

Geoengineering Under National Law: A Case Study Of Germany

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Geoengineering Under National Law: A Case Study Of Germany

Chiara Armeni and Catherine Redgwell

Introduction¹

Following the model established in working paper 2, this paper analyses the legal and policy debate emerging in Germany around geoengineering techniques; the applicability or adaptability of national laws and regulation; and the preparedness of the national institutional framework to govern them. After a brief introduction to the key characteristics of the legal and administrative system in Germany relevant to geoengineering, this paper addresses the following specific questions:

- Is there a national debate over geoengineering in Germany? If so, what actors are involved and what questions are being asked? (section II)
- Has Germany initiated any nationally (or European) funded research projects on geoengineering? If so, who are the actors involved and their aims and objectives? This section also include an analysis of the LOHAFEX project. (Section III)
- Which national control mechanisms (including constitutional guarantees) would be applicable, or at least adaptable, to address the legal questions associated with geoengineering in Germany? What gaps and new provisions would be required? What would be the consequences of their application upon the German position on geoengineering (e.g. would the constitutional freedom of research prohibit the German adoption of an international moratorium on geoengineering research)? (Section IV)
- What institutional bodies and agencies might have a role in the decision-making, application and enforcement of rules for geoengineering within the German jurisdiction and control? (Section V)

¹ The research for this working paper was substantially completed in the first phase of WP 3, in 2013.

I. Key concepts

Boundaries of national jurisdiction and control

Germany is a federal State, consisting of 16 constituent states (Länder).² Its jurisdiction extends to land, air space and marine areas within national jurisdiction and control. With respect to marine areas, Germany implemented the provisions of UNCLOS into national law in 1995.³ Germany has sovereignty over the territorial sea (extending 12 nautical miles from coastal baselines) whereby the Federal State exercises jurisdiction.⁴ Unlike the UK, an Exclusive Economic Zone (EEZ) (between 12 and 200 nautical miles) has been proclaimed, in the North and Baltic Sea, pursuant to the Implementation Act.⁵ Here the Federal Government exercises its sovereign rights for the purpose of exploration and exploitation of natural resources, according with the provisions of Part V of UNCLOS (e.g. marine spatial planning and licensing of offshore activities). In the EEZ, the German Federal Ministry for Transport, Building and Urban Development (BMBVS) has established targets and guidelines for marine spatial planning in the North Sea and Baltic Sea, including economic and scientific use of the sea and the safety and efficiency of marine traffic and environmental protection.⁶ Should geoengineering research be considered in this area, BMBVS is therefore likely to be involved.

German legal system and sources

Germany is a federal democracy, based on a codified Constitution (Basic Law-BL) containing its fundamental rights. As such 'environmental rights' are not expressly recognised in the Constitution, which however establishes that '[m]indful also of its responsibility toward future generations, the state shall protect the natural foundations of life and animals by legislation and, in accordance with law and justice, by executive and judicial action, all within the framework of the constitutional order.'⁷ While not expressly clarified in the text, this provision can be read to provide the legal basis for climate protection and climate mitigation measures given the importance of the integrity of the climate system for 'the natural foundation of life and

² In contrast with the UK, Germany does not have overseas dependent territories and is not a claimant state in the Antarctic.

³ Act Implementing the UN Convention on the Law of the Sea (Montego Bay) 21 *ILM* (1982) ('LOSC') in force 15 June 1995.

⁴ Limited by the right of innocent passage, (LOSC, art 17).

⁵ In the area of the North Sea and Baltic Sea, the German EEZ is overlapping with the German continental shelf, which is the sea floor extending for some 200 nautical miles from the coastline. In the Baltic Sea, the German EEZ is much smaller than in the North Sea because it is limited by the EEZs of neighbouring states.

⁶ The German Spatial Planning Act (Raumordnungsgesetz – ROG), which was made applicable to the EEZ in 2004, provides the legal basis for spatial planning in this sea area. See in particular Legal Ordinance on Spatial Planning in the German Exclusive Economic Zone in the North Sea (AWZ Nordsee-ROV) of 21st September 2009; and Ordinance on Spatial Planning in the German Exclusive Economic Zone in the Baltic Sea (AWZ Baltic Sea-ROV) of 10th December 2009 (unofficial translations available at http://www.bsh.de/en/Marine_uses/Spatial_Planning_in_the_German_EEZ/

⁷ Basic Law ('BL'), art 20

animals'.⁸ In this wider context, should geoengineering activities become prominent as climate change averting measures, they might find a legal justification in this provision.

In contrast with the UK and US predominantly common law systems, the German system is an example of a civil law system. This means that '[s]trictly speaking, all law derives from the legislators, the parliament and local decision-makers at various levels: federal (Bund), State (Land), regional (Landkreis) and municipal (Gemeinde). In practice, however, the German higher court's interpretations of the law serve as an additional authority'.⁹ In contrast with the concept of Parliamentary sovereignty in the UK, the Federal Constitutional Court has the authority to scrutinize the constitutionality of Acts of Parliament.¹⁰

Under the German legal system, the main sources of law are:

- **The Constitution:** This is the Basic Law of the German Federation, enacted in 1949 and subsequently amended.¹¹ The BL covers: fundamental rights, fundamental principles and the basic elements of German federalism. With respect to geoengineering research and potential deployment, constitutional rights, including in particular the freedom of scientific research (art 5(3) BL - see below), will play an important role based on the principle of sovereignty of the Constitution. In this context, it is possible that the judgment of the Constitutional Court might be sought with respect to the constitutionality of decisions related to geoengineering research and deployment in the future (e.g. freedom of scientific research vs. the control on geoengineering research established under the LC-LP framework). Recently, the constitutionality of laws regulating research, and their constitutional limits (art 5), have been clarified by the Federal Constitutional Court in 2010 with respect to GMOs (see details below).
- **Federal and State (*Land*) Statutes:** These include: comprehensive codes, amending or additional statutes adopted at Federal or State level (primary legislation), regulation and by-laws of the Federation, ministries of the Federation, Länder and their law-making bodies recognised by public law, and statutory ordinance which are largely

⁸ H.J Koch, M. Lührs and R. Verheyen, 'Germany', in R.Lord S.Goldberg, L.Rajamani, J.Brunnée, *Climate Change Liability – Transnational Law and Practice* (CUP, 2012) 377-378

⁹ Id. at 377

¹⁰ See D.P.Kommers **The Federal Constitutional Court: Guardian of German Democracy**, *Annals of the American Academy of Political and Social Science* Vol. 603, Law, Society, and Democracy: Comparative Perspectives (Jan., 2006), pp. 111- 128

¹¹ Last amended in 2010.

used in environmental law (secondary legislation).¹² In accordance with the Federal system, federal laws apply to the whole territory of the Federation, while Land laws only have validity in the Land in question. In case of conflict, Article 31 of the Basic Law states that 'Federal law shall take precedence over *Land* law.' Individual statutes – mostly implementing EU and international law – relating to e.g. climate change, environmental policy and conservation, as well as planning, would play an important role in the event of experimentation (and deployment) of geoengineering methods in Germany.

