



## *UFZ-Bericht 01/2009*

### **Climate Policy Integration, Coherence, and Governance in Germany**

PEER Climate Change Initiative – Project 2: “Climate Policy Integration,  
Coherence and Governance”

Silke Beck, Christian Kuhlicke, Christoph Görg

Helmholtz-Zentrum für Umweltforschung – UFZ  
Department Ökonomie und Stadt- und Umweltsoziologie

*ISSN 0948-9452*



# **Climate Policy Integration, Coherence, and Governance in Germany**

**Silke Beck, Christian Kuhlicke, Christoph Görg (UFZ)**

## **Contents:**

1. Introduction .....	4
1.1 The Context –The PEER Climate Change Initiative.....	4
1.2 Objectives and Task of Project 2.....	5
1.3 Key Concepts, Structure and Material of the Country and Case Study .....	6
2. The National Political Context and Institutional Framework Conditions.....	12
2.1 Political System and the Need for Integration .....	12
2.2 Political Situation .....	14
2.3 Key Climate Change Challenges.....	14
2.4 Setting the Stage for Innovation: The “Ecological Modernisation” Framework .	17
3. Horizontal Policy Integration and Coherence at the National Level .....	20
3.1 Governmental Programs and Strategies .....	20
3.2 Climate Protection Policies .....	24
4. Vertical Policy Integration and Coherence at the National Level.....	34
4.1 “Sector” Specific Policy Integration and Coherence at the National Level.....	34
4.2 Policy Integration and Coherence Across Levels of Government .....	36
5. Case Study: The Vereinigte Mulde .....	39
5.1 Introduction .....	39
5.2 The Mulde Case Study .....	43
5.3 The Implementation of Adaptation: A Bottom-Up Perspective.....	50
6. Conclusion – Climate Policy Integration in Germany .....	54
References .....	66

Table 1: Criteria to Assess Policy Integration.....	8
Table 2: Research Materials.....	10
Table 3: The Present Cabinets and their Programs in the Participating Countries .....	14
Table 4: Horizontal Climate Policy Integration – Early Policies.....	19
Table 5: Specific Initiatives in the Field of Climate Protection.....	19
Table 6: Win-win and Trade-Offs – the Coalition Agreement .....	21
Table 7: Horizontal Climate Policy Integration – the Coalition Agreement.....	22
Table 8: Horizontal Climate Policy Integration .....	24
Table 9: Adopted and Planned Climate Change Strategies in the Participating Countries.....	24
Table 10: Key Elements of an Integrated Energy and Climate Programme .....	27
Table 11: Key Elements of the IECP Not Yet Implemented .....	29
Table 12: The Integrated Energy and Climate Programme 2007/8 .....	30
Table 13: Policy Integration – IECP .....	32
Table 14: Policy Integration for the Climate Protection Initiative.....	33
Table 15: Policy Integration for the German High Tech Strategy .....	35
Table 16: Policy Integration for the National Adaptation Strategy .....	38
Table 17: Policy Instruments and Means to Increase Horizontal Policy Integration.....	58
 Map 1: Extent of the 2002 Mulde Flood .....	41
and single Case-Studies.....	41
Map 2: Eilenburg in the 12th Century.....	44
Map 4: Eilenburg in 1856.....	44
Map 6: Eilenburg in 2001.....	45
 Photo 1: Flood Wall in Front of the Former ECW.....	45
Photo 2: Aerial Photograph of the City Center of Grimma.....	46
Photos 3+4: Pictures from the Flood and Flood Damage in Grimma in August 2002 .....	46
Photo 5: Concept for Flood Protection Measures in Grimma.....	47
Photos 6+7: Aerial Photograph of Erlln (left), Dike Breaches in Erlln in August 2002 (right) .....	48
Photo 8: Plan for the Ring Dike in Erlln .....	49
 Figure 1: Policy Levels Where Climate Policy Integration May Take Place .....	6
Figure 2: Horizontal and Vertical Climate Policy Integration. ....	7
Figure 3: Structure and Distribution of Money (own figure).....	51
Figure 4: From Horizontal to Vertical Environmental Policy Integration .....	59

# 1. Introduction

The country and case study that will follow focus on policy integration and coherence in German climate policies. It is part of the PEER Climate Change Initiative.

## 1.1 The Context –The PEER Climate Change Initiative



At the L2L conference in Leipzig/ May 2007, PEER (Partnership for European Environmental Research) published a joint statement on climate change and set up a joint initiative to analyse and explore novel approaches to climate change mitigation and adaptation (<http://peer-initiative.org/html/obj454.html>). This initiative is guided by the idea that mitigation and adaptation are the two best approaches for minimising the adverse effects of climate change but their interplay and their impacts need to be better understood and assessed. The scale and complexity of the interactions between society, ecosystems, and global climate change present an unprecedented scientific challenge and call for new types of innovative solutions, especially on regional and local scales. The initiative is also based on the belief that these challenges can be best addressed by co-ordinated joint research across national and disciplinary borders under the PEER umbrella. Since its foundation in 2001, PEER has promoted synergies and attained added value on a European scale through the coordination of research strategies and the activities of its partners. PEER invited regional, national, European and global research partners to participate in this initiative. Research centres from the Netherlands (ALTERRA), United Kingdom (CEH), France (CEMAGREF), Denmark (NERI), Finland (SYKE), Germany (UFZ), and the Joint Research Centre (JRC) of the European Commission, joined the initiative in Leipzig. The goal is to build an open European platform that brings together expertise and exchanges information on the best approaches to mitigate and adapt to climate change.

As a follow-up to this statement, PEER launched, in November 2007, two joint projects:<sup>1</sup>

- **Project 1:** “Comparative Analysis of European national adaptation strategies” (coordinated by Rob Swart, ALTERRA);
- **Project 2:** “Policy Integration, Coherence and Governance” (coordinated by Per Mickwitz, SYKE).

Project 1 focuses on the development of National Adaptation Strategies and has two major objectives:

---

<sup>1</sup> These projects are voluntarily organised by the PEER partners using mostly internal funding and they are carried out in partnership with research organisations and government bodies beyond PEER.

- Policy support: compare the characteristics of existing or planned national adaptation strategies and derive innovative ideas for the development and implementation of adaptation strategies.
- Research agenda: on the basis of national strategies, identify interesting new research areas to strengthen national and European research activities in the area of adaptation.

The project focuses on 6 key dimensions of national strategies: drivers, science-policy interactions, communication and awareness raising, multilevel governance issues, integration into sector policies, and evaluation and review. It focuses on 13 EU member states.

## **1.2 Objectives and Task of Project 2: Climate Policy Integration, Coherence and Governance**

This country and case study on Germany is part of Project 2 “Climate Policy Integration, Coherence and Governance.” Project 2 is set up as a multi-case study. The other country and case studies conducted by PEER institutes are focusing on Denmark, Finland, the Netherlands, Spain and the United Kingdom. All these country and case studies share key concepts and criteria to assess the degree of policy integration in their respective countries that are provided by Mickwitz et al. (2008). The framework is used as starting point for conducting the case studies and for comparing their empirical results. In each country, several policies at the national level are examined. In addition, some regions are examined in detail. The added value of this approach is to combine comparative studies with in-depth involvement by researchers with national knowledge and different disciplinary backgrounds in order to maintain a country- and context-specific understanding and the new perspectives that emerge as a result of comparison using common concepts and questions are introduced.

Project 2 is guided by the understanding that any policy aimed at climate change mitigation or adaptation will interact with other policies. Interaction may take place during policy preparation and implementation, but it occurs, in most part, when decisions are made by target groups in relation to climate change. When industry, energy producers or transport companies take actions due to climate change policies their actions are also influenced by other policies. In some cases, policies have synergies, in others they have conflicts and, by recognising these, the policies may be modified to reinforce synergies and reduce conflicts (Mickwitz et al. 2008).

The relevance of policy integration and coherence for climate change will depend on concrete actions taken, partly in terms of management or regulation, but mainly in terms of operations. These actions are always local and have regional impacts. Thus, the project focuses on the national level, even while it offers an analysis of policy integration and coherence at the local and regional level for some case areas. Furthermore, measures undertaken or suggested at the EU-level (e.g. EU Green Book) interact with those originating at the national and regional levels. Thus, policy integration and coherence is part of multilevel governance.

The project will, first and foremost, aim at providing an increased understanding of the features and conditions for better integrated and coherent policies and governance processes. In addition, the goal is also prescriptive, i.e. which methods, approaches and institutions, at different levels, could contribute to fostering climate change policy integration and increasing coherence?

The research tasks of the project are:

- To assess the degree of climate change policy integration in different policy sectors (energy, traffic, spatial planning, education ...), countries, and for a selected policy sector at the local level, and to determine key coherence problems between climate change policies and other policies at different levels.

- To suggest means – such as institutions, processes (e.g. EIA) or measures – to enhance climate change policy integration and improve policy coherence, within the context of multi-level governance.
- To further develop concepts and methods by which policy integration, coherence and governance can be studied.

### 1.3 Key Concepts, Structure and Material of the Country Case Study

#### 1) Key Concepts

The following key concepts provided the starting point for the project and are guidelines to a common understanding of the central concepts.

##### A) Policy Integration

Based on the definition of policy integration by Underdal (1980) and Environmental Policy Integration by Lafferty and Hovden, climate **policy integration** is defined as:

- the incorporation of the aims of climate change adaptation and mitigation into all stages of policy-making in other policy sectors (non-environmental as well as environmental);
- complemented by an attempt to aggregate expected consequences for climate change adaptation and mitigation into an overall evaluation of policy, and a commitment to minimise contradictions between climate policies and other policies (2003: 9).

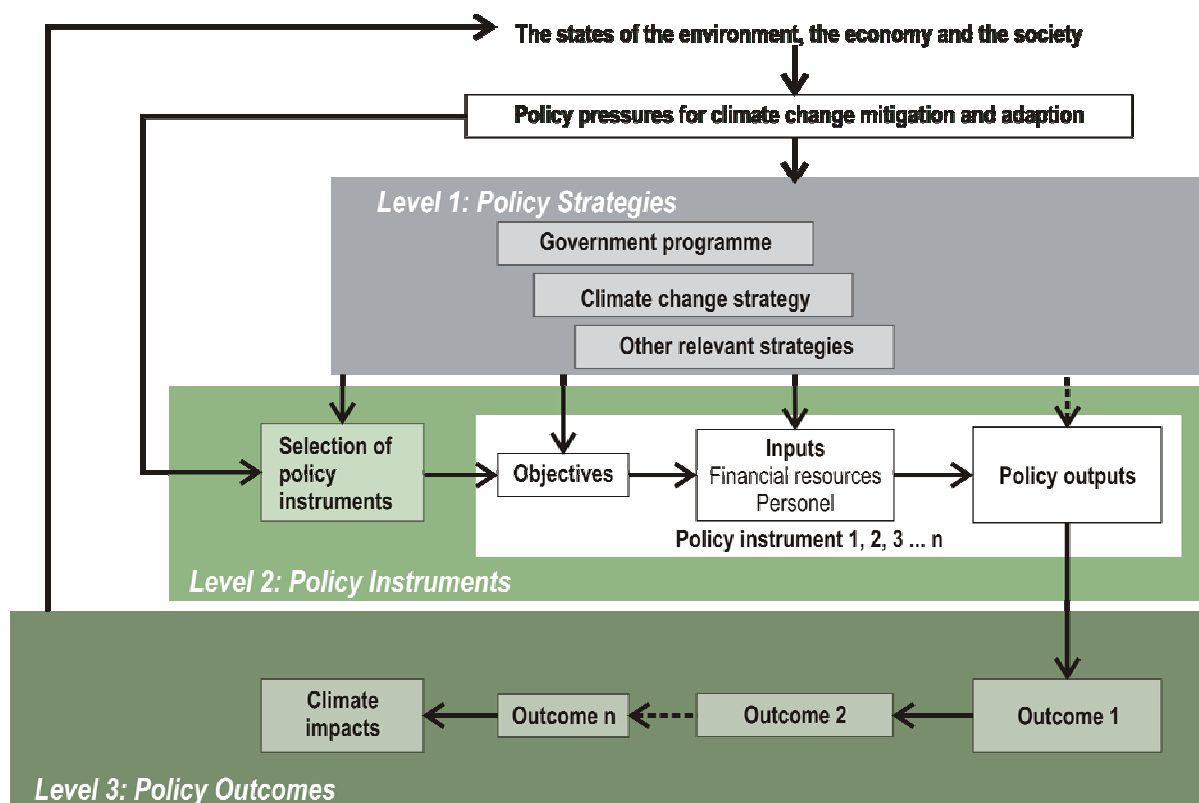


Figure 1: Levels of policies where climate policy integration may take place (Mickwitz et al. 2008) Arrows in Figure 1 indicate influence, but not unconditional causality since many other factors usually affect the development.

Policy integration can be divided into *horizontal policy integration* and *vertical policy integration*.

- *Horizontal policy integration* refers to cross-sectoral measures and procedures by the government or some governmental body, e.g. a commission, carried out to mainstream or comprehensively integrate climate change mitigation and adaptation aims into public policies. Typical means include broad climate change strategies and the integration of climate policies into the preparation and adoption of new regulations and the annual state budget.
- *Vertical policy integration* refers to the integration of climate policies into a specific sector. It includes sector-specific strategies and decisions made at the ministerial level, as well as climate policy integration into the strategies, measures and actions taken by the different agencies under the supervision of a ministry.

Both forms of policy integration can be assessed at just one level, but they also refer to integration through many levels (i.e. national state, state, regional, local).

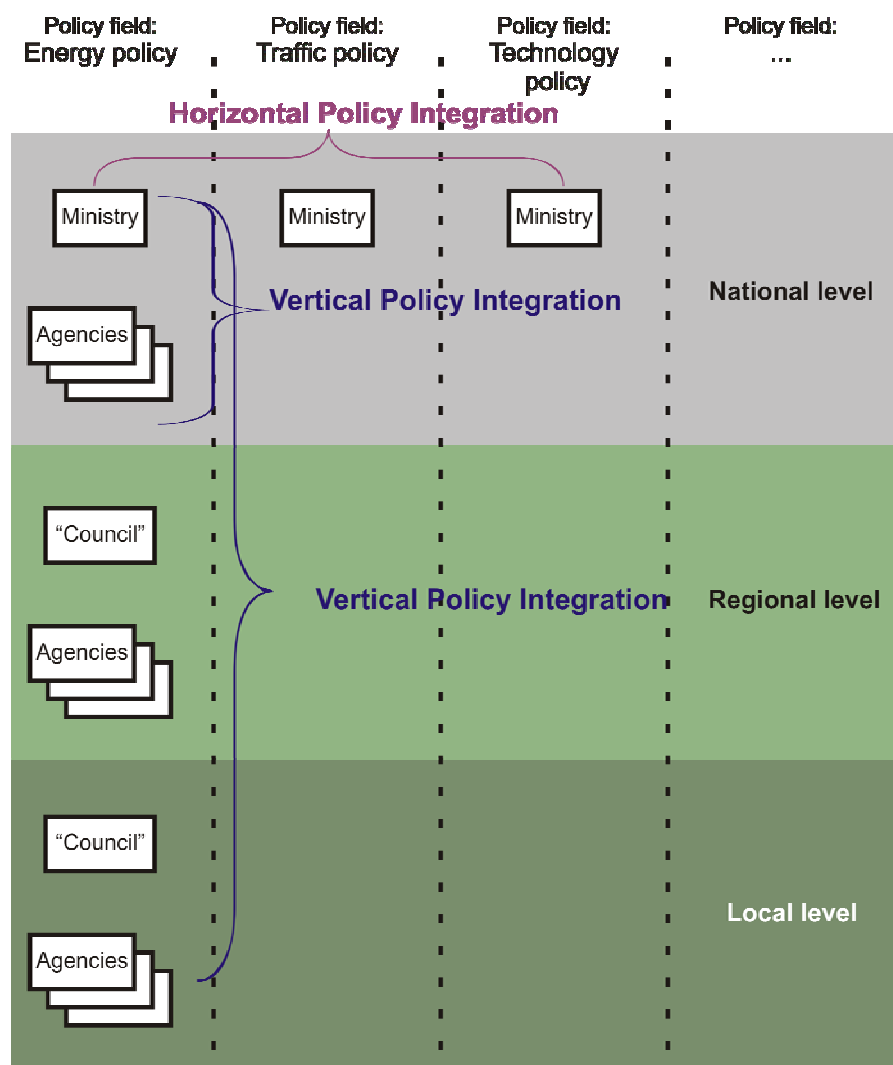


Figure 2: Horizontal and vertical climate policy integration.

(Mickwitz et al. 2008) Vertical policy integration may occur within as well as between levels (i.e. national state, regional, local).

Based on this definition, we used criteria to assess the degree of policy integration as follows:

- The first criterion is *the inclusion of integrated climate change aspects*. Some degree of inclusion is a prerequisite for the other criteria utilised. When integrating a policy, it is essential that different policy instruments are consistent with one another, or as phrased by Lafferty and Hovden (2003), there should be a *commitment to minimise contradictions*.
- The second evaluation criterion is thus *the consistency of the integrated climate change aspect in relation to other aspects*. Some have argued that, when there are conflicts between different policy aims, environmental issues should be prioritised (the second part of the Lafferty and Hovden definition). This argument is based on the view that environmental concerns cannot be balanced with other objectives, because they relate to the preservation of the carrying capacity of nature, i.e. the basis for any survival (Lafferty and Hovden 2003: 10). In the case of climate change it is clear that emissions of gases contributing to climate change will always occur.
- At the same time it is also obvious that there are other societal aims as well and some of these will be in conflict with the aims to mitigate and adapt to climate change. Some of these conflicts can be resolved while others have just to be treated in such a way that one can live with them. The third criterion will thus be *weighting of the integrated climate change aspect with respect to other aspects*.
- The fourth criterion *reporting* is based on the recognised importance of feedback for policy implementation. Reporting addresses the degree to which strategies include specifications *ex ante* about how climate change aims are to be followed up and reported. The reporting also takes into account the information on climate change mitigation and adoption actually included in *ex post* assessments of policy instruments utilised to implement them.
- Finally, policy integration is not just about intentions, it requires knowledge and resources as well. Being able to recognise the links of a strategy or the impacts of an instrument on climate change mitigation and adaptation is not always an easy task. Policy integration at all levels is thus dependent on the know-how of the people involved, the time they have to spend on these aspects, and the ‘expert’ resources available. The fifth criterion is thus, *the resources for integrating climate change aspects*.

**Table 1: Summary of the Criteria that Will Be Used to Assess Policy Integration (Based on Kivimaa and Mickwitz 2007)**

<b>Criterion</b>	<b>Key Question</b>
<i>Inclusion</i>	To what extent are direct as well as indirect climate change mitigation and adaptation impacts covered?
<i>Consistency</i>	Have the contradictions between the aims related to climate change mitigation and adaptation and other policy goals been assessed and have there been efforts to minimise revealed contradictions?
<i>Weighting</i>	Has the relative priority of climate change mitigation and adaptation impacts compared to other policy aims been decided and are there procedures for determining the relative priorities?
<i>Reporting</i>	Are there clearly-stated evaluation and reporting requirements for climate change mitigation and adaptation impacts (including deadlines) <i>ex ante</i> and have such evaluations and reporting happened <i>ex post</i> ? Have indicators been defined, followed up and used?
<i>Resources</i>	What are the internal as well as external ‘know-how’ of climate change mitigation and adaptation impacts available and how are they used?

## *B) Policy Coherence*

Policy coherence is often taken to imply that various policies go together because they share a set of ideas or aims. As pointed out by May et al. (2006) policy coherence is a relative term, but at the same time it cannot directly be measured. Policy coherence can be studied based on the policy sector (substantive area e.g. energy, transport, etc.), the target group (industry, energy producers, etc.) or the geographic area. Whereas some view policy coordination, consistency and coherence as synonyms, Jones (2002) argues that coherence goes further than the two other concepts in the systematic promotion of mutually reinforcing policy actions across government departments and agencies creating synergies toward achieving the defined objective. Nevertheless, policy coherence is not primarily about choosing between conflicting aims, but rather about enabling a process through which both aims and means can be redefined, so that new win-win situations can be determined. As mentioned before, if there are problems of *consistency* due to the fact that environmental concerns cannot be balanced with other objectives (Lafferty and Hovden 2003: 10), it remains an open question as to whether win-win-solutions are available or not.

There has also been a debate in the literature about the most appropriate approach to promote coherence and coordination. Especially prolific has been a discussion around the use of more centralised or diffuse approaches (Russel and Jordan 2007).

A special aspect of coherence is *cross compliance*, which is a concept adopted in the context of the EU's common agricultural policy (CAP). Varela and Calatrava (2004) defined cross compliance as one of the most promising instruments to integrate environmental concerns into the mainstream of agricultural policy and to stress the enforcement of current legislation related to environment and nature conservation, animal health and welfare and food safety and quality. Conceptually, cross compliance could be taken to ensure compliance of one policy through another policy.

## *C) Governance*

In this study the perspective of multi-level governance is especially important. Multi-level governance contains both vertical and horizontal dimensions. *Multi-level* refers to the increasing interdependence of governments operating at different levels, while governance signalled the growing interdependence between governments and non-governmental actors at various territorial levels (see Bache and Flinders 2005). There are, thus, both descriptive and normative aspects of governance.

## **2) Structure of the Country and Case Study**

**Chapter 2** offers an overview of the historical, political and cultural background of climate policies in Germany. It outlines structural features of the political system that are relevant for policy integration and coherence. It also sketches the historical development and the “path” of climate policies.

**Chapter 3** focuses on the “Integrated Energy and Climate Programme” that was finally adopted in June 2008 by the German Government. This program is an attempt to implement fundamental European policy decisions on the national level by means of a concrete program of measures in energy and transport policies that are the key sectors of economic and regulatory activities in Germany

**Chapter 4** assesses the *vertical* integration of climate concerns by the example of technology and innovation policies. It also includes the set up of the national strategy on adaptation.

**Chapter 5** combines top-down and bottom-up perspectives in analysing policy integration in the case of flood management at the regional level, taking into account the multi-level governance system of German Federalism. It deals with flood management since this sector is expected to be the one most affected by impacts of climate change in Germany and planning tools and measures to adapt to climate change are most advanced. We conduct the case study for the Mulde river basin, located in the Free State of Saxony. Eastern German river basins such as Elbe and Mulde are highly sensitive to impacts of climate change such as drought and floods, the infrastructure is extremely vulnerable and the potential losses will be high. The Mulde was one of the areas that were heavily affected by the big flood of August 2002.

In the **conclusion**, we compare the results of the country and case study systematically along the criteria “inclusion”, “consistency”, “weighing” and “reporting” in order to demonstrate the most striking features and problems of climate policy integration in German. We do not only focus on the integration of climate concerns into other policy areas such as energy policy (in the sense of mainstreaming), but we also ask what policy instruments, measures and institutional adjustments are introduced to improve policy integration and coherence.

