Deploying Carbon Capture and Storage "safely": The scope for Member States of the EU to adopt more stringent CO_2 stream-purity criteria under EU law

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Abstract. In several European countries, recent initiatives to launch Carbon Capture and Storage demonstration projects faced strong local opposition over perceived health, environmental, and property risks, putting policy makers under pressure to provide additional safety guarantees. One way to increase safety standards is to strengthen the criteria in Article 12 of Directive 2009/31/EC on the geological storage of CO_2, which are based on the London Protocol and OSPAR Convention requirements on the purity of the captured CO_2 stream. The German and the Dutch draft legislation implementing Directive 2009/31/EC both provide for the possibility to impose additional CO_2 stream-purity requirements. The paper examines the scope for EU Member States to adopt stricter CO_2 stream-purity criteria under EU law. Based on an analysis of the relevant case law of the European Court of Justice and the content of Directive 2009/31/EC, it concludes that the scope for EU Member States to adopt stricter CO_2 stream-purity criteria under EU law is likely to be narrow. The room for non-EU parties to the London Protocol and OSPAR Convention to adopt such stricter requirements might likewise be limited.

I. INTRODUCTION

In 2010, a number of early CCS[1] demonstration initiatives in several European countries met with strong local opposition. In Germany, the population of the states of Brandenburg and Schleswig-Holstein fiercely opposed plans for demonstration projects by Swedish utility Vattenfall and German power company RWE, respectively.[2] In July 2010, the German government, in direct reaction to popular worries over CCS technologies, decided to amend its draft Bill for the implementation of Directive 2009/31/EC on the geological storage of CO_2 (hereinafter CCS Directive) and allow no more than the testing of CCS technologies in the period up to 2017.[3]

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[1] Carbon Capture and Storage, commonly referred to as CCS, stands for a number of technologies whereby carbon dioxide emissions from, for instance, power plants and refineries can be captured and subsequently permanently stored in e.g. depleted gas fields.

[2] See Malte Kohl, *Developing CCS in Germany* (18 November 2009) (presentation held at the Energy Delta Convention, Groningen, available on the internet at <http://www.rug.nl/energyconvention/EDC/Archive/EDC2009/overviewspeakers2009> [last accessed on 10 December 2010]); Nicholas Comfort, *RWE May Build Dutch Carbon Capture Plant Amid German Opposition*, Bloomberg, 22 January 2010, available on the Internet at <http://www.bloomberg.com/apps/news?pid=20601100&sid=aOZGhPaq04MY> (last accessed on 15 April 2010) and Paul Voosen, *Freightened, Furious Neighbours Undermine German CO2-Trapping Power Project*, New York Times, 7 April 2010, available on the Internet at http://www.nytimes.com/gwire/2010/04/07/07greenwire-frightened-furious-neighbors-undermine-german-35436.html?scp=6&sq=paul%20voosen&st=cse (last accessed on 11 May 2010).

[3] See *Brüderle und Röttgen: CCS-Gesetz wichtiger Schritt für eine Zukunftstechnologie*, Bundesministerium für Wirtschaft und Technologie, 14 July 2010, available on the Internet at <http://www.bmwi.de/BMWi/Navigation/Presse/pressemitteilungen,did=350776.html> (last accessed on 10 September 2010).

In the Netherlands, in 2010, the government decided to stop spatial planning procedures for the planned CCS demonstration project in the town of Barendrecht.[4] In a letter to parliament, the Minister of Economic Affairs, Agriculture, and Innovation indicated that "the complete lack of local support for the project" was one of the main reasons to no longer work towards CO_2 storage in Barendrecht.[5] Moreover, on 14 February 2011, the Minister decided to no longer strive for a large-scale *onshore* CCS demonstration project in the north of the Netherlands.[6] Again, the apparent lack of local support for the proposed projects played a large role in the decision to no longer work towards CO_2 storage in the north of the Netherlands.[7]

Governments in EU Member States (hereinafter Member States) that have shown an interest in accommodating early CCS demonstration projects, such as Germany and the Netherlands, are increasingly under pressure to guarantee the safety of early CCS deployment. These Member States are therefore likely to be tempted to strengthen the safety standards in the CCS Directive. A likely target would be Article 12 of the Directive, which contains the requirements on the purity of the captured CO_2 stream.[8] The captured CO_2 stream can contain several substances which could pose a threat to the integrity of transportation and storage infrastructure, human health, or the environment. For example, in the case of a leak in a pipeline, substances in the CO_2 stream, such as acid gases and heavy metals, could mix with ground water.[9]

In Germany and the Netherlands, the draft legislation implementing the CCS Directive provides for the possibility to strengthen CO_2 stream-purity criteria in the future. Article

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[4] *Uitwerking van de afspraken voor de individuele CO2-opslagprojecten die momenteel in voorbereiding zijn* , Dutch Ministry of Economic Affairs, Agriculture and Innovation, at 2, CCS/10163598 (2010), available on the Internet at <http://www.rijksoverheid.nl/ministeries/eleni/documenten-en-publicaties/kamerstukken/2010/11/04/uitwerking-van-de-afspraken-voor-de-individuele-co2-opslagprojecten-die-momenteel-in-voorbereiding-zijn.html> (last accessed on 12 December 2010).

[5] Ibid.

[6] *CCS-projecten in Nederland*, Dutch Ministry of Economic Affairs, Agriculture and Innovation, CCS / 11020207 (201), available on the Internet at < http://www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2011/02/14/ccs-projecten-in-nederland.html> (last accessed on 14 February 2011).

[7] Ibid, at 2-3.

[8] The negotiations on the CCS Directive indicate a likelihood that there will be a (parliamentary) call for stricter CO_2 stream-purity criteria. During the negotiations on the CCS Directive, the European Parliament (hereinafter Parliament) long insisted on stricter CO_2 stream-purity criteria, initially pushing for a minimum level of ninety per cent CO_2 in the captured CO_2 stream and later even insisting on a ninety-five per cent CO_2 level as well as on a prohibition on H_2S (hydrogen sulphide) and SO_2 (sulphur dioxide). See *Draft report on the proposal for a directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006*, European Parliament, amendments 18 and 44, COM(2008)0018 – C6-0040/2008 – 2008/0015(COD) (2008), available on the Internet at <http://www.europarl.europa.eu/oeil/FindByProcnum.do?lang=en&procnum=COD/2008/0015> and *Préparation du trilogue informel*, Presidency of the Council of the European Union, amendment 84, 2008/0015 COD, 15789/08 (2008).

[9] *Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide – Draft Guidance Document 2: Site Characterisation, CO2 Stream Composition, Monitoring and Corrective Measures*, European Commission, 17 June 2010, at 77, available on the Internet at <http://ec.europa.eu/clima/policies/lowcarbon/ccs_implementation_en.htm> (last accessed on 13 December 2010.

25(2)(2) of a July 2010 version of the German draft Bill implementing the CCS Directive allows the Ministry for the Environment, Nature Conversation, and Nuclear Safety, in agreement with the Ministry of Economics and Technology and the Bundesrat,[10] to impose further requirements on the composition of the CO_2 stream, and in particular limit the values for process-related substances, or take measures for the control of improved admixtures.[11] According to Article 25(2)(3) of the draft Bill, such requirements are to be imposed by means of a decree. Likewise, Article 31(d)(3) of the Dutch draft Bill implementing the CCS Directive provides for the possibility to further specify the requirements of Article 31(d)(1) of the draft Bill through a decree.[12] The explanatory memorandum mentions a number of issues for which further measures are to be drafted, including (in reference to Article 12 of the CCS Directive) the composition of the CO_2 stream.[13]

Because the legal basis of the CCS Directive is Article 175(1) of the Treaty establishing the European Community (TEC)—a provision which is now found in Article 192(1) of the Treaty on the Functioning of the European Union (TFEU)[14]—Member States would, in theory, be able to adopt stricter CO_2 stream-purity criteria under EU law. According to former Article 176 of the TEC,[15] "the protective measures adopted pursuant to Article 175 shall not prevent any Member State from maintaining or introducing more stringent protective measures". Such measures must, however, be notified to the European Commission (hereinafter Commission) and be compatible with the TEC,[16] including the provisions on the free movement of goods, persons, services, and capital.[17]

However, it is not clear that stricter CO_2 stream-purity criteria would be compatible with the free-movement provisions in the TFEU. The development of different national sets of CO_2 stream-purity criteria could hinder the cross-border transportation and storage of captured CO_2, since it would likely increase costs along the CCS value chain. I aim here to analyse the scope for Member States to adopt stricter CO_2 stream-purity criteria under EU law. As the criteria in Article 12 of the CCS Directive are based on the requirements for CO_2 stream purity in two international marine-environment protection