- **Case law:** In Germany, there is no system of binding precedent, and judges are only meant to apply and interpret the law, rather than creating it. In practice though, the role of judges is greater than simple application and interpretation, and previous decisions of higher courts exert influence on subsequent decisions.¹³ In 2010, the Federal Constitutional Court ruled on the compatibility of some provisions of the 'Genetic Engineering Act'¹⁴ with, inter alia, the freedom of scholarship and research under art.5.3 of the Constitution. The Court held that 'The protection of human life and health, of the occupational freedom and freedom of property of those potentially affected and of natural resources (Article 2.2 sentence 1, Article 12.1, Article 14.1, Article 20a GG) are important values of constitutional status which justify a restriction not only of occupational freedom and of property[...], but also of the freedom of scholarship'.¹⁵ However, the Court's views on scientific knowledge is also of interest for its potential relevance to geoengineering techniques:

'In view of the highly controversial discussion in society between supporters and opponents of the use of genetic engineering in crops and the fact that the state of scientific knowledge is as yet not finally confirmed, in particular with regard to the causal relations and long-term effects of such a use of genetic engineering, the legislature has a particular duty of care in this area. In legislating, the legislature must balance not only the interests affected by the use of genetic engineering on the one hand and their regulation on the other hand: these are protected in particular by the right to life and physical integrity (Article 2.2 sentence 1 GG^[16]), the

¹² Foster in P. Cane and J. Conaghan (eds), *New Oxford Companion of Law* (OUP, 2008), 499.

¹³ *Ibid.*

¹⁴ Act on the Regulation of Genetic Engineering (*Gesetz zur Regelung der Gentechnik, Gentechnikgesetz* — Genetic Engineering Act — GenTG — in the version promulgated on 16 December 1993, BGBl I p. 2066.

¹⁵ BverfG judgment of the First Senate of 24 November 2010 on the constitutionality of the amended Act on the Regulation of Genetic Engineering - 1 BvF 2/05 - Para 131 (judgement in English available at http://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/EN/2010/11/fs20101124_1bvf000205en.html).

¹⁶ 'GG' stands for Grundgesetz, which is the Basic Law.

freedom of scholarship (Article 5.3 sentence 1 GG), occupational freedom (Article 12.1 GG) and the guarantee of property (Article 14.1 GG). But it must likewise comply with the duty contained in Article 20a GG also to protect natural resources out of responsibility for future generations [...]. This duty may be imposed both in order to avert dangers and also to take precautions against risks. The environmental interests thus protected by Article 20a GG also include the preservation of biological variety and the guarantee of a species-appropriate life for endangered animal and plant species'.¹⁷

- **EU Law:** See section below
- **International Law:** See below

German approach to EU law and the transposition of EU law in the national legal system

In contrast with the UK doctrine of Parliamentary sovereignty, art 24 and (new) art 23 BL authorise the Federation to 'transfer powers to international institutions'. But in common with all EU Member States, German national law interacts with EU law at three levels: the EU law-making process; the national implementation of EU law ('transposition'); and the application of EU law by national courts. Existing EU law applicable or adaptable to geoengineering activities (e.g. environmental and climate change regulation) , as well as any potentially new EU rule in this area, must therefore be implemented and applied at national level in Germany.

With respect to participation in the EU legislative process, art 23 II and III of the BL require the Federal government to inform the Federal Parliament (Bundestag) as early as possible in the preparation of all European legislative instruments, and take into account its non-binding opinion in the negotiations.¹⁸ It has been noted that in general the Bundestag does not exercise a very strong influence on the executive decisions with the European Union.¹⁹ This is a form of ex-post control, rather than advance decision-making.²⁰

With respect to the national implementation process, European Directives must be transposed, either by Parliament by means of primary legislation (e.g. Acts) or by the Federal Government by means of regulation (e.g.

¹⁷ *Id.* para 118

¹⁸ See W. Heun, *The Constitution of Germany- A Contextual Analysis* (Hart Publishing, 2010) at 120-122. See also German Bundestag, *Act on Cooperation between the Federal Government and the German Bundestag in Matters concerning the European Union*" (12 March 1993) and subsequent agreements (28 September 2006 and 4 July 2013).

¹⁹ Heun *id.*, at 121 citing S. Hölscheidt, , *The German Bundestag: From Benevolent 'Weakness' Towards Supporting Scrutiny*, in A Maurer, and W Wessels (Eds) *National Parliaments and their Way into Europe: Losers and Latecomers* (Baden-Baden, Nomos, 2011) 117 – 147.

²⁰ Heun n 18 above at 121.

statutory instruments). However, a special authorisation from the Parliament is required for the executive to implement EU law into the national system, pursuant to art 80 BL (specifying that the authority conferred shall be specified in an act of parliament). Formally no other actor is involved in the transposition process, but in practice 'parliament and the executive make regular use of hearings, panels of experts etc. at various stages in the legislative procedure, to exchange views and gather expertise from diverse sources.'²¹ Like the UK's devolved administrations, German Länder are in a difficult position with respect to the implementation of EU law: they have responsibilities to transpose, apply and enforce EU law within the boundaries of their competences, but have no direct influence in the negotiation process at EU level. Nevertheless art 23 BL provides a safeguard for the rights of the Länder to be preserved as a result of German membership of the EU. In practice, the interests of the Länder will be taken into account when the Federal Government negotiates its position at EU level and implements EU law.²²

The German Constitutional Court has recognised the supremacy of EU law, within the limits allowed by the German Constitution.²³ As a result, the Court can review the constitutional validity of ratification laws of EU treaties (and other international treaties) as well as transposition laws.

German approach to implementation of International law

Article 25 of the BL provides that '[t]he general rules of public international law shall be an integral part of federal law. They shall take precedence over the laws and shall directly create rights and duties for the inhabitants of the federal territory'.

As mentioned above, such primacy of international law is based on the possibility to transfer sovereign powers to intergovernmental institutions and enter into a system of mutual collective security by consenting to limitations upon the Federation's sovereign powers.²⁴ The BL also declares it unconstitutional to carry out 'acts tending to and undertaken with intent to disturb the peaceful relations between nations, especially to prepare for a war of aggression'. This is relevant for geoengineering only to the extent that it may be plausibly argued that some geoengineering techniques might be viewed and framed in terms of potential threats to international security. In this light, their compatibility with this provision might be an open question.

²¹ *Id.* pp 34-35. As far as can be ascertained at the time of drafting this report, no governmental guidelines on the German approach to transposition have been produced.

²² Bavaria, for instance, has traditionally had a strong say on matters related to agricultural subsidies, while Schleswig-Holstein's opposition to CCS has influenced the Federal position in the transposition process of the CCS Directive.

²³ Art 24 I BL authorises the Federal Republic to relinquish its sovereignty to implicitly make the European Law supreme. See Heun n 18 above at 116. See also 31 BVerfGE 145, 173f (decision I/1 230, 238) ; 73, 339 , 374 f.