### 3) Material

**Table 2: Research Materials**

Chapter	Title	Materials (for example)
<b>1</b>	<b><i>Introduction</i></b>	
<b>2</b>	<b><i>The national context and institutional responsibilities</i></b>	Comparative Research on political system, political culture in general and climate policy in particular
<b>3</b>	<b><i>Horizontal policy integration and coherence at the national level</i></b>	
3.1	<i>Governmental programmes and strategies</i>	Coalition Agreement (CA 2005) between the SPD (Social Democratic Party) and CDU (Christian Democratic Union), CSU (Christian-Social Union of Bavaria): “Working together for Germany – With courage and compassion” <a href="http://koalitionsvertrag.spd.de/servlet/PB/show/1673135/Koalitionsvertrag2005_engl.pdf">http://koalitionsvertrag.spd.de/servlet/PB/show/1673135/Koalitionsvertrag2005_engl.pdf</a>  “Climate Agenda 2020: Restructuring Industrial Society” (April 2007) <a href="http://www.bmu.de/english/climate/downloads/doc/39350.php">http://www.bmu.de/english/climate/downloads/doc/39350.php</a>  National Strategy for Sustainable Development (NSSD) <a href="http://www.bmu.de/english/international_environmental_policy/johannesburg_summit_2002_/doc/3403.php">http://www.bmu.de/english/international_environmental_policy/johannesburg_summit_2002_/doc/3403.php</a> <a href="http://www.oecd.org/dataoecd/58/42/36655769.pdf">http://www.oecd.org/dataoecd/58/42/36655769.pdf</a>
3.2	<i>Climate change strategies</i>	Das Nationale Klimaschutzprogramm 2000 <a href="http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/6886.php">http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/6886.php</a> Das Nationale Klimaschutzprogramm 2005 <a href="http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/35742.php">http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/35742.php</a> <a href="http://www.bmu.de/english/climate/downloads/doc/35833.php">http://www.bmu.de/english/climate/downloads/doc/35833.php</a>  Key Elements of an Integrated Energy and Climate Programme (2007) <a href="http://www.bmu.de/english/climate/doc/39945.php">http://www.bmu.de/english/climate/doc/39945.php</a> The Integrated Energy and Climate Programme of the German Government (December 2007) <a href="http://www.bmu.de/english/climate/downloads/doc/40589.php">http://www.bmu.de/english/climate/downloads/doc/40589.php</a>

		National climate protection initiative <a href="http://www.bmu.de/english/climate_protection_initiative/general_information/doc/42000.php">http://www.bmu.de/english/climate_protection_initiative/general_information/doc/42000.php</a>
3.3	<i>Strategic environmental assessment</i>	Environmental Impact Assessment Act (June 2004) <a href="http://www.bmu.de/english/service_downloads/doc/7007.php">http://www.bmu.de/english/service_downloads/doc/7007.php</a>
3.4	<i>Regulatory impact assessments</i>	<p>Wirtschaftliche Bewertung von Maßnahmen des Integrierten Energie- und Klimaprogramms (IEKP) (Oktober 2007) <a href="http://www.bmu.de/ueberblick/klima_und_energie/doc/40258.php">http://www.bmu.de/ueberblick/klima_und_energie/doc/40258.php</a></p> <p>Costs and benefits of the German government's energy and climate package (October 2007) <a href="http://www.bmu.de/english/climate/downloads/doc/40412.php">http://www.bmu.de/english/climate/downloads/doc/40412.php</a></p> <p>Economic Analysis and Evaluation of the Effects of the Renewable Energy Act (EEG) 2008. Study On Behalf of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. (Code 03MAP113) <a href="http://www.bmu.de/files/pdfs/allgemein/application/pdf/eeg_impacts_chap7_summary.pdf">http://www.bmu.de/files/pdfs/allgemein/application/pdf/eeg_impacts_chap7_summary.pdf</a></p> <p>Investitionen für ein klimafreundliches Deutschland. Eine Studie im Auftrag des BMU (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) (Zwischenbericht Mai 2008) <a href="http://www.bmu.de/wirtschaft_und_umwelt/downloads/doc/41696.php">http://www.bmu.de/wirtschaft_und_umwelt/downloads/doc/41696.php</a></p> <p>Den Herausforderungen der Energie- und Klimapolitik erfolgreich begegnen. Hintergrundpapier zur Verabschiedung des zweiten Maßnahmenpaketes des integrierten Energie- und Klimaprogramms der Bundesregierung (18. Juni 2008) <a href="http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/41818.php">http://www.bmu.de/klimaschutz/nationale_klimapolitik/doc/41818.php</a></p>
3.5	<i>Cross-compliance</i>	
3.6	<i>Other key means</i>	<p>SRU: Umwelt GUTACHTEN 2008: Umweltschutz im Zeichen des Klimawandels. Berlin 2008 <a href="http://www.umweltrat.de/02gutach/download02/umweltg/UG_2008">http://www.umweltrat.de/02gutach/download02/umweltg/UG_2008</a></p> <p>Bundesregierung: Fortschrittsbericht 2008 zur nationalen Nachhaltigkeitsstrategie. Entwurf 5. Mai 2008. <a href="http://www.bundesregierung.de/Content/DE/___Anlagen/2008/05/2008-05-08-entwurf-zum-fortschrittsbericht-2008,property=publicationFile.pdf">http://www.bundesregierung.de/Content/DE/___Anlagen/2008/05/2008-05-08-entwurf-zum-fortschrittsbericht-2008,property=publicationFile.pdf</a></p> <p>EEA Technical report No 2/2005: Environmental policy integration in Europe. State of play and an evaluation framework. <a href="http://reports.eea.europa.eu/technical_report_2005_2/en/Tech_2_2005_web.pdf">http://reports.eea.europa.eu/technical_report_2005_2/en/Tech_2_2005_web.pdf</a></p> <p>OECD (2002): Improving Policy Coherence and Integration for Sustainable Development. A Checklist. Paris. <a href="http://www.oecd.org/dataoecd/60/1/1947305.pdf">http://www.oecd.org/dataoecd/60/1/1947305.pdf</a> (Jänicke et al. 2001 <a href="http://www.oecd.org/dataoecd/27/32/1828117.pdf">http://www.oecd.org/dataoecd/27/32/1828117.pdf</a>) EPIGOV<sup>2</sup></p>

<sup>2</sup> Environmental Policy Integration and Multi-level Governance.  
<http://www.ecologic.de/projekte/epigov/download-area.htm>  
[http://web.fu-berlin.de/ffu/ffu\\_e/Projects/pro\\_epigov\\_e.htm](http://web.fu-berlin.de/ffu/ffu_e/Projects/pro_epigov_e.htm)

## 2. The National Political Context and Institutional Framework Conditions

### 2.1 Political System and the Need for Integration

The German political system is a federal and parliamentary representative democracy by constitution. The main features are a polycentric administrative structure and a decentralised political system. Executive power is exercised by the government. The parliamentary system undergirds the strong position of the Federal Chancellor who is the head of government and of a multi-party system, and who is elected by the Parliament. The Parliament (Bundestag) is elected every four years by proportional vote. Since 1949, the party system has been dominated by the Christian Democratic Union (CDU) and the Social Democratic Party of Germany (SPD). The administrative structures consist of three levels of decision making that possess constitutional autonomy: the federal, *Länder* (States) and local level that lead to the growing need for *vertical* integration. Germany is a federation consisting of 16 federal states, each with its own constitution, parliament and government. Legislative competencies are divided between federal authorities and the *Länder*, and are vested in both, the government and the two chambers of parliament, *Bundestag* and *Bundesrat*. The highest state authority is exercised by the federal government. Through the agency of the Bundesrat, The *Länder* and local authorities are responsible for implementation, in most cases under their own responsibility, and are represented at the federal level in the Federal Council (*Bundesrat*), which has to comment on every bill and may have the right of veto, depending on the matter at hand. These political and legal framework conditions explain the strong need for political cooperation, concertation and policy coordination at the *horizontal level* – between intergovernmental agencies and ministries (departmentalism) – and at the vertical level (federalism; state-society), and thus multi-level governance.

One of the most striking features of German political culture is its *consensual* policy style (Dyson 1982; Richardson et al. 1982). In comparative research, broader and deeply culturally entrenched patterns in the state-society relationship are called “policy styles” or “styles of regulation” (Jasanoff 1986). The first Enquete Commission, the advisory body linked to the Parliament, was able to arrive at results which were accepted by a wide spectrum of political and social actors (Beck 2004). Influential scientific organisations, the parliament, the government, the administration, and even industry, all tried to speak with “one voice.” This political convergence can be read as a symptom of Germany’s strongly consensus-oriented political culture. Open resistance to climate protection would immediately have led to a loss of credibility. This feature of German political culture is partly grounded in the legal tradition of “The Rule of Law” (Rechtsstaat), which requires unambiguous and unequivocal statements (Eindeutigkeit). In addition, the demand for consensual solutions can be traced to the structure of the political system. After World War II, the West German parliamentary system was organized according to the principles of coalition government and cooperative federalism, which also reinforced the preference for consensual solutions. With historical roots in corporatist arrangements typified by close collaboration between the state and major interest groups, policymaking in Germany can be characterised by its emphasis on consensus and consultation (Weidner and Mez 2008; Wurzel 2008). This style of policymaking has been reflected in German climate change policy from its inception (Beck 2004).

Germany’s unique institution of a “unitary federal state” was long considered part of the country’s post-war success story. Now, however, it is generally perceived as a major cause of a “joint decision trap” which impedes effective policy responses to new economic and

demographic challenges at both levels of government. The “joint decision trap” (“Politikverflechtungsfall”) is a common challenge for federal governments. The term was introduced by Scharpf to describe a situation in which interdependent government decisions must be taken at the “lowest common denominator” because, if this is not done, other governments may veto them (Scharpf 1988). It is argued that when member governments directly participate in central decisions, in which there is a *de facto* requirement of unanimous decisions, there will be a systematic generation of sub-optimal policy outcomes. This trend can be enforced if the “bargaining” style of decision-making prevails (as opposed to “problem-solving”). As a result, the system is vulnerable to political deadlock, especially if a majority of the *Länder* is governed by opposition parties. The “joint-decision trap” is explained by reference to the utility functions of member governments for whom present institutional arrangements, in spite of their sub-optimal policy output, seem to represent “local optima” when compared to either greater centralization or disintegration. One of the central projects on the Grand Coalition’s agenda of 2005 was a reform of the German federal system. A high powered bi-camera Commission set up in autumn 2003 failed to reach agreement on constitutional reforms. And while an earlier Reform Commission had failed, the Grand Coalition was indeed more successful: the first stage of the reform came into force in September 2006. But commentators are sceptical that Germany will finally escape the joint decision trap’ and the well-known *Reformstau*. They argue that the outcome is a result of the same strategies to avoid deadlock that have been observed in the past. Instead of opening the “joint decision trap,” Bund and Länder were at best able to adjust it slightly (Auel 2008). However, the Grand coalition’s initial attempt to reform the federal system resulted in failure during its first year in government. Moreover, it was warned that the revised reform proposal could make environmental policy coordination more difficult and could even trigger a lowering of environmental standards if the Länder were given wide ranging powers to adopt different environmental standards and statutes. Decentralising environmental policy powers (from the federal government to the Länder level) could trigger a “race to the bottom” within the German political system in which “cooperative federalism” would increasingly give way to “competitive federalism” (Wurzel 2008).

Decision-making on climate change had to cope with controversies that reflected deeper political cleavages among political parties about the boundaries of state intervention. The two large political parties tend to differ on major ideological issues, and portray themselves as rivals, or even sometimes enemies, and as such, they usually find it more difficult to agree on a common direction for a combined ‘two-party’ government than they do when each party aligns itself with smaller parties (Dyson 1982; Richardson et al. 1982; Brickman et al. 1985; Jasanoff 1986). While the Conservatives have traditionally leaned toward deregulation and the self-controlling forces of the market, the Red-Green wing has generally opted for an active role for the state and preferred political intervention.

German agencies tend to ensure compliance of regulations by meeting criteria of breadth and inclusiveness in their consultation and decision-making processes. In order to avoid conflicts with industry, representatives of major companies are brought on board right from the start. Stakeholder participation is used to enhance the political efficacy of policy decision-making. German political bodies often include experts with broader and less specialised competence. Experts can be representatives of industrial federations (Verbände), which have come to play an important role in giving advice on technical matters and in setting standards. A common recommendation is expected to be binding, because the group as a whole is capable of speaking for the wider community it represents. Consultations are thus thought to reflect in microcosm a cross-section of the society which will be affected by its policy decisions. It is

important to promote consensual statements in order to play an influential role in policymaking. As a result, they also have to manage and resolve both the technical and political conflicts latent in scientific controversies (Beck 2004).

This pattern of state-society relationship is mirrored by the political culture. Neocorporatism can be defined as a form of governance in which influential groups with different interests draw mutual advantage by acting in concert and by developing forms of cooperation for common goals. This pattern of ordered state-society relationships characterises a broad range of policy processes in Western Europe. Major social interests are organised in large representative hierarchies by the state, and are drawn into a close relationship to public decision-makers (Brickman et al. 1985: 24). An important challenge to a government coalition is to demonstrate that the government has the capacity to manage the antagonisms and accommodations between the two parties while still assuring the respective contributions each can make to the welfare of the country.

## 2.2 Political Situation

Since 2005, Germany has been governed by a grand coalition formed by the two largest political parties (CDU/ CSU and SPD). Historically, major reform projects are set up and implemented by grand coalitions. While the policy process is usually driven by stability and incrementalism, coalition government is required to encounter reform projects such as budget-taxation, pension reform, and federalism reform. These reform projects shift the politics of an issue from subsystem arenas to the macro-political framework of legislative and chief executive calculations (Lehmbruch 2002).

**Table 3: The Present Cabinets and their Programs in the Participating Countries**

Country	Cabinet	Date Program Was Agreed Upon	Expected Time Span
Denmark	Rasmussen III		
Finland	Vanhanen II	April 19 <sup>th</sup> 2007	2007 – 2011
France	Fillon		
Germany	Merkel	November 22 <sup>th</sup> 2005	2005 – 2009
Netherlands	Balkenende IV	June 14 <sup>th</sup> 2007	2007 – 2011
U.K.	Brown		

## 2.3 Key Climate Change Challenges

In the mid 1980s, a national consensus on the climate *catastrophe* emerged. In contrast to other countries, such as the US, the closure of the political debate was reached at an early state and a backlash against the science of climate change did not take place until recently. Since the 1980s, the overwhelming majority of Germans have not doubted the existence of global warming and its dangerous impacts, and they have been willing to accept ambitious reduction targets (Weingart et al. 2000; Beck 2004).<sup>3</sup> Yet, the political and public resonance

<sup>3</sup> The representative surveys carried out throughout Germany every two years since 1996 in the name of the Federal Environment Agency serve to provide an overview of the state of environmental awareness. These surveys indicate that environmental protection is gaining ever more political significance. The new study on

of global warming can be seen as “path dependent” and can be traced to historical patterns of environmental politics in Germany. In the early 1980s, environmental issues like forest death (*das Waldsterben*) and acid rain enjoyed high priority on public agendas. The global warming debate in Germany had one of its origins in the controversy over nuclear power triggered by the 1986 Chernobyl nuclear accident. After the Chernobyl accident in 1986, the German public was particularly sensitive to environmental risks and felt directly vulnerable to them (*Betroffenheit*).<sup>4</sup> French observers, for example, are inclined to say that environmental problems, especially “*le Waldsterben*,” originated in Germany. Since the oil crises of 1973-74 and 1978-79, the idea of conserving energy and using alternative energy sources, such as solar and wind power, have grown in popularity. Progressive environmental policies have their roots in the air pollution control policies that began to evolve in the 1970s (Weidner and Mez 2008) and which set the path for Germany to become a major exporting country of pollution reduction technology.

In the early 1990s a short phase of lively political activity resulted in the implementation of a national reduction target: in June 1990 the German government adopted the precautionary principle for the national response to climate change and finalised the target of a national 25% reduction of CO<sub>2</sub> emissions.

From its beginning, climate change has been closely linked to *energy and transport* issues in Germany. Early on in the debate, in the warning that was instrumental in raising public and political attention on the issue of climate change, a group of physicists used the term “climate catastrophe” to advocate the use of nuclear power which is possibly the most contested field of German politics. Energy policy in Germany is characterised by an irreconcilable debate concerning nuclear power and the potentials of renewable energy sources and energy-saving activities. In addition, car producing (and supplying) industries (Volkswagen, Daimler, BMW, Porsche) play a major role in the German (export-oriented) economy. Mobility and the ownership of a private car, perceived as a “prestige object” also enjoys high status and value within the German population. Porsche, for instance, has long been a symbol of wealth, power and freedom. The historical background explains why the stakes are so high and as such, the major challenge to climate politics is to resolve deeper and long-standing controversies between major interest groups. When it came to integrating climate change in the main sectors seen as being responsible for causing climate change, such as in energy and transport policies, the issue became highly polarised and contested, revitalising and mirroring deep-seated conflict lines and differences between political parties. Since the issue of climate is closely coupled to energy and transport policies, trade-offs and conflicting interests are at stake in discussions of climate change leading to compromises and lowest common denominator solutions that remain a major feature of policy-making.

---

environmental awareness demonstrates that climate change, a turnabout in energy, and environment-related health risks have become important for an increasing number of the population (Kuckartz 2008).

<sup>4</sup> With calls for either an immediate shutdown (e.g., the Greens) or phase-out (e.g., Social Democratic Party or SPD) of all nuclear plants, the construction of additional coal-fueled power plants was proposed to compensate for the lost capacity of nuclear facilities. The parties supporting nuclear power—most importantly, the governing Christian Democratic Union (CDU) and its Bavarian sister party (Christian Socialist Union or CSU)—found in the issue of climate change what they hoped would be an effective counterbalance, arguing that nuclear power made good environmental sense when confronted with the ominous threats posed by global warming.

Within the context of conflicting scientific claims and political polarisation, it was decided to establish an *Enquete* (Inquiry) Commission—a parliamentary body occasionally created “to deal with complex and often politically sensitive issues.

After German reunification (which commenced in 1989), “traditional” social issues and economic concerns began to dominate the political agenda, and environmental issues increasingly lost their political prominence. The cost of unification, the recession of the early 1990s and the *Standort Deutschland* debate (which is about Germany’s future as a production and investment location) weakened support for environmental regulation. The discussion on an environmental tax reform as the right instrument to reduce emission’s targets has paralyzed climate policy in the years following. The then Christian Democratic Party/Christian Social Union (CDU/CSU) – FDP (Centre-Right) coalition government began to give preference to voluntary agreements over environmental regulation in its coalition agreement although, in practice, regulation remained the dominant environmental policy instrument. It was within this changed political context that Germany began to take more seriously the concept of sustainable development with its emphasis on stakeholder participation and equal weight for environmental, economic and social concerns (Wurzel 2008).

According to Klaus Töpfer, former Minister of the Environment, the ambitious national reduction target of 25% CO<sub>2</sub> reduction was addressed to both the national and the international level. At the international level, Germany took over a “forerunner” strategy. This was driven in part by a desire to catch up with internationalisation, but in part also by a desire to internationalise the German perspectives so as to maintain the competitiveness of German industry. German climate protection policies can be characterised by their ambivalence. Policy statements sway between proclaiming ambitious targets, on the one hand, and preference for the incremental implementation of these targets, on the other. At first glance, the liberal-conservative Kohl government seems to have enacted a broad legislative framework for promoting CO<sub>2</sub> reduction but it also failed to implement the national target by law, regulatory standards and economic instruments. German representatives in international bodies also had to cope with the tensions that stem from different forms of state intervention, which partly explains the ambivalence of the German position in international negotiations. On the one hand, the German government set up the “forerunner” strategy to further the political process on climate change and to demonstrate its responsiveness and competence. On the other hand, the strategy was motivated less by a desire to protect the climate than to gain the initiative, and to improve the national bargaining position instead of being forced to act against national interests (*regulatory competition* and *first-mover advantage*). The primary goal was to prevent imposing regulatory burdens that would impair the competitiveness of German industries and their attractiveness for foreign investors, or alternatively, lead to the emergence of inter-country trade barriers. The official strategy was to involve as many countries as possible in developing congruent policies, which would lessen the likelihood of competition-distorting regulatory action and bring about comparable legal standards and economic conditions worldwide. At the same time, the German government decided to postpone comprehensive, legally-binding national regulation until agreement was reached on the European and international levels. This strategy helped to win time before immediate action had to be undertaken. Governmental officials realised that participation in transnational negotiations would encourage the tendency to seek *lowest common denominator-solutions* (Beck 2004).

The industrial stakeholders, lobby groups and conservative politicians built a coalition to undermine far-reaching policy targets and to block environmental reformism. They were instrumental in reframing climate change from a field of international solidarity (according to the Sustainable Development framework) to one of national competition and to place concerns about *Standort Deutschland* (the competitive position of the German economy) and

the nation's survival in a globalising world at the forefront of the political discussion. In this way the coalition succeeded in restoring the primacy of national interest politics, which continues to determine the German response to climate change. The coalition also changed the acceptable justification of policy measures from scientific evidence to economic criteria, demanding that policy would have to be justified in terms of its "cost neutrality." This strategy offered the starting point for polarising ecological and economic goals as irreconcilable and by presenting the former one as a "job killer" and as a "cost factor." Finally, it performed the shift from fundamental institutional and individual change to "business as usual."

Instead of threatening legal enforcement, the Kohl government communicated with industry and tried to convince companies to prepare for reduction as soon as possible. The government passed a declaration of intent, to which the Federation of German Industry (BDI) responded by announcing voluntary obligations to reduce CO<sub>2</sub> emissions. Stakeholders also succeeded in transferring implementation from the government to industry. Backed by the structure of the political system and the *culture of neocorporatist conflict management*, the alliance of industrial stakeholders, lobby groups and conservative politicians succeeded in dominating regulatory processes (Beck 2004; Weidner and Mez 2008; Wurzel 2008).

## 2.4 Setting the Stage for Innovation: The "Ecological Modernisation" Framework

From 1998, the Red-Green government, under Chancellor Gerhard Schroeder attempted to overcome the deadlock of climate policies and to catalyze decision-making and regulation processes. It managed to adopt an Ecological Tax Reform (1999; 2000)<sup>5</sup> and to initiate the phasing-out of nuclear power (2002).<sup>6</sup>

Germany is often portrayed as an environmental lead state because it adopted a relatively progressive domestic environmental policy in the early 1970s although it has pushed for stringent environmental standards at European Union (EU) and international levels only since the early 1980s. However, with the exception of a brief period in the early 1970s, Germany has not acted as a pioneer in relation to environmental policy integration (EPI). Broadly speaking, three main phases in thinking about EPI can be identified:

- 1969-74, when pioneering attempts to integrate the environment in policy-making were made;
- 1974 - late 1990s, when commitment to EPI fell away; and,
- the period since the late 1990s, when Germany re-converted, somewhat reluctantly, to EPI (Wurzel 2008).

The Red-Green government also set new directions for climate protection policies in Germany. The challenge of policy integration was already an integral part of environmental policies in the early 1970s when the (social-liberal) government began the process of incorporating strategic environmental planning and measures for policy integration (SRU

<sup>5</sup> The principal idea behind the revenue neutral ecological tax reform was to increase the cost for non-renewable resources while reducing non-wage labour costs. In essence, the ecological tax reform tried to bring about a more sustainable development path by implementing fiscal EPI measures. Germany was amongst Europe's eco-tax pioneers when it adopted a waste water levy in 1976 which, however, was implemented only in 1981.

<sup>6</sup> The Act contains a ban on the construction of new nuclear power plants, the restriction of the so-called residual operating life to 32 years as of the commissioning of the plant, but with possibilities to transfer electricity volumes to newer plants; legal stipulations for regular safety reviews and the tenfold increase of the financial security required for each plant to cover possible damages, which rose to 2.5 billion euros.

2008; Jänicke and Jacob 2006). Nonetheless, the importance of environmental issues and of environmental policy integration as a guiding principle was further downgraded by Helmut Schmidt (SPD) who succeeded Willy Brandt as German Chancellor in 1974 (Wurzel 2008). Schmidt reinstated traditionally corporatist interest intermediation patterns in which the government consults closely with employers and unions at the expense of other societal actors.

It is only since the late 1990s that Germany has started to reengage with the concept of EPI and focus its attention on the concept of sustainability. EPI and also the related concept of sustainable development were for a long time seen as distracting attention away from the need to develop a stringent environmental policy. Germany began, albeit reluctantly, to accept, once again, the need to think about environmental policy more holistically, with EPI serving as an important action-guiding norm. One of the critical drivers of this change was political. In 1998, the Green Party entered a coalition government with the SPD for the first time in German history (Jänicke et al. 2001). The Red-Green government also tried to catalyze the policy integration of environmental issues again. It approached it in an innovative way by embedding it in the “ecological modernisation” framework. This framework can be characterised by its strong focus on the potential of new technologies for solving environmental problems (Jänicke and Jacob 2006). Already during the 1980s, advocates of ecological modernisation gained cross-party support at a time when Germany emerged as a leading exporter of pollution-reduction technology (Weidner and Mez 2008).

