*, in proposing the necessary fiscal measures (such as amendments made to the Motor Vehicle Taxes to support implementation of the Car Emissions Regulation).

Earlier studies have documented substantial conflicts between the BMUB and BMWi in past national energy and climate policymaking (see e.g. Lauber and Mez 2004). This conflict line prevailed also under negotiations and implementation of the 2020 EU package. We have noted

strong disagreements between the two ministries, in particular concerning implementation of the EU ETS Directive (largely implemented at the EU level through comitology processes) and in the debate about reforming national renewable energy policies, thus responding to obligations under the Renewable Energy Directive.

Conflicts over implementing the EU ETS Directive notably concerned the design of a system of free allocation of allowances (benchmark system) – i.e. who should get free allocation of allowances for how long – and, after allowance prices collapsed, whether backloading auctioning should be implemented to spur a price increase. Implementation of both measures was decided in EU-level comitology discussions, with parallel coordination at the domestic level needed to formulate national positions. The conflicts reflected different administrative responsibilities and policy goals pursued by the two ministries. The primary task of BMWi, as lead ministry for German industry and energy policy, was to secure continued energy supply at costs that would not threaten national industrial competitiveness. Securing free allocation of generous amounts of allowances and preventing a too-high carbon price were thus highly understandable responses for BMWi. By contrast, BMUB, as lead ministry tasked with cutting national GHG emissions across the German economy, supported policy instruments that created incentives across all sectors for emission reductions. Interviewees for this study claim that BMUB was pleased to see the revised ETS shifting responsibility for allocation from the national to the EU level, in order to remove the quarrelling and compromises that had been needed at the national level.³⁸ Disagreements continued within the German government concerning formulation of national positions for EU comitology negotiations. The absence of a German position, particularly on backloading of allowances, delayed decisions at the EU level, since consent by Germany was needed to achieve a sufficient majority vote.

Conflicts over policies to support implementation of the Renewable Energy Directive had roots back in time. Before 2002, BMWi had held responsibility for drafting and administering renewable energy policies, but had encountered political criticism for curtailing reforms to spur higher growth rates for renewable energy and for being a spokesman for companies whose production was based on nuclear power and coal. The SPD/Green Party coalition government of that time thus transferred responsibility for renewable energy policy to BMUB. From that point onwards, the two ministries evolved into exponents of different policy approaches. In essence, BMUB advocated continuation of the feed-in tariff system, pinpointing its success because electricity generators were shielded from market risks. By contrast, BMWi advocated an alternative support system of exposing generators to varying market prices in order to prevent high cost options from entering the market; it feared that price increases would affect German industrial competitiveness and that intermittent renewable energy supplies could compromise the stability of Germany's electricity system.

³⁸ Interview with Severin Fischer, SWP, 4 June 2014.

German transposition of the Renewable Energy Directive largely meant assimilating new targets for renewable energy with the existing feed-in tariff system for renewable electricity. With this system prevailing as the main instrument, the two ministries in the implementation period differed as to the allocation of costs for paying for the system among various consumer groups. Exemptions from paying the feed-in surcharge were first granted to major energy-intensive companies. As the surcharge level increased, reflecting larger volumes of renewables in the market, BMUB called for re-allocation of the costs, to reduce these exemptions in order to prevent a steep increase in the surcharge for other consumers. BMWi, however, wanted continued shielding of these companies and industries from the costs generated by the feed-in tariff system.

Rapid growth in annual surcharge levels kept reform discussions alive in Germany. The debate was intensified when renewable electricity capacity started to press conventional energy capacity out of the market. BMWi and BMUB now came closer in their views concerning the need to halt costs, first and foremost by cutting feed-in tariffs for solar PV systems, which very rapid growth had contributed strongly to the rise in surcharge levels. However, the two ministries still disagreed on the timing of more fundamental reforms.

The 2013-elected government re-transferred responsibility for policy-making on renewable energy to BMWi, and appointed ministers from the same political party, SPD, to head the two ministries. This indicates that horizontal fragmentation was in fact seen as a problem, and that shifting the responsibility for renewable energy policies to the ministry that was also responsible for energy market policies could facilitate developing more coordinated policies. As indicated by leakages to the press on the recent policy process aimed at strengthening national climate policies to enable getting on track to achieve the 2020 targets, however, quarrelling continued between the two ministries during 2014, delaying the climate policy agreement that was reached in early December 2014 (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 4 December 2014).

Summing up, we find that the proposition that horizontal administrative fragmentation affected national implementation performance has *support* in our data, and that BMWi acted as a veto player on behalf of German industry interests in policy implementation where BMU had primary responsibility for drafting policies. This said, BMWi was not the only federal government veto player catering to the interests of German industries. Interviewees for this study emphasize that while Chancellor Merkel did not always play a very active intermediating role in conflicts between ministers, she actively intervened in policy proposals that could harm the competitiveness of traditional German industries.³⁹

³⁹ Interview with Severin Fischer, SWP, 4 June 2014, Berlin.

Vertical fragmentation – impacts on implementation performance

Our background chapter noted studies pointing out that baseline federal energy and climate policy legislation had been greatly influenced by governments at the state level and their co-legislative powers through the Federal Council. This study has documented that state-level government influence continued and impacted greatly on the implementation of parts of the EU Climate and Energy Package. The process of transposing the CCS Directive is highly illustrative. Two consecutive German federal governments worked for rapid transposition in order for Germany to take the lead role within the EU in demonstrating and developing the necessary technology, determined to support national full-scale demonstration initiatives already planned. The proposed transposition law needed the consent of the Federal Council, however, since it would interfere with the states' exclusive competencies in area planning. Drilling and underground storage of carbon could not be started without state government approval. The federal government acknowledged this as a barrier: the draft transposition bill thus proposed limiting the exclusive rights of state governments to decide.

Strong objections came from several state governments. The northern states of Schleswig-Holstein and Niedersachsen fronted the opposition, even though they were headed by Angela Merkel's CDU Party, which supported the law. These states were assessed as having the highest potentials for underground storage of carbon in Germany, and had already been targeted by several industrial initiatives. The local government objections reflected very broad popular lack of trust in carbon storage as a safe option, with massive popular anti-CCS campaigns showing that the CDU's dreams of re-election could be thwarted if it accepted the draft law. Campaigns frequently portrayed CCS as a saviour for the German coal industry and thus a potential obstacle to the renewable energy transformation that had advanced particularly rapidly in these northern states.⁴⁰ We additionally observe elements of local parochial sentiments put forward against CCS. In Schleswig-Holstein, people started to ask how dangerous is CCS really, why do we need new coal fired power plants for the Energiewende and why should typical coal-based states get away by leaving their waste problems to other states.⁴¹ Other state governments were supportive, like that of Brandenburg, which is home to one of Germany's largest deposits of brown coal. Here CCS was framed as pivotal for using these resources in the longer term.

Even though the federal government tried to make the CCS bill more acceptable through redrafting, scaling down the volumes of carbon to be allowed stored and turning it into a technology demonstration bill only, the opposition prevailed. The most sceptical state governments managed

⁴⁰ Schleswig-Holstein is the German state with the highest share of renewable energy in its electricity production mix, reaching 100% in 2014 and planned to reach 300% by 2025 (interview with Justus Riedlinger, government of Schleswig-Holstein, 30 May 2014. Also Niedersachsen has higher than German average production of electricity based on renewable energy.