²⁴ BL, art 24

The German legal system requires international norms to be adopted as rules of national law in order to come into effect within the national legal system. National judges will then apply them as rules of national law. As a result, Art 59 of the BL states: 'Treaties that regulate the political relations of the Federation²⁵ or relate to subjects of federal legislation shall require the consent or participation, in the form of a federal law, of the bodies responsible in such a case for the enactment of federal law.' As a result, national implementation will be required for any geoengineering related amendment to existing treaties (e.g. the LP amendment) as well as for any new international instrument in this area.

German Federalism and geoengineering-relevant competences

As a Federal constitutional system, the functions and competences of the Federation and the States are settled in the Constitution. With respect to legislative powers, the Länder can legislate on any matter insofar as that power is not conferred to the Federation by the Constitution.²⁶ After the 2006 reform, the main legislative powers granted to the Federal Government by the Constitution are divided between the exclusive competence of the Federation and concurrent competences between the Federation and the Länder. Any other power not specified in the Constitution belongs to the Länder.

For matters of **exclusive legislative power**, the Länder have the power to legislate 'only when and to the extent that they are expressly authorised to do so by a federal law'.²⁷ For matters of **concurrent legislative power**, the Länder have the power to legislate 'so long as and to the extent that the Federation has not exercised its legislative power by enacting a law'.²⁸ In all **other matters** the Länder are responsible.²⁹ However, on the one hand, the Federation can retain exclusive legislative powers in some concurrent matters (e.g. economic matters) 'if and to the extent that the establishment of equivalent living conditions throughout the federal territory or the maintenance of legal or economic unity renders federal regulation necessary in the national interest'.³⁰ On the other hand, the Länder have a derogatory power to enact laws that modify Federal legislation in some areas, such as 'protection of nature and landscape management (except for the general principles governing the protection of nature, the law on protection of plant and animal species or the law on protection of marine life); land distribution; regional planning; management of water resources'.³¹

²⁵ I.e. Existence, independence, status or role of the German State.

²⁶ BL art 71.

²⁷ BL Art 72

²⁸ BL Art 73

²⁹ BL Art 70 giving overall priority to Länder legislative power insofar as it is not assigned to the Federation by the Constitution

http://www.bundestag.de/htdocs_e/bundestag/function/legislation/competencies.html

³⁰ BL, art 72 (2)

³¹ BL, art 72 (3).

The table below summarises the key exclusive and concurrent matters of potential relevance for geoengineering activities, focusing on environmental, climate, planning, IPRs and economic matters.

Table 2: German Federalism and Geoengineering-relevant matters

Exclusive Legislative Power of the Federation: (Art. 73)	Concurrent Legislative Power of the Federation (art 74)	Other circumstances Art 72 (3)	Undefined
<p>Unity of the customs and trading area, treaties regarding commerce and navigation, the free movement of goods, and the exchange of goods and payments with foreign countries, including customs and border protection</p>	<p>Protection of nature and landscape management [...]</p>	<p>Derogatory powers for: protection of nature and landscape management; land distribution; regional planning; management of water resources</p>	<p>Climate protection, soil protection, chemical safety, renewable energy</p> <p>NB: Climate is not explicitly mentioned, but can also fit under the power to enact 'law relating to economic affairs' (art 74 (1) n.11).³²</p>
<p>Industrial property rights, copyrights and publishing;</p>	<p>Promotion of agricultural production and forestry, [...] ensuring the adequacy of food supply, the importation and exportation of agricultural and forestry</p>		

³² Koch et al, n 8 above, at 377, footnote 3

	products, deep-sea and coastal fishing, and preservation of the coasts;		
Air transport;	Maritime and coastal shipping, as well as [...]		
Economic affairs, if in the national interest	Waste disposal, air pollution control, and noise abatement [...]		
	Land distribution;		
	Regional planning;		
	Management of water resources;		

So far, no analysis has been conducted on the identification of relevant competences and responsibilities for national law-making, implementation and enforcement of potential rules applicable to geoengineering research and potential deployment.

Against this background, it is clear that the Federation does not have a comprehensive competence with respect the enactment of environment law statutes. The enforcement of federal law relating to the environment falls under the jurisdiction of the Länder. According to Art 83 of the BL, the Länder implement federal statutes as if they were their own, and execute the Federal statutes under the Federation's legal supervision.³³ The federation only assumes an enforcement role by way of exception.³⁴ This is an important aspect to bear in mind when considering who would exercise jurisdiction to enforce environmental provisions relevant to geoengineering projects under German jurisdiction and control.

II. Geoengineering Debate in Germany

The debate on whether geoengineering research should be pursued is still at its early stage in Germany. However some interesting discussion has taken place, both at the governmental (Federal) and non-governmental (mainly academic) levels.

³³ BL, art 84.

³⁴ BL, art 86.

Government-related Initiatives

The Federal Environment Agency (Umweltbundesamt – UBA)

In 2011, the **German Federal Environment Agency (UBA)**, the independent advisory body on environmental protection, published a background paper on geoengineering entitled 'Geoengineering- Effective Climate Protection or Megalomania?'.³⁵ The paper illustrates the various individual techniques and focuses on their feasibility, efficacy and the status of current scientific knowledge.

Overall, a message of caution and even scepticism emerges from the paper, which states that 'geoengineering offers [...] no guarantee of success' and 'does not necessarily increase the probability of preventing dangerous climate change by offering a further – emergency - option to combat global warming'.³⁶ The paper also warns against the possibility of moral hazard, fearing that 'the combating of causes would be delayed'.³⁷ With respect to stratospheric aerosol injection, UBA was firm in concluding that 'on the grounds of precaution this method may under no circumstances be employed before adequate clarification of possible risk'.³⁸ However, a definition of 'risk' is not provided.

UBA's paper addresses some key legal issues and potential legal frameworks for the regulation of geoengineering in a broad sense. The overview is however limited to potentially adaptable international legal frameworks, while national legal controls are said to only relate to 'the result of the policy strategies of individual states'.³⁹ It calls for an assessment of geoengineering techniques based on a combination of the following **criteria**: climate protection/global warming reduction potential; development status; cost-benefit analysis; risks; conflicting uses (e.g. CO₂ storage vs. geothermal, or renewable raw materials vs. food production) and synergies; societal acceptance (e.g. is there a societal discourse on geoengineering? Which ethical, moral, religious or aesthetic principles are touched by the application of these technologies?); and legal control (i.e. is an appropriate international regime available to control decisions relating to the development and application of geoengineering technology? Could key aspects be subject to a comprehensive consideration by a legal control regime?).

On that basis, UBA concluded that:

- Based on a precautionary approach, greater restraint must be exercised and a moratorium imposed on the employment of such

³⁵ UBA, *Geoengineering - Effective climate protection or megalomania?* (April 2011) (Authors: Harald Ginzky, Friederike Herrmann, Karin Kartschall, Wera Leujak, Kai Lipsius, Claudia Mäder, Sylvia Schwermer, Georg Straube).

³⁶ Id. p.7

³⁷ Id.

³⁸ Id. p.15

³⁹ Id. p.32

measures until there is a substantial improvement in knowledge of the interdependencies of geo-processes.⁴⁰ However, the report does not point to the fact that such a moratorium will need to take into account the constitutional status of freedom of research in Germany.