[10] The Bundesrat is one of the five constitutional bodies in Germany, through which the federal states participate in the legislation and administration of the German federation. See the website of the Bundesrat at <www.bundesrat.de> (last accessed on 14 February 2011).
[11] *Referentenentwurf für ein Gesetz zur Demonstration und Anwendung von Technologien zur Abscheidung, zum Transport und zur dauerhaften Speicherung von Kohlendioxid*, 23 July 2010,
[12] *Wijziging van de Mijnbouwwet in verband met de implementatie van richtlijn 2009/31/EG van het Europees Parlement en de Raad van 23 april 2009 betreffende de geologische opslag van kooldioxide en tot wijziging van richtlijn 85/337/EEG van de Raad, de richtlijnen 2000/60/EG, 2001/80/EG, 2004/35/EG, 2006/12/EG en 2008/1/EG en verordening (EG) nr. 1013/2006 van het Europees Parlement en de Raad (PbEG L 140) en van OSPAR Decision 2007/2 on the storage of carbon dioxide streams in geological formations – Voorstel Van Wet*, kamerstuk 32 343, Nr. 2, available on the Internet at <https://zoek.officielebekendmakingen.nl> (last accessed on 18 October 2010).
[13] *Explanatory memorandum to the draft amending bill*, kamerstuk 32 343, Nr. 3, at 20, available on the Internet at <https://zoek.officielebekendmakingen.nl> (last accessed on 14 February 2010).
[14] Article 192(1) of the TFEU is the environmental legal base in the TFEU.
[15] Now Article 193 of the TFEU.
[16] Unlike Article 176 TEC, Article 193 of the TFEU refers to the "Treat*ies*". These are the Treaty on European Union (TEU) and the Treaty on the Functioning of the European Union (TFEU). See Article 1(2) of the TFEU.
[17] The provisions on the free movement of goods, persons, services and capital can be found in Titles II and IV of the TFEU.

instruments which were in recent years amended to allow for the offshore geological storage of CO_2—viz. the London Protocol and the OSPAR Convention[18]—this paper simultaneously outlines some of the regulatory issues related to CO_2 stream purity that could likewise arise in other, non-EU, jurisdictions looking to enable the offshore geological storage of CO_2 based on the framework provided by the two treaties.

In section II, Article 12 of the CCS Directive is briefly discussed. Section III addresses the question of whether the EU provisions on the free movement of goods or those on the free movement of services apply when captured CO_2 for storage is transported across Member States' borders. Section IV discusses two concepts of EU law which are of great importance for determining the scope for Member States to adopt stricter environmental measures—namely the concepts of exhaustion and (minimum) harmonization.[19] Section V addresses the relationship between Article 193 of the TFEU and EU secondary environmental law,[20] which has in recent years led to a great deal of debate among EU lawyers and has figured in several cases before the European Court of Justice (ECJ). Finally, in section VI, the concepts of exhaustion and harmonization are analysed in relation to the CO_2 stream-purity criteria in the CCS Directive.

II. Article 12 of the CCS Directive

Article 12, on CO_2 stream-acceptance criteria and procedure, starts with the notion that "a CO_2 stream shall consist overwhelmingly of carbon dioxide". The term "overwhelmingly" was first used in the London Protocol, the first international marine-environment protection instrument to allow for the offshore geological storage of CO_2.[21] It was deliberately chosen by the London Protocol's Scientific Group, which drafted the amendment to the Protocol's Annex I, to prevent setting arbitrary levels for CO_2 stream components.[22]

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[18] The London Protocol is a protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention). Under the London Protocol all dumping is prohibited except for a limited number of wastes or other matter that may be considered for dumping, listed in Annex I to the Protocol. The OSPAR Convention is a regional treaty on the protection of the marine environment in the North-East Atlantic. Like the London Protocol, the OSPAR Convention prohibits the dumping of all wastes or other matter, except for a limited number of wastes or other matter listed in Annex II to the convention.

[19] These two concepts deal with respectively the scope and the degree of harmonization of the relevant EU legislation.

[20] In EU law, a distinction is made between "primary law", that is, the Treaties as defined in Article 1(2) of the TFEU (the Treaty on European Union [TEU] and the TFEU), and "secondary law/secondary legislation". Secondary legislation can be defined as the legislative instruments adopted by the European institutions pursuant to the provisions of the Treaties, comprising, among other things, the binding legal instruments (regulations, directives and decisions) and non-binding instruments (recommendations, opinions) mentioned in Article 288 of the TFEU. See EUR-Lex, *Process and Players*, available on the Internet at < http://eur-lex.europa.eu/en/droit_communautaire/droit_communautaire.htm> (last accessed on 14 February 2011).

[21] Shortly after the London Protocol, the OSPAR Convention was amended to allow for the offshore geological storage of CO_2. The term "overwhelmingly" is also used in the OSPAR Convention. See Articles 3(2)(f)(ii) and 3(3)(b) of respectively Annexes II and III to the OSPAR Convention.

[22] See Tim Dixon et al., *International Marine Regulation of CO_2 Geological Storage. Developments and Implications of London and OSPAR*, 1 *Energy Procedia* 4503, at 4506 (2009).

Arbitrary levels for CO_2-stream components would not necessarily improve security of storage and could have a perverse effect by increasing the energy penalty for CO_2 capture[23] and emissions from the capture process.[24] Some storage reservoirs may, for instance, be rich in H_2S at levels far greater than those present in the CO_2 stream.[25] Purity criteria that would require the amount of H_2S in the CO_2 stream to stay below those levels would increase the energy penalty for CO_2 capture as well as emissions from the capture process (both leading to higher capturing costs), while not necessarily increasing the safety of CCS deployment.

The formula that CO_2 streams "consist overwhelmingly of carbon dioxide"[26] allows for a case-by-case assessment of the levels of impurity, recognizing the natural variation in storage-site characteristics and different transport constructions.[27] The London Protocol provides that the CO_2 stream may contain incidental associated substances derived from the source material and the capture and sequestration processes used, and that no wastes or other matter may be added for the purpose of disposing of those wastes or other matter.[28]

The CCS Directive goes further than the London Protocol by providing that incidental substances and substances added for the monitoring and verification of CO_2 migration ("tracers") shall be below levels that:

> (a) adversely affect the integrity of the storage site or the relevant transport infrastructure;
> (b) pose a significant risk to the environment or human health; or
> (c) breach the requirements of applicable Community legislation.[29]

The criteria in (a) and (b) are not very clear. The Directive does not specify when incidental substances or tracers adversely affect the integrity of storage and transport infrastructure. Furthermore, the Directive's definition of the crucial term in criterion (b), "significant risk", is vague: "a combination of a probability of occurrence of damage and a magnitude of damage that cannot be disregarded without calling into question the purpose of this Directive for the storage site concerned".[30] The first part of this definition refers to a formula for risk that is commonly used in risk management, whereas the second part is meant to define the meaning of "significant". Yet, when does disregarding a foreseeable risk run contrary to the purpose of the Directive for the

[23] The term "energy penalty" refers to the decrease in operating efficiency due to the extra energy required for the sequestration of CO_2.
[24] *International Marine Regulation*, supra, note 22, at 4506.
[25] Ibid.
[26] Article 4(2) of Annex I to the amended London Protocol.
[27] *International Marine Regulation*, supra, note 22, at 4506.
[28] See Article 4(2) and (3) of Annex I to the amended London Protocol. Similar provisions can be found in Article 3(2)(f)(ii) and (iii) of Annex II to the amended OSPAR Convention.
[29] Article 12(1) CCS Directive.
[30] Article 3(13) CCS Directive. The criterion under (b) resembles the fourth criterion for allowing offshore CO_2 storage under the OSPAR Convention. Under the amended Annexes II and III to the OSPAR Convention, the fourth criterion only allows for offshore storage of captured CO_2 if CO_2 streams "are intended to be retained in these formations permanently and will not lead to significant adverse consequences for the marine environment, human health and other legitimate uses of the maritime area". See Articles 3(2)(f)(iv) and 3(3)(d) of respectively Annexes II and III to the OSPAR Convention.

storage site concerned? The CCS Directive (Article 1) establishes a legal framework for the environmentally safe geological storage of CO_2, the purpose of which is the permanent containment of CO_2 in such a way as to minimize risks to the environment and human health. This would seem to suggest that incidental substances and tracers in the CO_2 stream should stay below levels that raise doubt about whether the CO_2 to be injected will be permanently contained after injection in the storage site concerned.

Finally, the criterion under (c) refers to the requirements imposed on the operators of capture installations by several EU environmental directives, such as Directive 85/337 (hereinafter EIA Directive),[31] Directive 2008/1 (IPPC Directive),[32] and Directive 2001/80 (LCP Directive).[33] The last two directives have been incorporated into the Industrial Emissions Directive, which entered into force in January 2010.[34]

Article 12(2) of the CCS Directive allows the Commission to adopt guidelines to help identify the conditions applicable, on a case-by-case basis, for respecting the criteria of Article 12(1). The Commission has recently published a draft guidance document for stakeholder consultation, part of which deals with CO_2-stream composition.[35] These guidelines contain indicative limits for various substances, which aim to protect human health, the environment, and the integrity of pipeline and storage infrastructure.