It is based on the dual strategy of increasing efficiency and expanding the use of renewable energies and regenerative raw materials and thus, broadening the energy mix. The former government also began offering strong support and funds in an effort to promote the international diffusion of renewable energies; especially, the installation of wind power plants. The *Renewable Energy Sources Act* obliges electricity grid operators to give priority to the purchase of electricity from solar energy, hydropower, wind power, geothermal power and biomass, and to pay a specified price for it. The goal is to improve the international competitiveness of the industry, especially the energy-intensive sector.

The “ecological modernisation” framework proved to be just as instrumental in reframing climate change: In contrast to the former government, ecological, economic and social issues were not framed as contradictory, but rather, as complementary objectives. This framework was already introduced in the 1980’s. It challenged the conventional (neoliberal and socialist) paradigm which claimed that there is always a trade off between stringent environmental regulation and economic growth. It suggested instead that ambitious environmental policy measures benefit both the environment and the economy (Wurzel 2008). During the 1990’s, concern about the declining competitiveness of German European industry vis-a-vis US and Asian competitors persisted. Against this background, the *win-win proposition*, popularised by Porter and van der Linde, offers a solution, stating that environmental regulation could induce innovation by making industry aware of and willing to exploit opportunities that would otherwise be missed. Properly designed environmental standards can trigger – according to that argument - innovation that may, either partially or substantially, offset the costs of complying with them (Porter and Linde 1995). The *Porter hypothesis* has spurred substantial amounts of research on the influence of environmental regulation on innovation. The “ecological modernisation” framework reflects the belief that so called win-win opportunities could benefit industry and the environment alike and would result in environmental benefits and increased competitiveness. In Germany, the framework was first introduced and developed by Martin Jänicke and his co-scholars. Jänicke understands “ecological modernisation” as systematic eco-innovation and its diffusion which, taken together, offer by far the largest potential of achieving environmental improvements (Jänicke

2008). Driving forces behind “ecological modernisation” are the market logic of modernisation and competition for innovation combined with the market potential of global environmental needs (ibid.). Jänicke served as an advisor at the German Advisory Council on the Environment (SRU) from 1999 until 2007. It appears that this group of scholars was quite instrumental in diffusing the framework into advisory panels of the Red-Green government. This framework was instrumental in reframing climate change from being perceived as a threatening global risk to becoming associated with an economic opportunity for Germany.

**Table 4: Horizontal Climate Policy Integration – Early Policies**

Criterion	Early Climate Change Policies	
	Conservative Government (Kohl)	Red-Green Government (Schroeder)
Inclusion	Energy (including nuclear power) Transport	Dual strategy to increase efficiency and to expand the use of renewable energies
Consistency	climate as “cost factor” and “job killer” polarizing ecological and economic goals	Climate as driving force for innovation Ecological modernisation: ecological and economic objectives as complementary
Weighting	Forerunner strategy – setting ambitious targets – Incremental implementation	
	Compliance by voluntary commitment of the industry not implemented into regulatory standards and economic instruments	Ratification of Kyoto Protocol Implementing targets Ecological Tax Reform
Reporting	Evaluation and Reporting by an interministerial group (IMA)	
Resources	Resource allocation is not specified in the documents	

**Table 5: Specific Initiatives in the Field of Climate Protection**

Year	Government	Nat. Reduction Targets	Regulatory Initiatives
1990	Kohl	-25% CO <sub>2</sub> reduction until 2005	
1992			Rio Convention
1995			Voluntary obligations of industry
1997			Kyoto Protocol
1998	Schroeder		
1999			Ecological Tax Reform
2000			National Climate Protection Program
2002		-21% 2008-2012 (Kyoto target)	Ratification of Kyoto Protocol Phasing out of Nuclear Power
2005	National Climate Protection Programme (update) Renewable Energies Act Combined Heat Power Act (CHP) Emission trading allocation plan (NAP)		
2006	Merkel	-40% to 2020	
2007			Integrated Energy and Climate Programme Package I
2008			Package II

Source: Federal Ministry for the Environment, various internet sources

### 3. Horizontal Policy Integration and Coherence at the National Level

#### 3.1 Governmental Programs and Strategies

##### *a) Coalition Agreement: “More opportunities for innovation and jobs, prosperity and participation”*

In November 2005 the Red-Green government was replaced by the grand coalition led by the CDU. The social-democratic party is participating in both governments. Within the **Coalition Agreement** the new government reaffirms Germany’s “forerunner role” in international relations. While the former governments justified the pioneering approach with the idea of regulatory competition, the grand coalition reframed it in technological-economic terms. This shift already indicates the priority of the new government, namely to make climate policies both viable and economically successful.<sup>7</sup>

##### *INCLUSION*

In the preamble, climate change is covered under the umbrella “sustainability”. Following the policies of the Red-Green government, climate change is also closely linked to energy and issues pertaining to raw materials.

##### *CONSISTENCY*

The preamble highlights the social and political implications of climate change adaptation and mitigation in terms of international trade, justice and distribution issues: it states the

“great challenges resulting from the dangers of climate change and the foreseeable price and distribution conflicts concerning energy and raw materials” (CA 2005).

At the same time, the grand coalition accomplished the turning of environmental discourse from risk to innovation as well as bringing about the innovation-oriented turn of environmental policy. The most important move is that climate policies are systematically embedded within an *active ecological industrial* policy (SRU 2008). It also puts high emphasis on technological innovations for enhancing energy and resource productivity and efficiency and thus solving environmental problems. It reaffirms “the dual strategy to increase energy and resource efficiency and to expand the use of renewable energies and regenerative raw materials” as vital elements of their policy (CA *ibid.*). It is also seen as the key to the global transformation of energy supply structures and thus, the restructuring of industrial society.

Climate protection is systematically embedded in an *active ecological industrial policy*. This concept radicalizes that of “ecological modernisation.” The latter one is “a new approach combining the objectives of successful economic development and effective climate and environmental protection with the social needs of people – the sustainable economy of the 21st century” (*ibid.*). According to this approach, climate protection policy, thus, is not seen as a major hurdle for economic growth and national competition but as “a driving force for: developing and marketing future-oriented technologies worldwide, enhancing energy and resource productivity and thus boosting the competitiveness of the German economy creating new and secure jobs for well-qualified workers” (*ibid.*).

---

<sup>7</sup> See CA 2005.

**Table 6: Win-win and Trade-Offs – the Coalition Agreement**

Addressed coherence and win-win areas between climate policy and other policy goals	Addressed potential conflicts between climate policy and other policy goals
<ul style="list-style-type: none"> <li>strengthening the international competitiveness of German industry</li> <li>creating jobs</li> <li>reducing the burden on consumers and companies</li> </ul>	distribution conflicts and burdens caused by rising energy and raw material prices

The rationale of the ecological industrial policy is to provide initial support to ensure the success on the market of climate-friendly technologies and ecological innovations as an overall “megatrend.” The aim is to force an ecologically effective process through “strong” environmental innovations. This means that it is not the environmental technology innovations themselves that count, but their ability to realise global climate and environmental protection goals (e.g. dynamic energy efficiency standards). The latter can mobilise additional specific innovation potentials, and help overcome specific obstacles to innovation and adaptation (Jänicke 2008).

### *WEIGHTING*

The grand coalition performed a paradigmatic shift concerning the role of the state. The grand coalition finally made the shift from a first generation of “command-and-control” or strong regulations to a second generation of “smart regulation.” New modes of governance cover a wide range of different policy instruments such as the open method of coordination, voluntary accords, standard setting, regulatory networks and regulatory agencies. The political demand for and use of these seemingly more flexible, market-oriented instruments, such tradable permits, has grown considerably throughout Europe in recent years partly due to their potential of being more flexible and efficient than traditional regulation. These “smart” environmental regulations and the increasingly complex actor constellation of global environmental governance are thought to lead to mounting business risks for polluters, thereby exerting pressure for eco-innovation (Jänicke 2008).

The role that the state has to perform in environmental politics remains contested inside the government coalition. This led to a compromise in terms of a hybrid model that combines financial steering instruments to set the broad trend (e.g. through emissions trading) and regulatory management of detail. The innovation-oriented environmental policy also includes a pro-active government, demanding targets and a mix of instruments which influences the entire innovation cycle from initial research to achieving success on global markets. The difference between the Red-Green government and the grand coalition and the tensions inside the latter one can be traced to the role of the “traditional” instruments such as binding rules and regulatory standards as policy instruments to reach the national reduction target. While the former coalition introduced the eco-tax, the government coalition seems reluctant to use this instrument and promises to reduce the burden on consumers and companies caused by rising energy and raw material prices:

“In the interests of a cost-effective energy supply we will not raise the eco-tax further

The current eco-tax relief regulations for the industry will be retained” (CA *ibid.*).

For this reason the government tried to make use of all available relief measures and consider ways of improving national competitiveness when transposing the EU Energy Tax Directive.

## REPORTING

The coalition agreement calls binding legislation and effective evaluation of compliance central elements of environmental policies. These commitments only perform a programmatic role since they are neither implemented into a roadmap nor operationalised in concrete steps. Single measures are indicated as such:

- to evaluate the climate protection agreement concluded with industry in 2000;
- to review the funding criteria of the Heat-Power Cogeneration Act (KWK-Gesetz) on the basis of the evaluation report to be submitted in a timely manner.

Compliance is mainly achieved by the cooperation principle, namely a partnership on climate and innovation with German industry and civil society, which opens future markets worldwide for small and medium-sized enterprises in particular. But this question should not be overstressed since a government agreement is a declaration of intent, not a concrete policy strategy or program.

**Table 7: Horizontal Climate Policy Integration – the Coalition Agreement**

Criterion	Coalition Agreement
Inclusion	Covered under “Practicing sustainability” Relevant fields of action: <ul style="list-style-type: none"><li>• Key Technologies/ Innovation</li><li>• Infrastructure</li></ul>
Consistency	<ul style="list-style-type: none"><li>• Climate as a “driving force” for technological development worldwide and competitiveness of the German economy</li><li>• Ecological Industrial Policy as “a new approach” combining the objectives of successful economic development and effective climate protection with the social needs of people</li><li>• Ambitious goals can be met by the dual strategy of increasing energy and resource efficiency and expanding the use of renewable energies and regenerative raw materials</li></ul>
Weighting	<ul style="list-style-type: none"><li>• From “command-and-control” regulation to a “smart regulation”</li></ul>
Reporting	<ul style="list-style-type: none"><li>• Compliance is achieved by a partnership on climate and innovation with German industry and civil society</li><li>• Evaluation the climate protection agreement concluded with industry in 2000</li></ul>
Resources	<ul style="list-style-type: none"><li>• Innovation offensive for energy technologies, funding research setting subsidies and incentives</li><li>• Resource allocation is not specified in the document</li></ul>

### ***b) National Strategy for Sustainability – the Overall Framework for Policy Integration***

#### ***INCLUSION***

As indicated in the coalition agreement, climate change is set under the overarching umbrella or formal strategic framework of sustainable development. Thus, we will take into account the National Strategy for Sustainable Development (NSSD) since it is an important source of information about policy integration and policy coherence.<sup>8</sup>

<sup>8</sup> The adoption of a national strategy was anchored in the coalition agreement of the former Red-Green government, the coalition between the SPD and the Green party as junior partner, in 1998. In December 2001, the Green Cabinet presented a first draft of the NSSD for public consultation. It was approved by the cabinet, titled “Prospects for Germany. Our Strategy for Sustainable Development”, in 2002 (Federal Government 2002). The strategy also constituted the national contribution to the World Summit on Sustainable Development (WSSD). The EU-25 countries are all committed to implementing the sustainable

Similar to the coalition agreement, climate protection is closely linked to energy policy and the scarcity of energy. The NSSD contains long-term objectives, a set of 21 key indicators and seven priority areas for action. The strategy put the priority on increasing energy and resource efficiency (see <http://www.dialog-nachhaltigkeit.de>). Climate change is reaffirmed as a central topic of sustainable policies and the prior field of action by implementing the NSSD. It is striking that the NSSD is not explicitly linked to other strategies or implementation measures and action programs such as the “Agenda 2010” (SRU 2008).

## *COHERENCE*

The NSSD is a comprehensive and multi-dimensional strategy that embraces the economic, social and environmental dimensions (of climate change?) as well as addressing the goal of intergenerational equity:

“It deals with our overarching responsibility to ensure economically, ecologically and socially sound development for this generation and the generations to come”

([http://www.bundesregierung.de/nn\\_208962/Content/EN/StatischeSeiten/Schwerpunkte/Nachhaltigkeit/nachhaltigkeit-2006-07-27-die-nationale-nachhaltigkeitsstrategie.html](http://www.bundesregierung.de/nn_208962/Content/EN/StatischeSeiten/Schwerpunkte/Nachhaltigkeit/nachhaltigkeit-2006-07-27-die-nationale-nachhaltigkeitsstrategie.html), in short NSSD 2006).

However, the strategy does not follow the controversial pillar approach, but develops an overall policy coordination framework. The NSSD states that conflicts between economic and ecological objectives can be moderated or even avoided, if trade offs of different policies are considered in an integrated way and are subject to an overall policy coordination framework. The coordinates for policy action are fairness to different generations, quality of life, social cohesion and international responsibility. The NSSD also contains measures to be taken into account for reaching these objectives with regard to the requirements of the Agenda 21 (Implementation at the local level) (Rat für Nachhaltige Entwicklung 2002).

## *REPORTING*

The Green Cabinet is officially in charge of both implementing the NSSD and evaluating its progress. As the NSSD is related to the every aspect of public policy, all ministries are subject to implementation requirements. The Federal Government has to deliver a progress report every two years in which it depends upon the contributions of the single departments. Progress reports on the further development of the strategy also have to incorporate the views and ideas of a wide spectrum of civil society groups. In 2004, for instance, the Federal Ministry for the Environment organised a conference under the banner “Dialogue for the National Sustainable Development Strategy: How could its environmental profile be strengthened?”

The third progress report has been prepared and is currently in the stage of public consultation. The cornerstones of the strategy and an initial draft were thus made available online for discussion at [www.dialog-nachhaltigkeit.de](http://www.dialog-nachhaltigkeit.de).

The dialogue is complemented by consultation rounds with local authorities, industry, trade unions, environmental and development associations, agricultural and consumer protection bodies as well as the academic community and the church. The evaluations will then be incorporated in the progress report which is to be presented by the German government in autumn 2008.

---

development and integration provisions of the EU Treaties (EEA 2005). After being reviewed, the NSSD proposal was presented and finally adopted by cabinet on April 17<sup>th</sup>, 2004 (Jänicke et al. 2001).

**Table 8: Horizontal Climate Policy Integration – National Strategy for Sustainable Development**

Criterion	National Strategy for Sustainable Development
<b>Inclusion</b>	<ul style="list-style-type: none"> <li>Climate Change as a key issue and prior field of action of the NSSD</li> </ul>
<b>Consistency</b>	<ul style="list-style-type: none"> <li>NSSD offers an overarching umbrella or formal strategic framework for governmental action</li> </ul>
<b>Weighting</b>	<ul style="list-style-type: none"> <li>Considering trade offs of different policies in an integrated way</li> </ul>
<b>Reporting</b>	<ul style="list-style-type: none"> <li>Every two years the government delivers a progress report on the 21 indicators of the strategy</li> <li>no external, independent evaluation</li> <li>consultation by the Parliament and the Länder (states), representatives from the local level, business and trade unions, NGOs, also broad public participation via the Internet</li> <li>Green Budgeting: No, but extended responsibilities of the Ministry of Economic Affairs to report on ecological concerns</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>Council of Sustainable Development administers and monitors pilot projects in special action areas of the NSSD</li> <li>Capacity Overload within the Federal Chancellors Office</li> <li>no special financing</li> </ul>

## 3.2 Climate Protection Policies

**Table 9: Adopted and Planned Climate Change Strategies in the Participating Countries**

Country	Adopted Strategy	Adoption Date	Planned Strategy	Expected Date
Denmark				
Finland	National energy and climate strategy	November 24 <sup>th</sup> 2005	Energy and climate strategy – 2020	Late spring 2008
France				
Germany	National Climate Protection Programme (NCPP)	2000	Update 2005	
	Integrated energy and climate programme (IECP)	Package I: 12/2007 Package II: summer 2008		July 2008
Netherlands				
U.K.				

### *a) National Climate Protection Program*

The German government presented the **National Climate Protection Program** (NCPP) in October 2000. The target was a 25% CO<sub>2</sub> emissions reduction from 1990 levels by 2005. The program contains 64 concrete measures for climate protection, set reduction targets by sector and developed a number of related measures.

### *INCLUSION*

Key measures taken in the course of implementing the successive programs for climate protection include the ecological tax reform, the promotion of renewable energies, energy saving and the energy-sensitive (?) renovation of older buildings. These included an increase

in energy production from combined heat and power plants, an Energy Savings Ordinance, and a voluntary pledge by German industrial associations to reduce their emissions. Later developments contained tax breaks and an agreement with the automobile industry to help the proliferation of energy-efficient cars, and an additional levy on air traffic is under consideration.

The **National Climate Protection Program 2000** was updated in July 2005. The evaluation of the Climate Protection Program 2000 showed that Germany was able to reduce its greenhouse gas emissions by 18.5% up to 2003 as compared with 1990 and is thus already close to reaching its goal of 20%. Even if Germany appears to be among the few industrialised countries which are on track to meet the targets they committed themselves to under the Kyoto Protocol, this achievement may appear less remarkable if one takes into account that Germany benefited from so-called “wall-fall profits”, i.e. the breakdown and restructuring of the East German economy after reunification in 1990. Assessments show that the wall-fall profits account for almost 50% of the reduction of all six greenhouse gases. That means that the contribution of all the policies combined was slightly higher than the impact of unification and higher targets will not be achieved without far-reaching policy measures (Schleich et al. 2001). The National Climate Protection Programme 2005 contains a comprehensive catalogue of measures to ensure that the goal of reducing greenhouse gas emissions by 21% as compared to 1990 levels between 2008 and 2012 will be achieved.

The evaluation of the Climate Protection Programme 2000 indicated the need for action in sectors such as energy that are not covered by the emissions trading scheme that was introduced under the requirements of the Kyoto Protocol. Therefore, the Climate Protection Programme 2005 translates the remaining shortfall of 5-7% into sectoral targets for private households and buildings, energy and industry and transport (Jänicke et al. 2001) and focuses on action deemed necessary in these sectors as well as formulating a catalogue of measures ([http://www.bmu.de/english/climate/general\\_information/doc/4311.php](http://www.bmu.de/english/climate/general_information/doc/4311.php)). The programme is now explicitly linked to the principle of sustainable development and Agenda 21 to acknowledge that action at the local level is essential for protecting the global climate ([http://www.bmu.de/english/climate/general\\_information/doc/4311.php](http://www.bmu.de/english/climate/general_information/doc/4311.php)).

## *CONSISTENCY*

All of the German governments have faced problems with the enforcement of sectoral policy changes in the **transport sector, in efforts to** move beyond end-of-pipe measures. In order to overcome this resistance, in 2000, the Red-Green government formulated a specific CO<sub>2</sub> reduction target for the transport sector (15-20 million tonnes). It also increased the support for the railway system, intending to double its capacity. An Energy Strategy for Transport was formulated with the car industry (in parallel to the same EU initiative).<sup>9</sup>

The programme followed the path of interaction with the target groups as adopted by the former government. Instead of passing binding regulatory measures the Red-Green coalition

---

<sup>9</sup> One of its objectives is CO<sub>2</sub> reduction through more efficient fuels and motor technologies. A significant tax reduction for fuel-efficient cars had already been introduced in 1997. A new environmental assessment scheme has been introduced for the Federal Traffic Route Planning System. The government plans a special duty on heavy goods transport on highways (DEM 0.25 per tonne kilometer). A special working group on Integrated Transport Policy, including all major societal groups such as environmental NGOs, was established within the Federal Ministry for Transport, Construction and Housing (BMVWB). “Integrated Transport Policy” is also the title of the present “Transport Report 2000” of the Ministry. The closer integration of the formerly separate systems of traffic route planning and spatial planning in the new Federal Building and Spatial Planning Act of 1997, and the subsequent merging in 1998 of the Federal Ministry for Transport with the Ministry of Construction and Spatial Planning, have improved the general conditions for a more integrated approach to spatial planning (Jänicke et al. 2001).

government could only obtain voluntary agreements by the industry. In order to fulfil its obligations in the area of climate protection, industry has opted for a voluntary self-commitment. In the 1996 Declaration by German Industry on Global Warming Prevention, 19 leading industry associations promised to reduce specific CO<sub>2</sub> emissions by 20% by the year 2005. As this target was already reached in 1999 (23% reduction of specific CO<sub>2</sub> emissions), a new agreement was signed by industry and government in November 2000 aiming at a 28% reduction of specific CO<sub>2</sub> emissions by 2005 and a 35% reduction of the six greenhouse gases listed in the Kyoto Protocol. The targets may still be modest, but the activity of industrial associations connected with this agreement may stimulate innovations that lead to a greater potential for improvement.

## **REPORTING**

The National Climate Protection Programme of 2005 also provides for regular evaluation. It contains ongoing evaluations as to whether the measures laid down in the programme produce the projected emissions reductions. The IMA is charged with evaluation and reporting and it has to submit an annual assessment report to the cabinet on the national greenhouse gas emission status with special emphasis placed on meeting climate protection targets (BMU 2005).

### ***b) The “Integrated Energy and Climate Programme” (IECP)***

In 2007, triggered by the growing evidence of extreme events such as Hurricane Katrina and exponential energy prices, the issue of climate change became salient again in German politics. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) attracted much public attention.<sup>10</sup> Since 2004 environmental policy has been marked by two trends in particular: firstly, the reorganisation of legislative competences in Germany as a result of the reform of federalism, and secondly, the focusing of environmental policy on the risks posed by climate change.

Angela Merkel, the German chancellor, made “ambitious climate protection goals” to one of the two forward-looking decisions taken during her six-month German Presidency of the European Union in 2007. At the supra- and international level, Chancellor Merkel tried to push progress in the field of climate and energy policy. At the EU summit meeting in March 2007, Europe agreed on an integrated climate and energy policy with ambitious objectives.

In December 2007 the German Cabinet declared climate protection as one of the focal points of Germany’s policies. The German government reaffirms the strategy and direction of the coalition agreement and adds quantitative targets: By 2007, greenhouse gas emissions had already been reduced by around 20% compared to 1990 levels. Germany has almost met the Kyoto target of -21% for the period of 2008 to 2012. The German government has set itself the ambitious target of a 40% reduction in greenhouse gas emissions by 2020 compared with 1990, thus doubling the previous national climate protection efforts. With the new, more ambitious, national target the German government continues its “forerunner” role and tries to break the deadlock in and push forth international negotiations. The principal way to achieve these targets will be to increase energy efficiency 20% by 2020 compared with the business-

---

<sup>10</sup> IPCC was instrumental in clearing out any remaining scientific doubt about the existence of global warming, which is essentially man made. Also, the urgency with which radical decisions are needed at the international level is now generally accepted. It no longer appears certain that the goal set by the EU and many other states of preventing average global temperatures from rising by more than 2°C as over the 1750 figures can be achieved (SRU 2008).

as-usual scenario and to triple the share of renewable energies in primary energy consumption to 20% by 2020. This includes 10% of fuel consumption to be derived from biomass (BMU 4/2007). The government now formulates concrete targets for the strategy. This can be seen as a sign of the goal orientation and willingness to implement the strategy. To sum up, in 2007, climate change policies had won top priority and became a “matter of the boss.”

## INCLUSION

During its closed meeting in Meseberg in August 2007, the Cabinet adopted an ambitious paper called “Key elements of integrated energy and climate programme” consisting of 29 key elements of energy and climate policies.