- Some geoengineering techniques could potentially constitute an emergency option, but not an alternative to mitigation and adaptation to climate change (and some techniques are seen as to jeopardise the latter). Like in the UK, this approach follows a Plan B rational for geoengineering research and potential deployment, but leaves questions of e.g. threshold, triggers and reversibility, unanswered.⁴¹ Some of these techniques seem to be in contradiction with the principle of common but differentiated responsibilities (CBDR), as they would expose developing countries to specific risks (e.g. changes in precipitation pathways, droughts and food insecurity), and 'to annul [...] the successes of past decades in reducing substances discharges into water, air and soil, and in conflict with previous environmental policy'.⁴² However, such a superficial interpretation of the CBDR principle seems to refer to the differentiated effects of the risks, rather than to the differentiated ability to address them, which is the main rational of this principle.
- Assessment of the technologies should be guided by key criteria, and based on an early assessment of the risks.
- Existing international rules are inadequate to govern geoengineering techniques and control its potential risks. As a result the development of an appropriate national statutory framework is seen as necessary, but no detailed analysis is provided with respect to possible applicable or adaptable rules, gaps and institutional capacity to exercise decision-making and enforcement.

Finally, as opposed to market-based mitigation policies, funding for geoengineering is most likely to come from public spending which will result in the ultimate cost falling on taxpayers.

Federal Ministry for Education and Research (Bundesministerium für Bildung und Forschung - BMBF)

In 2010, the **German Federal Ministry for Education and Research** (BMBF) became interested in the implications of geoengineering and commissioned a scoping report by the **Kiel Earth Institute** entitled 'Large Scale Intentional Interventions into the Climate System? Assessing the

⁴⁰ In the report, the meaning of 'precaution' is broadly defined as an approach to ensure that precautionary action is taken where there is incomplete knowledge of the type, extent and probability of occurrence of adverse effects on the environment, in order to preclude adverse effects and disturbances from the very beginning': UBA, n 35 above, at 4.

⁴¹ See discussion of overlapping rationales for geoengineering in C.Armeni and C.Redgwell, *International legal and regulatory issues of climate geoengineering governance: rethinking the approach*. CGG Working Paper no. 21. March 2015.

⁴² UBA, n 35 above, at 42.

Climate Engineering Debate'.⁴³ The report was intended to address issues and gaps associated with the following questions:

- Is the deployment of Geoengineering technologies a viable option in dealing with anthropogenic climate change?⁴⁴
- With our current level of knowledge, can recommendations be given with regard to certain geoengineering technologies?
- Should there be even more research on geoengineering technologies? If so, how can it be structured and regulated?

On the assumption that the geoengineering debate will become more intense as climate change progresses, this study was intended to provide initial guidance for the further political decision-making process. In addition, it was expected to provide an overview of the current level of research beyond the predominantly scientific-economic perspective of previous reports.⁴⁵

This resulted in an extensive and detailed study by an interdisciplinary team of experts from six disciplines (i.e. ethics, natural science, economics, sociology, law and political science). The report discusses in general the pros and cons of geoengineering techniques, their rationale, as well as risks, technical aspects and public perceptions. Some direct references and examples are drawn from the German experience, but most of its focus is on the international regulatory mechanisms and the social science dimension of the geoengineering debate. The report focuses both on research and deployment, and on unilateral and multilateral action.

With special reference to Germany, it concludes that:

- Attitudes to climate engineering in Germany are currently very heterogeneous, and the German media debate has been 'slow to gather speed, and it has been mainly sceptical and apprehensive'.⁴⁶ Some of the most critical comments have been made as a reaction to the LOHAFEX project (see box 1 below).⁴⁷
- The potential for social conflict in Germany is conditioned by a variety of factors: if Germany were to take part in a geoengineering initiative, either at an operative level or as a financial backer, this would raise a potential for conflict more appreciably than if Germany were merely a passive observer of such initiatives. Experts agree that the potential for conflict would increase with the implementation of geoengineering technologies in close proximity to Germany.⁴⁸

⁴³ W. Rickels et al., Large-Scale Intentional Interventions into the Climate System? Assessing the Climate Engineering Debate. Scoping report conducted on behalf of the German Federal Ministry of Education and Research (BMBF), (Kiel Earth Institute, Kiel, 2011).

⁴⁴ The report uses the term 'climate engineering'. Here Geoengineering will be used here for reasons of consistency.

⁴⁵ Rickels n 43 above at 13-14.

⁴⁶ Id. at 72.

⁴⁷ See e.g. ETC Group (2009) 'Geoengineering's Governance Vacuum: Unilateralism and the Future of the Planet', prepared by ETC Group for the US National Academies Workshop Geoengineering Options to Respond to Climate Change: Steps to Establish a Research Agenda, Washing D.C. 15-16 June 2009.

⁴⁸ Rickels, n 43 above at 128

- 'Leading NGOs such as Greenpeace Germany, Robin Wood, the German branch of Friends of the Earth (BUND), and NABU, an organization concerned with nature conservation and biodiversity, have not yet issued statements or informative literature on climate engineering'.⁴⁹

The background paper by UBA states that BMBF and BMU (ministry for the environment) 'share the view that no meaningful climate protection is to be seen in large -scale iron fertilization of oceans'.⁵⁰ However it is not clear what the source of these positions is, as at the moment it seems that BMBF is not pursuing the topic further.

Parliamentary Inquiry

In July 2012, some MPs from the Social Democratic Party, close to the Green Party, submitted 56 questions on geoengineering to the Federal Government through the Committee on Education, Research and Technology Assessment at the German Bundestag.⁵¹ This inquiry followed the two reports published by the BMBF and UBA. Their questions related to the Federal Government's position on a wider range of aspects of geoengineering governance both nationally and internationally. They focused on: the definition of geoengineering; potential risks; current research and funding from the Federal Government; patents; and current and planned experiments (LOHAFEX and SPICE). They also addressed the constitutionality of a moratorium on geoengineering research against the freedom of scientific research.

The government responded promptly, but rather vaguely in several respects. This seems mainly due to scientific uncertainties, lack of information and lack of a coordinated position on geoengineering. Overall the following points have emerged from the Government response:

- Geoengineering might have a role as a Plan B to tackle climate change, but priority rests with emission reduction and adaptation. In this context, no institutional responsibility is identifiable yet within the Federal government;
- More research is needed to address the risk and uncertainties of geoengineering. In this area some initiatives have already taken place, but no structured government-led research programme nor direct funding is envisaged;
- Beyond publication of the BMBF and UBA's reports, no specific government-led initiative on public engagement is currently planned;
- Research projects are underway in several geoengineering related areas, funded both by the German Research Foundations and by the EU F7 programme (EU-TRACE and IMPLICC – Implications and Risks of engineering solar radiation to limit climate change); and

⁴⁹ Id. at 74 – comparison in this respect has been made to the UK branch of Greenpeace that has been more vocal about in the geoengineering debate.

⁵⁰ UBA n 35 above, at 3.