Article 12(3) of the CCS Directive provides for the commitment to observe the criteria set out in Article 12(1). Accordingly, the storage operator is to accept and inject a CO_2 stream only if an analysis of its composition and a risk assessment have been carried out, and only if the latter has shown that the containment levels are in line with the criteria of Article 12(1). The storage operator is required to keep a register of the quantities and properties of the CO_2 streams delivered and injected, including their composition.

III. Qualifying Captured CO_2 for Storage Under EU Internal-Market Provisions

When captured CO_2 for storage is transported across Member States' borders the TFEU free-movement provisions may apply, even when the CO_2 was captured in a non-EU country. The question is whether in that case the provisions on the free movement of services or those on the free movement of goods would apply. In other words: Do the

[31] *Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment,* OJ 1985 L 175. The IEA Directive provides that development consent for public and private projects which are likely to have significant effects on the environment should be granted only after prior assessment of the likely significant environmental effects of these projects has been carried out.

[32] *European Parliament and Council Directive 2008/1 concerning integrated pollution prevention and control*, OJ 2008 L 24. The IPPC Directive lays down measures to minimise polluting emissions into air, water or soil in order to achieve a high level of protection for the environment as a whole.

[33] *European Parliament and Council Directive 2001/80 on the limitation of emissions of certain pollutants into the air from large combustion plants*, OJ 2001 L 309. The LCP Directive sets limits on SO_2, NO_x and dust emissions.

[34] *European Parliament and Council Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)*, OJ 2010 L 334.

[35] *Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide – Draft Guidance Document 2*, supra, note 9, at 62.

transporters and storage operators handling captured CO_2 for storage provide a *service* to the capturer or are the three parties along the chain instead engaged in the trading of a *good*?

At first sight, it seems logical to assume that the TFEU provisions on the free movement of services apply. In the case of the geological storage of CO_2, both the transporter and the storage operator do not acquire the captured CO_2 for their own use. Rather, they help the capturer dispose of a substance that represents a cost to the capturer. CO_2 captured for storage represents a cost to the capturer as the company will generally participate in the EU's trading scheme for greenhouse gas emission allowances (EU ETS), which requires it to surrender an emissions allowance for each tonne of CO_2 emitted into the atmosphere. Captured CO_2 can even represent a cost to the transporter or storage operator, as both transport by pipeline (with a view to storage) and storage of greenhouse gas have been added to the activities covered by Directive 2003/87/EC.[36] Thus, any leakage of CO_2 during transportation or storage will have to be covered by emissions allowances.

However, case law seems to suggest that the provisions on the free movement of services are unlikely to apply. In the case of *Commission of the European Communities v. Kingdom of Belgium* (*Walloon Waste)*, the ECJ indicated that waste constituted a good within the meaning of the TFEU provisions on the free movement of goods.[37] The ECJ provided that "objects" which are transported cross-border "in order to give rise to a commercial transaction" are covered by the TFEU provisions on the free movement of goods "irrespective of the nature of those transactions".[38] Even though captured and transported CO_2 for storage is, as a consequence of Articles 35 and 36 of the CCS Directive, excluded from the scope of Directive 2006/12/EC on waste[39] and thus Regulation 1013/2006 on shipments of waste,[40] the ECJ's ruling in *Walloon Waste* is relevant for the classification of captured CO_2 for storage under the TFEU free-movement provisions; the point in common is that both non-recyclable waste and captured CO_2 for storage are *disposed of*, even though the latter is formally no longer classified as waste under EU environmental legislation.

The free movement of goods and the free movement of services are two of the four "fundamental freedoms" central to the effective functioning of the EU internal market.[41] Article 26(2) of the TFEU provides that "the internal market shall comprise an area without internal frontiers in which the free movement of goods, persons, services and

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[36] *European Parliament and Council Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC*, OJ 2003 L 275.
[37] Case C-2/90 *Commission v. Belgium* [1992] ECR I-04431.
[38] Para. 26.
[39] *European Parliament and Council Directive 2006/12/EC on waste*, OJ 2006 L 114. Directive 2006/12 has recently been repealed by *European Parliament and Council Directive 2008/98/EC on waste and repealing certain Directives*, OJ 2008 L 312/3.
[40] *European Parliament and Council Regulation No 1013/2006 on shipments of waste*, OJ 2006 L 190.
[41] See *Europa, Summaries of Legislation – Free movement goods: general framework*, available on the Internet at http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/free_movement_goods_general_framework/index_en.htm (last accessed on 14 February 2011).

capital is ensured". The free movement of goods allows goods originating, or in circulation, in the EU to be traded freely between Member States. The principle of the freedom to provide services enables the cross-border provision of services, allowing the service provider, service receiver, or the service itself to cross Member States' borders.

The EU provisions on the free movement of goods are contained in Articles 34 to 36 of the TFEU. Articles 34 and 35 prohibit restrictions on imports and exports between Member States. Article 36 contains a limitative list of grounds justifying restrictions on imports and exports, among which is the protection of the health and life of humans, animals, and plants. Alongside this list in Article 36, the ECJ in the case of *Rewe-Zentral A.G. v. Bundesmonopolverwaltung für Branntwein* (*Cassis de Dijon*) created a second, open category of derogations, namely the "mandatory requirements".[42] Since the case of *Commission of the European Communities v. Kingdom of Denmark* (*Danish Bottles*), this category includes the protection of the environment.[43]

IV. Assessing the Scope for Stricter Environmental Protection Measures

When assessing the scope for Member States to take more stringent environmental protection measures, two questions are of relevance. The first is whether the relevant subject matter has been exhaustively regulated by EU legislation.[44] The second is to what extent the applicable EU legislation harmonizes national legislation. In the following, the EU law concepts of, respectively, exhaustion and (minimum) harmonization will be briefly addressed.

1. Exhaustion

The concept of exhaustion is generally ill-defined and often confused with total harmonization, a form of harmonization which is discussed in section IV.2, below.[45] Basically, the question is whether the relevant area is "occupied by the EU". The drafting of legislation demands that various interests, often private as against public interests, are weighed and balanced. When assessing whether a specific area has been exhaustively regulated by EU legislation, the question is whether the specific weighing and balancing of interests that a Member State intends to do has already been done by the EU legislature (Parliament and Council of Ministers—hereinafter the Council). If this is the case, the subject matter has been exhaustively regulated and a Member State can no longer take unilateral legislative action (unless the EU legislation allows it to do so). When a specific matter has not been exhaustively regulated by EU legislation, legislative action (unilateral) by a Member State is not pre-empted.

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[42] Case 120/78 *Cassis de Dijon* [1979] ECR 00649, para. 8.
[43] Case 302/86 *Danish Bottles* [1988] ECR 04607, para. 9.
[44] See also Stephen Weatherill, *Pre-emption, Harmonisation and the Distribution of Competence to Regulate the Internal Market*, in The Law of the Single European Market, Unpacking the Premises, 41, at 51-52 (Barnard and Scott, eds., 2002). Weatherill identifies four questions in relation to particular (harmonizing) instruments of secondary legislation like directives and regulations, of which the question of the scope of coverage of the secondary legislation is the first.
[45] Piet Jan Slot, *Harmonisation*, 21 ELR, 378, at 389 (1996). The ECJ, for instance, often refers to "exhaustive harmonisation". See e.g., Case C-428/08 *Monsanto* [2010] ECR 00000, paras 60 and 90, Case C-165/08 *Commission v. Poland* [2009] ECR I-06843, para. 34, Case C-205/07 *Gysbrechts,* para. 33, and Case C-374/05 *Gintec* [2007] ECR I-09517, para. 34.

In a long line of case law, the ECJ has held that a Member State cannot rely on (possible) Treaty derogations (Article 36 of the TFEU)[46] to justify national legislation on a matter which has been exhaustively regulated by EU legislation.[47] Moreover, in a number of cases the ECJ has indicated that a national measure on a matter which has been thus exhaustively regulated must be assessed in the light of the provisions of the relevant harmonizing measure "and not those of the Treaty" (including Article 34 of the TFEU).[48] The case of *DaimlerChrysler A.G. v. Land Baden-Württemberg* (*DaimlerChrysler*) makes clear that when a national measure on an exhaustively regulated matter meets the requirements of the applicable EU legislation, a review of its compatibility with the Treaty provisions on the free movement of goods is not necessary.[49] Any such measure must, however, still comply with primary EU law, including the provisions on the free movement of goods.[50]

2. (Minimum) Harmonization

Once it has been determined that a specific matter has been exhaustively regulated by EU legislation, the next question is to what extent the applicable EU legislation harmonizes/replaces national legislation. In other words: what harmonization method has been chosen for the applicable Directive or Regulation? Several forms of harmonization exist in EU law, ranging from minimum harmonization to total harmonization.