**Table 10: Key Elements of an Integrated Energy and Climate Programme. Decision of The German Cabinet on August 23rd/24<sup>th</sup>, 2007 at Meseberg**

KEY ELEMENTS	LEAD Responsibilities
1. Combined heat-and-power generation	Federal Ministry of Economics and Technology (BMWi)
2 Expansion of renewable energies in the power sector	BMU/ BMWi/ Federal Ministry of Transport, Building and Urban Affairs (BMVBS) within the scope of their respective competences
3 CCS technologies	BMWi/BMU/BMVBS/BMBF within the scope of their respective competences
4 Smart metering	BMWi
5 Clean power-station technologies	BMU
6 Introduction of modern energy management systems	Federal Ministry of Finance (BMF)
7 Support programmes for climate protection and energy efficiency (apart from buildings)	BMU/BMWi/BMVBS/BMELV
8 Energy-efficient products	BMWi/BMU (voluntary labeling with eco-labels)
9 Provisions on the feed-in of biogas to natural gas grids	BMWi/BMU
10 Energy Saving Ordinance	BMVBS/BMWi, BMU/BMF involvement
11 Operating costs of rental accommodation	BMVBS/BMWi, BMU involvement
12 Modernisation programme to reduce CO <sub>2</sub> emissions from buildings	BMVBS, BMF/BMBF/BMWi/BMU involvement
13 Energy-efficient modernisation of social infrastructure	BMVBS
14 Renewable Energies Heat Act	BMU (Renewable Energies Heat Act), BMVBS/BMWi (Energy Saving Ordinance and technical harmonisation with the Renewable Energies Heat Act)
15 Programme for the energy-efficient modernisation of federal buildings	BMVBS/BMU (evaluation of action on commitments)
16 CO <sub>2</sub> strategy for passenger cars	1 Introduction of appropriate binding CO <sub>2</sub> values (BMU with BMVBS) 2 Implement. f EC strategy BMF
17 Expansion of the biofuels market	BMF/BMU/BMELV
18 Reform of vehicle tax on CO <sub>2</sub> basis	BMF
19 Energy labeling of passenger cars	BMWi
20 Reinforcing the influence of the HGV toll	BMVBS
21 Aviation	Extension of emissions trading to air traffic (BMU) Creation of the “Single European Sky” (BMVBS)
22 Shipping	BMVBS
23 Reduction of emissions of fluorinated greenhouse gases	BMU

24 Procurement of energy-efficient products and services	BMWi Länder
25 Energy research and innovation	BMWi (overall approach)/ BMU (renewable energies and climate protection/ BMBF (in particular High-Tech Strategy/6 Billion Euro Programme), BMVBS/BMELV (subprogrammes)
26 Electric mobility	BMWi/BMVBS/BMBF/BMU
27 International projects on climate protection and energy efficiency	BMU/ BMWi (Export Initiative)
28 Reporting on energy and climate policy by German embassies and consulates	AA (Federal Foreign Office)
29 Transatlantic climate and technology initiative	AA/ BMWi
Source: “Key Elements of an Integrated Energy and Climate Programme. Decision of German Cabinet on August 23 <sup>rd</sup> /24 <sup>th</sup> 2007 at Meseberg”	

(BMU 12/2007)

As the title indicates, IECP seals the linkage between climate and energy. It is set up to make better use of renewable energies and energy efficiency and move away from oil and gas (security of supply). The cabinet decision envisages, for example, stricter energy-related requirements for buildings which will increase energy efficiency by an average 30%. The CO<sub>2</sub> Building Modernisation Programme, started in 2001, has already been simplified in 2006. Improved conditions have applied since 1 January 2007 (<http://www.bmvbs.de/artikel-.302.982592/Das-CO2-Gebaeudesanierungsprog.htm>).

On 5 December 2007 the Cabinet submitted the first comprehensive package, including 14 acts and ordinances. In June 2008 the Federal Cabinet adopted the second package implementing the integrated energy and climate programme containing seven acts and ordinances.

By setting up these packages, the decisions of Meseberg were convincingly translated into concrete terms and implemented in a few major fields of action (SRU 2008). The German government's integrated energy and climate policy goes beyond the agreed measures and key elements. It also includes the ongoing legislative initiatives on creating greater competition in the energy markets, the promotion of local public transport, the Allocation Plan 2008-2012, and the new regulations for emissions trading.

## *CONSISTENCY*

The IECP is structured within clear guidelines: security of supply, economic efficiency and environmental compatibility (BMU 5/12/2007). Rising energy prices have pushed forth this innovation-based approach to environmental policy (Jänicke 2008) and the economic significance of energy efficiency.

The programme considers energy policy, in general, and efficiency, in particular, as the key to both economic prosperity and effective climate protection. It attempts to put into practice the climate protection philosophy of the third industrial revolution by transforming the energy production in CO<sub>2</sub> relevant areas such as electricity and heat production, transport, building modernisation, and energy efficiency. It holds that the “21<sup>st</sup> century must become the century of energy efficiency” (ibid.). The philosophy is to decouple growth from the emission of GHG in order to achieve “a third revolution to a low-carbon based economy” (BMU 2007). The dynamic of innovation and growth is (supposed to) opening up space/ scope for action (SRU 2008: 79). According to this framework climate protection offers evident synergies and benefits to all parties involved in its implementation. By pointing to the economic benefits of

climate protection and turning it from an economic burden to an opportunity, the government tries to get target groups on board and break the resistance of these industries. Even the industry can jump on the “train” and shift from resistance to commitment to climate protection policies. The government busily demonstrates the *benefits* of the IECF: The new measures aimed at energy conservation and improving energy efficiency are supposed to improve the quality of residential buildings, will lead to cost savings and will create 500,000 new jobs by 2020.

## WEIGHTING

As indicated in the Coalition Agreement, key elements adopted in Meseberg clearly follow economic imperatives. Climate protection has to be implemented in all sectors in an “economically viable” way. The key elements of the paper tend to identify energy efficiency with economic efficiency. Radical energy efficiency is seen as the indispensable precondition for any successful climate protection strategy, and counts, at the same time, as the most profitable option. The role of the government is defined as taking over the lead for setting frameworks for climate policy and in creating economic incentives to push forth innovation and the use of energy-efficient technologies. The government prefers a combination of: regulatory and fiscal matters, support programmes and economic instruments (TA: 9). Following economic imperatives, the first choice is to set up framework conditions which enable markets to develop their “strengths.” The underlying philosophy is: Where price signals from the market are not enough, the government “steps in” and chooses additional instruments such as independent evaluation which enables strategies to be reassessed (ibid.).

## Lack of coherence

Even if the IECF is evaluated as a major success story by the German Advisory Council on the Environment, it is worth taking a look at the other side of the coin, namely at key elements that have not yet been implemented:

**Table 11: Key Elements of the IECF Not Yet Implemented**

KEY ELEMENTS Meseberg	LEAD Responsibilities	Implementation	Explanation
3 CCS technologies	BMWi/BMU/B MVBS/BMBF	(yes)	Negotiation at the European level on a legal framework for Carbon Capture and Storage remain open
6 Introduction of modern energy management systems	BMF	No	Agreement with the industry on coupled tax releases not feasible
11 Operating costs of rental accommodation	BMVBS/BMW, BMU	(yes)	Expertise not yet finished
16 CO <sub>2</sub> strategy for passenger cars	(BMU with BMVBS/ BMF	(yes)	Negotiation at the European level open
17 Expansion of the biofuels market	BMF/BMU/BM ELV	(yes)	Parliamentary negotiations open
18 Reform of vehicle tax on CO <sub>2</sub> basis	BMF	(yes)	agreement of the lead responsibility of the federal government
19 Energy labeling of passenger cars	BMWi	No	Intergovernmental Cooperation open
21 Aviation	BMU BMVBS	(yes)	Negotiation at the European level open
22 Shipping	BMVBS	(yes)	Negotiation at the European level open

Bundesumweltministerium, 18.6.2008. Den Herausforderungen der Energie- und Klimapolitik erfolgreich begegnen. Hintergrundpapier zur Verabschiedung des zweiten Maßnahmenpaketes des integrierten Energie- und Klimaprogramms der Bundesregierung. Berlin. (BMU 18/6/2008)

The table above shows the key elements where binding regulation could not be achieved, for instance, in novel technologies which are perceived as being part of Germany's method of securing its energy supply, as well as measures such as taxes in the transport sector.

The government claims that measures on CCS and biofuels needed to be postponed as these technologies are still at the prototype stage and as such, they remain beset by numerous flaws. While it is still an open question as to whether or not CCS technology, for example, will achieve a degree of maturity that makes it attractive on the market, and if so when and what the risks and costs of its success will be? Furthermore, there is still some uncertainty about whether or not acceptance for the storage of CO<sub>2</sub> can be achieved, partly also in view of the recent problems experienced in plants in Norway and the USA.

Table 12 also demonstrates that some of the key elements not yet implemented are mainly in the traffic and transport sector. One of planned measures, that of coupling automobile registration costs with the amount of CO<sub>2</sub> vehicles emit, has been tabled indefinitely. The German government tends to justify the delay in the implementation of key elements in terms of open, not yet determined negotiations at different levels of decision-making such as the EU (multi-level "game"). It argues that it is waiting until the framework and directives/ guidelines are adopted at the European level and appropriate binding CO<sub>2</sub> values are introduced, which must be anchored legally at the EU level. Once the European Commission has finalised how its CO<sub>2</sub> strategy is to be implemented, the government will deliberate on the consequences for the tax treatment of company cars. At the same time, the delay also mirrors resistance by affected industries and stakeholders as well as conflicts between governmental departments.

The so-called "intelligent" power meters, devices which can control a house's or apartment's power consumption for maximised efficiency, showed themselves to be central foci for disagreements and controversy, especially inside the cabinet between the Ministry for the Environment and the Federal Ministry of Economics and Technology (BMWi). This dispute led to problems of negotiation closure as several delays occurred. Originally, "intelligent" power meters were to be mandated. Tough negotiations on this issue ended up with the compromise that devices will only be optional (<http://www.spiegel.de/international/germany/0,1518,560567,00.html>).

**Table 12: Integrated Energy and Climate Program 2007/8**

<b>Integrated Energy and Climate Program 2007/8</b>	
<b>Addressed coherence and win-win areas between climate policy and other policy goals</b>	<b>Addressed potential conflicts between climate policy and other policy goals</b>
<b>energy-efficient modernisation of buildings</b> improve the quality of residential buildings	
<b>Public benefits: Saving electricity costs</b> economically efficient as the investment pays off well within the service life of the installations	
Transport	
Creation of more than 500,000 additional jobs by 2020	

A first evaluation of the IECP shows that energy efficiency standards envisaged by the German government, in general, constitute progress. Frequently, however, they lag behind what would already be possible in the interests of ensuring a dynamic process of innovation. It is hoped that the passive house standard, for instance, will be applied to new buildings as of 2015. In the field of energy-consuming appliances, the *Eco-design Directive* with its life-

cycle approach is a step in the right direction. It should, however, be put into practice more rapidly and be geared more closely to the **standards of top runners**. The alignment of future standards with the best appliances on the market today can significantly enhance the technical potentials for saving energy. Purely incremental improvements such as those the European Commission plans for many products will not help Europe hold its own against competitors in innovation. Finally, a great deal of untapped economic potential remains in the field of energy efficiency. Additional measures to mobilise special innovation potentials, from dynamic ceilings on consumption to assistance to help new products gain a foothold on the market, are necessary and possible, provided they do not significantly distort costs (SRU 2008).<sup>11</sup> Obstacles to investment in energy savings in rented property are to be overcome through a reform of the way the housing market is regulated. Assistance programs are to be geared more to the efficient use of funds and the actual energy savings realised.

Different observers question the strong public focus on the problems of climate protection. In view of climate change, some other political fields of action are in fact becoming more critical from an environmental policy point of view, either because of the contributions they could possibly make to mitigating climate change and its consequences or because of the threat to these environmental resources in the wake of global warming. Special note should be made of the importance of forests, moors and grasslands, as well as the special roles played by soils as a store and sink for greenhouse gases.

## *REPORTING*

### *Regulatory Impact Assessments*

The Federal Environmental Agency (UBA) has already calculated ex ante the impacts of the **integrated energy and climate program**. It has drawn up calculations on the **climate protection impacts** of the integrated energy and climate program. These show that with rigorous implementation, the program can lead to emission's reductions of more than 36% by 2020 compared with 1990 levels. According to these calculations almost 220 million tonnes CO<sub>2</sub> will be saved with the existing and agreed-upon measures. Major reductions in CO<sub>2</sub> will be brought about by:

- the expansion of renewable energies in the electricity sector (54 million tonnes),
- increased energy efficiency in buildings (31 million tonnes) and in
- electricity consumption (25 million tonnes).

The assessment comes to the conclusion that via these means, Germany is well on the way to reaching the national 40% reduction target (BMU 5/12/2007).

### *Economic Assessment of Measures in the Integrated Energy and Climate Program*

On behalf of the Federal Environmental Agency (UBA), a team of experts, led by the Fraunhofer Institute for Systems and Innovation Research (ISI), calculated the **economic costs and benefits** of the energy and climate program. In the study "Economic assessment of measures in the integrated energy and climate program" this team analysed the key measures with regard to program and investment costs and the energy costs saved. The assessment

---

<sup>11</sup> The incentive program for commercial refrigeration plants promotes highly efficient and climate-friendly refrigeration technology by providing grants for consultation (status checks) and investments (existing and new plants). With commercial refrigeration technology, huge savings are still possible in money, energy and CO<sub>2</sub> emissions. A further focus is the incentive program for the installation of mini-CHP plants (CHP: combined heat and power). These mini-CHP plants generate both electricity and heat and therefore use energy very efficiently. They are one of the most effective measures for reducing CO<sub>2</sub> emissions. Mini-CHP plants can be used for buildings where heat is needed for many hours of the year, for example in residential buildings, hotels and residential care homes. Investments grants are provided for these plants.

states that the majority of the analysed measures will save costs in the long run. In 2020 the annually calculated investment costs will total 31 billion euros. In contrast, energy savings of 36 billion were calculated. On balance, this means economic gains of around 5 billion euros in 2020. The authors state that benefits in terms of cost savings could increase even further based on the assumption that gas and oil prices were rising significantly (to approx. \$90 per barrel) ([http://www.bmu.de/ueberblick/klima\\_und\\_energie/doc/40258.php](http://www.bmu.de/ueberblick/klima_und_energie/doc/40258.php)).

### ***Progress Report***

The ministries involved in implementing the IECP have to elaborate and submit a progress report to the Cabinet, starting in 2010 and every two years thereafter. In this report they will describe the overall impact of the climate and energy package in general and on the individual measures in the field of energy efficiency and renewable energies in detail. The achievement of goals in the respective areas and their cost efficiency will be the focal point of these reports. Independent experts commissioned by the German government will provide the data required. The Government has declared, in the case that the measures turn out to be inadequate or not cost-effective, that it will supplement existing measures or propose and implement new ones. The effectiveness of the Climate Protection Initiative's programmes and individual projects (gas reduction, multiplier effect, impacts on jobs) is evaluated by a team of research institutes. The programs will be continuously adapted and further developed on the basis of this evaluation. A cost analysis of measures in the integrated energy and climate programme shows that climate protection does not cause significant programme costs (direct spending of the government and of the general public, e.g. due to surcharges on the electricity price from promoting renewable energies) which should assist investors in bearing any possible additional costs of energy-efficient technologies and technologies for utilising renewable energy sources. On the other hand, the package measures also ensure a clear easing of the cost burden for individual, end consumers by reducing energy costs. Furthermore, the dependency on energy imports will be reduced and the opportunities for German industry to achieve competitive advantages through innovative, environmentally-friendly technologies will grow (Doll et al. 2008).

### ***RESOURCES***

The IECP is also reflected in the federal budget. A total of around 3.3 billion euros (including up to 400 million euros from the auctioning of emission's allowances and around 700 million euros from bilateral and multilateral development cooperation) are available from the federal budget for climate policy for the 2008 financial year. This is 1.8 billion euros more than in the federal budget of 2005. This represents an increase of 200 percent compared to 2005. The Cabinet will decide on the consolidation and further topping up of programmes in the course of its future budget planning consultations (BMU 12/2007: 7).

The German government is providing a total of 1.4 billion euros per year for the **energy-efficient modernisation of buildings**.<sup>12</sup>

### **Table 13: Policy Integration – IECP**

<sup>12</sup> The government provides, from within the market incentive programme, incentives for private households to equip their house with heating systems that use renewable energies. Solar thermal installations, biomass boilers and heat pump installation are supported via grants or low-interest loans. The funds earmarked for these incentives will rise from 130 million euros in 2005 to up to 350 million euros in 2008 and up to 500 million euros in 2009. The German government will also provide grants for the energy-efficient modernisation of schools and kindergartens (200 million euros) ([http://www.bmu.de/english/current\\_press\\_releases/pm/41999.php](http://www.bmu.de/english/current_press_releases/pm/41999.php)).

Criterion	IECP
Inclusion	Better use of renewable energies and energy efficiency modernisation of buildings
Consistency	security of supply, economic efficiency and environmental compatibility
Weighting	economic imperatives identification of energy efficiency with economic efficiency
Reporting	The ministries involved in implementing the IECP will elaborate and submit a progress report to the Cabinet in two years starting in 2010 and every two years thereafter.
Resources	Reinvestment from the sale of CO <sub>2</sub> emission allowances: 280 million euros of this will be used for national measures, 120 million euros for international projects

### *c) Climate Protection Initiative*

The German Ministry for the Environment launched its comprehensive **National Climate Protection Initiative** to promote climate protection measures for increased energy efficiency and greater use of renewable energies ([http://www.bmu.de/english/climate\\_protection\\_initiative/aktuell/42001.php](http://www.bmu.de/english/climate_protection_initiative/aktuell/42001.php)).

#### *INCLUSION*

The goal is to tap already existing and major potentials for reducing emissions in a *cost-effective* way and *on a large scale*, and to advance innovative model projects. It is set up to make an important contribution to reaching the national climate protection goal by tapping major potentials for CO<sub>2</sub> savings on a large scale in social and cultural institutions such as schools, municipalities, small and medium-sized enterprises and private households. Support is given for investments in energy efficiency and renewable energies by industry, municipalities and consumers.

The National Climate Protection Initiative consists of support programs and individual projects that aim to advance climate-friendly technologies in a targeted way, to demonstrate and to disseminate innovative climate protection technologies using model projects, and to identify and overcome barriers preventing the implementation of climate protection measures.<sup>13</sup> The Federal Ministry for the Environment (BMU) aims to develop a general support framework for the market launch and penetration of climate protection technologies and to present this to the EU Commission for approval

#### *RESOURCES*

Up to 400 million euros were made available in 2008 for the National Climate Protection Initiative programmes from the sale of CO<sub>2</sub> emission allowances. 280 million euros of this will be used for national measures, 120 million euros for international projects ([http://www.bmu.de/english/climate\\_protection\\_initiative/aktuell/42001.php](http://www.bmu.de/english/climate_protection_initiative/aktuell/42001.php)).

**Table 14: Policy Integration Criteria for the Climate Protection Initiative**

<sup>13</sup> Five support programmes have been published so far as part of the national initiative:

- Guidelines on promoting climate protection projects in municipalities and in social and cultural establishments.
- Climate protection incentive programme for the installation of mini-CHP plants (CHP: combined heat and power) in private households and in commercial enterprises
- Climate protection incentive programme for commercial refrigeration plants.
- A programme for promoting projects to optimize biomass energy use.
- An extension of the existing market incentive programme for renewable heat.

Criterion	Climate Protection Initiative
Inclusion	energy efficiency and greater use of renewable energies focus on schools, municipalities, small and medium-sized enterprises and private households
Consistency	Demonstration of pay-offs for industry, municipalities and consumers
Reporting	
Resources	Reinvestment from the sale of CO <sub>2</sub> emission allowances: 280 million euros of this will be used for national measures, 120 million euros for international projects

## 4. Vertical Policy Integration and Coherence at the National Level

### 4.1 “Sector” Specific Policy Integration and Coherence at the National Level

#### *The High-Tech Strategy on Climate Protection*

##### *INCLUSION*

Following the approach of *active ecological industrial policy*, the government launched an innovation initiative called “Energy for Germany.”<sup>14</sup> This initiative indicates the government’s attempt to anchor climate change policies within technology and innovation policies, especially in the field of energy. The objectives of this initiative are taken over and thereby strengthened by the High Tech Strategy on Climate Protection (HTSCC). The High-Tech Strategy (HTS), in general, outlines the objectives pursued by the German government in research and innovation policies. With the HTS, the German Federal Government has presented a national strategy for innovation policy for the first time. With the HTSCC the research sector attempts to contribute to climate policy and to play a stronger role in climate policies (BMBF 2008).

##### *CONSISTENCY*

The HTS establishes the innovation policy priorities and defines the research policy guidelines for climate protection in the coming years. The HTS also follows the imperative of the ecological industrial policy and reaffirms the goals of the IECF. The strategy reaffirms Germany’s role as *global pioneer* in resource-efficient and energy-efficient production processes and innovative service markets.

The HTS marks a paradigmatic shift in research and innovation policies:

“Many good ideas are being developed in Germany but too few of them are turned to commercial account. We therefore need a climate where ideas can be ‘ignited’, where research results can be translated into products, processes and services” (BMBF 2008).

The main objectives of the HTS are to accelerate technological breakthroughs and their commercial application. The rationale of the strategy is to bring together a number of diverse

<sup>14</sup> The government is gradually increasing funding for energy research. The funding covers renewable energies and biomass, the use of efficient technologies on the demand side (industry, products, transport, buildings), centralised and decentralised efficient technologies for energy production (including storage technologies) and a national innovation programme for hydrogen technologies (including fuel cells).

players for drawing at the same robe and to shorten the distance between invention and application. This strategy is based on the notion that to achieve a common purpose in confronting the challenges of climate change, there is a need for cooperation-building between scientists, business people and politicians.

As indicated above, the key in how to meet these goals involves the creation and consolidation of “innovation alliances,” networks and new partnerships. The underlying philosophy is that innovation policy can succeed only when those persons in positions of responsibility in the sectors of: education, research, the media, trade and industry, politics, and civil society, mobilise all available forces for innovation in Germany. For instance, energy research within the government is presently fragmented and divided into at least four departments. This leads to the breakdown of research competences (Die Zeit vom 31.08.2006; Nr. 36). The HTS is set up to integrate efforts and activities in different departments and sectors to make research more coherent and “flawless”; to enhance the synergies between sectors and activities and to hence, to shorten the path from idea to innovation.

## REPORTING

The progress made will be documented in annual reports, starting in 2007. From 2008 on, the “Federal Report on Science and Innovation” will document progress. The BMBF will report regularly, enlisting the participation of stakeholders from science, the economy, and politics, in order to appropriately document the progress of work.

## RESOURCES

The German government is investing an additional 6 billion euros in research and development during the current legislative period. A total of some 15 billion euros will be allocated for cutting-edge technology throughout the year 2009. This will bring Germany's federal government, Länder (state) governments, trade and industry closer to achieving their common goal: Boosting research expenditure to **three per cent of gross domestic product** by the year 2010. Four innovation alliances are thus about to be implemented. The BMBF will provide a total of 220 million euros. Industry has pledged to contribute 1.2 billion euros for the implementation of these priority measures.

**Table 15: Policy Integration Criteria for the German High Tech Strategy**

Criterion	High Tech Strategy
Inclusion	Principle of research and innovation policy The task of research is to generate new solutions and facilitate their implementation. HTS is the research sector's contribution to the realisation of this task. links climate protection with innovations that create jobs and ensure prosperity. It defines the research policy guidelines for climate protection in the coming years, taking into account scientific, technological, economic and financial factors.
Consistency	Ecological Industrial Policy Application of market
Weighting	Alliances and networks to mobilise all available forces for more innovation
Reporting	Annual reports, starting in 2007. From 2008 on, the “Federal Report on Science and Innovation” will document the progress. The BMBF will report regularly, with the participation of stakeholders from science, the economy and politics, in order to document the progress of work.
Resources	additional 6 billion euros in research and development during the current legislative period. A total of some 15 billion euros will be allocated for cutting-edge technology throughout the year 2009.