⁵¹ F.W. Steinmeier (13.06.2012): *Geoengineering/Climate-Engineering. Aktenzeichen: 17/9943. Kleine Anfrage*. Written inquiry from the German social democratic party to the government with 56 questions. (available at <http://dip21.bundestag.de/dip21/btd/17/103/1710311.pdf>)

- In many instances the Government was open in admitting that information is not known (regarding e.g. the public attitude to geoengineering in Germany; Federal government studies or jurisdictions that deal with constitutionality of research moratoria on geoengineering techniques) or that no position has been taken (e.g. Government public participation strategy).

The Federal government expressly addressed the legal challenges related to the balance between the autonomy of science recognised by art 5 of the Constitution and the potential negative consequences of geoengineering research projects.⁵² Following the Constitutional Court position in the GMO case, the Government clarified that, despite its high constitutional value, the freedom of research can be constrained. However it noted that until now the Government has no knowledge of unintended consequences of geoengineering to justify such an action. Moreover no specific case law can support Government decisions in this area. In contrast with the UBA's opinion then, the Government stated that a moratorium on geoengineering would not be supported until more research on unintended consequences of these techniques is available. However, the Government response also noted that, in any case, self-governance of research would not be sufficient to deal with geoengineering projects, with the government, the public and independent experts playing an important role in controlling these activities.⁵³

The German rejection of a possible moratorium in the light of freedom of science, research and teaching marks a potential contrast with the UK position, which seems to be more cautious in consideration of the potential risks. Overall this approach also confirms the possibility in Germany to consider the impact of international regulation (e.g. a possible international moratorium) upon its national constitutional system, which cannot be found in the same terms in the UK or the US (for different reasons).⁵⁴

Federal Ministry of Defence (Bundesministerium der Verteidigung und den Verteidigungsminister. – BMVg)

In February 2013, the Planning Office of the German Armed Forces ("Planungsamt der Bundeswehr") within the Ministry of Defense (BMVg) published a report on geoengineering from a security perspective.⁵⁵ The report addresses the meaning and uses of geoengineering, its risks and contentious issues as well as its potential regulation. It also discusses who could have an interest in its implementation and its implications for international security. The Office concluded that the German Army should

⁵² *Id.*, Question 31.

⁵³ See Deutscher Bundestag (German parliament): Answer to written inquiry "Geoengineering/ Climate-Engineering" (Available at <http://dip21.bundestag.de/dip21/btd/17/103/1710311.pdf>) (in German) paras. 25, 43 and 31.

⁵⁴ Following the inquiry, the Office for Technology Assessment of the Federal Parliament (TAB) is also finalising its own report on the subject, after commissioning two independent studies.

⁵⁵ Planungsamt der Bundeswehr Geoengineering. Future Topic (2012) (in German).

develop its own position on geoengineering, especially in consideration of other countries' policy (e.g. US, China, India and Russia). The Office stated that it could not exclude that armed conflict associated with these activities might arise in the future. In this context, a major concern is the protection of infrastructure, while special SRM infrastructure is potentially needed. As such, the army is urged to follow discussions in countries that are more vulnerable to climate change and in those that are interested in a post-fossil fuel society. Technical and international law development should also be taken into account.

III. Nationally and European-Funded Research Projects

The German National Research Foundation (Deutsche Forschungsgemeinschaft- DFG)

The German National Research Foundation (DFG) is the largest funding body in Germany. In May 2013, DFG launched a Priority Programme on Climate Engineering called 'Research to Evaluate Climate Geoengineering: Risks, Challenges and Opportunities'. The programme originates from the perceived need for the conduct of more research, especially in the fields of politics, law and ethics. The objectives of the Programme are to: reduce the uncertainties in our understanding of the ecological, social, and political risks of CE, and investigate the challenges and opportunities of geoengineering. This will be a broad, interdisciplinary, basic research to comprehensively assess geoengineering from scientific, environmental, economic, social, political, ethical, and communicative perspectives.⁵⁶ The first phase will run until 2015, the second phase may run 2016-2018. This is background research, but it seems that the DFG is not likely to fund any additional work at this stage.

DFG made a general statement on geoengineering, emphasising the need for further research in this area and the Foundation's role in promoting it. DFG stressed the importance of a) new research beyond the technical feasibility of geoengineering techniques, to 'assess their effectiveness and consequences; b) interdisciplinary research (scientific, technical, social, economic, legal, ethical and political); c) collaboration between the natural and social sciences; and d) studies of the legal, social, and international political dimensions of a potential deployment(s) of geoengineering technology, to be conducive to regulation.⁵⁷

EU F7 Programme : EU TRACE and IMPLICC

Two main research projects on geoengineering involving German researchers have been funded under the European Commission Seventh Framework Programme: 'Implications and Risks of Engineering Solar

⁵⁶ See description at <http://www.spp-climate-engineering.de/home.html>

⁵⁷ The DFG full statement (in German) is available at <http://www.spp-climate-engineering.de/focus-program.html>.

radiation to Limit Climate Change' (IMPLICC) (2009 -2012) and 'The European TRansdisciplinary Assessment of Climate Engineering' (EuTRACE) (2012- 2014).

IMPLICC aimed to 'study the effectiveness, side effects, risks, and economic implications of proposed SRM techniques'.⁵⁸ EuTRACE aims to assess the potentials, implications, risks and uncertainties of CE; develop criteria for decisions aid whether or not various CE options can be implemented; engage in a dialogue with the public, policy makers, and other civil society stakeholders; outline policy options and pathways for the EU; and identify gaps in current understanding of climate engineering'.⁵⁹

⁵⁸ See the IMPLICC project's Synthesis report for policy makers at http://implicc.zmaw.de/fileadmin/user_upload/implicc/deliverables/D6_3_synthesis_report_nohead.pdf

⁵⁹ See EuTRACE website available at <http://www.eutrace.org/> The final report was expected by mid-2014.

Box. 1: The LOHAFEX experiment and its associated legal questions

Between January and March 2009, the “Polarstern”, a German-flagged vessels cruised from South Africa (Cape Town) to Chile (Punta Arenas) and conducted OIF tests in the Southern Ocean.⁶⁰ The project - called LOHAFEX - was an Indo-German cooperation jointly carried out by the National Institute of Oceanography (NIO) of the Council of Scientific and Industrial Research (India) and the Alfred Wegener Institute for Polar and Marine Research, (Germany).⁶¹ The experiment was initially approved by the German Federal Research Ministry (BMBF) without requiring a specific environmental impact assessment. However, the Federal Environment Ministry did not support the authorisation on the basis that the experiment was deemed to violate the 2008 CDB COP Decisions IX/16 related to geoengineering, and requested BMBF cancel the project. Further to public pressure (eg. ETC and other non-governmental organizations) and tensions between government departments, the expedition was initially suspended by BMBF, but eventually authorised. Overall the analysis of its preliminary results indicates that the CO₂ drawdown effect of the fertilization was lower than expected.⁶²

Legal opinions were sought on the legality of the LOAHFEX experiment under international law (i.e. CDB and LC-LP). Of particular note is the opinion of Prof Alexander Proelss which concluded that: ‘CDB COP decisions are, as a basic principle, legally non-binding. The Federal Republic of Germany is therefore not obliged under Decision IX/16 to prohibit the performance of the LOHAFEX marine research experiment’.⁶³ In any event, the opinion considered the experiment to fall within the exception for small scale experiments within coastal waters, and not to constitute dumping under the LC-LP regime. As for waters beyond, it held that ‘marine research experiments on the high seas which are permissible under international law and are conducted by German flag vessels are not subject to [national] authorisation’.⁶⁴

IV. Potentially applicable, or adaptable laws and regulation

⁶⁰ See details at:

http://www.awi.de/en/infrastructure/ships/polarstern/weekly_reports/all_expeditions/ant_xxv/ant_xxv3/

⁶¹ LOHA is the Hindi for “iron” joined with Fertilization Experiment.