In the case of minimum harmonization, minimum EU standards are set, and a Member State is, in principle, free to adopt stricter standards. The applicable EU legislation sets a floor, the Treaty sets a ceiling, and the Member State is free to pursue a domestic policy between the two.[51] In the case of total harmonization, national legislation is (fully) replaced by EU legislation and a Member State may not adopt stricter measures, unless otherwise provided for in the relevant EU legislation. In other words, exhaustive legislation in principle allows Member States to adopt stricter standards where there is minimum harmonization but prevents them from doing so for total harmonization.[52]

In the field of EU environmental policy, minimum harmonization measures can be enacted under either Article 193 of the TFEU (former Article 176 of the TEC) or Article

[46] These cases all relate to Article 36 of the TFEU.
[47] See Case 148/78 *Ratti* [1979] ECR 01629, Case C-29/87 *Dansk Denkavit* [1988] ECR 02965, Case C-169/89 *Gourmetterie* [1990] ECR I-02143, para. 8, Case C-5/94 *Hedley Lomas* [1996] ECR I-2553, para. 18, Case C-1/96 *Compassion in World Farming* [1998] I-01251, paras 47 and 64 and Case C-102/96 *Commission v. Germany* [1998] ECR I-06871, paras 21-22.
[48] Case C-150/88 *Parfümerie-Fabrik* [1989] ECR 3891, para. 28, Case C-37/92 *Vanacker and Lesage* [1993] ECR I-4947, para. 9, Case C-324/99 *DaimlerChrysler* [2001] ECR I-9897, para. 32, Case C-99/01 *Linhart and Biffl* [2002] ECR I-9375, para. 18, Case C-322/01 *Deutscher Apothekerverband* [2003] ECR I-14887, para. 64 and Case C-205/07 *Gysbrechts* [2008] ECR I-09947, para. 33.
[49] Case C-324/99 *DaimlerChrysler*, paras 44-46.
[50] The latter provided that the measure applies to imported or exported goods that originate or are in free circulation in the EU. See Joanne Scott, *Flexibility in the Implementation of EC Environmental Law*, in Yearbook of European Environmental Law, 37, at 41 (Han Somsen, ed., 2000).
[51] Michael Dougan, *Minimum Harmonization and the Internal Market*, 37 CML Rev. 853, at 855 (2000).
[52] Harrie Temmink, *From Danish Bottles to Danish Bees: The Dynamics of Free Movement of Goods and Environmental Protection – A Case Law Analysis*, in Yearbook of European Environmental Law, 61, at 68 (Han Somsen, ed., 2000).

114 of the TFEU (former Article 95 of the TEC). Like Article 193, Article 114 requires Member States to notify stricter protective measures to the Commission.[53] However, whereas the obligation to notify under Article 193 of the TFEU does not, within the national legal order, affect the validity of the rules not notified and their enforcement as against private individuals,[54] national provisions notified under Article 114(4) or (5) have to be approved by the Commission.[55] Member States are allowed to apply such measures only once they have been approved by the Commission.[56]

V. ARTICLE 193 OF THE TFEU AND SECONDARY EU ENVIRONMENTAL LAW

As indicated above, exhaustive legislation in principle allows Member States to adopt stricter standards where there is minimum harmonization but prevents them from doing so for total harmonization. In recent years, an intense debate has developed among EU environmental lawyers as to whether the content of secondary EU environmental legislation as such can prevent Member States from invoking Article 193 of the TFEU.[57] Put differently: can Article 193 prevent the EU legislature from adopting environmental legislation that leaves a Member State no scope for adopting more stringent national measures?[58] This is a particularly pertinent question, since Article 193 of the TFEU provides Member States with a Treaty base to adopt stricter national environmental standards.

The debate on the relationship between Article 193 TFEU and secondary EU environmental legislation[59] has been extensively covered in the literature and remains unresolved to date.[60] Rather than reiterating the different views in great detail as well as expressing my own opinion thereupon, I will focus on the ECJ's case law in this regard. Without denying the importance of the different opinions expressed in the literature, it is the ECJ's opinion on this issue which, in my view, matters most. Moreover, the

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[53] Article 114(4) and (5) of the TFEU.
[54] *Minimum Harmonization*, supra, note 51, at 880 and *Flexibility in the Implementation*, supra, note 50, at 39.
[55] Article 114(6) of the TFEU.
[56] See Case C-41/93 *French Republic v. Commission* [1994] ECR I-1829, para. 30 and Case T-69/08 *Poland v. European Commission* [2010] ECR 00000, para. 57.
[57] See Jan H. Jans and H. H. B. Vedder, European Environmental Law 107 (3rd ed. 2008). The same question can and has been asked in relation to Article 114 of the TFEU. See e.g., *From Danish Bottles*, supra, note 52, at 69 and Damian Chalmers, Gareth Davies and Giorgio Monti, European Union Law, 701 (2010).
[58] See e.g., Robert Schutze, *Cooperative Federalism Constitutionalised: The Emergence of Complementary Competences in the EC Legal Order*, 31 ELR 167, at 174 (2006).
[59] This relationship is closely linked to the general EU law principle of subsidiarity and the division of powers between the Member States and the EU legislature. The principle of subsidiarity is enshrined in Article 5(3) of the TEU which provides that in areas which do not fall within its exclusive competence, the EU shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level. The division of powers and the question of the level at which legislative action should be taken (obviously) are of great importance within (semi-)federal structures like the EU.
[60] See e.g., *European Environmental Law*, supra, note 57, at 107-108; *Cooperative Federalism Constitutionalised*, supra, note 58, at 174-175; Pål Wennerås, *Towards an Ever Greener Union? Competence in the Field of the Environment and Beyond*, 45 CML Rev. 1645, at 1164-1665 (2008) and *From Danish Bottles*, supra, note 52, at 69-70.

literature appears to lack an overview of the most recent cases before the ECJ on this matter (2007-2010).

Suffice to say that one view is that Member States can always adopt more stringent environmental protective measures, since (overriding)[61] primary EU law (Article 193 of the TFEU) literally says so,[62] and that according to the other view, EU environmental legislation can prevent Member States from taking stricter measures, because the introduction of the predecessor to Article 176 of the TEC[63] was solely meant to give the practice of using minimum harmonization clauses[64] a Treaty base and "not really intended to have legal consequences".[65]

The relationship between Article 193 of the TFEU and secondary EU environmental legislation has figured in several cases before the ECJ.[66] Even though the ECJ in these cases did not explicitly answer the question of whether the content of secondary EU environmental legislation as such can prevent Member States from invoking Article 193 of the TFEU, it did implicitly rule on the matter. The case of *Criminal proceedings against Giancarlo Fornasar et al.* (*Fornasar*) was one of the first such cases. In *Fornasar*, the ECJ, in assessing the degree of harmonization of the relevant EU environmental legislation, crucially noted that:

> it must be observed that the Community rules do not seek to effect complete harmonisation in the area of the environment. Even though Article 130r of the Treaty (now Article 191 of the TFEU) refers to certain Community objectives to be attained, both Article 130t of the EC Treaty (now Article 193 of the TFEU) and Directive 91/689 allow the Member States to introduce more stringent protective measures.[67]

According to Jans and Vedder, the ECJ's ruling seemed to have settled the "doctrinal dispute" over the relationship between Article 193 of the TFEU and secondary EU environmental legislation: secondary EU environmental legislation cannot prevent Member States from invoking Article 193 because EU environmental measures "do not seek to effect complete harmonisation".[68]

However, the ECJ's ruling was more complex than that.[69] True, the ECJ's remark that EU environmental measures do not seek to effect complete harmonization, as well as its

[61] The CJEU has confirmed the primacy of primary EU law over secondary EU law in several cases. See e.g., Case C-341/95 *Bettati* [1998] ECR I-04355, para. 61.
[62] See e.g., *Cooperative Federalism Constitutionalised*, supra, note 58, at 175; *Towards an Ever Greener Union?*, supra, note 60, at 1665 (2008) and *From Danish Bottles*, supra, note 52, at 70.
[63] Article 130t of the Treaty Establishing the European Economic Community (TEEC).
[64] A minimum a harmonization clause is a clause explicitly allowing Member States to adopt more stringent protective measures.
[65] See *European Environmental Law*, supra, note 57, at 108.
[66] Among these are Case C-203/96 *Dusseldorp* [1998] ECR I-04075, Case C-318/98 *Fornasar* [2000] ECR I-04785, Case C-510/99 *Tridon* [2001] ECR I-07777, Case C-6/03 *Deponiezweckverband*, Case T-387/04 *EnBW* [2007] ECR II-01195, Case C-219/07 *Nationale Raad van Dierenkwekers* [2008] ECR I-04475, Case C-100/08 *Commission v. Belgium* [2009] ECR I-00140, Case T-16/04 *Arcelor* [2010] ECR 00000, Case C-378/08 *ERG-I* [2010] ECR 00000 and Case C-82/09 *Kritis* [2010] ECR 00000.
[67] Para. 46.
[68] *European Environmental Law*, supra, note 57, at 109.
[69] See e.g., *Cooperative Federalism Constitutionalised*, supra, note 58, at 178.

reference to Article 130(t) of the TEC allowing Member States to introduce more stringent measures, could be read as supporting the view that EU environmental legislation cannot prevent Member States from adopting more stringent protective measures under Article 193 of the TFEU. Nevertheless, were the ECJ truly convinced of the latter, it could have stopped there. Instead, as we saw, it went on to refer to the relevant secondary legislation by stating that "both Article 130t of the EC Treaty ... *and Directive 91/689* allow the Member States to introduce more stringent protective measures". Moreover, by referring to the minimum harmonization clause in Directive 91/689 (Article 1(4)(ii)), the ECJ signified the importance it attaches to the wording of the relevant secondary legislation.