## 4.2 Policy Integration and Coherence Across Levels of Government

### *The National Strategy on Adaptation*

In recent years the discussion has opened up to include adaptation policies. Adaptation policies are based on the insight that it will not be possible to avoid all serious consequences of climate change, even with a substantial reduction in emissions. While climate change mitigation remains a priority, there is also an urgent need to develop integrated strategies for adaptation since the potential impacts of climate change such as floods, droughts and heat-waves will significantly affect key socio-economic sectors, activities and places. This is also the reason why German policymakers point to the need to prepare for the expected climate changes right away and to step up the activities they have already launched to develop and implement national, regional and local adaptation strategies.

### *INCLUSION*

In Germany the awareness of the necessity of adaptation to the consequences of climate change has been growing over the last few years. Under the UN FCCC, Germany committed itself to implementing action programs that facilitate systematic adaptation to expected climate change and its consequences. In the **2005 Climate Protection Programme**, the German government announced that it would initiate the necessary steps for the development and implementation of a comprehensive national concept on adaptation to climate change in Germany. The German government charged the Federal Ministry for the Environment (BMU) with promoting cooperation with the Länder to develop the “National Strategy for Adaptation (NSA). Efforts are aimed at creating a conceptual framework for action. A draft proposal and initial set of measures are to be submitted by the end of 2008.

Adaptation policies are set up as both *reactive and preventative*, which means adjusting to and mitigating the adverse consequences of climate change, the resulting damage, as well as the economic costs, or adversely, achieving potential advantages and taking advantage of the opportunities that may arise from the current and future impacts of climate change (UBA 4/2008).

The aim is to strengthen and improve Germany’s adaptation *capacity* so as to reduce its *vulnerability* to climate change. In this context, the strategy should actively support the process of adaptation to climate change; promoting natural, social and technical adaptation capacity, as well as providing the necessary decision-making bases for this and helping to ensure that adaptation management becomes an integral part of all fields of policy and action (Federal Environment Agency 2008: Germany in the midst of climate change Adaptation is necessary (ibid.).

At the same time adaptation measures have not been restricted to technical and planning adjustments. Agencies such as the UBA state the need for greater discussion among policymakers and the public concerning what risks should be considered as tolerable. These discussions are aimed at reaching a consensus on acceptable risks and differentiated protection levels, i.e. on assets and uses that should be protected as a matter of priority and on ones that can be neglected. In addition to the possible harm done to the national economy and individuals, it is imperative at all levels to consider the impact on ecosystems and natural habitats (ibid.).

Adaptation encompasses both national and regional strategies as well as practical measures taken at all political levels or by individuals. Climate adaptation is seen as a societal task in

which citizens as well as actors in business, politics, administration, the media, environmental organizations, education and research, can and should make a contribution. The resulting framework for adaptation measures would be particularly suitable for implementation at the local and regional levels.

## *CONSISTENCY*

Adaptation to the consequences of climate change that are no longer avoidable today is seen as a second pillar of contemporary climate policy, complementing the reduction of greenhouse gas emissions. There is now a widespread recognition that combating climate change requires a combination of mitigation and adaptation measures. Thus, the need for a well-balanced and integrated approach to evaluation and decision-making is stated as being essential in ensuring win-win solutions and avoiding negative cross-sectoral feedbacks of measures or non-action in one sector. Successful adaptation to climate change will depend on the extent to which the issue is integrated into decision-making in other sectoral policies such as water and waste management, energy supply, transport, infrastructure.

### *The Need for Vertical Integration*

At the same, there is an emergent need to coordinate sectoral policies at different levels of decision-making more effectively. Besides the mechanisms for horizontal policy integration described above, effective vertical policy integration plays an important role in a federal system where legislative competencies are divided among central and state governments. Allocating responsibilities in the shaping of federal policy and carrying out adaptation measures require close cooperation between the federal government and federal states (Bundesländer). For this reason the Conference of the German Federal and State Environment Ministers decided in spring 2007 to support the federal government in its efforts to identify and implement a national German adaptation strategy.

Vertical coordination of environmental policies is carried out mainly by the Conference of Environmental Ministers (Umweltministerkonferenz – UMK) which brings together the environment ministers of the Länder and the Federal Minister for the Environment. The UMK is paralleled by Länder Working Parties (Länderarbeitsgemeinschaften), which coordinate state and federal policies in specific issue areas such as waste and water management, air pollution control, or nature conservation. However, a significant handicap to improving the integration of environmental concerns into sectoral policies could be the fact that many of the non-environmental ministries are well coordinated among all Länder and at the Federal level – for example, by means of planning institutions for joint funding mechanisms (Gemeinschaftsaufgaben). In comparison, environmental administrations have a less formal consultation and coordination structure.

Spatial planning is a promising candidate for facing and overcoming these challenges. The impacts of climate change will significantly alter land use practices, the regulation of which is a major concern of spatial planning. It is already based on integrative approaches, which include different sectors, scales and levels, involving a wide range of instruments (including regulatory plans, fiscal incentives or sanctions, voluntary and soft measures) which do take into consideration future development. First assessments show, however, that spatial planning presently faces a particular dilemma: while the need for coordination and integration across sectors, scales and levels is growing, the capacities to respond are shrinking due to the rigidity of administrative and political borders, the stability of departmentalism and the strength of sectoral interests and preferences for small-scale solutions.

At the same time, German policies of adaptation still have a very programmatic character since they remain in the initial stage of policy formulation.

## RESOURCES

All these activities aim to fully integrate the actors and parties concerned into the adaptation strategy at an early stage. To support these and other tasks, the Federal Ministry for the Environment set up the Competence Centre on Climate Impacts and Adaptation (KomPass) at UBA.

KomPass's task is to summarise the results of climate impact research and make them readily accessible to the public as well as giving technical and conceptual advice to the Federal Ministry for Environment (BMU) in the work on the German adaptation strategy. It also acts as a central office for the coordination and implementation of the strategy (UBA 4/2008).<sup>15</sup>

The UBA also seeks to improve decision-makers' awareness of associated risks and opportunities through increased public information activities, scientific workshops and fostering dialogue between the parties concerned. To ensure that the risks of climate change do not lead to displacement responses or even fatalistic reactions, policymakers should always combine communication of the risks with communication of possible adaptation measures.

**Table 16: Policy Integration Criteria for the National Adaptation Strategy**

Criterion	The National Adaptation Strategy
Inclusion	technical and planning adjustments Acceptance of risks and of protection levels impact on ecosystems and natural habitats implementation at the local and regional levels
Consistency	Adaptation and mitigation Enhance synergies (win-win) Avoid negative cross-sectoral feedbacks of measures or non-action in one or various sectors
Weighting	
Reporting	
Resources	Set up of KOMPASS

<sup>15</sup> KomPass collects information on possible adaptation options, evaluates them with respect to their risks and opportunities and makes the results available to relevant actors. Key questions in this context are how vulnerable sections of society and possible adaptation action can be identified, what adaptation costs, what its limits are and what political framework must be in place to implement adaptation strategies. The UBA wants to support the work of all those involved in adapting to climate change, whether they be companies, administrations, trade associations, or environmental organisations.

## 5. Case Study: The Vereinigte Mulde

### 5.1 Introduction

The discussion of climate policy integration has tended to focus on mitigation decisions mostly taken at the international and national levels. Clearly, there is also a more locally-focused adaptation dimension to climate policy integration, which has not been adequately explored by either academics or policy makers. The case study on the Vereinigte Mulde concentrates on the local and/or regional level and deals with the overall question of how the adaptation dimension is integrated into existing policies. The empirical object of the study is weather-related, extreme events, namely floods. The study investigates the extent to which different sub-elements of policies within water sectors already take into account impacts of climate change and either support or undermine potential adaptive responses. This is accomplished by combining both a top-down and a bottom-up perspective. The top-down approach assumes that policies set explicit aims and objectives that are directly translated into action on the ground. The bottom-up approach recognises the importance of other actors in shaping policy integration (Urwin and Jordan 2008). This view is further substantiated by also considering the opinions of local decision-makers (e.g. employees of municipalities) as well as those of the citizens living in flood-prone areas.

While the Federal Republic of Germany had, for most of its history, not been affected by disastrous weather extremes – apart from the storm flood in Hamburg in 1962 – a series of floods during the 1990s and finally the 2002 summer flood along the Elbe River and its tributaries initiated a public and political debate on how to design flood-protection efforts more effectively in the future. While initially the issue of climate change played only a subordinate role, if it was mentioned at all, in recent years the question of how to adapt to climate change has become more prominent in policy fields related to flood protection. The Vereinigte Mulde case-study will therefore deal primarily with the time span reaching from the 2002 flood to summer 2008. It demonstrates that the flood-protection approach implemented in 2002 was largely developed under the influence of the experiences of the 2002 flood and had not as yet been affected by the climate change policy.

Before going into the more detailed investigation, some further background knowledge on both the German political system as well as the flood protection legislation initiated after 2002 is provided. Germany is, as previously laid out, a federal and parliamentary representative democracy by constitution (cf. chapter 2). Its main features are a polycentric administrative structure and a decentralised political system. The administrative structure consists of three levels of decision-making that possess constitutional autonomy: the federal (*Bund*), states (*Länder*) and the local authorities (*Gemeinden* and *Städte*). Flood protection is, above all, the responsibility of the states. However, the federal level provides the general conditions that have to be considered by the states. The states and also the local authorities are responsible for implementing the actual measures.

As a result of the 2002 flood and the public debate in its aftermath, in May 2005 a new flood protection law (*Hochwasserschutzgesetz*) became effective in Germany, which for the first time provides coherent instructions on how to adapt to flood hazards. This law complements the Water Management Act (*Wasserhaushaltsgesetz*, *WHG*) (Köck 2005). It has been the duty of the single states (*Bundesländer*) to put the federal law into legislation by May 2007. The state of Saxon had already passed the Water Law (*Wassergesetz*, *WG*) by September 2004.

Important for the context of this study is the finding that there is no explicit mentioning of climate change in either the WHG or the WG. However, although climate change is not considered in the national flood protection law or in the Saxon Law, both laws can be regarded as a considerable step towards a more effective design of adaptation efforts (Köck 2006). Without wanting to go into a detailed discussion, the following important regulations/rules (*Regelungen*) need to be mentioned:

- Areas prone to floods with an exceedance probability of 1/100 are defined as flood-prone areas; the standard to define the protection goal for settlement-prone areas is also the exceedance probability of 1/100 (WHG § 31 b Abs. 2);
- In flood-prone areas the utilisation was considerably impeded and prerequisites for exceptions were considerably restricted (WHG § 31 b Abs. 4);
- Thirdly, citizens residing in flood-prone areas are obliged to implement mitigation measures in accordance with his/her possibilities and capabilities (WHG §31 a). Almost the same phrase is to be found in the formulation of the new Saxon Water Law (WG § 99).

Short discussion (Köck 2006):

- A point of criticism is the exclusive orientation on statistical return rates, which are based on past events. This orientation is not satisfactory, since it neglects the fact that simple projections, which are based on past experience, are not sufficient to anticipate future risks. This point of criticism is particularly relevant, since there is no binding time frame for updating the flood protection plans.
- Furthermore, defining flood protection standard simply based on a statistical return rate (e.g. 1/100) is not meaningful, since economic, ecological and social criteria are not considered.
- Positive in Principle is to demand citizens for implementing private adaptation measures. Yet, as the bottom-up perspective will unravel, this demand is mostly not known and by some regarded as an over-excessive demand on the individual.
- However, positive is the strong restriction of extension of settlement area in flood prone areas.

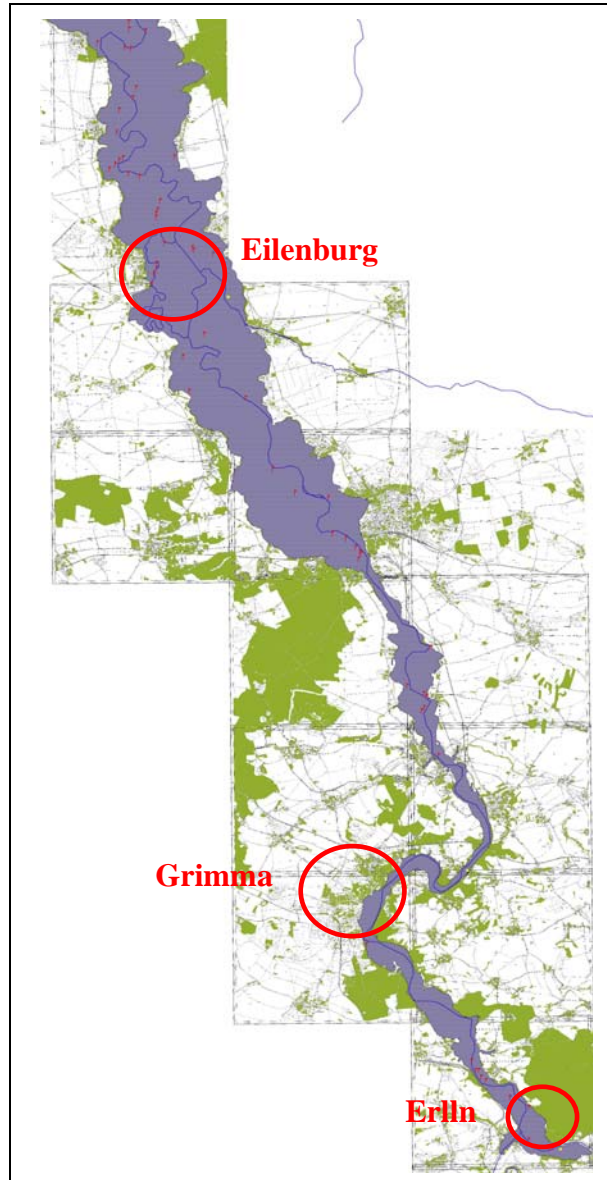
Generally, the legislator favors an integrative adaptation strategy consisting of structural and non-structural measures. While structural measures encompass the construction of flood walls and dykes, non-structural measures encompass both individual actions (e.g. private mitigation measures) as well as organisational actions (e.g. warning). By applying both an integrative approach is possible. The interplay of structural and non-structural measures is hence central for this case-study since they represent quite different adaptation approaches: While structural measures are mostly based on technical approaches that intervene in the flood-risk system by use of structural works of hydraulic engineering, non-structural measures have a broader orientation and also consider the societal context (e.g. information for residents, insurance, etc.) (cf. also Schanze et al. 2008). This implies that although an integrative adaption strategy is normatively favoured, the necessary steps for implementation are based on quite different measures. The case-study concentrates on the question as to whether the integrative approach favored by the legislator is actually accomplished.

Map 1: Extent of the 2002 Mulde Flood and single Case-Studies

The area of the case study is constituted by three communities, each of which offers quite different approaches to flood protection, since they all pursue different strategies with regard to the implementation of structural and non-structural measures.

- The city of Eilenburg (18,000 inhabitants; 2003) experienced severe flood damage in 2002. Quickly after the flood, the collapsed levee system surrounding the city was rebuilt and reinforced. As such, Eilenburg represents a community which pursues a classical structural, flood-protection approach relying mostly on dikes and walls surrounding the city.
- The village of Erlln (93 inhabitants, 2005) also experienced severe flood damage in 2002. Afterwards, a mixture of relocating dikes (non-structural) and improving existing dikes (structural) was used for future flood protection.
- The city of Grimma (18,000 inhabitants, 2003) also experienced severe damage from the 2002 floods. The city represents a community which has to rely on non-structural measures such as a locally organised warning system, since it is not yet protected by technical flood protection measures.

Before introducing the reader to a more detailed description of the case-study, a short overview about the methodology is given.



### **Methodology**

The bottom-up perspective, reconstructed in this case study, is based on the results of a different research project that was conducted along the Mulde River in the aftermath of the 2002 flood. In total, 33 qualitative interviews were conducted. Five interviews had an emphasis on the community of Erlln<sup>16</sup>, six on the city of Grimma<sup>17</sup> and twenty-two on the city of Eilenburg<sup>18</sup>. We conducted “problem-centered interviews” (Hopf 2000: 350). This means,

<sup>16</sup> These interviews were conducted within the CRUE-ERA project FLOOD-ERA.

<sup>17</sup> These interviews were generated in the context of a diploma thesis entitled “Influences of the 2002 flood on the dealing with flood hazards: The example of the city of Grimma” (Schildt 2006).

<sup>18</sup> The interviews were conducted in the context of a dissertational thesis on the 2002 flood (Kuhlicke 2008).

we asked a mixture of open questions that would allow the narrator to develop his/her subjective view on flood protection in general, and more specific questions that would allow us to focus on specific issues. The duration of the interviews was between 70 to 90 minutes. They were recorded on tape and subsequently transcribed verbatim.

Furthermore a household survey was conducted in the city of Eilenburg and Erlln (Steinführer and Kuhlicke 2007). The questionnaire survey was conducted between 24 November and 4 December 2005. The questionnaire was structured into seven main parts (Appendices II and III). The first covered general questions focusing on the biographical and emotional bonds of the respondent to the research location as well as on social capital both with regard to a collective and an individual perspective. Therefore, in this part, questions about the perception of solidarity and trust in the community, activities in local associations as well as the individuals' social network questions were asked. The second section focused extensively on the 2002 flood. We asked questions about the experience of the 2002 flood; warnings and evacuation, the physical impact, about consequences as well as support and information that people received after the flood. The third part focused on both public and private flood protection and precautionary measures from the point of view of the local residents, while the fifth part focused on general perceptions of flood protection. In this context, questions about responsibility, effects of different measures and information policies were asked. The sixth section addressed some long-term consequences of the flood, and the seventh part asked questions about the socio-demographic structure of the respondent's household as well as about his/her professional background. The questionnaire combined closed and open questions, the former serving "quantitative" and the latter "qualitative" (content) analyses.

This means that the bottom-up perspective is based on qualitative and quantitative data. The triangulating of different data is not considered here as standing in competition with one another and hence reinforcing the traditional divide between qualitative and quantitative data. On the contrary, using both kinds of data allowed a complementary research strategy, enabling insights not possible by only considering one type of data. The data gained through the household data should, firstly, give a general overview about single topics and identify dominant patterns that seem to be important in better understanding how people try to make sense of the 2002 flood.

The qualitative data gained through the interviews are used to reconstruct dominant patterns of interpretation people developed in the aftermath of the 2002 flood. At the same time an interpretational pattern of actors was reconstructed as a way of trying to explain the flood. Whenever the findings derived from the qualitative data allow a different conclusion than the quantitative, differences are outlined and possible explanations are developed subsequently.

The following groups of actors were identified as relevant:

- Citizens living in flood-prone areas. Their views and interpretations of the flood were taken into account by means of the household survey and by means of narrative interviews. This group presents the centerpiece of the case-study.
- Employees of the municipalities and employees of organisations closely associated or even cooperating with the municipalities. Their views were taken into account by means of semi-structured interviews.
- Employees of the State Reservoir Administration of Saxony (*Landestalsperrenverwaltung*) and the Regional Administrative District Office

(*Landratsamt*). Their viewpoints were taken into account by means of semi-structured interviews.

The following analysis concentrates on dominant and central findings that were generated within the different studies.

## **5.2 The Mulde Case Study**

### ***5.2.1 General Description of the Case-Study***

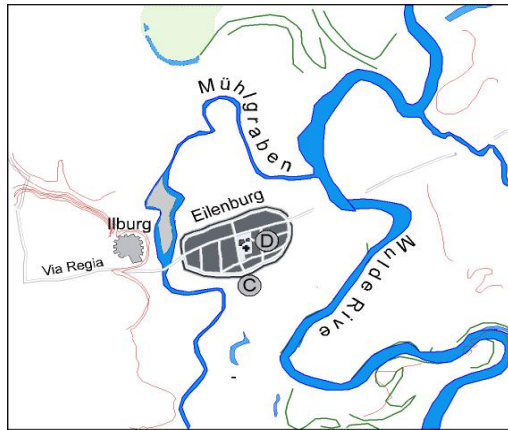
The research location for the German case study is the area of the Vereinigte Mulde, i.e. the region between Sermuth (Southern part of the river basin) and Dessau/Bad Dübén (close to the confluence with the Elbe). The Vereinigte Mulde is a tributary of the Elbe River. The river flows through the Saxon hill country, a landscape defined by glacial loess sediments which emerges through the confluence of the Zwickauer and Freiburger Mulde at Sermuth (map 1). The area was heavily affected by the flood in August 2002, causing high damage in towns and villages. The existing flood-protection system collapsed in many places during this exceptional “flood of the century” which was defined as an event with an exceedance probability of 1/200 – 1/250 (von Kirchbach et al. 2002; Freistaat Sachsen 2002; SMUL 2003). Generally, the 2002 flood is the single most expensive flood in German history. The economic losses were estimated at 11.6 billion euros (Schwarze and Wagner 2007).

### ***5.2.2 The City of Eilenburg***

Eilenburg represents a city that relies heavily on structural protection measures. The hopes attributed to these measures are well summarised by a quote on the official webpage of the city of Eilenburg: “Although there exists no fail-safe flood protection, Eilenburg will, most probably be flood secure in 2009. By then in Eilenburg along the Mulde River and the Mühlgraben the government of the Free-state of Saxony will have constructed 10 kilometers of walls and levees for 35 million Euros” (Stadt Eilenburg 2004).

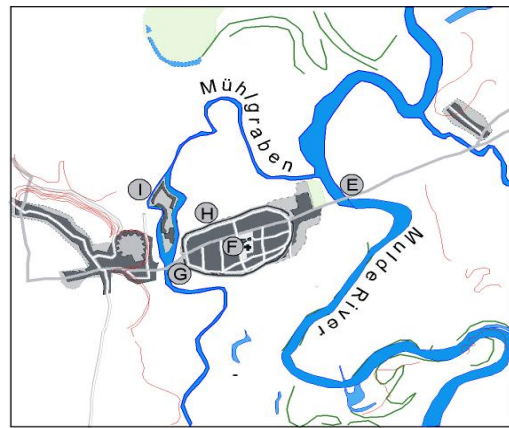
To understand the current situation of Eilenburg it is necessary to go back to the middle of the 19<sup>th</sup> century. In 1868 the ground for a railway across the Mulde valley was prepared (map 4). In the course of the construction works, the Mulde River had to be relocated. As a consequence of the construction of the railway, the area south of Eilenburg was drained and protected by the railroad embankment. From then on, this area could be utilised since the railway track functioned as an artificial levee by which the southern part of the city was protected. Yet, during this time the city was not yet protected systematically. It was again and again inundated. Only in 1900 was it finally agreed upon to entirely dike the city area. From this time onwards one tried to protect the city with higher technical efforts by establishing a clear demarcation between the “space of the river” and the “space of the city”.

Map 2: Eilenburg in the 12th Century

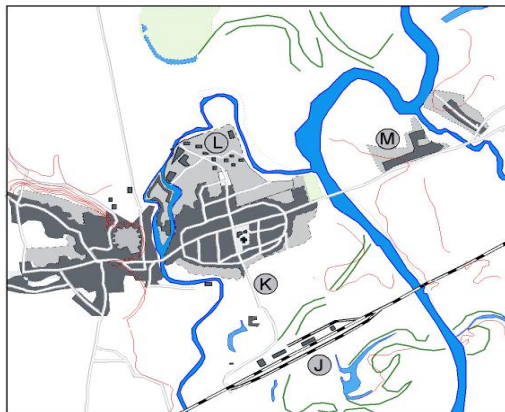


Source: Kuhlicke 2008

Map 3: Eilenburg from 1560 to 1850



Map 4: Eilenburg in 1856



Map 5: Eilenburg in 1911



During the 20<sup>th</sup> century the city was inundated three times; that is in 1932, 1954 and 1974. However, the 2002 flood by far exceeded the water level of previous floods. Map 7 shows that large parts of the city were inundated by the flood. 1,350 dwellings and 300 business enterprises were directly affected. As for municipal property, the flood caused damage valued at 47.6 million euros; for Eilenburg as a whole the estimation is 200 million euros. However, fortunately, no loss of life occurred (Häussler and Leihe 2005).