⁶² Rayfuse and Warner in Warner and Clive Shofield, *Climate Change and The Oceans*, at 283 referring to IMO report 2010 LP CO2 3/7.

⁶³ A. Proelss *Legal Opinion on the Legality of the LOHAFEX Marine Research Experiment under International Law* (Kiel, 22 January 2009) at 20.

⁶⁴ *Ibid.*

Constitutional rights and individual statutes of relevance for Geoengineering

There is no single, dedicated German law or regulation directly applicable to all geoengineering techniques, or all aspects on one geoengineering technique. As a result, the analysis of the national legal and regulatory framework applicable, or at least adaptable, to these techniques is necessarily speculative and piecemeal. As in the UK, however, national law will play a key role depending upon the extent of national jurisdiction and control exercised over the area where these activities are carried out, as well as over the individuals and the point of origin (vessels or aircraft) of these activities.

Broadly speaking, the analysis of existing laws and regulations applicable, or at least adaptable, to geoengineering within German jurisdiction and control must – at a minimum – address the following areas: Climate change and environmental law and regulation (including protection of habitat and species, conservation of natural resources and Environmental impact Assessment); Planning law; and Regulation of Scientific Research.

Climate change Law

Climate change mitigation does not appear as an objective in the Constitution. However it has been argued that it can be considered a component of the wider environmental protection objective, pursuant to art 20 BL, and of the right to life and health (art 2 BL).⁶⁵ At statutory level, German climate and environmental law has largely been influenced by the body of EU and international environmental law.

Germany does not have an individual climate change statute, like the UK Climate Change Act, and seems reluctant to adopt a single legally binding emission reduction target, like the UK. However, it has developed a sophisticated climate change legislative framework, mostly based on the EU climate change and energy package and on the German Meseberg Decisions adopted by the Federal Government on 23-24 August 2007. This covers the main areas of ETS (e.g. the Greenhouse Gas Emissions Trading Act 2011, as amended), energy efficiency (e.g. Energy Services and Energy Efficiency Measures Act 2010) and renewables (e.g. Renewable Energy Sources Act 2009). But, while geoengineering activities are based on a climate change purpose, there is no readily applicable mechanism within the existing German climate change law unless and until a specific amendment or bespoke rules are adopted.

Owing to the potentially dangerous impact of some geoengineering activities on the environment (e.g. marine environment, biodiversity), the wider range of environmental protection laws and regulation will come into play should these activities be carried out at either research or deployment

⁶⁵ Koch, n 8 above.

level. The task of reviewing all German environmental law is outside the scope of this paper, but key provisions relevant – and adaptable – to geoengineering activities can be found in the following Federal Acts:

- **High Seas Dumping Act:** This Act prohibits the incineration of wastes and other substances on the high seas and their dumping in the sea in order to protect the marine environment.⁶⁶ Subject to specific adaptation, this Act might be able to cover ocean iron fertilization activities. Ocean iron fertilization is unlikely to occur in the German Marine Area (e.g. Territorial sea and EEZ) due to its biochemical characteristics. However these activities could be carried out by German nationals and/or German-flagged vessels, triggering the application of German national law.
- **Federal Nature Conservation Act:** This Act aims to 'protect, preserve, develop and restore the natural environment and the landscape to their original conditions in settled or unsettled areas.'⁶⁷ The Act includes provisions on preservation and planning. Applicable to any impact on nature conservation and biodiversity, the Act could potentially apply to geoengineering impacts within its scope.
- **Federal Forestry Act:** The Act contains environmental law provisions as they relate to forests⁶⁸ and could potentially cover land-based geoengineering involving forestry management.
- **Federal Emission Control Act:** This Act regulates the establishment and operation of installations through a licensing process to avoid and prevent harmful effects on the environment.⁶⁹ The Act defines pollution as 'a change in the natural composition of the air, especially through [...] **aerosols**' and provides a wide definition of installation, to also cover non-stationary one, such vehicles and crafts. Within its limits (e.g. air pollution) and subject to some adjustment and interpretation, the Act might potentially provide a basis for addressing some of substances injected as part of the SRM activities.
- **Environmental Impact Assessment Act:**⁷⁰ The Act aims to 'ensure that, [...] in the case of certain public and private projects, 1. the effects on the environment are identified, described and assessed in good time and comprehensively; 2. the results of the environmental impact assessment are taken into account as early as possible in all cases in which public authorities decide upon the approval of

⁶⁶ Hohe-See-Einbringungsgesetz, *Federal Law Gazette, BGBl I*, page 2455 of 25 August 1998.

⁶⁷ Bundesnaturschutzgesetz, BNatSchG, *Federal Law Gazette, BGBl. I*, page 2994) in the version as amended on 21 September 1998, art 1(1).

⁶⁸ Bundeswaldgesetz, (*Federal Law Gazette, BGBl. I*, page 1037) of 2 May 1975, as amended.

⁶⁹ Bundes-Immissionsschutzgesetz (BImSchG) As amended and promulgated on 14 May 1990 (*Federal Law Gazette I*, p. 880), as last amended by Article 1 of the Act of 3 May 2000 (*Federal Law Gazette I*, p. 632).

⁷⁰ Gesetz über die Umweltverträglichkeitsprüfung, of 5 September 2001 (*BGBII I*, p.2350 p. 1914).

projects' (art 1). Although geoengineering is not expressly included in the list of activities covered by the Act, it could potentially fall under the definition of project as 'the realisation of [a] measure that encroaches on nature and the landscape'.⁷¹ As part of the procedural requirements, an EIA on geoengineering measures under this Act would also entail mandatory local and transboundary public consultation, depending upon the likely location of potential effects.⁷²

- **Environmental Liability Act:** The Act establishes liability for damage caused by the environmental impacts of certain high-risk installations.⁷³ Geoengineering falls outside the scope of the Act, as it is not covered by its Annex I. However the scale and impact of installations associated with some of these techniques (e.g. air scrubber's installations) might become relevant to the aims and objectives of the Act in the future.

Planning Law

Planning law will also be relevant for geoengineering-related activities. Spatial planning is an area of public competence where responsibilities are shared between the Federal (overall spatial planning) and local government (urban and land use planning). The Basic Law provides for Federal exclusive powers in this area, with concurrent powers of the Länder . With respect to activities in the EEZ, the German Federal Ministry for Transport, Building and Urban Development (BMBVS) is competent. The table below summarises the German Planning Law system:⁷⁴

⁷¹ *Id.*, art.2 (2).

⁷² *Id.*, art 9 (a) See background and analysis of German EIA legislation, in H. Heinelt at al. (eds) *European Union Environment Policy and New Forms of Governance* (Ashgate, 2001).