⁴¹ Interview with Justus Riedlinger, government of Schleswig-Holstein, 30 May 2014.

to convince also other colleagues in the Federal Council to not accept federal interference with regional prerogatives in area planning. The long-delayed CCS Directive transposition law determined that the states would have the right to ban future underground storage of carbon. The Niedersachsen government has since put forward a bill proposing no permanent CO₂ storage in the state, and Schleswig-Holstein has also voiced this as a possibility.

Reforming renewable energy policy is another illustrative example of vertical fragmentation affecting output. Throughout the implementation period 2009–2014, consecutive federal governments proposed reforms of the feed-in tariff system to slow the investment boom and curtail the growing costs to the consumers. Although these were not consent bills, delayed legislation became normal, with the Federal Council invoking Mediation Committee negotiations. Frequently, the end-result was watered-down compromises reached in order to break the legislative impasse. Our study has noted instances of Federal Council voting exceeding 2/3 majority rejection of renewable energy reform proposals when also state representatives of the same political colour as the federal government joined in – notably from states with strong renewable energy industries. This gave the Federal Council considerable veto power, since the Bundestag could reject this objection only by a similar 2/3 vote, which meant that also opposition party politicians would have to join in voting for the rejection.

Besides these two parts of the EU package where Federal Council voting impacted heavily on policy output, it contributed to delayed implementation also other relevant legislative measures. A common feature in these cases was Federal Council intervention to ensure that new laws would not distort the existing balance between the state and federal level in opportunities for income generation. In 2009, the Federal Council accepted amendments to the national motor vehicle tax law, in support of implementing the EU Car Emissions Regulation, only after the Mediation Committee had raised the level of federal compensation for state loss of tax revenue. In 2011, the Federal Council objected to the proposal of amending Germany's Greenhouse Gas Emission Trading Act, demanding a proportionate federal-state sharing of revenues from the sale of emissions allowances and compensation for tax losses of deductible purchase costs of certificates. Acting on these recommendations, the Bundestag made alterations accepted by the Federal Council. Also in 2011, the Federal Council failed to approve a new act proposing tax incentives to promote energy-efficient renovation of old buildings, part of implementing the EU Energy Efficiency Directive but clearly also related to implementation of the German targets under the EU Effort-Sharing Decision. Federal states opposed the bill for fear of tax losses, which they demanded compensation from the Federation. After more than a year in the Mediation Committee, a compromise could not be found. Being a consent bill, the bill was formally vetoed and withdrawn, despite appeals from various trade associations that underlined the positive impacts of tax incentives for regional businesses and thus the federal states. However, the motor vehicle tax and GHG emissions trading bills were objection bills, showing the more general leverage of the Federal Council as veto player in German energy and climate policies.

Conflict over distribution of costs and benefits from EU policy implementation was an important underlying cause of state government opposition. In the case of the CCS Directive, the federal government proposed transposition that would limit state-level leverage and impose new environmental/financial risks on the states, without being matched by guarantees for full recovery of costs/liabilities should carbon start to leak out of the storage sites.

Also in the case of reforms of national renewable energy policies (the feed-in tariff system), distributional issues played a crucial role. This system had contributed to major transfers of income between the different states and from German cities to the rural areas. Consumers across the country paid for the system through the surcharge, while receivers of the subsidies were farmers, businesses, energy companies, and residents in areas where construction of renewable energy plants and installations was feasible. Some parts of Germany became net payers and others huge net receivers of funding under the system. The amounts transferred between the states through the feed-in tariff system came to exceed the amounts transferred through the general national fiscal equalization scheme (*Länderfinanzausgleich*), adopted to level out income inequalities within Germany, often criticized by net-payer states. German net-receiving states from the feed-in tariff system thus saw the system as a mode of compensating its net-payer role under the *Länderfinanzausgleich*.⁴²

A further result of the feed-in tariff system was new economic activity and employment in the states hit particularly hard by industry-structural challenges: northern areas that saw their shipyards and military bases disappearing, eastern states where traditional industries were crumbling after reunification, and southern states that saw challenges for their large farming industry and were hit hard by the decision to phase out nuclear power. The southern state of Bayern saw the highest number of jobs created in the renewable energy sector, followed by Nordrhein-Westfalen and Niedersachsen. In terms of the share of total employment, the renewable industry played a particularly important role in the eastern states of Sachsen-Anhalt, Brandenburg and Mecklenburg-Vorpommern (Duell and Vetter, 2013). The total number of people working in the renewable energy sector in Germany (direct and indirect jobs) was up from 160,000 in 2004 to around 381,600 by 2011, with the growth rate for green jobs assessed as being six times higher than total employment growth (O'Sullivan et al., 2012).⁴³

⁴²Interview with Jan Scharlau, BUMB, 4 June 2014, Berlin.

⁴³The largest industries in terms of employment in 2011 were photovoltaics (110, 900), on-shore windpower (92, 500) and biogas production (50, 600) (O'Sullivan et al., 2012).

Table 2. Employees in renewable energy industries as share of total employment in the German states, 2012⁴⁴

Eastern Germany		Other states	
Sachsen-Anhalt	2.6%	Bayern	1.1 %
Brandenburg	2.1%	Baden-Württemberg	0.5%
Mecklenburg-Vorpommern	1.9%	Hessen	0.7%
Thüringen	1.5%	Rheinland-Pfalz	0.7%
Sachsen	1.1%	Nordrhein-Westfalen	0.6%
		Saarland	0.5%
Northern states			
Schleswig-Holstein	1.3%		
Niedersachsen	1.5%		

Distributional conflicts between the states played a role also in other implementation cases. Government representatives of the state of Nordrhein-Westfalen actively lobbied against federal government support of backloading allowances under EU ETS Directive. The domestic distribution of industrial installations regulated by the EU ETS is highly skewed among the various German states, with around a quarter of all German quotas allocated to installations in Nordrhein-Westfalen in 2007 (The Climate Group, December 2007; Eikeland, 2013). This state is home to a large share of German energy-intensive industries and coal-based electric power plants. Some 57% of total GHG emissions from the state (in 2007) came from industrial installations regulated by the ETS (ibid.). As discussed above, inter-state distributional conflicts also came up under implementation of the CCS Directive. The government of Brandenburg, home to a major part of the German lignite industry, begged the northern states with superior carbon storage locations within their borders to accept the transposition law initially drafted by the federal government. Implementation became delayed in both cases, but the two states fighting for their fossil-fuel interests did not win out in the negotiations.

Fragmentation: shifts over time

We further proposed that shifts in governments and administrations could affect implementation performance, bringing in implementation actors different from those that had responsibility for negotiating policies at the EU level. New governments could take political steps that meant more, or rather less, administrative fragmentation. New governments that had not been responsible for negotiating the EU policy package could act as veto players in implementation. In Germany, three successive coalition

⁴⁴ The city states of Berlin, Bremen and Hamburg not included

governments became involved in the implementation of the EU climate and energy package. These were made up of different political party constellations, adding a potential conflict line to the implementation process.

Looking more closely at the three successive governments, we find no major differences in their national climate policy ambitiousness (targets set for short- and long-term emissions reduction and long-term energy system transition towards renewable energy). This also indicates that there were no decisive party-political conflicts over climate policy.