Map 6: Eilenburg in 2001



Source: Kuhlicke 2008

Map 7: Eilenburg and the 2002 Flood

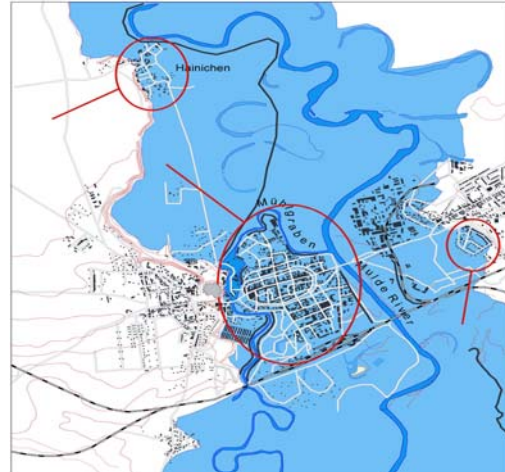


Photo 1: Flood Wall in Front of the Former ECW; Source: Kuhlicke 2008

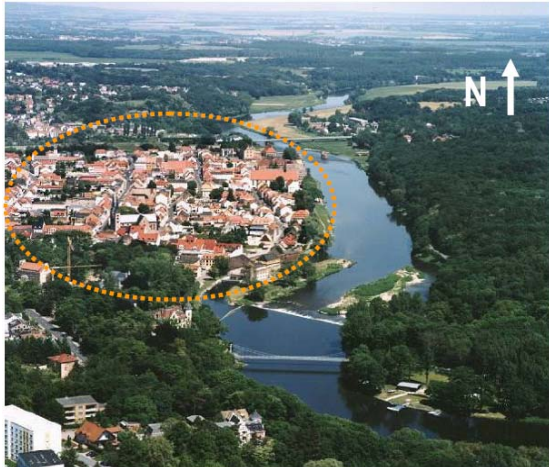


Eilenburg now has one of the most costly flood-defense systems in Saxony. After the flood, different measures were applied. In the inner part of the city, flood walls were constructed. Furthermore, at bottlenecks, dikes were relocated, a bridge was widened and dykes were improved and heightened (photo 1). According to the official protection goal, a 1/100 safety standard will be achieved by this bundle of measures. The work will be finished by the end of 2008. The costs are around 30 million euros.

### 5.2.3 The City of Grimma

Grimma is a city of about 18,000 inhabitants (2003). The flood-prone town centre (see photo 2) is inhabited by approximately 2,000 people. Similarly, as in Eilenburg, Grimma was one of the most heavily affected towns in 2002. The entire old town centre was flooded with inundation depths of up to 4 meters, causing major damage (see photo 3+4). Reconstruction started relatively quickly after the flood and by the end of 2004 the town had been reinstated to its pre-flood state or better.

Photo 2: Aerial Photograph of the City Center of Grimma



Source: [www.grimma.de](http://www.grimma.de)

Photos 3+4: Pictures from the Flood and Flood Damage in Grimma in August 2002



Sources: <http://proheritage.info/saxony02/Grimma1Ffb.jpg> (top left image), [www.greenpeace.de/themen/klima/nachrichten/artikel/neue\\_klimastudie\\_verheisst\\_nichts\\_gutes/](http://www.greenpeace.de/themen/klima/nachrichten/artikel/neue_klimastudie_verheisst_nichts_gutes/) (bottom left image), [www.stern.de/wissenschaft/natur/511015.html?eid=511340&nv=ex\\_L3\\_ct](http://www.stern.de/wissenschaft/natur/511015.html?eid=511340&nv=ex_L3_ct) (right hand image)

Grimma has, up to now, no new structural flood protection. A solid flood protection wall in front of the old town wall was already proposed in the flood protection concept for the Mulde (SMUL et al. 2004). Although a high priority was given to this measure within the federal evaluation and prioritisation scheme (SMUL 2005), so far it has not been built. The reason is that the construction of a solid protection wall in front of the historical town wall was rejected by many inhabitants and also by members of the municipality of Grimma (Schildt 2006). They argue that some of the historical setting and cultural heritage of the old town would be destroyed by such a measure. After some discussion and proposals by a team of architects and preservationists from the TU Dresden (Will and Lieske 2007) a compromise solution was developed which tries to integrate the protection into the old town wall. The actual concept which is now planned to be conducted in 2008 consists of the following elements:

- Construction of a new wall section combined with mobile elements (orange line in the image);
- Reconstruction of the old city wall and integration of a protection wall into the city wall (red line);
- Object protection (integration into existing walls), a new protection wall and mobile flood defence components (green line); and
- Construction of a rampart with an integrated protection wall (yellow line).

According to the official protection goal a 1/100 safety standard will be achieved by this bundle of measures (in the following referred to as the “protection wall”). However, the actual cost calculations for the compromise solution are significantly much higher (23 million euros) than the cost calculations for the initially-planned protection wall (11.8 million euros).



Measures in Grimma; Source: LTV

Whereas the decision-making process on the structural flood protection of Grimma took some time, a non-structural measure was installed quickly after the flood. With the experience of 2002 in mind – no timely flood warning was received in Grimma – the city council decided after 2002 to use some of the donations received to install an autonomous local warning system. This system consists of the following components:

- Central hooter sirens on town roofs and a central flood announcement system;
- Autonomous SMS – information network
- A river gauge camera – live streaming on the internet
- 24-hour information in situations of approaching flood conditions on local TV Muldentel;
- House threshold measuring: to assess how much time is left until flooding.

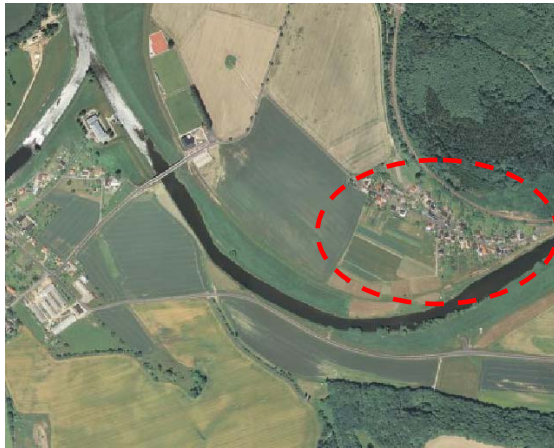
According to interviews with members of the town council the system is intensively used by the population.

Photo 5: Concept for Flood Protection

### 5.2.4 The Village of Erlin

Erlin is a small village located near the confluence of Freiburger and Zwickauer Mulde, belonging to the municipality of Zschadras. The village of Erlin (92 inhabitants; 2005) also experienced severe flood damage in 2002. During the flood in August 2002 the old dike, located directly beside the riverbed, was overtopped and broken at three locations. The water level was around 85 centimeters above the dike crest. The entire village was flooded, causing major damage (see photo 6+7). After the flood, the damaged areas of the old dike were removed and the village itself was reconstructed.

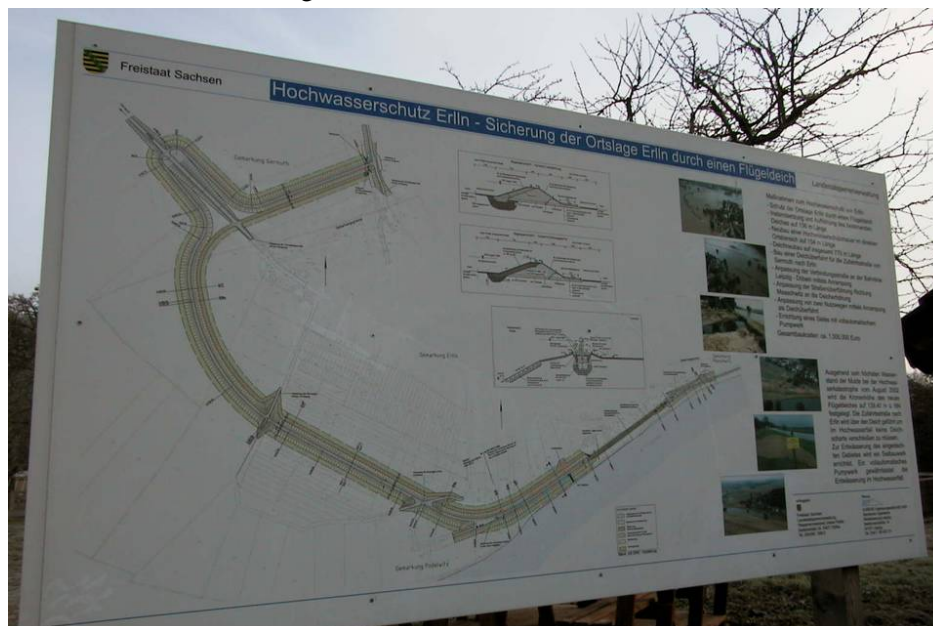
Photos 6+7: Aerial Photograph of Erlin (left), Dike Breaches in Erlin in August 2002 (right)



Sources: Google-Earth (left), [www.kubens-ingenieure.de/bilder/erlin/erlin\\_lb1.jpg](http://www.kubens-ingenieure.de/bilder/erlin/erlin_lb1.jpg) (right)

According to an employee of the LTV, initially, three protection options were discussed for Erlin for the flood protection concept of the Mulde (SMUL et al. 2004): Firstly, a heightening of the old dike to the 1/100-protection goal. Secondly, the construction of a ring dike closer to the village, also providing the 1/100-protection. And, thirdly, a “do-nothing option”, where no protection at all would have been provided. According to the mentioned interviewee, the first and especially the third option were ruled out very quickly. The do-nothing option would not have fulfilled the protection goal and was therefore not a serious option. The heightening of the old dike was considered to be an inferior measure to undertake, both from a hydraulic as well as an economic standpoint. Furthermore, it was expected that this option was “not licensable” because of environmental reasons. Accordingly, the ring dike was proposed as the most appropriate flood-protection concept for the Mulde. This measure was evaluated within the prioritisation scheme (SMUL 2005) as having a high priority and was finally built in 2006. The measure consists not only of the construction of the new ring dike at a length of 855 meters but also of a pumping station which ensures the drainage of the inner area. Furthermore, on a section of 175 meters close to the river, the old dike is used and heightened by a wall (Ingenieurbüro Kubens 2007, see also photo 8). The initial cost calculations of 2.7 million euros (SMUL 2005) were exceeded. The actual costs amounted to 3.9 million euros (Mr. Trepte, personal communication).

Photo 8: Plan for the Ring Dike in Erlin



### 5.3 The Implementation of Adaptation: A Bottom-Up Perspective

In principle, the integrative approach to flood protection outlined in the introduction to this case study is pursued, on the regional level, by the Saxon Parliament (*Landtag*) which governs through laws and budget allocation as well as by the Saxon Government (*Landesregierung*) which decides how adaptation should be organised and shaped.

However, the bottom-up perspective reveals that this integrative approach favoring both structural and non-structural measures is not mirrored at the organisational level. There are two different authorities responsible for flood protection. While the State Reservoir Administration (LTV) is above all responsible for structural measures, the Saxon State Agency for Environment and Geology (LfUG) is responsible for non-structural measures such as emitting warnings. Between both organisations a misbalance exists with regard to financial capacities. Below, this is discussed more in depth, especially with respect to the consequences this misbalance has for adaptation measures.

To understand the current situation, it is insightful to go back to the time shortly after the flood. In the aftermath, the decision-makers used the bitter “lessons learnt” as “windows of opportunity” to improve the flood protection along the Mulde River. After the 2002 flood the responsible *Saxon State Ministry of the Environment and Agriculture* (SMUL) initiated the reconstruction and development of new flood protection and put the LTV in charge of designing and implementing this new flood-protection concept (*Hochwasserschutzkonzept*). Over time, new responsibilities have developed, which have been solidified. Flood protection is currently, above all, the duty of the State Reservoir Administration (LTV).

After the flood of 2002, the LTV developed a new flood-protection concept, which is quite innovative, at least in the German context. It even exceeds, in one respect, the legal requirements. Similarly, as the federal legislator, the indicative-protection goal is to safeguard settlements against floods up to an exceedance probability of 1/100 by means of flood-protection measures (LTV 2003). However, this protection goal is only valid for densely populated areas. For single buildings and temporal settlements a protection goal is designed only up to an exceedance probability of 1/25 and for agricultural areas only against floods with an exceedance probability of up to 1/5. Hence, the flood-protection concept takes different protection goals into account. Therefore, all 1,600 measures planned in the 47 flood-protection concepts were evaluated and prioritised (SMUL 2005). Most of the measures given a high priority have already been carried out or will be set in place in the coming years.

Besides these flood-protection concepts focusing on structural measures, the SMUL initiated the development of a flood warning system (the Saxon Flood Centre, see [www.hochwasserzentrum.sachsen.de](http://www.hochwasserzentrum.sachsen.de)). This warning system is supervised by the *Saxon State Agency for Environment and Geology* (LfUG).

Another important characteristic with regard to the administrative structure is the availability of considerable financial resources. In the aftermath of the flood, the affected communities and regions could rely on heavy financial support by the European Union, the *Bund* (federal state) and The Free State of Saxony. One narrator explained that about half a billion euros are available for flood protection up until 2013 and stated: “No measure dashes against money” And another underlined: “We have so much money around that it would be really great if needed no authorisation process”.

As a consequence of the previous outlined development (1/100 protection goal for settled areas, division of responsibility, funds), structural adaptation measures are clearly prioritised in Saxony. To reach the standard protection goal, structural measures inevitably need to be implemented. Furthermore, the funds, which were available for reconstruction and for which the Saxon Government decided to apply to the European Regional Development Fund (ERDF), clearly favor structural measures. The flood-protection concept was already organised in line with the standards of the ERDF. It was also decided that the Ministry of the Environment and Agriculture would receive large amounts of funding. The ministry transferred most of the money directly to LTV. The latter employs mostly engineers favoring structural measures. As a result, no integrative view, pursued in flood protection, is adopted. While LTV, responsible for structural measures, is financially better equipped and leading in the implementation of adaptation measures, LfUG, which is responsible for non-structural measures (e.g. warning), is not involved in the same way and, thus, structural measures are accorded preference.

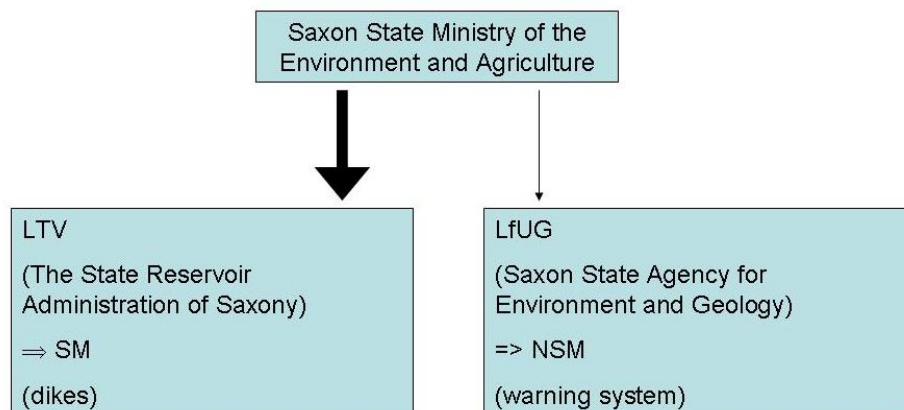


Figure 3: Structure and Distribution of Money (own figure)

It needs to be emphasised again that during the initial phase of setting up the flood protection concept and defining the responsibilities, climate change played no role, either in documents (e.g. flood-protection concept) or in discussions. This has started to change only in the last 2 years.

### ***Bottom-Up: The View of Decision-Makers and Local Population***

The analysis of the view of decision-makers involved in flood-risk management, as well as the opinions of the local population, reveal three dominant arguments. It is underlined by decision-makers that, (a) there exists a strong desire among the affected population for structural measures, which is connected with a **demand for security**; (b) it became apparent through the interviews that if non-structural measures were considered in the aftermath of the 2002 flood they could not be realised, since there was **strong resistance** among the population; (c) generally, **trust** among decision-makers as well as between decision-makers and the local population is important to ensure that certain adaptation measures implemented.

A). The 2002 flood meant a loss of control for many people and caused considerable damage not only economic but to an even greater extent, emotional. (Steinführer and Kuhlicke 2007). In the aftermath of the flood, therefore, a strong need for security surfaced among the population. This need is mostly associated with a specific imagination about how flood

protection should be organised, which finds its expression in a strong belief in the superiority of structural measures. This is a quite dominant pattern, which is shared by most of the residents living in the flood-prone areas. Generally, the interviewed decision-makers and experts echoed this view and underlined that the population desires a form of protection, which is visible and which appears to be reliable. These attributes are associated with structural measures like dikes and walls.

This need was taken into account by the decision-makers, as one interviewed expert said: “The State government works for the citizens and not for itself; from there comes the input and from there a political opinion is developed”. As the overall majority of the population favored physical measures – an assumption that is clearly confirmed by empirical investigations (Kuhlicke and Steinführer 2006; Steinführer and Kuhlicke 2007) – the representatives of the political system also favoured these measures.

This dominant view is contrasted with the tendency of decision-makers to consider technical details. The LTV, in particular, also considered measures that had a greater nonstructural character (e.g. the slitting of dikes or their relocation at bottlenecks). However, in the course of time, in many cases, they adapted their plans to the dominating belief among the population about how such measures should be implemented.

B). Resistance to non-structural measures began surfacing in many cases after the flood. In Erlln, for instance, a ring dike was planned, offering protection for a 100 year flood. At the same time the old dike needed to be slated to create more retention area for the Mulde River. However, local residents disliked these measures and their resistance to them became increasingly evident. Two interest groups appeared as key actors thereafter: The local farmers who feared that their fields would be prone to repeated flooding bi-annually, and their fields would therefore be prone to increased pollution. A second group, was a local soccer association. After the flood, a soccer field close to the Mulde River was remediated. It was feared that if the dike were to be slated the soccer field would also be regularly flooded. Because of this resistance, the LTV decided to rebuild the old dike in accordance with its previous level of protection.

Furthermore, the ring dike in Erlln could not be put into practice as it was initially intended by the LTC, since the new dike meant that there would be a change in land use in Erlln. This would affect some citizens in Erlln. These citizens considered the compensation payment proposed (by LTC?) as insufficient. As a result, the LTV initiated an intensive dialogue with the local population to convince them of the necessity that every single person had to contribute to the over-all aim of protecting the community more effectively. Some decision-makers coined the phrase of “strategic resistance” to underline that some citizens also used the argument to force-up the value of their properties. Because of all these resistances a delay in the construction work and an increase in transaction costs became inevitable.

C). The interviews revealed that the better the actors know and trust each other, the more likely it is that measures are set in place and quickly completed. Of particular importance are contacts to local decision-makers and the affected population, because their local knowledge is essential for the implementation of measures. However, more important is their acceptance and the manner in which they are embedded within the community. Local decision-makers, it is argued, possess both the necessary integrity and acceptance within the local communities, something which the regional decision-makers (e.g. LTV) lack, at least in the eyes of the local

population. People trust local decision-makers more than regional ones, who are seen as being more distant to the specific issues and arguments on the spot. Therefore, the inclusion of local decision-makers (e.g. mayors) and their support for the respective measure to be implemented is fundamental in building a trusting relationship between the executing authorities and the responsible persons.

This is also emphasised by the case of Grimma where a locally-operated warning system was installed after the flood. The mayor proposed, along with others, to install a SMS warning system, which is not dependent on the official warning system of the Free State of Saxony. Many people assign the implementation of this measure to the personal interests, charisma and effort of the mayor of Grimma. The consideration and complementary nature of nonstructural and structural measures is, in our case study, above all, dependent on the personal effort of individuals (and not on the formal institutionalised effort of flood protection).

The case study hence shows that although on the legislative level an integrative adaptation approach is pursued, this strategy is not implemented on the organisational and project levels. Here technical measures clearly dominate. The reasons for this hierarchy are, firstly, the organisational division-of-labour between the LTV (which is responsible for structural measures) and the LfUG (which is responsible for non-structural measures), which leads to a preference for structural measures, since the LTV is accorded more responsibility for fund usage as well as having a higher financial budget. Secondly, the responsible decision-makers of the LTV, although open minded to non-structural measures, are mostly grounded in an engineering culture which intrinsically favours structural measures. Thirdly, among the local population a strong belief in the superiority of structural measures exists, which is taken up and implemented by the decision-makers.

## 6. Conclusion – Climate Policy Integration in Germany

In the concluding section we will first consider the state of the degree of climate policy integration in Germany from a comparative perspective. The section is structured along the criteria we used to assess policy integration as discussed in the introduction. We will then examine instruments and institutional arrangements that can serve to improve policy integration.

### INCLUSION

In German politics, climate change gained salience from the mid 1980s until the year 1990 and again from 2000 onwards, especially in 2007. While the two periods are not entirely coincidental, they can both be characterised by busy policy-making efforts resulting in the set up of major regulatory frameworks for climate policies. Independent of their composition, almost every government declared a high-level commitment to far-reaching targets for climate protection and promoted the German *pioneer* or *forerunner* role in international affairs.

Energy and transport were determined as the most important sectors for implementing these ambitious targets. Since 1998 climate policies were also embedded in technology, innovation and research-based policies. While climate change mitigation remains a priority, there is now widespread recognition that combating climate change requires a combination of mitigation and adaptation measures and that successful adaptation to climate change will depend on the extent to which the issue is integrated into decision-making in other sectoral policies such as water and waste management, energy supply, transport, and infrastructure.

The case study has demonstrated that a lot of activities to respond to or to prepare for extreme events, such as floods, are set up at the regional level, but they are not yet systematically linked to climate change. In the immediate aftermath of the 2002 flood, climate change was not an issue, and thus adaptation issues were not seriously included in the decision-making processes. Flood protection stood at the forefront of the newly negotiated Flood Protection Law and the Water Management Act (Wasserhaushaltsgesetz, WHG) (Köck 2005). Even if integrative and multi-dimensional approaches are provided under European and national law, they are rarely taken into account or not fully employed when it comes to decision-making at the local level. From a bottom-up perspective, it is evident that traditional interpretations on how to protect against weather extremes are dominating both the view of decision-makers and of the local population. However, it also needs to be clearly stressed that, although climate change is not explicitly mentioned in the newly enacted laws, they signify a considerable improvement towards a more effective design of adaptation efforts. As mentioned above, German policies toward adaptation are in the stage of policy formulation, a very early stage of the policy cycle.

### CONSISTENCY

Since its uptake in German politics, climate change is closely linked to social, political, and economic goals such as employment, economic stability and competitiveness. These linkages between climate change and highly contested policy aims and/ or sectors contributed to the opening up of controversies and conflicts. As a result of this issue-linkage, decision-making on climate policy has also had to manage and resolve both technical and political trade-offs and conflicts latent in public controversies such as on nuclear power and mobility. These problems contributed to paralyze climate policies in the 1990s. In this era, climate policies were often characterised as “symbolic politics”, since far-reaching targets were not seriously

implemented into concrete strategies. This led to a remarkable lack of coherence between the key choices made by the government and those made by the private sector as these institutions tend to be independent and fragmented, and tend to operate according to closed, self-referential decision-making processes. Coherence problems are most evident in Germany when it comes to the development of instruments and procedures on how to implement ambitious climate-protection targets in respective sectors such as energy and transport. Different initiatives, such as the introduction of legally-binding *instruments* such as the eco tax to control the behavior of target groups, faced remarkable resistance from particular target groups. The lack of coherence and compliance by target groups can be seen as one of the major problems of German climate policies. In order to be efficient and effective, political measures have to address and include those actors relevant for causing the problem and implementing the solution (big polluters such as energy companies and energy-intensive industries).

Triggered by the Red-Green government, climate protection accomplished its boom in 2007 as climate objectives were effectively incorporated into different sectoral policies (such as the energy policy and the modernisation of buildings) and ambitious targets were complemented, with far-reaching measures, and supported by the national innovation initiative (SRU 2008). While climate policy integration was quite advanced in the energy sector, the transport sector proved to be much more difficult. Almost every government faced problems in enforcing sectoral policy integration in the transport sector, as a means of moving beyond end-of-pipe measures. The controversy on “CO<sub>2</sub> limit values for passenger cars” illustrates these problems. One of the planned IECP measures, that of coupling automobile registration costs with the amount of CO<sub>2</sub> vehicles emit, has not been implemented at least up until now.