It can thereby be said that the ECJ has not ruled out the possibility of secondary EU environmental legislation preventing Member States from invoking Article 193 of the TFEU. Again, were the ECJ convinced that this would be impossible, the precise wording of the applicable secondary legislation (including possible minimum harmonization clauses) would have been irrelevant—for in that case Member States would, on the basis of Article 193 of the TFEU, always be allowed to adopt stricter environmental measures, regardless of the content of the relevant harmonizing legislation.

Nevertheless, it could also be argued that the ECJ, by referring to both Article 193 of the TFEU and the relevant harmonizing legislation, merely sought firmly to argue its point. Accordingly, the reference to Article 193 of the TFEU and the relevant harmonizing legislation does not indicate that the ECJ considered it necessary that both allow for more stringent protective measures.

However, the clear difference between the ECJ's ruling and Advocate General Cosmas' Opinion in the same case suggests that the ECJ did not refer to both Article 193 of the TFEU and the relevant harmonizing legislation just to be on the safe side. Contrary to the ECJ, Cosmas explicitly and forcefully argued that EU environmental legislation could not prevent Member States from adopting stricter protective measures, stating that the relevant system of waste classification could

> in no way exclude the competence of Member States, based directly on Article 130t, first to maintain or introduce their own autonomous definition of hazardous waste and, secondly, to take the necessary measures for the protection of the environment from hazardous waste.[70]

The ECJ clearly did not follow Cosmas' line of reasoning. Unlike the Advocate General, it took the content of the relevant harmonizing legislation into account in assessing the scope for Member States to adopt stricter protective measures. Considering the outspoken line taken by Cosmas, the ECJ must have been aware of the message it would convey by departing from the Advocate General's Opinion. In this light, it seems difficult to maintain that the ECJ referred to both Article 193 of the TFEU and the relevant harmonizing legislation merely for reasons of emphasis.

[70] Para. 40.

In the case of *Criminal proceedings against Xavier Tridon* (*Tridon*), the ECJ seemed to depart from its ruling in *Fornasar*. In this case, the ECJ contended that neither relevant Regulation (Regulations 3626/82 and 338/97)[71] precluded Member States from taking stricter measures in compliance with the provisions of the Treaty. It stated that:

> The introduction or maintenance of such measures is provided for, as regards Regulation No 3626/82, in Article 15 thereof, and, as regards Regulation No 338/97, which was adopted on the basis of Article 130s(1) of the EC Treaty (Article 192(1) of the TFEU), in Article 130t of the EC Treaty (Article 193 of the TFEU), which provides that the protective measures adopted pursuant to Article 130s are not to prevent any Member State from maintaining or introducing more stringent protective measures which must be compatible with the Treaty.[72]

According to the ECJ, the relevant stricter domestic measures were "adopted in a field in which secondary Community law does not preclude a Member State from taking measures stricter than those provided for by that law".[73] The ECJ therewith seemed to indicate that EU environmental legislation could not, in its view, prevent a Member State from taking stricter protective measures under Article 193 of the TFEU.

However, in a second preliminary reference ruling[74] on waste disposal, the ECJ seemed to distance itself from its line in *Tridon* and to return to the approach it took in *Fornasar*. In *Deponiezweckverband Eiterköpfe v. Land Rheinland-Pfalz* (*Deponiezweckverband*), the ECJ was asked whether Directive 1999/31 on the landfill of waste precluded more stringent national waste legislation.[75] The relevant German legislation contained, inter alia, stricter demands on the content of waste going to landfills. In a preliminary remark, the ECJ noted, as it did in *Fornasar*, that "the Community rules do not seek to effect complete harmonisation in the area of the environment".[76] In reference to its ruling in *Fornasar*, the ECJ went on to state that "Article 176 EC allows the Member States to introduce more stringent protective measures" and that that article "makes such measures subject only to the conditions that they should be compatible with the Treaty and that they should be notified to the Commission".[77] The ECJ then briefly analysed the content of the relevant provisions of Directive 1999/31, after which—and again referring to its ruling in *Fornasar*—it concluded that:

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[71] *Council Regulation No 3626/82 on the implementation in the Community of the Convention on international trade in endangered species of wild fauna and flora*, OJ 1982 L 384 and *Council Regulation No 338/97* on the protection of species of wild fauna and flora by regulating trade therein, OJ 1997 L 61.
[72] Para. 45.
[73] Para. 53.
[74] Article 267 of the TFEU contains the preliminary reference procedure through which the ECJ can give guidance to national courts on the interpretation of the Treaties and the validity and interpretation of acts.
[75] *Council Directive 1999/31/EC on the landfill of waste*, OJ 1999 L 182.
[76] Para. 27.
[77] Ibid. Some have read the phrase that Article 176 TEC "… makes such measures subject only to the conditions that they should be compatible with the Treaty and that they should be notified to the Commission" as illustrating the CJEU's support for the view that EU environmental legislation cannot prevent Member States from taking more stringent protective measures under Article 193 of the TFEU. See *Towards an Ever Greener Union*, supra, note 60, at 1665. These words could, however, also be read differently, namely that the ECJ merely states that Article 193 of the TFEU sets no further conditions than those mentioned in the article itself.

> *The wording and the broad logic of those provisions make it clearly apparent that they set a minimum reduction to be achieved by the Member States and they do not preclude the adopting by the latter of more stringent measures* ... It follows that Article 176 EC *and the Directive* allow the Member States to introduce more stringent protection measures that go beyond the minimum requirements fixed by the Directive.[78]

In assessing the scope for Member States to take more stringent protective measures, the ECJ, like it did in *Fornasar*, referred to both to Article 193 of the TFEU and the relevant secondary legislation, signalling the importance it attached to the wording and the "broad logic" of the latter. Likewise, the ECJ's ruling in *Deponiezweckverband* seemed to indicate that it did not rule out the possibility of EU environmental legislation preventing Member States from adopting stricter protective measures under Article 193 of the TFEU.

Several more recent cases (2007-2010) confirm the above picture of the ECJ being ambivalent about the relationship between Article 193 of the TFEU and secondary EU environmental legislation.[79] In the majority of these cases, the ECJ seems to have abandoned the line taken in *Fornasar* and *Deponiezweckverband* and to have returned to the kind of reasoning in *Tridon*.[80] These cases suggest that the ECJ considers Article 193 of the TFEU to provide sufficient basis for Member States to take more stringent protective measures, implying that the content of secondary EU environmental legislation cannot prevent Member States from invoking Article 193.

However, in cases like *Nationale Raad van Dierenkwekers en Liefhebbers VZW* (*Nationale Raad van Dierenkwekers*)[81] and *Raffinerie Mediterranee (ERG) SpA and others v. Ministero dello Sviluppo economic* (*ERG-I*),[82] the ECJ appears to have stuck to the approach it chose in *Fornasar* and *Deponiezweckverband*. In these cases, it again referred to the relevant harmonizing legislation when assessing the scope for Member States to take stricter protective measures. In contrast to the *Tridon*-like cases, *Nationale Raad van Dierenkwekers* and *ERG-I* seem to imply that the ECJ does not rule out the possibility of secondary EU environmental legislation preventing Member States from invoking Article 193 of the TFEU.

The above shows that the ECJ's jurisprudence on this matter is inconclusive and unclear. To date, it has still not provided clarity as to whether it considers secondary EU environmental legislation capable of preventing Member States from adopting stricter protective measures under Article 193 of the TFEU. The ECJ has neither ruled out the possibility that secondary EU environmental legislation cannot prevent Member States from invoking Article 193 of the TFEU to adopt more stringent protective measures nor that it can.