However, we note clear differences between the succeeding governments in views on *how* the *Energiewende* should be carried out: what role should be played by different energy sources and technologies, what policy instruments would be needed, and how to align German and EU energy policies. Potentially important here were party-political shifts in leadership over the conflict-ridden ministries of economics/energy (BMW*i*) and the environment (BMUB). The Merkel-I grand coalition government (2005–2009) allocated the ministerial post of BMW*i* to Michael Glos of CSU, the conservative Bavarian sister party of CDU. SPD's Sigmar Gabriel headed the BMU. The two colleagues represented parties that differed in views concerning the future role of nuclear power. Gabriel represented a party that in the previous coalition government with the Green Party (1998–2005) had agreed on nuclear power phase-out by 2022. Minister Glos, and also Chancellor Merkel, represented more pro-nuclear parties that argue for a more gradual phase-out. Both Gabriel and Glos represented parties with strong constituencies supporting the feed-in tariff system. SPD had headed the government reforming the system in 2000 and 2004, causing the boom in renewable electricity investments. Glos represented a party that had German (and in particular Bavarian) farmers and small businesses as important constituencies, actors that on a massive scale had benefited from the feed-in tariff system for investments in small-scale biomass- and solar-based electricity generation. Both parties and both ministers promoted clean coal (with CCS). SPD had a strong constituency of voters in coal-rich industrial regions. Elections in 2009 brought a new conservative–liberal coalition government to power. The Merkel-II government (2009–2013) gave FDP representatives (Rainer Brüderle, Philip Rössler) the task of heading the BMW*i*, while CDU representatives (Norbert Röttgen, Peter Altmaier) headed the BMU. In German politics, FDP is regarded as the most consistently big industry-friendly political party: pro-nuclear, backing a future for clean coal (CCS), opting strongly for market liberalization and opposing the feed-in tariff system, seen as undue interference in the market.

Our data show that conflicts between heads of these ministries, delaying implementation, have traces of party-political disagreement. Conflict was particularly heated between the FDP politicians heading the BMW*i* and the CDU politicians heading the BMUB in the Merkel-II government. These conflicts delayed decisions about reforms of the ETS (backloading) and on how Germany should implement its renewable energy plan. Chancellor Merkel could not easily intervene to stop the public quarrel

since reprimanding a junior coalition party might bring about a split of the entire government.⁴⁵ When the long practice of letting different political parties head the BMWi and the BMUB came to an end with the Merkel-III government in 2013, this indicates that party-political differences had been acknowledged as a factor *reinforcing* ministerial conflict lines in the German government – or at least as an obstacle to administrative coordination. From 2013 onwards, both ministries have been headed by representatives from the same political party, SPD. However, recent conflicts between these two ministers over whether and how to achieve the national 2020 climate targets indicate that horizontal fragmentation between ministries remain a central feature of German politics.

Also state governments saw shifts in the implementation. Did this impact on vertical fragmentation and implementation performance? State parliament elections, non-coordinated in time with federal elections, gave variously overlapping and differing political party majorities in the Bundestag and Federal Council. During 2009–2013, the CDU/CSU/FPD majority in the Bundestag had an absolute majority in the Federal Council only until 7 October 2010. Apart from SPD, the Green Party and the Left Party were represented in some of the coalition governments at the state level: these are parties that have consistently opposed nuclear power, have been sceptical to the national coal industry (and CCS),⁴⁶ and firm supporters of the feed-in tariff system to spur decentralized development of renewable electricity in order to break the traditional market and political powers of the major utilities.

We have noted recurrent vertical fragmentation (Federal Council vetoing federal government policy proposals) affecting implementation in Germany. Party-political shifts in state governments do not seem to have played a decisive role, however. Examining majority voting in the Federal Council that led to delays in implementation, we note that these majorities also included state governments overlapping in political colour with the federal government. The CCS Directive became delayed and later transformed after opposition by state governments headed by the CDU, even though this party headed all federal governments in the implementation period, and had a party programme in support of CCS. Proposals for reform of renewable energy policies were voted down by state governments of differing political colours, including parties that were part of the federal government at the time.

Impacts from policy packaging

We proposed that implementing a *full package of policies* could cause either more fragmentation or better coordination between units in the government apparatus, thus affecting implementation. We noted stronger coordination between the BMWi and the BMUB in the implementation

⁴⁵ Interview with Jasper Braam, BMUB, 5 June, 2014.

⁴⁶ The Left Party saw splits on the issue, with leading politicians in e.g. the coal-rich state of Brandenburg supporting storage of carbon as a solution to secure a future for utilizing its coal resources.

period, expressed as more convergent views on the need for policies that would link renewable electricity producers more tightly to the electricity market and later, the government's decision to transfer responsibility for renewable energy policy reforms from the latter to the former. We also observe more converging views in support of emissions trading as policy instrument to curtail German GHG emissions. The new German government accepted backloading of emissions allowances after the 2013 elections without delay; and as part of the Climate Action Programme proposed in late 2014, economics/energy minister Sigmar Gabriel has apparently accepted the idea of a national cap and trade system for German power-plant operators with a cap on emissions set for national emissions from the power sector (*German Energy Blog*, 4 December 2014). We noted that the two ministries had recurrently clashed over these policy issues.

These new coordination signals may indicate that both the BMWi and the BMUB see challenges from the German mode of implementing the EU climate and energy package for their overarching main tasks. The ministries found that executing reforms of the feed-in tariff system had become politically difficult (because of opposition from state governments) and that continued rapid increase in the share of renewable electricity might lead to costs for energy consumers (industry and households) that would challenge competitiveness (important for BMWi), *and* challenge the high popular support of the *Energiewende* (important for BMUB). Both ministries also acknowledged that challenges from low carbon prices contributed to make coal more competitive than natural gas, which affected the competitiveness of the utilities, and also made backup capacity for renewable energy more carbon-intensive. Here they observed a shift in the policy position of major utilities, which began calling for higher carbon market prices to save their stranded natural-gas assets, and BMWi acknowledged that free allocation of emissions allowances/compensation for higher electricity costs would shield energy-efficient German industries from harsh effects of higher carbon prices. Both ministries also noted how the costs of windpower and solar PV had been brought down, making them competitive alternatives without the very generous support arrangements of the past. Continued investments in renewable energy were likely even within a more market-adapted support system.

Hence, benefits of stronger coordination between renewable energy and energy market policies became less contested and a more pressing solution for the ministries, as did support for a strengthened EU ETS through backloading, with successive 're-packaging' of German energy and climate policies after the 2013 federal elections. We may thus suggest that learning from experiences with the national mode of implementing the EU policy package affected administrative reforms aimed at less horizontal fragmentation at a later stage of the implementation cycle.

Our analysis shows, however, that it was vertical fragmentation that more frequently caused implementation problems. Germany's 16 federal states have exclusive powers, or co-legislative powers with the Bundestag, as regards various parts of the EU energy and climate package. These powers were several times used to curtail policy reforms proposed by the

federal government. Conflict over the distribution of costs and benefits between the federal and state level and horizontally, between different German states, was a recurrent underlying factor behind state government voting that delayed or curtailed federal implementation policies. German states differ greatly in population size, economic strength, primary energy endowment and industry structure, and thus in GHG emissions, in turn entailing differences in costs and benefits from energy and climate policies. Some states, like Nordrhein-Westfalen and Brandenburg, benefit from coal resources. The former also has a large part of Germany's energy-intensive industries within its borders, regulated by the EU ETS. Some other states lack such resources but have abundant windpower resources, like Schleswig-Holstein, and more generous insolation levels and available biomass resources, like the southern state of Bayern.