## WEIGHTING

An important driving force of policy integration can be seen in the Red-Green Government coalition, pushing the framework of *ecological modernisation*. The grand coalition followed this approach and transformed it into an *active ecological industrial* policy. This framework was instrumental in addressing coherence problems. From within a historical perspective, we observed that trade-offs between different policy aims (such as climate protection and economic stability) are displayed by different actors in different ways. The trajectory of climate change in Germany demonstrates that the relationship between climate protection, economic stability, and social security is framed differently over time. When the ecological modernisation framework was introduced in the 1980s, it challenged the conventional (neoliberal and socialist) paradigm which claimed that there is always a trade-off between stringent environmental regulation and economic growth. As an alternative, it suggested that ambitious environmental policy measures benefit both the environment and the economy. In contrast to former governments, ecological, economic, and social issues were not framed as contradictory but as complementary to objectives. Advocates of ecological modernisation gained cross-party support at times when Germany tried to become a leading exporter of “green” technologies (Weidner and Mez 2008). This framework was instrumental in turning climate policy integration from a negative to a positive project following the general paradigmatic shift from *risk* to *innovation*.

In times of economic crisis, however, worries about declining competitiveness of the national and European industry vis-a-vis US and Asian competitors persist and policy makers tend to step back to the old dichotomy. Conservative politicians reassess climate regulation from a “chance” to a “threat” to the German industry. They are particularly concerned about a scheduled increase in fuel-efficiency standards for cars that could harm the German auto

industry. They also tends to polarise climate protection and economic welfare as excluding alternatives, where heroic decision-makers have to make a tragic choice and prioritise the national survival at the expense of climate protection.

Both at the national and local level, we observe the priority of measures that do not require structural and behavioral changes. The preference for technical measures can also be evidenced in flood management. If non-structural measures were considered in the aftermath of the flood in Eastern Germany in 2002, for the most part they could not be implemented because of resistance from residents and specific interests groups. Even if strategies at the national level include structural and non-structural measures and the need for integrated strategies is stated, at the regional and local level both measures are polarised and play-off against each other. From a bottom-up perspective, there is evidence that local populations prone to floods clearly prefer visible and physical, structural measures over non-structural measures. Local decision-makers echo this view by arguing that they are not making decisions in a vacuum, but rather, in a context that is influenced by the views and opinions of citizens. Thus, they also, generally, support structural measures. It is therefore emphasised that a trustworthy relationship among decision-makers and also between decision-making bodies and the local population is essential for the successful application of non-structural adaptation measures. Both, the national study and the local case show that citizens are averse to measures that require fundamental changes to their way of life and their individual behaviour. These far-reaching transformations were expected from third parties, thus, they do not deeply affect entrenched patterns such as mobility and living standards (Kuckartz 2008).

Controversies surrounding climate policies are, generally, imbued with a technical focus, not to say a technical bias. The integration of climate claims into technology and innovation policies leads to an asymmetry when it comes to problems where a marketable technological solution for environmental problems such as the loss of a species is not available. This leads to a situation where non-technical aspects and problems are marginalised or excluded from the debate. Closing down the policy discussion to one particular option comes at the cost of excluding more efficient alternatives (such as the sufficiency debate or restoring ecosystems as carbon sinks).

The strong focus on technology-based solutions may, however, hide problems when integrating these policies and implementing them in targeted areas. The question remains open as to whether all conflicts could be resolved and restrictions and resistance could be thwarted via the introduction of a novel framework which is based on technological potentials. Integrating climate mitigation and adaptation targets and measures into vital sectors of modern industrial societies (such as energy, transport and infrastructure policies) has far-reaching political consequences. Climate policy integration modifies sectoral policies in different directions. Indeed, it may lead to opening up new options, benefits and thus “winners” (such as in the case of energy and cost efficiency) or to reopening old controversies on sharing the “burdens”, “risks”, and “losses” resulting in political deadlock such as in the nuclear power debate. If climate policy integration affects stakes and interests that are obviously high, it causes or may be accompanied by a lot of tensions and trade-offs that can lead to latent or manifest conflicts. Policy integration thus often contributes to reopen conflicts concerning the distribution and allocation of resources and responsibilities across sectors, ministries, or other parts of the administration and between regulators and target groups. Climate policy instruments such as taxes lead to increasing costs of fossil fuels that have different distributive effects on different target groups and end users, consequently bringing about new relative “winners” and “losers” from these policies. The concrete dynamic of conflicts depend, to some degree, on how politicized and polarised the political context has

been. The task of policy integration is thus accompanied by challenges to resolve conflicts arising in sectors where they are implemented.

Conflicts between government and target groups are most evident when it comes to the introduction of new legally-binding *instruments* such as taxes to control the behavior of target groups. One of the current examples is the European controversy on “CO<sub>2</sub> limit values for passenger cars.” The impacts on the competitiveness of the automobile industry and the benefits of such instruments become contested between regulating agencies and target groups. While target groups perceive regulations such as such CO<sub>2</sub> limits as “burdens”, regulating agencies introduce them as “drivers” for huge investments in climate-friendly technologies, thus securing the competitiveness of the automobile industry in the long turn. Controversies on the benefits of regulations may differ from sector to sector. While “limit values” in the transport sector are defined as a “threat” to the national economy, in the case of air pollution, energy efficiency and renewable energies, they are mainly seen as “opportunities.” Conflicts and controversies are often opened up by stakeholders and politicians that use climate change as means of reframing and justifying other policy agendas and goals (e.g. nuclear power). In the past, environmental risks and pollution have been primarily used as arguments against nuclear energy. Recently, nuclear energy was reintroduced as an available solution for the problem of CO<sub>2</sub> reduction. As the example of nuclear power demonstrates, what is at stake is not only the reliability of technologies, but also the trust in institutions responsible for managing them. The implementation of new technologies (such as biofuels or carbon storage) also faces local resistance and may contribute to the opening up of controversies concerning acceptable risks, responsibility, agency, and causality. The focus on technological solutions tends to inadvertently suppress the fully-fledged expression of normative questions and to marginalise legitimate democratic concerns if agreements are achieved by keeping problems away from the political whirl (Beck 2004).

It is an open question as to whether and if so how deeply, conflicts caused by long-entrenched values and policy styles between both (“left” and “right”) can be constructively resolved and the structural conservatism of the “old economy” (e.g. coal mining, car producers), together with the parties’ strong regional power, as well as resistance by “modernisation losers” can be overcome.

These conflicts may not only be caused by the (re-)allocation of benefits, resources and responsibilities, but they also are also related to deeply-entrenched cultural patterns, such as lifestyles, consumption and mobility. Policy integration of climate change and respective instruments (such as the introduction of taxes) have to cope with controversies that reflect deeper political cleavages among “styles of regulation” (Jasanoff 1986).

## Policy Instruments to Increase Horizontal Policy Integration and Coherence

**Table 17: Policy Instruments and Means Adopted or Planned to Increase Horizontal Policy Integration and Coherence**

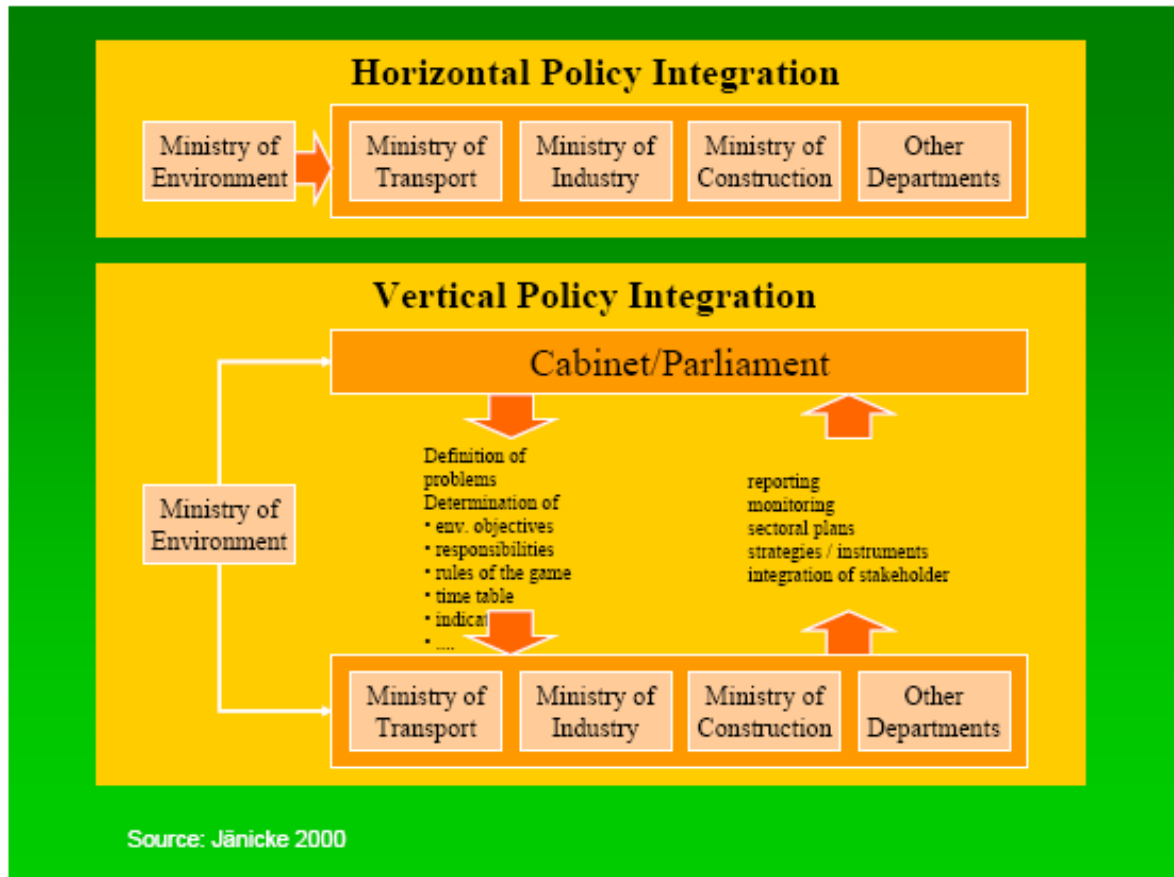
Category	Specific action
<i>Organisational reforms</i>	Reform of Joint Standing Orders of the Federal Ministers <sup>19</sup> : general impact assessment for legislative proposals has been made obligatory
<i>Establishing new permanent institutions</i>	<ul style="list-style-type: none"> <li>– BMU –</li> <li>– mirror units in non-environmental sectors</li> <li>– Green cabinet (sustainable development)</li> </ul>
<i>Establishing temporary institutions</i>	IMA
<i>New offices</i>	–
<i>Evaluation functions</i>	UBA; IMA
<i>Budgeting</i>	–
<i>Stakeholder cooperation</i>	<ul style="list-style-type: none"> <li>– Climate Alliances</li> <li>– Policy consultations (NSSD)</li> </ul>
<i>Science-policy interaction</i>	<ul style="list-style-type: none"> <li>– Enquete Commission of the Parliament</li> <li>– SRU</li> <li>– WBGU</li> <li>– PIK</li> <li>– KomPass</li> <li>– Climate Service Centre</li> </ul>
<i>Personnel policy</i>	–

In general, there are alternative methods of designing the approach to and the institutional setting, which either enable or constrain policy integration and coherence (EEA 2005). Our country study demonstrates that defining, attributing and taking over responsibilities also proved to be an important step in enforcing policy integration.

The approach to policy integration – “horizontal” or “vertical” – can be defined in relation to questions of responsibility for cross-governmental leadership and coordination:

<sup>19</sup> Interministerial coordination of legislative proposals is regulated in the Joint Standing Orders of the Federal Ministers (*Gemeinsame Geschäftsordnung der Bundesministerien*). It also includes rules for the participation of the *Länder*, local authorities and societal associations.

Figure 4: From Horizontal to Vertical Environmental Policy Integration



Source: Jänicke and Jörgens 2006: 189

The principle of “lead responsibility” (Federführung) is a critical feature of decision-making in Germany. It holds that one department is responsible for defining targets and formulating measures and to bring them to cross- or intergovernmental coordination. Lead responsibility for coordinating can lay with the Prime Minister’s office (vertical integration from a higher level – sustainable development in Germany). The task for cross-governmental leadership and coordination can be also mandated to environment ministries (horizontal integration at the same level– climate change in Germany).

One of the problems related to principle of “lead responsibility” is that the institution with “lead responsibility” may not be involved in the implementation of targets in concerned sectors since a different department is responsible for this task. This feature and the respective gap between the definition of targets and sectoral strategies and their implementation count as major problems in German climate policies.

### “Lonesome princess” – Vertical Integration by the Green Cabinet

Following the first approach, lead responsibility for coordinating the sustainable development activities lies with the Federal Chancellors Office. It has the mandate for both cross-

governmental leadership and coordination and for the vertical integration of concerns in departmental policies. The institutional set up underlines the role and the standing of the Green Cabinet as part of the Federal Chancellor's Office in Germany. To put it in a contractual way: had the lead responsibility been given to the BMU, the strategy would not have had the same weight and position. The Green Cabinet is officially in charge for both implementing the strategy and monitoring and reporting on its progress. As the NSSD is related to the every aspect of public policy, all ministries have to be subject to implementation requirements. The very fact that the leading role of Cabinet – or the “Green Cabinet” – was not clear and yet was accepted by all ministries, in the case of the NSSD, led to remarkable deficits in the dimension of goal and output orientation and policy integration (SRU 2008: 43). Sustainable development statements remain programmatic. Even if sustainable development is given highest priority in the government programme, its implementation remains sluggish and the implementation in concrete sectoral strategies is lagging. Until now, no real efforts have been undertaken to institutionalise approaches such as Green Budgeting or Sustainability Impact Assessment of public spending or to integrate sustainability criteria into current regulatory impact assessments. In addition, there is no external agency or another organisation in charge of monitoring the process.

### **Horizontal Integration – “Primus inter pares”**

When it comes to initiating and enforcing policy integration in German climate politics, the Federal Ministry for the Environment is the most important player. As a rule, the Federal Ministry for the Environment is the *leader responsible* for formulating the goals and targets of national climate policies (including both protection and adaptation). In contrast to the NSSD, the prime responsibility for national climate policies is not located at the Chancellor's Office itself but at a ministry. In Jänicke and Jörgens's terms it is a case of *horizontal* integration since climate policies are not coordinated by the superordinated Chancellor's Office, but by a ministry at the same decision-making level.

During the formulation in the early period of climate policies, the Ministry for the Environment was in charge of the formulation of targets, while the respective departments of the Federal Ministry of Economics and Technology (BMWi) were responsible for the implementation of the targets in their policies. This approach leads to the critical situation in which the BMU had to assume the full responsibility for climate policies without having the chance of influencing the concrete implementation of the abstract measures. The gap between the formulation of targets and their implementation was seen as one of the reasons for the implementation deficit that characterised climate policies until the time the Red-Green Government attained office.

It was also strengthened by an *asymmetry of power* between the ministries in charge. The standing and weight of the Ministry for the Environment inside the government and thus inter-departmental negotiations is relatively weak in comparison to influential player such as the BMWi, for example. In addition, the BMU does not receive the support of influential associations while the BMWi does. Last but not least, in time periods where climate was not seen as a “matter for the boss,” The BMU also lacked the support of the Chancellor's Office that could – in principal - catalyze policy coordination.

In order to coordinate the different efforts and initiatives related to climate policies, in 1990, an Interministerial Committee (Interministerielle Arbeitsgruppe – IMA) on climate protection was established, chaired by the BMU. In the early period, it was highly effective in allocating responsibilities for climate protection to a number of environmentally-relevant ministries (economic affairs, transport, construction, technology, agriculture) and thus integrating

climate protection into the decision-making spheres of government in general (Jänicke et al. 2001).

Inside the working group, the same pattern of cross-departmental coordination took place as outside and conflicts and trade-offs between the government and affected industries were internalised into the negotiations of the working group. Furthermore, many initiatives of the environmental ministry face resistance and attempts at blockade by departments representing economic “interest groups.”

The set up of the working group reinforced the institutional gap since the BMU has to assume the full responsibility for climate policies without being accorded the chance to influence the concrete implementation of the abstract measure.<sup>20</sup>

## **Decentralised Approach – Sharing Responsibilities**

As an alternative, while setting up the IECF, departments such as the Ministry of Finance relevant for the implementation of policies in the respective sectors were also included in the formulation of the targets and development of measures and, thus, the lead responsibility was “shared.” The responsibility for the formulation targets and measures is not confined to a single ministry, but is opened up to all ministries in charge of the implementation of the particular measure. This novel approach to the coordination of policy formulation can be seen as a step towards ensuring the implementation of targets and measures into and within single sectors. In addition to these mechanisms set up to enforce horizontal policy coordination, most ministries have established their own environmental sub-departments. Although these departments regularly act as a sort of “bumper” in the negotiations between the Ministry for the Environment and other ministries, they can work as triggers of environmental learning-processes within non-environmental ministries and act as important driving forces for the “greening” of sectoral policies (Jänicke et al. 2001).

As non-environmental departments were included in developing their own sectoral strategies, they can also be made responsible for implementing them in their respective field of action. The case of the IECF shows that horizontal integration can also be enforced via the decentralised approach, that also contributes to advancing commitments and acceptance of adopted measures. When climate change became salient in 2007, Chancellor Merkel and the Minister for Environment, Gabriel, used the “window of opportunity”, and turned climate change into a “matter for the boss”, demonstrating a willingness to take over political leadership and to push climate policies. This approach mirrors the path-dependent, media-focused, sectoral regulatory style which brought about important environmental policy achievements, turning Germany into an environmental lead state.

This organisational innovation can be seen as a step aimed at strengthening the implementation of targets in the respective sectors. The sectoral, decentralised approach chosen for climate integration mirrors the national style of policy integration which relies heavily on the integration of environmental policy requirements into selected sectoral policies, including foreign policy, rather than using a top-down, centralised approach (Wurzel 2008).

---

<sup>20</sup> The IMA counts as the second-best solution for addressing cross-cutting issues under these particular political framework conditions since it could at least compel the implementing departments to justify their policies under ecological criteria and points of view, supported by environmental divisions – so called “mirror units” – in non-environmental ministries which positioned themselves in the role of “watch-dogs” with respect to the BMU (Pehle 1998: 98).

The novel approach to policy integration or “coordination” is reflected in the policy style. As demonstrated by the example of taxes, top-down and restrictive state interventions in production, consumption, or transport structures become more and more contested and face strong opposition by powerful target groups. As this approach faces opposition by powerful target groups and usually does not relate to win-win strategies, there is a strong need to develop adequate strategies for dealing with potential “modernisation losers.” As a result, climate policy integration often fails in issue areas where the stakes are high and vital interests are strongly affected. Target groups are not sufficiently addressed and made responsible and accountable for the impacts they cause by defining long-term targets and measures (SRU 2008). The novel approach characterising energy and technology policies in Germany is embedded in a paradigmatic shift, in reference to the changing style of regulation, from a first generation of “command-and-control” or strong regulations, to a second generation of “smart regulation.” The rational is to decouple climate policies from a negative image caused by restrictive policies, including prohibitions and bans. The underlying philosophy is that climate policy can succeed only when the persons in positions of responsibility in research, trade and industry, the political sector, government, and civil society, mobilise all available resources and to pull together. As the German Integrated Energy and Climate Programme demonstrates, sectoral, bottom-up, and decentralised approaches to policy integration may contribute to enhance policy coherence if they create incentives for target groups to cooperate and to take over responsibilities for implementation targets. These “smart” environmental regulations and the increasingly complex actor constellation of multi-level governance are thought to lead to mounting business risks for polluters, thereby exerting pressure for eco-innovation (Jänicke 2008).

The issue of adaptation highlights the need for vertical policy integration. The capacity for strategic action seems to be lower in Germany than in many of the smaller EU member countries. This has partly to do with the federal structure of the political system, creating problems of multi-level coordination. Our case study also underscores the need for strengthening vertical integration between the European, federal, state and local levels by harmonising and standardising goals/ targets, measures, indicators, and time frames under review on a regular base. Vertical policy integration is supposed to be achieved by a strong coupling between the adaptation strategies adopted in the federal government and in the Bundesländer. In order to enforce vertical integration, the Länder are included into the formulation of the national strategy (Entwurf Fortschrittsbericht 2008; Fortschrittsbericht 2008 zur nationalen Nachhaltigkeitsstrategie, Stand 5.05.2008: 40-41).

In Germany there is a remarkable difference between environmental policy integration that is linked to the concept of sustainable development and climate policy integration. The set up of a national sustainability strategy triggered important innovations in terms of policy appraisal and SEA which are also proposed to facilitate the implementation of policy integration. The dynamics and degree of environmental policy integration and climate policy integration differ remarkably. There is a clear contradiction in Germany between the late, slow – and probably weak – process of implementing the concept of sustainable development and a stronger – path-dependent – climate policy (Jänicke et al. 2001). Germany’s climate change policy, which preceded its national sustainable development strategy, has turned out to be a reasonably successful example of the implementation of policy integration.

The latter approach to integration has its own dynamic and is clearly more influential than the German sustainable development process. Climate policy integration followed the national path of an incremental and ‘decentralised’ approach to policy integration that relied on sectoral strategies. Environmental policy considerations were integrated into different sectoral

policies including agricultural and transport policy but also foreign policy. A comprehensive reorientation of environmental policy towards a national strategy for sustainable development did not occur in Germany (Wurzel 2008). However, despite the introduction of innovative environmental and sustainable development measures, the Red-Green government did not bring about a radical departure from the traditional regulatory style. Many German policy-makers remained sceptical about a turn towards a centralised sustainable development strategy which ensures in a top-down fashion that equal weight is given to environmental, economic, and social concerns across all sectoral policies. Together with the EU's recent emphasis on procedural measures, such as EIA and SEA, environmental policy-makers perceived a centralised sustainable development strategy as being potentially damaging to bitterly contested domestic climate policy achievements.

## Improving Reporting and Enforcement Mechanisms

Binding legislation has to be accompanied by the effective evaluation of compliance. An important precondition is the availability of comprehensive and reliable data (e.g. on the state of the environment and impacts of climate change at the regional), as well as the development of assessment and performance tools (such as indicators and indices) and effective evaluation systems. Adaptation to climate change will intensify the need for the reporting and assessment of both, of feedbacks between climate change and water cycles, for example, and for trade-off between policies.

Impact Assessment – understood as formal analysis of the potential effects of new policies before their adoption – is seen by many as a key mechanism to improve the quality of regulation and to integrate different policy objectives (Jacob et al. 2008). In Germany, there are no concrete **compliance mechanisms** in place, since the principle of environmental policy integration is only loosely linked to regular strategic planning, budgeting, and auditing and not institutionalised by mechanisms such as the method of Integrated Impact Assessment (Jacob and Volkery 2006: 437).