⁷³ 1990 Environmental Liability Act (*Umwelthaftungsgesetz*); see also the 2007 Environmental Damage Act (*Umweltschadensgesetz*).

⁷⁴ In general, E. Pahl-Weber, Dietrich Henckel (Eds.) *The Planning System and Planning Terms in Germany* A Glossary, *Studies in Spatial Development* No 7 Hanover 2008, available at http://shop.arl-net.de/media/direct/pdf/ssd_7.pdf

Structure of the German Planning Law

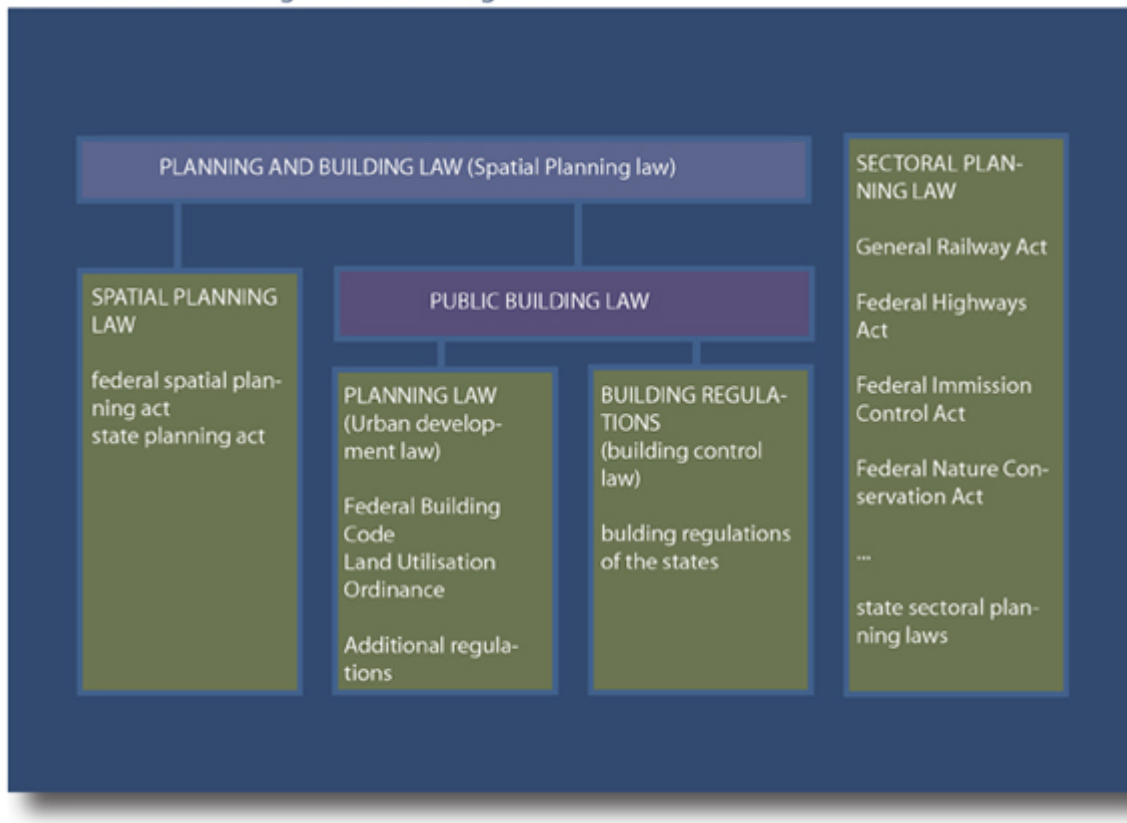


Diagram 2: Structure of the German planning Law.

Source: ARL available at <http://www.arl-net.de/commin/germany/21-legislative-powers-and-statutory-framework-various-levels-planning>)

With respect to geoengineering, many aspects of the activities will require planning permission from the competent authorities, including construction of onshore air scrubbers and associated storage facilities, and roof painting. With respect to activities at sea, such as ocean iron fertilization, marine spatial planning rules must also be taken into account. Planning for SRM activities is less clear. It might fall under the marine planning rules as a result of its potential impact on the ocean or the location from where substances are injected (e.g. cloud brightening, or sulphur aerosols injection from vessels). For SRM activities such as injection from aircrafts and solar reflectors, the planning permission requirements might be controlled by the German Federal Aviation (Luftfahrt-Bundesamt) and by the German Space Centre (DLR) as part of the general authorisation process.

Regulation of Research

Art 5 (3) BL states that '[a]rt and sciences, research and teaching shall be free'.⁷⁵ This provision raises some fundamental legal and ethical questions, which also apply to the field of geoengineering research. It has been noted

⁷⁵ Freedom of scientific research is also included in many other European Constitutions e.g. Italy art 33.

that the German concept of 'Wissenschaft' (science) embraces a broad concept of science, including humanities, philosophy, social sciences, mathematics and natural sciences.⁷⁶ The Federal Constitutional Court defined freedom of science as a protection to 'everything that, according to its content and form, can be seen as a serious and methodological attempts to establish the truth'.⁷⁷ This basic right is directed to preserve scientific research from State interference, but also put the State under the obligation to protect the freedom of research. As such scientific research cannot be subject to statutory restrictions.

However scientific research is subject to limits. On the one hand, it has internal limits in the form of codes of practice at German and EU level. Some of these internal restrictions are also subject to civil and criminal sanctions.⁷⁸ On the other hand, it has external restrictions imposed by other constitutional guarantees, specific freedoms and restrictions derived from the protection of collective interests and the individual rights of others (e.g. human dignity under art 1 BL)⁷⁹. In this area the German Constitutional Court held that '[c]onflicts between the guarantee of scientific freedom and the protection of other constitutionally guaranteed interests...[must] be resolved according to the constitutional order of values and in the light of the unity of this value system though constitutional interpretation. In this tension, *freedom of research does not take precedence per se over other constitutionally protected values*'.⁸⁰

Questions of constitutional balance have previously come into question with respect to genetically modified organisms. The Gene Technology Act 1993 requires laboratories engaging in research, carrying out specific activities and releasing GMOs, to register their genetic research, and also applies conditions and procedures for the approval of research. As in the UK, the Animal Protection Act 1998 subjects to prior approval animal testing conducted for the purpose of scientific research.

In the light of its potential risks, geoengineering could also be an area where a conflict between freedom of scientific research and protection of the environment and human health might arise. In this context, the constitutional value given to the natural foundations of life and animals (art 20a BL) could potentially be seen as constituting a limit to the freedom of scientific research. As discussed above, this issue has been addressed by the Federal Government in its response to the Parliamentary inquiry.

⁷⁶ C. Starck, 'Freedom of Scientific Research and its Restrictions in German Constitutional Law', 39 *Israel Law Review* (2006) at 110.

⁷⁷ BVerfGE 35, 79, 113 (1973) ('University Case').

⁷⁸ Starck, n 76 above, at 111.

⁷⁹ Two recent constitutions of German Lander subject scientific research to statutory restrictions if the research threatens to violate human dignity or affect the natural foundation of life - Brandenburg art 31-Meckelenburg-Vorpommern art 7.