Given the governance challenges from such vertical distribution of legislative powers, it would make sense for the German federal government to implement broader policy packages that carefully balance the allocation of costs and benefits among the states. We may also conclude that the federal government has pursued such a packaging approach quite extensively. It provided for a generous renewable energy policy to states that could see high industry and employment growth in this area, including generous support for biomass-based energy benefiting agricultural states. It made expedient use of opportunities to compensate energy-intensive industries regulated under the EU ETS. It provided for side-payments to fossil-based energy generators (generous investment and R&D programmes for technological restructuring, including the initial proposal of generous support to CCS as long-term solution) to benefit states that had a large share of coal in their energy mix. Federal government policy packaging also included direct financial compensation to states that would lose tax revenues due to proposed policy reforms.

While the federal government's policy-packaging approach facilitated solving some cases of implementation impasse, we have also noted clear examples of insufficiencies, as with implementing the CCS Directive. The federal government here initially prepared a law to facilitate the use of this option in Germany, supported by governments in the coal-rich states. However, the governments of states home to major storage capacities refused to agree. An important underlying cause was the massive popular mistrust of carbon storage as a safe solution, but perceived conflicts of interest among and between states also mattered. The leading opposition governments represented states with strong industrial interests in renewable energy, and saw state governments that supported CCS as catering to their coal industry interests while leaving the long-term waste problem to others.

Summary – administrative fragmentation and policy implementation

Our study supports horizontal and vertical administrative fragmentation as factors that have caused delays in policy implementation in Germany. Horizontal fragmentation, as revealed by conflicts between federal ministries with a say in implementation, contributed to delayed implementation of backloading under the EU ETS Directive (implementation at the EU level). While transposition of the Renewable Energy Directive

was made on schedule, this conflict also contributed to delaying further national policy reforms aimed at cutting escalating costs. Vertical fragmentation can explain many implementation problems. Federal and state governments shared responsibilities for transposing parts of the EU package, notably the CCS Directive. State governments, though their veto in the Federal Council, delayed and fundamentally changed the initial federal-level proposal for transposing this directive, in turn curbing on-the-ground implementation. While the Renewable Energy Directive was transposed on time, state governments repeatedly contributed to delaying national reforms aimed at halting escalating costs to German consumers, viewed as needed to ensure continued popular support for long-term national energy restructuring. This resulted in very generous support levels being maintained and highly successful on-the-ground implementation in the form of investments in renewable electricity. State governments also curtailed federal reforms aimed at providing tax exemption for investments in energy-efficiency refurbishing of buildings, claiming this would impair their opportunities for revenues. The proposal aimed at cutting GHG emissions from one of Germany's major non-ETS sectors, contributing to poor on-the-ground implementation performance for the Effort Sharing Decision.

Our analysis indicates that German implementation of the policy-packaging approach generated learning within the ministries responsible and stronger coordination (less horizontal fragmentation) at a later stage. This has apparently facilitated re-packaging of German energy and climate policies from 2014 and onwards, although the results for on-the-ground implementation are still to be seen. The analysis has further shown federal government policy packaging as a strategy for overcoming vertical fragmentation problems – finding acceptable distribution of costs and benefits between the German states in order to stagger opposition from state governments with co-legislative powers in policy implementation. The federal government policy packaging approach facilitated solving some cases of implementation impasse, but we have also noted clear examples of insufficiencies, as with implementation of the CCS Directive.

6.2.2 *Social group affectedness and reactions*

This section turns the focus to state–society relationships in Germany, on the assumption that policy implementation can be supported or opposed by affected societal groups, with repercussions for implementation. We proposed that high concentration of adaptation costs would create opposition and tend to affect implementation performance negatively, more so if groups facing high cost concentration did not see a similar share of benefits outweighing costs. On the other hand, we would expect even distribution of adaptation costs and benefits in national transposition policies to spur less opposition and good implementation performance.

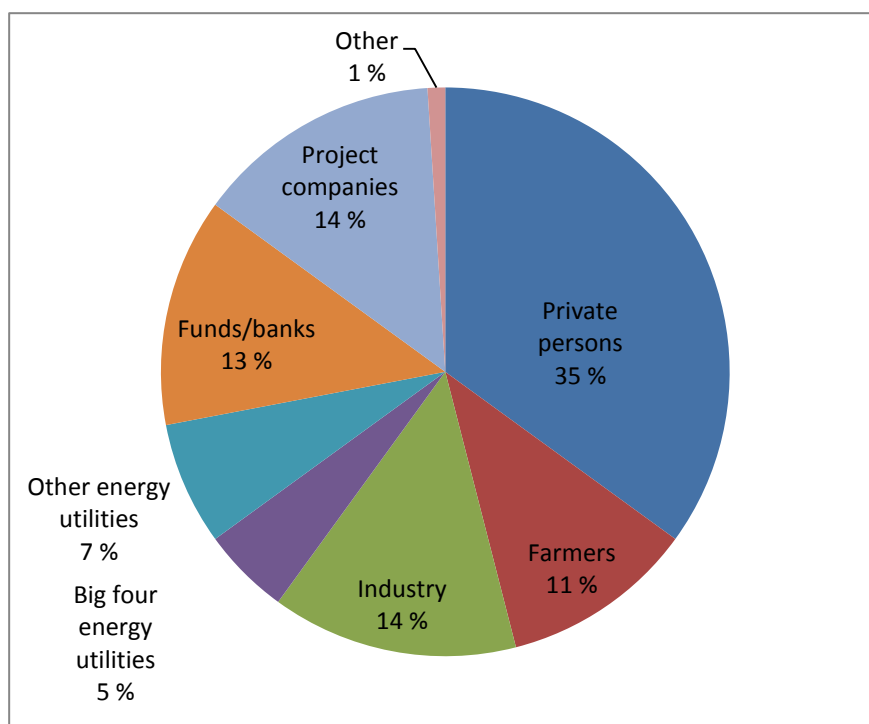
Looking at the *cost and benefit consequences* for different societal groups, we observe cases of considerable concentration of implementation costs for the major *electric power utilities* as a group, and costs multiplying for this group in the implementation period. The utilities saw higher direct costs from the reformed ETS Directive since they no longer

received free allowances: however, that did not prove overly demanding, because of the collapse in market price for allowances. On the other hand, the utilities still faced the risk of market prices returning to a higher level. Other major costs were indirect, stemming from utilities' loss of market shares to producers of renewable electricity – in turn a product of the mode by which Germany chose to implement the Renewable Energy Directive. The German feed-in tariff system secured priority access to the grid and a guaranteed 20-year sales price, removing commercial risks and boosting the number of investors who could take market shares from the utilities, reducing asset values for their conventional power plants. Particularly painful was loss of market shares during the commercially valuable high-price peak-load hours when also solar and windpower production peaked. Gas-powered peak-load plants lost operating time and faced revenue losses that curtailed remuneration of upfront investment costs (stranded assets). Adding to the cost-concentration picture were new nuclear power decommissioning costs from the 2011 phase-out decision.

A contrasting cost picture emerged for Germany's major energy-intensive companies. They experienced few costs from the EU ETS, granted mostly free allocation of allowances. They saw Germany making use of opportunities under EU state-aid rules to compensate them for higher electricity prices due to emissions trading. Moreover, they saw generous exemptions from paying the feed-in surcharge for expanding renewable electricity, and wholesale market prices falling from 2011 because of this expansion. Additionally, they enjoyed exemptions from paying national CO₂ taxes. Small installations became exempted from the EU ETS.