Our empirical findings indicate that successful policy integration is not only a question of reinventing new frameworks and tools but also of enhancing already-existing capacities and putting them effectively into practice. Instruments such as the Regulatory Impact Assessment are required by European regulation and general impact assessment for legislative proposals has been made obligatory in Germany by the Reform of Joint Standing Orders of the Federal Ministries. According to an EU Directive (on Strategic Environmental Impact Assessment), the introduction of the instrument of strategic Environmental Impact Assessment is obligatory for all EU-Member states. A duty to assess the possible impacts of a bill exists, but this regulation is not implemented seriously in Germany. In comparison to other OECD-countries, instruments such as impact assessments or policy appraisals of planned policies are not seriously employed and effectively integrated into regulatory structures at different levels of decision-making.<sup>21</sup> The German administrative system is often seen as being relatively immune to the adoption of Anglo-Saxon style policy appraisal systems, new public management (NPM) practices, and “management by objectives” (EEA 2005: 19). Significantly, in Germany there are neither comprehensive environmental appraisal systems

---

<sup>21</sup> In the case of the NSSD, there is no external agency or another organisation in charge of the evaluation of the process. To a certain extent, the RNE takes over this function but without any official mandate and any additional resources. In 2004, the 15<sup>th</sup> German Bundestag established the Parliamentary Advisory Council on Sustainable Development that closely monitored the sustainability process in Germany. That mandate was continued by the 16<sup>th</sup> German Bundestag.  
([http://www.bundesregierung.de/nn\\_6516/Content/EN/StatischeSeiten/Schwerpunkte/Nachhaltigkeit/nachhaltigkeit-2007-04-13-strukturen-der-nachhaltigkeitspolitik.html](http://www.bundesregierung.de/nn_6516/Content/EN/StatischeSeiten/Schwerpunkte/Nachhaltigkeit/nachhaltigkeit-2007-04-13-strukturen-der-nachhaltigkeitspolitik.html)).

nor is there a system of SIA, although there is a system of RIA. There were, however, rudimentary attempts to put a price tag on the cost of environmental laws proposed in the 1971 Environmental Programme (Jänicke et al. 2001). Moreover, EIA for federal government activities was introduced in 1975. On the other hand, strict economic cost-benefit analysis as adopted in the USA or numerical EPI models as developed in Britain have been rejected as too narrow by German environmental policy makers (Wurzel 2008). Reluctance to introduce far-reaching environmental assessment procedures was evident both in EU decision-making and during the implementation of the Directive.

The same can be said for instruments such as the approaches of Green Budgeting or Sustainability Impact Assessment of public spending. There are no formal green budgeting procedures in Germany in place, although a greening of the budget has occurred over the years. Green budgeting received considerable attention with the ecological tax reform in 1999. Moreover, the federal government has made available significant subsidies for the development of renewable energy and less-polluting technologies (Wurzel 2008). Significant sums of public money have been invested from the federal and Länder budgets to subsidise public transport. The Red-Green coalition reduced subsidies for polluting activities while increasing subsidies for less-polluting technologies.

The Mulde case study revealed that the need for evaluation and the associated challenge of how to integrate new knowledge into existing policy framework has not as yet been adequately addressed. In the aftermath of the 2002 flood, different adaptation measures were set up:

- Firstly, for the first time, areas prone to floods with an exceedance probability of 1/100 were defined and a standard protection goal for settlements was established;
- Secondly, the utilisation of flood-prone areas was considerably impeded;
- Thirdly, citizens prone to flood hazards are obliged to implement mitigation measures in accordance with their possibilities and capacities (WHG §31 a).

However, what is clearly missing with regard to climate change is a binding time-frame for updating flood protection plans. This orientation is not satisfactory, since it neglects the fact that simple projections, which are based on past experience, are not sufficient to anticipate future risks. At the same time, there is a growing awareness that adaptation policies do not necessarily require more accurate and specific predictions from climate models as the modellers suggest, in order to justify continuing investments in this area of research. Literature in this area suggests that such accurate and precise predictions are not really necessary for effective decisions to occur. There is a need to assess what kind of knowledge and information is required, and what is relevant from the perspective of decision-makers at different levels.

We conclude that there is a general need to enforce the policy integration by independent evaluation mechanisms. In contrast to considering only isolated political measures, a systematic assessment of political action and its impacts could provide an occasion to orientate the entire political and juridical system and their outcomes to the idea of climate protection and adaptation (Fortschrittsbericht 2008 zur nationalen Nachhaltigkeitsstrategie, Stand 5.05.2008: 39).

Evaluation can also be enforced by the inclusion of independent scientific and advisory institutions such as SRU and the Federal Environment Agency, or NGOs such as German Watch.

In Germany, compliance is mainly achieved by cooperation, namely via partnership with German industry. As a rule, this setting leads to the closure and insulation of the implementation process behind closed doors, leading to a lack of public accountability and transparency. The neocorporatist closure is traditionally accompanied by asymmetries of

power with respect to the opinions presented in the public debate, as well as access to the scientific resources necessary to express those views. The networking approaches used in innovation policies can be seen in the light of this path. It is also an open question as to whether novel forms such as networks and alliances, put in force by current innovation policies, indicate an innovative path or whether they empower the alliance of industrial stakeholders, lobby groups, and conservative politicians and thus reproduce the culture of neocorporatist conflict.

It is evident that effectively integrating evaluation systems would require far-reaching changes and adjustments in practices, institutional arrangements, and political culture (path-dependency), but these attempts encounter established structures. The main issues are, first, that enhancing evaluation will need to be accompanied by a re-examination of the institutional constraints. Second, it is critical that agencies continue to cope with the issue of how to enforce institutional adjustments to effectively integrate novel solutions into existing regulatory structures. Although these initiatives are scarcely likely to eliminate conflicting values and interests, such shifts in policy may represent the beginning of a new culture and may go a long way toward improving accountability and transparency.

## Main Recommendations

The relatively successful German climate policy integration strategy consists of the following key elements:

- high-level political commitment to the formulation and implementation of ambitious goals (supported by political will and leadership) by demonstrating win-win solutions
- *horizontal* integration of climate policy objectives into other sectors (energy, transport, infrastructure);
- *strict goal orientation and leadership/ political will*
- *decentralised* approach to formulating and assigning sectoral responsibilities for implementing the strategies;

The IECP makes a compelling case for decentralised approaches to policy integration. The key to their success is to transfer non-environmental policy sectors the mandate to develop their own sectoral strategies, relatively independent from cross-sectoral coordination. Thus, sectoral responsibilities for the results of the sectoral strategies can be established. They can be enforced by independent and critical evaluation of both the formulation of sectoral strategies and their implementation.

## References

- Auel, K., 2008. Finally an Exit from the Joint Decision Trap? The German Federalism Reform. *German Politics*. 17(4), 424-439.
- Bache, I., Flinders, M., 2005. Themes and Issues in Multi-level Governance. In: Bache, I., Flinders, M. (Eds.), *Multi-level Governance*. Oxford University Press, Oxford, pp. 1-11.
- Beck, S., 2004. Localizing Global Change in Germany. In: Jasanoff, S., Long Martello, M. (Eds.), *Earthly Politics: Local and Global in Environmental Governance*. The MIT Press, Cambridge, MA, pp. 173-194.
- Brickman, R., Jasanoff, S., Ilgen, T., 1985. *Controlling Chemicals: The Politics of Regulation in Europe and the United States*. Cornell University Press, Ithaca, NY.
- BMBF, 2008. The High-Tech Strategy on Climate Protection. Bundesministerium für Bildung und Forschung, Berlin.  
[[http://www.bmbf.de/pub/the\\_high-tech\\_strategy\\_for\\_climate\\_protection.pdf](http://www.bmbf.de/pub/the_high-tech_strategy_for_climate_protection.pdf)].
- BMU, 2005. The National Climate Protection Programme 2005. Summary.  
[[http://www.bmu.de/files/english/climate/downloads/application/pdf/klimaschutzprogramm\\_2005\\_en.pdf](http://www.bmu.de/files/english/climate/downloads/application/pdf/klimaschutzprogramm_2005_en.pdf)].
- BMU, 4/2007. Climate Agenda 2020: Restructing Industrial Society.  
[[http://www.bmu.de/files/pdfs/allgemein/application/pdf/climate\\_agenda2020.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/climate_agenda2020.pdf)].
- BMU, 12/2007. The Integrated Energy and Climate Programme of the German Government.  
[[http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/hintergrund\\_meseberg\\_en.pdf](http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/hintergrund_meseberg_en.pdf)].
- BMU, 5/12/2007. Germany is taking action! Climate and energy policy and the cabinet decision of 5 Dec 2007.  
[[http://www.bmu.de/files/pdfs/allgemein/application/pdf/infopapier\\_bali\\_dez2007\\_en.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/infopapier_bali_dez2007_en.pdf)].
- BMU, 2007. Taking action against global warming. An overview of German Climate Policies. Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, Berlin.
- BMU, 18/6/2008. Den Herausforderungen der Energie- und Klimapolitik erfolgreich begegnen. Hintergrundpapier zur Verabschiedung des zweiten Maßnahmenpaketes des integrierten Energie- und Klimaprogramms der Bundesregierung.  
[[http://www.bmu.bund.de/files/pdfs/allgemein/application/pdf/ikep2\\_hintergrund.pdf](http://www.bmu.bund.de/files/pdfs/allgemein/application/pdf/ikep2_hintergrund.pdf)].
- Bundesregierung, 2008. Fortschrittsbericht 2008 zur nationalen Nachhaltigkeitsstrategie. Entwurf vom 5. Mai 2008.  
[[http://www.bundesregierung.de/Content/DE/\\_\\_\\_Anlagen/2008/05/2008-05-08-entwurf-zum-fortschrittsbericht-2008,property=publicationFile.pdf](http://www.bundesregierung.de/Content/DE/___Anlagen/2008/05/2008-05-08-entwurf-zum-fortschrittsbericht-2008,property=publicationFile.pdf)].
- CA, 2005. Coalition Agreement.

[[http://www.bundesregierung.de/Webs/Breg/EN/Federal-Government/Coalition Agreement/coalition-agreement.html](http://www.bundesregierung.de/Webs/Breg/EN/Federal-Government/CoalitionAgreement/coalition-agreement.html)].

DKKV, 2003. Hochwasservorsorge in Deutschland – Lernen aus der Katastrophe 2002 im Elbegebiet. Deutsches Komitee für Katastrophenvorsorge e.V., Bonn.

Doll, C. et al. (2008). Wirtschaftliche Bewertung von Maßnahmen des integrierten Energie- und Klimaprogramms (IEKP). Kostenbetrachtung ausgewählter Einzelmaßnahmen der Meseberger Beschlüsse zum Klimaschutz. Forschungsbericht 205 46 434. UBA-FB 001097.

[<http://www.umweltdaten.de/publikationen/fpdf-l/3517.pdf>].

Dyson, K., 1982. West Germany: the search for rationalist consensus. In: Richardson, J. (Ed.), Policy Styles in Western Europe. Allen & Unwin, London, pp. 120-141.

EEA, 2005. Technical report No. 2/2005: Environmental policy integration in Europe. State of play and an evaluation framework. European Environment Agency (EEA), Copenhagen. [[http://reports.eea.europa.eu/technical\\_report\\_2005\\_2/en/Tech\\_2\\_2005\\_web.pdf](http://reports.eea.europa.eu/technical_report_2005_2/en/Tech_2_2005_web.pdf)].

Freistaat Sachsen, 2002. Report of the Saxony Government on the Flood Catastrophe in August 2002.

Häussler, E., Leihe, H., 2005. Das Jahrhundertderthochwasser im August 2002 in Eilenburg. Presentation given within the international teaching-module FLOODmaster of the Institute of Hydrology of the TU Dresden, Municipality of Eilenburg.

Herodes, M., Adelle, C., Pallemarts, M., 2007. Environmental Policy Integration at the EU Level – A Literature Review. EPIGOV Paper 5. Ecologic, Berlin. [<http://www.ecologic.de/projekte/epigov/download-area.htm>].

Hopf, C., 2000. Qualitative Interviews – ein Überblick. In: Flick, U., von Kardoff, E., Steinke, I. (Eds.), Qualitative Forschung: Ein Handbuch. Rowohlt Taschenbuch Verlag, Reinbek bei Hamburg, pp. 349-360.

Jacob, K., Hertin, J., Hjerp, P., Radaelli, C., Meuwese, A., Wolf, O., Pacchi, C., Rennings, K., 2008. Improving the Practice of Impact Assessment – Policy Conclusions from EVIA (Evaluating Integrated Impact Assessments). Forschungsstelle für Umweltpolitik (FFU), Freie Universität Berlin. [[http://web.fu-berlin.de/ffu/evia/EVIA\\_Policy\\_Paper.pdf](http://web.fu-berlin.de/ffu/evia/EVIA_Policy_Paper.pdf)].

Jänicke, M., 2008. Ecological modernisation: new perspectives. Journal of Cleaner Production 16(5), 557-565.

Jänicke, M., Jacob, K. (Eds.), 2006. Environmental Governance in Global Perspective: New Approaches to Ecological and Political Modernisation. Forschungsstelle für Umweltpolitik (FFU), Freie Universität Berlin.

Jänicke, M., Jörgens, H., Jörgensen, K., Nordbeck, R., 2001. Governance for Sustainable Development in Germany: Institutions and Policy Making. FFU 01-2006. Forschungsstelle für Umweltpolitik (FFU), Berlin.

[<http://www.oecd.org/dataoecd/27/32/1828117.pdf>].

Jasanoff, S., 1986. Risk Management and Political Culture. Russell Sage Foundation, New York.

Jones, T., 2002. Policy Coherence, Global Environmental Governance, and Poverty Reduction, *International Environmental Agreements: Politics, Law and Economics* 2(4), 389–401.

Jordan, A., Wurzel, R., Zito, A., 2005. The Rise of ‘New’ Policy Instruments in Comparative Perspective: Has Governance Eclipsed Government? *Political Studies* 53, 477–496.

Köck, W. (Ed.), 2005. Rechtliche Aspekte des vorbeugenden Hochwasserschutzes. Dokumentation des 9. Leipziger Umweltrechts-Symposiums des Instituts für Umwelt- und Planungsrecht der Universität Leipzig am 22. und 23. April 2004. Nomos Verlag, Baden-Baden.

Köck, W., 2006. Klimawandel und Recht – Adaptation an Klimaänderungen: Auswirkungen auf den Hochwasserschutz, die Bewirtschaftung der Wasserressourcen und die Erhaltung der Artenvielfalt. Wandel von Vulnerabilität und Klima: Müssen unsere Vorsorgewerkzeuge angepasst werden? Workshop des Deutschen Komitee Katastrophenvorsorge e.V. und der Akademie für Landesplanung, Hannover, Deutsches Komitee für Katastrophenvorsorge.

Köck, W., 2007. Klimawandel und Recht. Adaption an Klimaänderungen: Auswirkungen auf den Hochwasserschutz, die Bewirtschaftung der Wasserressourcen und die Erhaltung der Artenvielfalt. *Zeitschrift für Umweltrecht* 18(9), 393-400.

Kuckartz, U., 2008. Umweltbewusstsein in Deutschland 2006. Ergebnisse einer repräsentativen Bevölkerungsumfrage.  
[[http://www.umweltbundesamt.de/uba-info-medien-e/mysql\\_medien.php?anfrage=Kennnummer&Suchwort=3113](http://www.umweltbundesamt.de/uba-info-medien-e/mysql_medien.php?anfrage=Kennnummer&Suchwort=3113)].

Kuhlicke, C., 2008. Ignorance and Vulnerability: The 2002 Mulde Flood in the City of Eilenburg (Saxony, Germany). Department of Geography, University of Potsdam. PhD Thesis.

Kuhlicke, C., Steinführer, A., 2006. Wie vorbereitet ist die Bevölkerung auf ein Hochwasserrisikomanagement? Lehren aus dem Hochwasser 2002. In: Jüpner, R. (Ed.), Beiträge zur Konferenz „Strategien und Instrumente zur Verbesserung des vorbeugenden Hochwasserschutzes“. Shaker, Aachen.

Lafferty, W. M., Hovden, E., 2003. Environmental Policy Integration: Towards an Analytical Framework. *Environmental Politics* 12 (3), 1-22.

Lehmbruch, G., 2002. Der unitarische Bundesstaat in Deutschland: Pfadabhängigkeit und Wandel. MPIfG Discussion Paper No. 2/02. Max-Planck-Institut für Gesellschaftsforschung (MPIfG), Köln.  
[[http://www.mpi-fgkoeln.mpg.de/pu/mpifg\\_dp/dp02-2.pdf](http://www.mpi-fgkoeln.mpg.de/pu/mpifg_dp/dp02-2.pdf)].

- LTV, 2003. Erstellung von Hochwasserschutzkonzepten für Fließgewässer. Empfehlungen für die Ermittlung des Gefährdungs- und Schadenpotenzials bei Hochwasserereignissen sowie für die Festlegung von Schutzziele. Landestalsperrenverwaltung des Freistaates Sachsen, Pirna. Unpublished.
- May, P. J., Sapotichne, J., Workman, S., 2006. Policy Coherence and Policy Domains. *The Policy Studies Journal* 34(3), 381-403.
- Mickwitz, P., Kivimaa, P., 2007. Evaluating Policy Integration: The Case of Policies for Environmentally Friendlier Technological Innovations. *Evaluation* 13, 68-86.
- Mickwitz, P., Kivimaa, P., Hildén, M., Estlander, M., Melanen, M., 2008. Mainstreaming Climate Policy and Policy Coherence. Background report for the Government foresight report on climate and energy. The Prime Minister's office, Publications 6/2008.
- NSSD, 2006. Die nationale Nachhaltigkeitsstrategie. Die Bundesregierung, Berlin.  
[[http://www.bundesregierung.de/nn\\_208962/Content/EN/StatistischeSeiten/Schwerpunkte/Nachhaltigkeit/nachhaltigkeit-2006-07-27-die-nationale-nachhaltigkeitsstrategie.html](http://www.bundesregierung.de/nn_208962/Content/EN/StatistischeSeiten/Schwerpunkte/Nachhaltigkeit/nachhaltigkeit-2006-07-27-die-nationale-nachhaltigkeitsstrategie.html)].
- OECD, 2002. Improving Policy Coherence and Integration for Sustainable Development. A Checklist. OECD, Paris.  
[<http://www.oecd.org/dataoecd/60/1/1947305.pdf>].
- Pallemaerts, M., 2006. The EU and Sustainable Development: An Ambiguous Relationship. In: Pallemaerts, M., Azmanova, A. (Eds.), *The European Union and Sustainable Development: Internal and External Dimensions*. VUBPRESS, Brüssel, pp. 19-52.
- Pallemaerts, M., Wilkinson, D., Bowyer, C., Brown, J., Farmer, A., Farmer, M., Herodes, M., Hjerp, P., Miller, C., Monkhouse, C., Skinner, I., Brink, P. ten, Adelle, C., 2006. Drowning in Process? The Implementation of the EU's 6<sup>th</sup> Environmental Action Programme. An IEEP Report for the European Environmental Bureau. Institute for International and European Environmental Policy, London.
- Pallemaerts, M., Herodes, M., Adelle, C., 2007. Does the EU Sustainable Development Strategy Contribute to Environmental Policy Integration? EPIGOV Paper 9. Ecologic, Berlin.  
[<http://www.ecologic.de/projekte/epigov/download-area.htm>].
- Pehle, H., 1998. Das Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit: Ausgegrenzt statt integriert? Das institutionelle Fundament der deutschen Umweltpolitik. Westdeutscher Verlag, Wiesbaden.
- Porter, M. E., van der Linde, C., 1995. Green and Competitive: Ending the Stalemate. *Harvard Business Review* September-October 1995, 120-134.
- RNE, 2002. Perspektiven für Deutschland – Unsere Strategie für eine nachhaltige Entwicklung. Rat für Nachhaltige Entwicklung, Berlin.  
[<http://www.nachhaltigkeitsrat.de/der-rat/strategie/strategie-2002/>].

- Richardson, J., Gustafsson, G., Jordan, G., 1982. The Concept of Policy Styles. In: Richardson, J. (Ed.), *Policy Styles in Western Europe*. Allen and Unwin, London, pp. 197-208.
- Russel, D., Jordan, A., 2007. *Joining-Up or Departmentalism? Coordinating Policy for Sustainable Development in the United Kingdom*. CSERGE Working Paper EDM 07-01. [[http://www.uea.ac.uk/env/cserge/pub/wp/edm/edm\\_2007\\_01.pdf](http://www.uea.ac.uk/env/cserge/pub/wp/edm/edm_2007_01.pdf)].
- Scharpf, F. W., 1988. The Joint-Decision Trap: Lessons From German Federalism an European Integration. *Public Administration* 66 (2), 239-78.
- Schanze, J., Hutter, G., Penning-Rowsell, E., Nachtnebel, H.-P., Meyer, V., Werritty, A., Harries, T., Holzmann, H., Jessel, B., Koeniger, P., Kuhlicke, C., Neuhold, C., Olfert, A., Parker, D., Schildt, A., 2008. Systematisation, evaluation and context conditions of structural and non-structural measures for flood risk reduction. FLOOD-ERA Joint Report. ERA-NET CRUE, London.
- Schildt, A., 2006. Einflüsse des Extremhochwassers 2002 auf den Umgang mit Hochwassergefahren – dargestellt am Beispiel der Stadt Grimma. Department of Geography, University of Halle. Diploma Thesis.
- Schleich, J., Eichhammer, W., Boede, U., Gagelmann, F., Jochem, E., Schlomann, B., Ziesing, H.-J., 2001. Greenhouse gas reductions in Germany – lucky strike or hard work? *Climate Policy* 1(3), 363-380.
- Schwarze, R., Wagner, G. G., 2007. The Political Economy of Natural Disaster Insurance: Lessons from the Failure of a Proposed Compulsory Insurance Scheme in Germany. *European Environment* 17, 403-415.
- SMUL, 2003. Report of the SMUL on the Flood Catastrophe in August 2002. Saxon Ministry for Environment and Agriculture (SMUL), Dresden.
- SMUL, 2005. Ergebnisse der landesweiten Priorisierung von Hochwasserschutzmaßnahmen. Saxon Ministry for Environment and Agriculture (SMUL), Dresden.
- SMUL, LTV, PGS (Planungsgemeinschaft Dr. Scholz), 2004. Hochwasserschutzkonzept für die Mulden im Regierungsbezirk Leipzig. Unpublished.
- SRU, 2008. Umwelt GUTACHTEN 2008: Umweltschutz im Zeichen des Klimawandels. Sachverständigenrat für Umweltfragen (SRU), Berlin. [[http://www.umweltrat.de/02gutach/downlo02/umweltg/UG\\_2008](http://www.umweltrat.de/02gutach/downlo02/umweltg/UG_2008)].
- Stadt Eilenburg, 2004. Eilenburg and the Mulde River. [Retrieved 26.11.2007, from <http://www.eilenburg.de/rubrik1/rubrik171.php>].
- Steinführer, A., Kuhlicke, C., 2007. Social Vulnerability and the 2002 Flood: Country Report Germany (Mulde River). Report of Task 11 of the Floodsite Integrated Project. Floodsite.

- Stoker, G., 1998. Governance as theory: five propositions. *International Social Science Journal* 155, 17–28.
- UBA, 4/2008. Germany in the midst of climate change. Adaptation is necessary. [<http://www.umweltdaten.de/publikationen/fpdf-l/3500.pdf>].
- Urwin, K., Jordan, A., 2008. Does Public Policy Support or Undermine Climate Change Adaptation? Exploring Policy Interplay across Different Scales of Governance. *Global Environmental Change* 18, 180-191.
- Underdal, A., 1980. Integrated Marine Policy: What? Why? How? *Marine Policy* 4 (3), 156-169.
- Varela-Ortega, C., Calatrava, J., 2004. Evaluation of Cross Compliance: Perspectives and Implementation. Report of Seminar 4: Granada, Spain (19-20 April 2004). [<http://www.ieep.eu/publications/pdfs/crosscompliance/seminar4report.pdf>].
- von Kirchbach, H.-P. et al., 2002. Bericht der unabhängigen Kommission der Sächsischen Staatsregierung. Flutkatastrophe 2002.
- Weidner, H., Mez, L., 2008. German Climate Change Policy. A Success Story With Some Flaws. *The Journal of Environment & Development* 17(4), 356-378.
- Weingart, P., Engels, A., Pansegrau, P., 2000. Risks of Communication: Discourses on Climate Change in Science, Politics, and the Mass Media. *Public Understanding of Science* 9, 261-283.
- Wurzel, R., 2008. Germany. In: Jordan, A., Lenschow, A. (Eds.), *Innovation in Environmental Policy. Integrating the Environment for Sustainability*. Cheltenham, UK, pp. 180-201.
- Will, T., Lieske, H., 2007. Flood Protection vs. Heritage Conservation? An integrated urban and landscape design approach for Grimma, Saxony. In: Schumann, A., Pahlow, M. (Eds.), *Reducing the Vulnerability of Societies to Water Related Risks at the Basin Scale*. IAHS Press, Wallingford, pp. 441-444.