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[78] Paras 31 and 32, emphasis added.
[79] Case T-387/04 *EnBW*, Case C-219/07 *Nationale Raad voor Dierenkwekers*, Case C-100/08 *Commission v. Belgium*, Case T-16/04 *Arcelor*, Case C-378/08 *ERG-I* and Case C-82/09 *Kritis*.
[80] See Case T-387/04 *EnBW*, para. 112, Case C-100/08 *Commission v. Belgium*, paras 62 and 63, Case T-16/04 *Arcelor*, para. 179 and Case C-82/09 *Kritis*, para. 24.
[81] Para. 14.
[82] Para. 68.

VI. MEMBER STATE SCOPE TO ADOPT STRICTER CO_2 STREAM-PURITY CRITERIA

1. Exhaustion and CO_2 Stream-Purity Under EU Law

As indicated above, the first question when assessing the scope for Member States to take more stringent environmental protection measures is whether the specific weighing and balancing of interests that a Member State intends to do already has been done by the EU legislature. Member States are likely to adopt more stringent CO_2 stream-purity criteria to try to defuse public concerns over the safety and security of CCS. This would involve the weighing and balancing of several (competing) interests. One the one hand, there is the "public" interest of trying to appease public concerns over CCS in order to realize CCS demonstration. On the other hand, there is the private interest in having a sufficient degree of operating flexibility when deploying CCS.

In order to answer the question of whether the purity of the CO_2 stream has been exhaustively regulated under EU law, it is necessary to examine whether the above interests have been weighed in relation to the EU CO_2 stream-purity criteria. This requires a closer look at the objectives of the CCS Directive and Article 12 on CO_2 stream purity.

Article 1(1) of the CCS Directive provides that the Directive "establishes a legal framework for the environmentally safe geological storage of Carbon Dioxide (CO_2) to contribute to the fight against climate change". According to Article 1(2), "The purpose of environmentally safe geological storage of CO_2 is permanent containment of CO_2 in such a way as to prevent and, where this is not possible, eliminate as far as possible negative effects and any risk to the environment and human health".

From the wording of Article 1 of the CCS Directive, which covers the subject matter and the purpose of the Directive, it can be inferred that the objective of the Directive is to minimize the risks from CCS deployment to the environment and human health. The Directive provides a legal framework not just for the geological storage of CO_2 but for the *environmentally safe* geological storage of CO_2.[83] As underlined by the European Council in 2008,[84] the objective of proposing a regulatory framework for CCS was "to ensure that this novel technology would be deployed in an environmentally safe way".[85]

As for the objective of Article 12, according to recital 27 of the CCS Directive's preamble:[86]

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[83] See also recital 49 of the preamble to the CCS Directive, which mentions "the establishment of a legal framework for the *environmentally safe* storage of CO_2" (emphasis added) as the objective of the CCS Directive.

[84] The European Council consists of the heads of state or government of the Member States, its President and the President of the Commission. Even though the European Council does not formally participate in the EU legislative process, it is arguably one of the most important EU institutions since it defines the general political direction and priorities of the EU. For more information on the European Council, see its website at <http://www.european-council.europa.eu/> (last accessed on 15 February 2011).

[85] Recital 9 of the preamble to the CCS Directive.

[86] Even though the preamble to a Directive is not legally binding, it often reveals quite clearly the legislator's intentions behind the relevant Directive.

> It is necessary to impose on the composition of the CO_2 stream constraints that are consistent with the primary purpose of geological storage, which is to isolate CO_2 emissions from the atmosphere, and that are based on the risks that contamination may pose to the safety and security of the transport and storage network and to the environment and human health.

Recital 27 indicates that the purity criteria in Article 12, taking due account of the risks from contamination, are to ensure that captured CO_2 remains isolated from the atmosphere. The CO_2 stream-purity criteria are to prevent the captured CO_2 (and other substances in the stream) from leaking into the atmosphere and harming the environment and human health, by guaranteeing the safety and security of the transport and storage network.

However, while seeking to minimize the risks from contamination of the CO_2 stream, Article 12 provides industry with a significant degree of operating flexibility. The purity criteria in Article 12 are flexible and do not contain absolute limit-values for substance impurity.[87] As argued above, the formula "a CO_2 stream shall consist *overwhelmingly* of CO_2" allows for a case-by-case assessment of levels of impurity, recognizing the natural variation in storage-site characteristics and different transport constructions.[88]

At first sight, a Member State adopting stricter purity criteria to appease public concerns over the safety of CCS seems to weigh and balance interests which are different from those weighed and balanced by the EU legislature in the drafting of Article 12 of the CCS Directive. For in drafting Article 12, the EU legislature balanced the private interest of sufficient operating flexibility with the public interest of minimizing the risks from contamination of the CO_2 stream.

A Member State adopting stricter purity criteria to defuse public concerns over the safety of CCS would balance the private interest of sufficient operating flexibility with the public interest of appeasing public concerns over a CCS demonstration project. The primary objective of stricter purity criteria would in that case not to be to minimize risks from contamination of the CO_2 stream, that is, to protect the environment and human health, but rather to maintain public order. The conclusion could therefore be that Member States would be free to unilaterally adopt stricter purity criteria to appease public concerns over the safety of CCS, as this particular public interest has not been specifically taken into account by the EU legislature when drafting Article 12 of the CCS Directive.

Nevertheless, in the case of *The Queen v. Minister of Agriculture, Fisheries and Food, ex parte Compassion in World Farming Ltd* (*Compassion in World Farming*), the ECJ ruled that when interests not covered by the relevant harmonizing legislation, such as public policy or public morality, are secondary to and derive from an interest which *is* covered by that legislation, these apparently "non-harmonized" interests must be

[87] The guidelines on CO_2 stream composition do contain absolute limit values, but these are indicative and legally non-binding. Following Article 288 of the TFEU, only regulations, directives and decisions are legally binding. Guidelines are, however, administratively binding on the Commission itself. See to that extent e.g., Case C-351/98, *Spain v. Commission* [2002] ECR I-08031, para. 53.
[88] *International Marine Regulation*, supra, note 22, at 4506.

considered to have been taken into consideration by the EU legislature when drafting the relevant harmonizing legislation.[89] In other words, the subject matter has in that case been exhaustively regulated, even though the specific balancing that a Member State intends to do has only indirectly been done by the EU legislature.

Following the ECJ's ruling in *Compassion in World Farming*, it seems likely that the purity of the CO_2 stream must be considered to have been exhaustively regulated by the CCS Directive, even in relation to the public policy interest of appeasing public concerns over CCS. After all, public concerns over CCS to a large extent consist of worries over the consequences of CCS deployment for human health and the environment.[90] This includes worries over the consequences of "impure" substances in the CO_2 stream, such as H_2S. People are afraid of captured CO_2 (and other substances in the stream) leaking from pipelines or reservoirs and subsequently sickening or even killing humans, animals, and plants. The public policy interest of appeasing public concerns over the safety of CCS deployment derives from the public interests of minimizing risks from CO_2 stream impurities to the environment and human health.

As a consequence, the purity of the CO_2 stream for storage seems to have been exhaustively regulated under Article 12 of the CCS Directive, even in relation to the public interest of appeasing societal concerns over CCS. This means that Member States seeking to adopt stricter CO_2 stream-purity criteria in order to appease public concerns over the safety of CCS can no longer rely on the exceptions in Article 36 of the TFEU or one of the mandatory requirements to justify such (trade-restricting) measures. The sole framework for assessing whether Member States are allowed to adopt stricter CO_2 stream-purity criteria is the relevant harmonizing legislation, that is, the CCS Directive. In the following section, the second variable, that is, the degree of harmonization of the EU criteria on CO_2 stream purity is analysed.

2. The Degree of Harmonization in Article 12 of the CCS Directive

In several of the cases mentioned in section V, the ECJ paid close attention to the wording and the broad logic of the provisions in question as well as to the structure of the relevant Directive. Below, I will first examine the wording of Article 12 of the CCS Directive, after which I will turn to the article's broad logic as well as the structure/spirit of the CCS Directive.

The wording of Article 12 reveals, first, that the article does not contain a minimum harmonization clause, that is, there is no wording explicitly allowing Member States to adopt stricter CO_2 stream-purity criteria. The fact that Article 12 does not contain a minimum harmonization clause does not necessarily say anything about the article's degree of harmonization. Whereas such clauses frequently appeared in environmental

[89] Paras 65-66. In this case, the ECJ stated that public policy and public morality (in relation to animal welfare) were not invoked as a separate justification, but were "an aspect of the justification relating to the protection of animal health, which is the subject of the harmonising directive". See also Case C-165/08 *Commission v. Poland* [2009] ECR I-06843, para. 55.

[90] Another much voiced fear is that of sharp declines in property value due to CO_2 storage in geological reservoirs located under residential areas (see e.g., the cancelled CCS demonstration project in Barendrecht).