Beyond these extremes, other consumer groups, German households and companies not exempted from paying feed-in surcharges, saw high and increasing electricity costs particularly because of these surcharges escalating. These groups did not enjoy the benefit of lower wholesale market prices since the feed-in surcharge was designed to increase when market prices went down. For companies in all industries, the efforts of big emitters complying with the EU ETS would mean indirect costs in the form of higher energy prices and higher prices on carbon-intensive commodities like steel, processed minerals and paper. Moreover, households and companies not exempted would have to pay various energy and electricity taxes.

On the benefit side, households as well as companies were provided with opportunities under the feed-in tariff system to invest in autogeneration capacity, exempted from paying the surcharge, and giving new revenue opportunities from selling surplus back to the grid. Figure 3 shows ownership shares for German renewable energy capacity as of 2013.

Figure 3. Ownership shares for German renewable energy capacities, 2013.

Source: Renewable Energies Agency (2014) *Renewable Energies – a success story. Germany's Energiewende in practice*, http://www.unendlich-viel-energie.de/media/file/332.Flyer_Success_Mai2014_Endfassung.pdf

Looking at patterns of opposition/support for German energy and climate policies, German utilities, facing high total costs, recurrently spoke out against the German mode of implementing the EU policy package. They urged re-packaging that would remove the feed-in tariff system to slow down the speed of investments in renewables, and that the German government should accept EU ETS backloading, seeing a working emissions trading system as a lesser evil despite the potential extra costs for their fossil fuel-based generation capacity. Seeing their conventional peak-load plants out of operation much of the time, the utilities have called for a new larger policy package to include also energy market reforms, with a capacity remuneration mechanism to support holding conventional power plants in backup mode. German households, another group that saw high implementation costs, has apparently showed continued firm acceptance of these costs, as indicated by recurrent public opinion polls.⁴⁷ The German Industry Association (BDI) teamed up with the utilities in demanding reforms, lobbying for the feed-in tariff system

⁴⁷ In a recent October 2014 poll by TNS Emid on behalf of the German Agency for Renewable Energy, 55% of the respondents answered that the 6.24 cent/kWh renewable electricity surcharge was appropriate; 4% felt that it was too low and 36% that it was too high. Further, 92% of the respondents felt that speeding up the transition to renewable energy was important or extraordinarily important (Agentur für Erneuerbaren Energien, 2014).

being scrapped and for making the EU ETS the main energy and climate policy instrument, while not supporting EU ETS reforms to spur higher allowance prices. The BDI further signalled fears that a capacity remuneration mechanism would mean higher energy prices. The BDI is an umbrella organization for both energy-intensive and energy non-intensive industries. Among the latter group are manufacturing industries that use products sold by energy-intensive industries as input factors, including the important German automotive industry.

Finally, the German Renewable Energy Federation (Bundesverband Erneuerbare Energie e.V. – BEE), which organizes national renewable energy industries benefitting from the feed-in tariff system, has consistently supported both the continuation of this system, and EU ETS reforms to spur higher allowance prices (see also Ydersbond, 2012).

Summing up, we observe tendencies but find no consistent pattern where the strongest opponents of German policy implementation were the societal groups that saw high cost concentration. German utilities and energy-consuming industries (those not extensively shielded from costs) complied with such a pattern – but German households did not. Opposition was strong among a societal group that had been extensively shielded from implementation costs: the energy-intensive industries. This opposition may reflect expectations, without policy reforms, that costs could rise in the future. The group that saw the clearest benefits from German implementation, the renewable energy industry, supported implementation.

The German mode of implementing the EU energy and climate package, notably the continuation of the feed-in tariff system in the period 2009–2013, was thus carried out despite major cost concentration for German utilities, households and industry groups. This said, cost re-allocation was hotly debated during the 2013 election campaigns, and the reforms of renewable energy policies in 2014 to some extent met requests from actors that saw the highest concentrated costs. On the other hand, energy-intensive industries, earlier largely shielded from costs, got new voluntary agreements in 2011 that made continued exemptions from national energy taxes conditional on documentation of certified energy auditing systems and achievement of energy-efficiency improvement targets.

Here we must here not forget the benefit side of the German energy and climate policy package, however. German governments implemented EU policies by a national policy mix that provided many compensatory opportunities for groups bearing high costs. The feed-in tariff system was open for all societal groups, and thereby opportunities for exemption from paying the surcharge. Additionally German politics included various forms of side-payments: investment support programmes and cheap loans provided by the semi-state reconstruction bank KfW that covered broad societal groups. As shown in Figure 3, however, not all groups, notably the energy utilities, chose to invest in renewable electricity capacity, thereby missing out on the compensatory mechanism available under the feed-in tariff system.

To conclude then, the cost concentration for societal groups in Germany variously caused opposition to German implementation policies. Different mechanisms in the German policy mix gave opportunities for cost compensation, and contributed to maintaining high popular acceptance of ambitious energy and climate policies. Some other groups saw the national policy mix as a threat, and compensatory mechanisms as insufficient. Further, there were implementation problems with some compensatory mechanisms. This was notably the case when the German mode of implementing the CCS Directive removed the opportunity of using carbon capture and storage to aid fossil fuel-based interest groups in decarbonizing their energy installations. We have also noted that the German government made compensatory funding more independent of the budget cycle through earmarking EU ETS auctioning revenues, but that the fall in allowance prices/revenues then made the total amount of compensatory funding lower.

Summary – social group affectedness and reactions

We expected opposition to German implementation policies from groups facing high costs and no benefits to outweigh these benefits. On the aggregate, cost concentration combined with distributed benefits would affect implementation negatively. Further, we expected policy packaging to provide for compensatory mechanisms to facilitate implementation, by reducing opposition. We have seen how German implementation policies have been opposed by some groups with high costs (major utilities). We also note that some groups with high costs have been policy supporters (household consumers as indicated by popular polls). The German package of implementation policies has provided broad opportunities for cost compensation, variously used by different groups. First and foremost, these opportunities increased popular support for German policies and facilitated implementation.

6.2.3 Policy style and national implementation performance

We had proposed that implementation performance would be affected by national policy style: that a consensual policy style securing broad consultation among affected societal actors would facilitate implementation through high policy legitimacy, but might lead to less ambitious policy outcomes; whereas a top-down policy imposition style with no prior consultation could worsen policy legitimacy. It might increase the chances of more ambitious policies in the short run, since policymakers would not have to listen to stakeholder concerns, but poorer legitimacy may punish governments in the longer term (no re-election), with repercussions for the ambitiousness of later policies. For a corporatist policymaking style we expected to see implementation (ambitiousness of policies) reflecting the interests of the industry interests selected for consultations. Policy legitimacy may be high or low, depending on the representativeness/importance of these industries in terms of national value creation.

In terms of dynamics we expected broad societal consultations in the policy-formation stage (connected to negotiations at the EU level) to improve implementation performance in the later transposition and

application stages. This factor would, however, have been conditioned by the actual success of the German government in uploading its national policy positions at the EU level. The present study has not collected detailed information on societal actor access to and influence on the German government's negotiating positions back in 2008. That said, these positions, documented in section four, seemed to reflect a broad compromise between German environmental interest groups and different German industry-sector interests. And since Germany was a successful uploader, there is little reason to believe that patterns of consultations on the German negotiation positions back in 2008 meant a lot for later implementation problems.