⁸⁰ 1978 BVerfGE 47, 327, 369, quoted in Starck, n 76 above at 116 (emphasis added).

Intellectual property rights

Owing to the potential commercial and dual-use of some geoengineering techniques, their patentability has emerged as an additional legal issue.⁸¹ The German debate in this area is embryonic, but it has been considered by the Federal Government in the context of the Parliamentary Inquiry. A starting point is the German Patent Law (Patentgesetz)⁸² which addresses enforcement of IP and related Laws, Genetic Resources, IP Regulatory Body, Patents (Inventions), Utility Models, but does not - at the moment - cover geoengineering in itself. The German Patent and Trade Mark Office (DPMA) is the competent authority in this field.

V. Institutional Framework for geoengineering-related activities.

As mentioned above, no specific analysis has yet been carried out with respect to the potential competent authorities for geoengineering activities. The current picture appears fragmented: Table 3 illustrates the government departments and agencies likely to become involved in the decision-making process and enforcement of laws and regulation that might address geoengineering activities under German jurisdiction and control.

The main federal ministries likely to be involved and coordinate policy decisions on geoengineering are the Federal Ministry of Education and Research (BMBF) and the Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU). A role could also be played and competences can be assigned to the German Foreign Office, the Treasury and the German Armed Forces, depending on the developments in this area. Support and advice to policymakers in this area would be led by the German Federal Environment (UBA) 'as a scientific environment authority'. Other agencies might become involved in the process, such as the Federal Maritime and Hydrographic Agency (BSH) with respect to research activities at sea.⁸³ The Federal Foreign Ministry coordinates the German position in international negotiations and collaborates with the German Aerospace Centre (DLR) and the European Space Agency. They could jointly play a role in the (unlikely event of) geoengineering in outer space.

⁸¹ Geoengineering Watch has published an extensive list of patent for geoengineering component (the list is available at <http://www.geoengineeringwatch.org/links-to-geoengineering-patents/>). With reference to the wider debate on patents, see for instance D. Keith, Researcher: Ban Patents on Geoengineering Technology, *Scientific American*, (April 18, 2012) available at <http://www.scientificamerican.com/article.cfm?id=researcher-ban-patents-on-geoengineering-technology>

⁸² Patent Law (as amended by the Law of July 31, 2009).

⁸³ <http://www.bsh.de/en/index.jsp>

Table 3: German Federal government departments and agencies and their potential relevance for geoengineering

Federal Government Departments or Agencies	Responsibilities and Competences	Potential Relevance for Geoengineering
Federal Ministry of Education and Research (BMBF)	Promotes Education and Research	Research Initiative and Funding support
Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU).	Responsible for Environmental Policy, including climate policy, conserving the diversity of fauna and flora, efficient use of resources and energy as well as protecting human health from environmental pressures	Implementation of Environmental policy, authorisation and control over geoengineering activities
Federal Foreign Office	Promotion of international Exchange and protection of German Citizens Abroad	International Cooperation and Security and geopolitical aspects of geoengineering
Treasury	German Central Bank and Fiscal agent, responsible for financial and monetary system, banking supervision, cashless payments and cash operations	Approval of Federal government funding of potential geoengineering programme
German Armed Forces	Security policy	Security aspects of geoengineering
German Federal Environment Agency (UBA)	Provides advice to government on environmental matters, enforces environmental laws, provides environmental information to the public	Enforcement and monitoring of environmental legislation and standards. Public information and communication
German Aerospace Centre (DLR)	Space research and planning and implementation of the German Space programme	Space-based SMR techniques Authorisation and monitoring

Federal Maritime and Hydrographic Agency (BSH)	Supports maritime shipping and the maritime industry; promotes sustainable use of the oceans; ensures the continuity of monitoring; provides information about the Status of the North and Baltic Seas	Ocean-based geoengineering techniques (research, monitoring, planning and supervision)
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VI. Conclusions

This paper has identified the key questions emerging in the –still embryonic- German debate on geoengineering techniques. Although different from the structured Parliamentary inquiry conducted in the UK (and, as we will see in working paper 4, the US), key questions have been asked with respect to the German Government’s position on these technological developments. The vagueness of the official Government response underscores a reluctance to take conclusive positions at this embryonic stage in developments. Nonetheless, several Ministries have taken independent initiatives to investigate the implications of research and potential deployment of these methods in Germany. What emerges is a fragmented and uncoordinated approach across government departments and agencies (e.g. UBA) and the absence of a coherent national political debate on this matter.

This is partially confirmed by the limited involvement of the public, including German NGOs and the media, in any geoengineering debate, with the controversy surrounding German support for the LOHAFEX project an isolated exception. Learning from LOHAFEX, some consideration has been given to the differential impact and negative perception of the public depending on the level of German involvement (or support) for research and deployment in the German territory or beyond. This is consistent with the ‘NIMBY’ attitude by (segments of) the German public towards other controversial technological developments (e.g. CCS, nuclear).

In general, however, the German Government’s position on geoengineering is not dissimilar to that of the UK Government. First, it considers geoengineering as a potential Plan B, but remains committed to mitigation efforts. Second, it considers that more research is needed, but does not intend to take an active role in supporting and funding research programmes in this field. Third, the Government is not planning to initiative any public engagement activities for the time being.

A crucial finding from this working paper is the pivotal role of the constitutional freedom of scientific research and its implications for geoengineering. Based on past experience on GMOs, our analysis has highlighted that freedom of research is not an absolute freedom, and can be limited where it conflicts with other constitutional rights of a similar order (e.g. environmental protection, human dignity). However, thus far the Government has concluded that there is no conclusive scientific evidence available demonstrating the adverse effects of geoengineering techniques and thus a moratorium is possible unless and until more evidence is found confirming this assumption. This approach seems directly to reject the application of the precautionary approach in this context, as it is seeking conclusive evidence before action can be taken. It is interesting to compare this approach with the UK rejection of the principle by the Science and Technology Committee, based on the argument that its application to geoengineering 'would risk halting geoengineering research and small tests being carried out by those States playing by the rules to develop a plan B, but it could also force from international and public scrutiny any research carried out by other bodies or states not playing by the rules'.⁸⁴

Finally, the analysis of the potential application of existing laws and regulation to geoengineering has confirmed that the no one-size-fits-all approach is as apt for Germany as it is for the UK. This is hardly surprising owing to the diversity of the technologies, and the fact that none of the existing rules, whatever their individual scope for adaptation, have been promulgated with the implications of geoengineering research, and potential deployment, in mind. A similar conclusion can be reached with respect to the institutional framework, with all the main competences relevant to geoengineering (e.g. environment, planning, climate change, energy, shipping, biodiversity protection, national security) fragmented across different government departments. As in the UK context, the absence of one-stop shop regulation does not preclude the possibility of further legislative action to adopt geoengineering-related rules on a case-by-case or step-by-step basis, nor indeed the possibility of soft law developments.

⁸⁴ HC Science and Technology Committee (STC), *The Regulation of Geoengineering*, Fifth Report of Session 2009-2010, [HC 221] Published on 18 March 2010, at 34-35.