Directives two to three decades ago, environmental Directives nowadays usually do not contain minimum harmonization clauses. Some argue that Article 193 of the TFEU, as a direct constitutional limit for every EU environmental measure, has taken over the role of minimum harmonization clauses in environmental Directives.[91]

Second, Article 12 lacks the language typically hinting at minimum harmonization, such as the term "at least". This lack of typical "minimum harmonization language" is remarkable considering the fact that the CCS Directive contains a number of articles in which the words "at least" are used, hinting at the presence of minimum EU standards and minimum harmonization.[92] Article 15(3), for instance, provides that routine inspections of all CO_2 storage complexes shall be carried out *at least* once a year, leaving Member States free to require competent authorities to inspect those sites according to a more frequently. When looking at the wording of Article 12, the conclusion must therefore be that there seems to be nothing to suggest that the article constitutes minimum harmonization..

At first sight, the broad logic of Article 12 does not seem to oppose stricter national requirements on CO_2 stream purity. Stricter purity criteria would most likely contain either absolute limit values (hereafter impurity-limit levels) for or bans on impure substances, or minimum standards for CO_2 content, along the lines of the stricter criteria proposed by Parliament during the negotiations on the CCS Directive.[93] Such criteria would normally contribute to achieving the objective of Article 12 for they would likely reduce the risk of capture CO_2 leaking into the atmosphere and possibly harming the environment and human health.

Article 12 might, however, restrict the way in which Member States can impose such stricter criteria. This is due to the case-by-case approach underlying Article 12. This approach can be inferred from the use of the term overwhelmingly, which was, as I have indicated, deliberately chosen by the London Protocol's Scientific Group to prevent setting arbitrary levels for CO_2 stream components and which allows for a case-by-case assessment of levels of impurity. The EU legislature chose to use the same concept and require the CO_2 stream to consist overwhelmingly of CO_2, despite discussion among the Member States during the negotiations on the CCS Directive. During these negotiations, some Member States expressed their preference for defining purity/contaminants values at EU level, while others indicated that they wanted to retain the possibility the assess the required purity levels on a case-by-case basis.[94]

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[91] *Cooperative Federalism Constitutionalised*, supra, note 58, at 175.

[92] These are Articles 7, 9, 14, 15, 18 and 20. Considering the character of these articles which deal with e.g., reporting requirements, it is not surprising that these provisions set minimum standards. However, the subject matter of Article 12 as such would seem no less suitable for setting minimum standards.

[93] It is, after all, hard to conceive how further national requirements on the purity of the CO_2 stream could be stricter than the criteria contained in Article 12 of the CCS Directive without setting absolute limit-values for impurity substances, introducing a minimum standard for CO_2 content or banning certain impure substances.

[94] See Tim Dixon, *Future Direction of CCS Directive toward Defining CO2 Quality* (presentation), available on the Internet at http://www.co2captureandstorage.info/docs/oxyfuel/Discussion%20Purity/01%20-%20T.%20Dixon%20%28IEA%20GHG%29.pdf (last accessed on 11 March 2011).

However, this case-by-case approach not only follows from the crucial concept of overwhelmingly, but is also inherent in other criteria in Article 12. Moreover, it logically follows from the fact that the (desired) concentration of impure substances in a CO_2 stream is directly related to a large number of case-specific variables, such as the specific components in the feedstock, the capture process, any post-capture processing[95] and the specific type of transport infrastructure and storage formation. Impurity is not a stand-alone concept. Whether certain concentrations of incidental and added substances would adversely affect the integrity of transport and storage infrastructure (Article 12(1)(a)) or pose a significant risk to the environment or human health (12(1)(b)), can obviously only be assessed on a case-by-case basis. In the end, the physical characteristics of transport infrastructure and storage formations determine the levels of impurity required. This is illustrated by Article 12(2), which states that the Commission guidelines are " … to help identify the conditions applicable *on a case by case basis* for respecting the criteria laid down in paragraph 1".

The case-by-case approach underlying Article 12 limits the possibilities for Member States to further specify the EU purity criteria by means of national regulation. Article 12 would likely not allow Member States to adopt stricter purity criteria that would make a case-by-case determination of levels of impurity impossible. Whether stricter purity criteria would indeed make a case-by-case determination of impurity levels impossible to a large extent depends on the legislative instrument and manner by which these criteria would be imposed. Were stricter purity criteria to be imposed in a general manner, through, for instance, a decree regulating all individual cases,[96] such criteria would seem to collide with the broad logic of Article 12.

Were the same criteria, however, imposed through, for instance, permit authorizations, they would likely not collide with Article 12. Specific regulatory instruments like these would still allow for a case-by-case-assessment, thus preventing arbitrary limit values and guaranteeing a large degree of operating flexibility. The impurity-limit levels could be determined in individual cases on the basis of, among other things, the Commission's guidelines on CO_2 stream purity, and subsequently be imposed through the permitting process.

Likewise, a decree containing different criteria for various categories of CCS projects could conceivably still leave room for exact impurity-limit levels to be determined on a case-by-case basis. The sequestration of CO_2 by means of oxyfuel combustion technology, for instance, is likely to lead to lower levels of CO_2 in the captured CO_2 stream than CO_2 sequestration based on either pre-combustion or post-combustion technology.[97] Such differences could be accommodated by devising different criteria for the different categories of capture technology.

Finally, the scope for stricter national CO_2 stream-purity criteria can be assessed in the light of the structure and spirit of the CCS Directive. The character of the CCS Directive

[95] See *Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide – Draft Guidance Document 2*, supra, note 9, at 62.
[96] Such as the amendments proposed by Parliament during the negotiations on the CCS Directive.
[97] See *Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide – Draft Guidance Document 2*, supra, note 9, at 67.

has to a large extent been determined by the relatively novel nature of CCS technologies. Even though different parts of the CCS chain have been applied for quite a number of years now, experience with fully-integrated[98] large-scale CCS projects is still limited. Moreover, in relation to the long-term geological storage of CO_2 several uncertainties remain.

Being aware of this, the Commission gave itself a large role in the application of the Directive when drafting its proposal for the CCS Directive. For example, the Commission is to review draft storage permits (Article 10) and draft decisions of approval for the transfer of responsibility for a storage site from the operator to the competent authority (Article 18(4)). In doing so, it is to be assisted by a scientific panel composed of geology experts. According to recitals 25 and 33 and the Commission's Q&A on the CCS Directive, the Commission's central role is to ensure a consistent application of the Directive across the EU and to enhance public confidence in CCS.[99]

The adoption of stricter CO_2 stream-purity criteria by individual Member States would be likely to lead to an inconsistent application of the CCS Directive due to the development of different sets of criteria across the EU. However, contrary to an inconsistent application of other parts of the Directive (e.g. Articles 10 and 18) this should not be problematic from the point of view of the Directive's overarching objective, that is, minimising environmental and health risks from CCS.

The large role for the Commission in the application of the Directive is to prevent Member States from implementing safety requirements too casually. Competent authorities might hand out storage permits too easily or take on responsibility for a closed storage site too readily. This could lead to safety risks. Such risks, however, can be said to exist to a far lesser extent when individual Member States adopt stricter CO_2 stream-purity criteria. Stricter CO_2 stream-purity criteria would normally, in any event, not make the deployment of CCS technologies less safe.

However, an inconsistent application of the Directive's CO_2 stream-purity criteria could have other negative consequences. As argued earlier, the existence of different CO_2 stream-purity criteria across the EU could hinder the cross-border transportation and storage of captured CO_2, since it would likely increase costs along the CCS value chain. This would make the development of a cross-border EU market for CCS more difficult. Nevertheless, even though the CCS Directive recognizes the possibility of the cross-border application of CCS,[100] the development of a cross-border EU market for CCS is not one of the Directive's objectives. There is nothing in the CCS Directive to indicate that it aims at fostering the development of a cross-border EU market for CCS. Furthermore, it is highly unlikely that the CCS Directive would have been endorsed by the Council had that been the case. During the negotiations on the CCS Directive,

[98] The term fully-integrated refers to CCS projects that include all three parts of the CCS value chain, that is capture, transport and storage. Most of the early CCS projects dealt with parts of the value chain only.
[99] European Commission, *Questions and Answers on the Directive on the Geological Storage of Carbon Dioxide*, 17 December 2008, available on the Internet at < http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/798&language=EN> (last accessed on 7 December 2010).
[100] See e.g., Article 24 of the Directive on transboundary cooperation in cases of transboundary transport of CO_2 and transboundary storage sites or transboundary storage complexes.

several Member States voiced strong concerns over the safety of CCS, particularly in relation to the long-term geological storage of CO_2. For those Member States, facilitating the deployment of CCS at the EU level already represented a far-reaching concession, without going as far as incentivizing the cross-border application of CCS.