The present study has documented a significant shift in policy style emerging in the baseline period. Historically, corporatist-style energy policymaking had given advanced access for a limited group of major industry associations that teamed up with the Ministry of Economic Affairs and Energy (BMWi). In 1990, local renewable energy interests convinced policy-makers in the Bundestag to adopt the feed-in-tariff system, against the will of industry associations and the BMWi. Initial policies spurred a new industry of manufacturers, installation companies and renewable electricity producers, growing in numbers and economic strength, and professionalizing through a network of national industry associations. A greater coalition of actors – environmental groups, farmers and local communities – supported the new industry's request for more ambitious policies, based in a vision of making renewable energy the cornerstone of a transformed German energy system, and to assume greater democratic control and bottom-up influence over energy policy development (see Ydersbond, 2012). The Green Party was a wholehearted supporter of this vision. When entering the federal government in the late 1990s, the Green Party opened new venues for this coalition to exert influence. An important step was moving the responsibility for renewable energy policies from the BMWi to the BMUB. Access to local and regional policymakers seeing the new industry growing within their constituencies, creating jobs and generating taxes, were also important here.

This also meant that the big utilities saw greater competition for political attention. The utilities also saw trust problems that might explain loss of influence compared to the renewable energy interests. This in turn stemmed from recurrent negative media entries: on: nuclear power plant incidences, their lawsuits against the German government for compensating the nuclear power phase-out, their destruction of villages to give way for brown coal mines, and their windfall profits gained from free allocation of emissions allowances under NAP I and II. Popular distrust in the utilities made also politicians aware that associating too strongly with them would not be a recipe for winning elections.⁴⁸

⁴⁸ Added to this, direct government-utility trust relations saw blows, as when the utility E.on back in 2008 accepted a deal with the European Commission for ownership unbundling for parts of its transmission grid, despite telling the German government to lobby against mandatory EU legislation on the issue (Eikeland, 2011). This move came as a surprise for the government, caused trouble for its credibility vis-à-vis the European

The consensual policy style, consolidated in the period when Germany implemented the EU energy and climate policy package, meant wide access for societal actors supporting reforms to express their views in federal policy consultations. The case of reforming German renewable energy policies is illustrative. Policies were decided after broad consultations with societal groups and consensus meetings with all prime ministers at the state level.

That said, we also observe policy cases where the government concluded that broader consensus consultations would be needed after policies had failed, notably connected to policies aimed at spurring investments in technologies contested at the local level: CCS and transmission grids.

To what extent has policy-style affected Germany implementation performance? Take first implementation of the Renewable Energy Directive, qualifying as a case with clear aspects of consensual policy-making. Here, transposition occurred without problems and on-the-ground implementation was very successful (at least for investments in renewable electricity). This indicates a connection between consensual policy style and good implementation performance. Take next implementation of the CCS Directive, qualifying as a case with aspects of policy imposition. Here, transposition met problems and the final transposition output crippled further implementation on-the-ground (application). This indicates a connection between a policy imposition style and poor implementation performance. However, the latter case also indicates that moving in the direction of a more consensual policy style gives no guarantee for implementation progressing the way the government wants when strong underlying conflict of interests exists. Wide popular distrust in the safety of carbon storage could not be easily overcome by stronger elements of consensual policymaking.

Hence, no clear connection between policy style and implementation performance seems evident. Strong conflicting interests may, if they have good access to governmental veto players, impede implementation despite of consensus-style policymaking. Implementation of backloading under the EU ETS may here serve as example. The main conflict line was one where the German industry association opposed the reform and various environmental groups/academic communities supported it. The policy process became dominated by disagreement within the government and bargaining between the economics and the environment ministers. The former, catering to the well-being of national energy-intensive industries, acted as veto player, showing that elements of 'classical' corporatist-style policy making was still present.

Summary – policy style and implementation

Summing up then, the general impression of this study is that German implementation of EU energy and climate policies followed from comprehensive consultation and consensus-seeking processes among

Union and poorer trust relations with the utilities (Interview, Severin Fischer, SWP, 4 June, 2014).

sectoral interests. As such, we may say that implementation took place in the context of a dominating consensual policy-making style. A comparative view with past German energy policymaking shows that this consensual style had emerged to make corporatist-style policymaking less relevant because of high and broad stakeholder mobilization dominant. A consensual policy-style appeared as unavoidable given the complex of sectoral interests mobilized and their links to potential governmental veto players at the federal and state levels. Some minor deviations from this picture may be found with elements of a more top-down imposing policy style. The CCS Directive transposition process appeared as one example where the government after initial implementation failure admitted that broader consensus-talks would be needed. However, as shown by the final transposition of this directive, by delays in EU ETS implementation and in continuous calls for reforming renewable energy policies, a consensual policy-style is no guarantee for successful implementation if conflicting interests have leverage vis-à-vis national veto players.

7 Main conclusions and the road ahead

Germany has shown mixed implementation performance as regards the EU 2020 energy and climate package. Transposition was completed – with delays – for the CCS Directive and the adoption of national implementation measures under the ETS. The Renewable Energy Directive was transposed on time, but national policies and measures became contested, with repeated calls for reform. Regarding on-the-ground implementation (application), we can observe mixed results as of 2014. Rapid growth in renewable electricity means that Germany is on track to meet its Renewable Energy Directive target of 18% share for renewables in total energy consumption, despite a halt in progress for renewable heat and a setback for renewable fuels in transport (not on track to meet the 10% renewables share for transport fuels). However, as of 2014, Germany was not entirely on track as regards meeting its obligations for reducing GHG emissions. German ETS sectors experienced a growth in 2012 and 2013, reflecting increased use of coal for electricity generation. Germany's non-ETS sectors were off-track for achieving the 14% GHG emissions reduction target for 2020, reflecting implementation problems in the major non-ETS sectors of transport and buildings. There were delays and a series of failures in the execution of policies and measures for these sectors.

Our analysis shows that misfit in what Germany wanted and what was decided at the EU level does not provide a good explanation for implementation problems. The EU package design fitted well with Germany's policy preferences. Indeed, the German government actively supported the package and was successful during the negotiations in re-making of drafts not in line with its preferences.

Finding limited support for the 'misfit proposition', the study has investigated a series of 'domestic politics' explanations. One conclusion is that implementation problems in Germany variously reflected horizontal and vertical fragmentation in the politico-administrative apparatus. Horizontal fragmentation was evident in the recurrent conflicts between the Ministry of the Environment (lead ministry responsible for transposition of the package) and the Ministry of Economics and Energy. These conflicts delayed agreement on ETS reforms (backloading), in turn postponing implementation at the EU level. However, these delays had few consequences for (and thus cannot explain) implementation problems on the ground, as with higher emissions from increased use of coal in power generation. When finally adopted, backloading had very limited effects on carbon prices and, thus, on incentives to reduce the use of coal. Conflicts between the two ministries contributed to delaying reforms in renewable energy policies as well. This meant that costs for German consumers escalated – but also that on-the-ground implementation progressed very successfully. We may conclude that the Ministry of Economics and Energy acted as a veto player on policy issues where the Ministry of the Environment had main responsibility for implementation.