The CCS Directive intends to ensure that those Member States that wish to deploy CCS[101] do so in an environmentally safe manner. It does not, however, aim to facilitate the development of a cross-border EU CCS market. It could therefore be argued that an inconsistent application of the Directive's CO_2 stream-purity criteria does not conflict with the structure/spirit of the CCS Directive.

3. The conformity of stricter CO_2 stream purity criteria with primary EU law

Some might argue that an assessment of the scope for EU Member States to adopt stricter CO_2 stream purity criteria to appease public concerns over CCS is incomplete without a review of such measures' compatibility with primary EU law. Even in cases where a matter has been exhaustively regulated by EU environmental legislation, stricter national measures must be compatible with the provisions of the TEU and TFEU, including those on the free movement of goods. This is a direct consequence of the wording of Article 193 TFEU, which, as we have seen earlier, provides that more stringent protective measure " … must be compatible with the Treaties". I have argued that it is not clear that stricter CO_2 stream-purity criteria would be compatible with the TFEU free-movement provisions (Articles 34-36 TFEU – see section III), since they would likely increase costs along the CCS value chain. A CO_2 capturer looking to export captured CO_2 for storage to another Member State, the law of which contains stricter requirements on CO_2 stream purity than those in the capturer's national law, will have to further purify the CO_2 stream after capture. This will require extra energy and accordingly make export of captured CO_2 for storage more costly.

When reviewing the compatibility of national measures with primary EU law, the ECJ will normally first assess whether the allegedly infringing measure indeed falls within the scope of the applicable provision of primary law, in this case Article 34 of the TFEU. As a second step, the ECJ will determine whether the infringing measure can perhaps be justified by e.g., one of the grounds contained in Article 36 of the TFEU. In so doing, it will review the proportionality of the relevant national measure. The ECJ will first ask whether the measure is suitable to achieve the objective pursued ("suitability test") and will, second, ask whether the national measure does not go further than necessary to achieve the objective pursued ("necessity test"), that is whether there is no measure that is less onerous.[102] A measure must pass both sub-tests

[101] Article 4(1) explicitly and, considering Member States' sovereignty over their own sub-soil, needlessly provides that Member States have the right not to allow for any storage in parts or in the whole of their territory. This clearly reflects the problems certain Member States had with CCS during the negotiations on the CCS Directive.

[102] Some authors contend that the ECJ also applies a third element in its proportionality test ("proportionality strictu sensu"). See Gráinne de Búrca, *The Principle of Proportionality and its Application in EC Law*, *in* Yearbook of European Law 1993, 105, at 113 (A. Barav, D. A. Wyatt QC and Joan Wyatt, eds., 1994); Jan H. Jans, *Proportionality Revisited*, 27 LIEI 239, at 240 (2000) and Juergen Schwarze, European Administrative Law 859 (2006). This alleged sub-test requires that even if there are no less restrictive means, it must be established that the measure does not have an excessive impact on the

to be compatible with the general EU law principle of proportionality. As stricter national CO_2 stream purity criteria might hinder cross-border CO_2 trade, it could be argued that it is useful to assess how the ECJ would likely apply the proportionality principle when reviewing the compatibility of such criteria with the TFEU provisions on the free movement of goods.

However, the usefulness of such assessment is doubted here. In practice, the ECJ normally does not conduct such a review when a matter has been exhaustively regulated by EU legislation. The cases referred to in section IV.1 show that the ECJ, as soon as it finds a certain matter to have been exhaustively regulated by EU law, does not review the compatibility of the relevant national measure with primary EU law, such as Article 34 of the TFEU. This works two ways. In most of the cases referred to in section IV.1, the ECJ decided not to review the compatibility of the relevant national measure with primary EU law after it had found the measure to be *incompatible* with the applicable Directive/Regulation. However, in *DaimlerChrysler* the ECJ indicated that a review of a national measure's compatibility with primary EU law is also not necessary when the relevant rule *does meet* the requirements of the applicable secondary EU legislation.[103]

The logic of the ECJ's line of reasoning in this regard is compelling. It would be strange for a Member State to be allowed to adopt a national measure on the basis of Article 36 TFEU, while the relevant secondary EU legislation would preclude the same measure. Likewise, it seems unnecessary to review a national measure's compatibility with primary EU law if that measure is compatible with the applicable Directive/Regulation, since the latter can be considered to be in line with the provisions of the Treaties. If not, the Directive/Regulation would be illegal.

The case of *Deutscher Apothekerverband* provides an exception to the above rule.[104] In this case, the ECJ confirmed the principle that a national measure in a sphere which has been the subject of exhaustive harmonization at EU level must be assessed in the light of the provisions of the harmonising measure and not those of the Treaty.[105] However, it also provided that when the applicable EU legislation contains a minimum harmonization clause expressly stating that the power conferred on the Member States must be exercised "with due regard for the Treaty", " … such a provision does not, therefore, obviate the need to ascertain whether the national prohibition at issue in the main proceedings is compatible with Articles 28 to 30 EC (34 to 36 TFEU".[106]

In section VI.1, I argued why, in my opinion, the purity of the CO_2 stream has been exhaustively regulated by Article 12 of the CCS Directive, even in relation to the public interest of appeasing societal concerns over CCS. Assuming that this argumentation is correct, the ECJ would not likely review the compatibility of stricter CO_2 stream purity

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applicant's interests. See Takis Tridimas, *Proportionality in Community Law: Searching for the Appropriate Standard of Scrutiny*, *in* The Principle of Proportionality in the Laws of Europe, at 68 (Evelyn Ellis, ed., 1999). However, other authors dispute that the ECJ generally applies it as a separate element of the proportionality test. See Tridimas, *Proportionality in Community Law*, at 68 and Paul Graig, EU Administrative Law 670 (2006).

[103] Case C-324/99 *DaimlerChrysler*, Paras 44-46.

[104] Case C-322/01 *Deutscher Apothekerverband*.

[105] Para. 64.

[106] Para. 65.

criteria with primary EU law, but would rather assess such national measures in the light of Article 12 of the CCS Directive, like I have done in the above. Article 12 does not contain a minimum harmonization clause expressly obliging Member States to take due regard for the Treaty when devising stricter national rules.

It could be argued that such a duty, instead, directly follows from Article 193 of the TFEU and that therefore, when EU legislation that exhaustively regulates a matter is based on Article 192(1) TFEU, a national measure's conformity with primary law must be assessed, even when the relevant EU legislation does not directly refer to the Treaties. Nevertheless, the case of *DaimlerChrysler*, which involved EU legislation based on Article 192(1) TFEU (Regulation No 259/93),[107] seems to suggest that the latter is not the case. It can therefore be doubted whether an assessment of the proportionality of stricter national CO_2 stream purity criteria would be useful here.

VII. CONCLUSION

When drafting Article 12 of the CCS Directive, the EU legislature carefully balanced the private interest of sufficient operating flexibility with the public interest of minimizing the risks from contamination of the CO_2 stream to the environment and human health. Even though a Member State adopting stricter CO_2 stream-purity criteria to appease public concerns over CCS would not balance the exact same interests, the purity of the CO_2 stream for storage seems to have been exhaustively regulated at the EU level, even in relation to this public interest. Therefore, the sole framework for assessing whether Member States are allowed to adopt stricter CO_2 stream-purity criteria is the relevant harmonizing legislation, that is, the CCS Directive.

An analysis of the wording of Article 12 reveals that the EU CO_2 stream-purity criteria do not appear to constitute minimum harmonisation. Furthermore, stricter CO_2 stream-purity criteria would seem to be in line with the broad logic of Article 12 only if such criteria allow for a case-by-case assessment of levels of impurity. General impurity-limit levels applying to all individual cases would seem to collide with the broad logic of Article 12, as such criteria would not respect the case-by-case approach underlying the article. Finally, the structure/spirit of the CCS Directive does appear to allow for stricter national purity criteria, as such criteria are unlikely to compromise the safety and security of CCS deployment.

On the basis of these findings, the scope for EU Member States to adopt stricter CO_2 stream-purity criteria under EU law appears to be narrow. The wording of Article 12 does not seem to indicate that the EU CO_2 stream-purity criteria are minimum standards. Even though the structure/spirit of the CCS Directive and the broad logic of Article 12 do appear to allow for stricter purity criteria, the latter seems to rule out impurity-limit levels that apply in all individual cases. This is a direct consequence of the EU legislature's decision to follow the approach chosen in the London Protocol and OSPAR Convention. Accordingly, the scope for non-EU parties to the London Protocol and OSPAR Convention to adopt purity criteria (for offshore CO_2 storage) stricter than

[107] *Council Regulation No 259/93 on the supervision and control of shipments of waste within, into and out of the European Community*, OJ 1993 L 30.

those contained in both treaties seems likewise to be limited to criteria that allow for a case-by-case assessment of levels of impurity.