Vertical fragmentation can explain many of Germany's implementation problems. The country's federal structure gives the chamber of state-level

governments (the Federal Council) co-decision powers with the Bundestag in law-making at the federal level. Moreover, Germany's federal states have prerogatives in area planning and can thus influence implementation on the ground. States and municipalities have extended administrative responsibilities for implementing federal laws and policies. The Federal Council was instrumental in vetoing consecutive federal government proposals for reform of renewable energy policies and in curtailing federal transposition legislation for the CCS Directive. The federal government drafted legislation to facilitate carbon storage, interfering with state government prerogatives in national area planning. To retain this prerogative, the Federal Council put in an 'opt-out clause' that resulted in poor on-the-ground implementation (application): full stop of industrial initiatives to use CCS as option for decarbonizing energy supply. Federal Council veto further curtailed implementation performance under the Effort-Sharing Decision, as when the proposal of tax exemptions for investments in refurbishing of German buildings was voted down. Underlying these implementation problems were conflicts over the distribution of costs and benefits between the federal and state levels, and among the various states.

We had expected opposition from societal groups to cause implementation problems, and opposition to be severe if implementation costs were concentrated and benefits distributed. This factor proved to have some explanatory power. We have noted how the very high costs from implementation of the Renewable Energy Directive combined with limited use of compensatory opportunities for one group (the major electric utilities) were strongly correlated with opposition to policies. On the other hand, we find no clear pattern of opposition from other groups facing high costs, German household and business consumers. This group is not homogeneous. Some made use of opportunities to compensate for high costs (by investing in renewable energy paid by feed-in tariffs); others simply accepted high costs, while yet others opposed high-cost implementation policies. Opposition was strong from one group that was considerably shielded from implementation costs: the energy-intensive industries. This group expected that costs could increase in the future. Aggregated, the German population appeared to show high acceptance of implementation costs and support of policies. Societal group opposition had an impact through recurrent federal government proposals for renewable energy policy redesign – but here, veto by the Federal Council had a neutralizing effect. Opposition by energy-intensive industries was important in getting the government to delay decisions that would have speeded up EU ETS reforms (backloading) at the EU level.

Finally, we expected that implementation performance would be affected by the national policy style. Implementation problems could stem from a style where policies were *imposed* top-down, without prior consultation with stakeholders. We have found little evidence for such an explanation, however. On the contrary, we find clear support for a *consensual* policymaking style with broad consultation dominating German energy and climate policy in the implementation period – more so than in earlier periods when stronger elements of a corporatist policy style had greater impacts, meaning consensus-seeking between a narrower group of top industry associations and segments of the government. We may conclude

that even a consensual policy style provides no guarantee against implementation problems if underlying interests and opposition are strong.

That said, we observe variation in breadth of consultations between the implementation cases. Renewable energy policies saw very broad consultations, corresponding with the large number and spread of actors with economic interests throughout the country and the opportunities (federal and state-level venues) for these actors to influence policymaking. We may conclude that the German bicameral system for producing federal laws necessitated very broad consensus processes.

In the case of the CCS Directive we find indications of a top-down policy process curtailing implementation of a first transposition policy draft, and that broader consensus consultations were initiated when implementation failed – although without producing the results that the government hoped for. We have also noted cases where there were more limited and closed consultations between the government and a narrower group of stakeholders, notably important national industry groups whose consensus would be needed to ensure on-the-ground implementation (application). Thus, Germany partly continued its tradition of negotiating agreements with important industry groups in both the ETS and the non-ETS sectors. Energy-intensive industries were granted many concessions to alleviate the implementation costs of the EU package, but they had to agree to energy management and savings measures so as not to lose concessions. The economically important car manufacturing industry was comprehensively consulted in connection with implementation of policies to spur market uptake of new low-emitting and electric cars in Germany. In exchange for a plan with 2020 and 2030 targets, the industry was granted massive government R&D funding to catch up in innovation with its international competitors.

This study has specifically investigated *whether and how implementing a package of conjoined energy and climate policies affected implementation*. Did the ‘package approach’ at the EU level improve or worsen implementation performance in Germany, or did it have no impacts at all? We had thought that reaching agreement on a package of policies might have made Germany give concessions on some issues in order to gain on other issues, thus increasing mismatches and impacting on implementation – but we found little evidence of such a mechanism at work. Further, we had expected that implementing a package that provided sectors broadly with targets to cut GHGs and invest in renewable energy/energy efficiency could affect administrative organization, leading to more (or less), fragmentation, thereby impeding (or facilitating) implementation. We have observed more horizontal coordination emerging between the two lead ministries responsible for implementing the package, expressed as more convergent views on the need for policies to link renewable electricity producers more closely to the electricity market, and ending with merged responsibility over the two policy issues within the same ministry. We have also observed more ministerial convergence of views in support of emissions trading as a policy instrument for curtailing German GHG emissions. This apparently correlated with reduced conflict levels within the government observed in 2013 and 2014, facilitating policy reforms and energy policy re-packing.

Our analysis shows major challenges to implementation from vertical fragmentation (conflict between federal and state level governments). We may conclude that the German federal government pursued a packaging approach quite extensively aimed at levelling costs and benefits between the states and thus reducing conflict: generous support of renewables to states benefiting from industry growth in this area, and opportunities to compensate energy-intensive industries and side-payments to fossil-based energy generators to benefit states with a large share of coal in their energy mix. Federal government policy packaging also included direct financial compensation to states that would lose tax revenues due to the proposed policy reforms. While such compensatory measures facilitated solving some instances of implementation impasse, there are also examples of insufficiencies, as with implementing the CCS Directive. Here, the initial federal policy draft was supported by the local governments in Germany's coal-rich states but not by those that hosted major storage capacities, even though they would benefit from generous renewable energy support policies. An important underlying cause was the massive popular mistrust of carbon storage as a safe solution, but also perceived conflicts of interest among the various states played a role here.

The compensatory mechanisms extensively addressed cost and benefit (opportunity) distribution among societal actors, thus reducing opposition and facilitating implementation. They targeted energy-intensive companies for wide cost exemptions. Generous investment programmes (to be strengthened by ETS revenues) were provided to all sectors of the economy, and operational support for renewable electricity and CHP. We note, however, that companies facing high cumulative costs made scant use of the most generous opportunity-creating mechanism (operational support for renewable electricity system through the feed-in tariffs). By contrast, other groups made quite extensive use of this mechanism – as with ordinary citizens and farmers investing in renewable energy. The compensatory mechanisms did not remove opposition entirely, but they may have contributed to the strong popular support observed for German energy and climate policies, thus facilitating implementation. Another effect of this wide distribution of opportunities was a growing number of Germans with a direct economic stake in policy development. This made policy reforms difficult without widening the scope of consultations. As such, the German mode of implementing the EU package appeared to build on a traditional consensual policy-style with extensive consultations.

7.1 The road ahead

Germany's implementation performance halfway towards 2020 shows the clear challenges involved in achieving EU-induced and national targets for GHG emissions. Germany has put itself in a delicate position by the parallel phase-out of low-carbon nuclear power. Despite these implementation challenges, it has not abandoned its commitments to long-term low-carbon energy transition and to uploading similar ambitions at the EU level. Germany has formulated a series of targets for GHG emissions, renewable energy and energy productivity by 2050 and interim periods. It pushed for more ambitious EU 2030 targets than those decided in October 2014. The German government has supported the

40% GHG emissions reduction target but wanted 30% targets for renewable energy and energy productivity. The EU decided on 27%. Germany has also taken a leading role in pressing for EU ETS reforms with the introduction of a market stability reserve in 2017 rather than in 2021, as proposed by the European Commission.

What then of the road ahead for Germany? Whether it will be able to stay on track with its ambitions or derail depends on national and international developments. New short-term policies will be needed for achieving the 2020 targets. In early December 2014, the government announced that it had agreed on a new carbon action plan. This plan would set targets for all sectors, with the bulk of emission cuts from electricity generation, which has seen the use of coal and emissions increasing during the past three years. A cap on emissions for the period 2016–2020 will be set. It is proposed to add an emissions trading system for the electricity sector to the wider EU system. Power companies will be allocated allowances based on how much they currently emit, and can sell surplus allowances to companies in deficit. The carbon action plan also includes new measures to achieve the Effort-Sharing Decision target and for implementing the EU Energy Efficiency Directive of 2012. For the major non-ETS sectors, the German government plans to offer €1 billion tax breaks for retrofitting buildings, to add 200 million for low-interest loans for installation of energy-saving measures, and to give new incentives for getting one million electric vehicles on the road, thereby cutting emissions from the transport sector. The add-on emissions trading system is new to Germany, whereas other major measures reinforce existing instruments or are new play-offs of measures previously found non-acceptable by the Federal Council (the tax break for retrofitting buildings), as discussed in this study.

The fate of these short-term measures will depend on whether new political will and support can be mustered. For Germany to keep on track for the longer term, additional measures will be needed, including mechanisms that can allow the energy system to maintain reliability with even greater shares of renewable-source energy. To secure sufficient support for these longer-term measures, broad commitment will be needed as well as policies involving an acceptable distribution of costs and benefits. As of today, we find a mix of supporters and opponents of long-term energy transition in Germany – because current national policies have created winners and losers. Opinion polls show strong and stable support in the German population, despite the rising costs of energy. To ensure continued support, renewable energy policies were reformed in 2014, with new cost control expected to eventually stabilizing consumer costs. For small-scale autoproducers of renewable electricity, exemptions have been given. This is intended to ensure that ordinary members of the public can still gain from investing, which is seen as important for maintain popular enthusiasm for the transition. Help will come from the massive reductions seen in windpower and solar PV costs, and new innovative decentralized energy solutions.

Parts of German industry have remained sceptical, notably those that fear loss of competitiveness if energy prices increase because of the transition. Here we can note that the German Association of Industrial Energy

Consumers, VIK, was opposed to the EU's setting higher 2030 emission reduction targets for ETS-sectors and introducing a market stability reserve for a reformed EU ETS. Other parts of German industry, however, are supportive of the national energy transition and of extending this to the EU – notably those groups that see expanding market opportunities in this. We may note the clear support from the VDMA, the German Engineering Association, which has 3100 member companies with close to 1 million employees in Germany. VDMA holds that new opportunities will be created for its members, with the *Energiewende* away from mainly nuclear power and fossil fuels to renewable energy and energy-efficient solutions, as well as ambitious 2030 targets for the EU. German technologies are regarded as the key to greater energy and resource efficiency, and to reducing CO₂ emissions in energy supply, industrial and commercial sectors, and in buildings.

Germany's major energy utilities have long been sceptical, as they bear high costs from the national energy transition. However, the German Association of Energy and Water Industries (BDEW) has taken a clear pro-position, if the German transition is not rushed but can be coordinated with the larger European energy market context to minimize the costs. BDEW has become a clear supporter of a reinforced EU ETS as key instrument to guide the German and wider European transition, and has joined a network of major companies and associations supporting the EU 2030 framework and early reforms of the EU ETS to ensure confidence for necessary investments.

Positions on the long-term transition in Germany are necessarily coloured by developments in the EU and elsewhere on the international scene. Opposition from German industry associations may be reduced if a global climate deal can be reached in Paris in 2015, and if the EU can succeed in transforming its new 2030 targets into a policy package that allows acceptable cost shielding to companies affected by international competition. New EU and international deals may extend the opportunities for Germany's green energy industries to maintain a strong market position despite the competition from companies in lower-cost countries. And finally, continued growth of green industries will further increase the leverage of this group in the German economy and polity, thereby serving to boost support for the long-term transition to a more sustainable future.

List of Interviewees

Two series of interviews and discussions with experts on aspects of German energy and climate policy were conducted. In a first series in May and June 2014, semi-structured interviews were held with the following persons:

- Einar Westre, Executive Director, Networks and Markets, Energy Norway, former Executive Director, Networks and Market, MVV Energie AG, 1998-2004 (telephone interview, May 2014)
- Bjørn Erik Brustad, Norwegian Ministry of Foreign Affairs, 21 May 2014, Oslo.
- Sabine Gores. Öko-Institut e.V.m, telephone interview 2 June 2014.
- Justus Riedlinger, VSE 3 – Referent Stabstelle Energiepolitik, Ministerium für Energiewende, Landwirtschaft, Umwelt und ländliche Räume des Landes Schleswig-Holstein (telephone interview, 30 May 2014).
- NN, Bundesministerium für Wirtschaft und Energie (BMWi IV B 5: Mineralische Rohstoffe und Geowissenschaften), 3 June 2014, Berlin.
- Severin Fischer, *Dipl. Pol.*, Stiftung Wissenschaft und Politik (SWP), Research Division: EU Integration Fellow, 4 June 2014, Berlin.
- Henning Mümmeler-Grunow, Wissenschaftlicher Referent Büro Oliver Krischer, Bundestagsfraktion Bündnis 90/Die Grünen, 4 June 2014, Berlin.
- Dr Felix Matthes, Öko-Institut, 4 June 2014, Berlin.
- Dr Jan Scharlau, Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit – Referat KI I 3 (Rechtsangelegenheiten Klimaschutz, Emissionshandel, 4 June 2014, Berlin.
- Jasper Braam, BMUB, Division KI I 6, 5 June 2014, Berlin.
- Dr Volker Hoppenbrock, M.A., Bundesministerium für Wirtschaft und Energie, Referent im Referat III B 2, Übergreifendes Energierecht und Erneuerbare-Energien-Gesetz, 5 June 2014, Berlin.
- Christian Redl, Senior Associate, Agora Energiewende, 5 June 2014, Berlin.
- Stephanie Ropenus, Agora Energiewende, 5 June 2014, Berlin.
- Joachim Hein, BDI – Federation of German Industries, 6 June 2014, Berlin.
- Rainer Hinrichs-Rahlwes, member of BEE Board, spokesperson on European Affairs, 6 June 2014, Berlin.
- Dr Martin Ruhrberg, BDEW, 6 June 2014, Berlin.

In the period 5–10 October 2014, I was invited by the German Federal Foreign Office to attend a visitors' programme on the Federal Republic of Germany, featuring presentations and discussions on the political process driving the energy turnaround in Germany. Persons who gave presentations and contributed in these discussions included:

- Dr R. Andreas Kraemer, Director, Ecologic Institute, 5 October 2014
- Mr Marius Backhaus, Federal Ministry for Economic Affairs and Energy, 6 October 2014
- Mr Ernst Peter Fischer, Deputy Director-General for Globalization, Energy and Climate Policy, Federal Foreign Office, 6 October 2014
- Dr Joachim Lang, Director E.on representation, Berlin, 6 October 2014
- Dimitri Pescia, Senior Project Manager European Energy Cooperation, Agora Energiwende, Berlin 7 October 2014.

The programme also included a guided tour to and presentations at Feldheim, a local community that has developed as a decentralized unit self-sufficient unit in energy, on 8 October 2014; and presentations at the Renexpo energy fair in Augsburg, 9 October 2014.

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