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Foreword

This 60 credit master thesis was written while I was a research assistant at the Nordic Institute of Maritime Law, under the supervision of Associate Professor Catherine Banet. The publication has been produced with support from the NCCS Centre, performed under the Norwegian research program Centres for Environment-friendly Energy Research (FME). I acknowledge the following partners for their contributions: Aker Solutions, Ansaldo Energia, Baker Hughes, CoorsTek Membrane Sciences, EMGS, Equinor, Gassco, Krohne, Larvik Shipping, Lundin, Norcem, Norwegian Oil and Gas, Quad Geometrics, Total, Vår Energi, and the Research Council of Norway (257579/E20).

The thesis considers a key legal issue posed to the forthcoming carbon capture and storage projects in Europe: whether the economic incentive to employ carbon capture and storage technologies ('CCS') under the European Union emissions trading system ('ETS') is available for CCS processes that employ mobile CO_2 transport.

Carbon capture and storage technologies are perceived by the International Panel on Climate Change and the International Energy Agency as a critical part of most pathways to curb global warming at 1.5 degrees Celsius.

Several European CCS projects are under development. The Norwegian Longship project and the Dutch Porthos project are the most progressed so far. These emerging CCS projects are considering mobile CO_2 transport as a key part of the project design to make the storage and transport networks available for decentralised capturing sources. Whether and how the ETS accommodates a CCS project design with mobile CO_2 transport is therefore vital for the potential commercial viability of these forthcoming projects.

This thesis focus on the legal issues posed to mobile CO_2 transport under the current ETS legal framework. The analysis considers the problems caused by the wording of key provisions and suggests a teleological

interpretation that makes the incentive for CCS under the ETS available for the CCS projects that employ mobile CO_2 transport.

The thesis is updated to include the most recent information on the Longship project, including the government investment decision and new industry partners. Furthermore, the text now includes a comment on the significance of a long-awaited legal opinion from the European Commission on the Longship project's legal status under the ETS. These inclusions, and minor structural changes, were added in collaboration with the examiners Sofie Vogstad Vold and Anne-Karin Nesdam.

A big thank you to all that have supported my work and provided valuable input. I look forward to continue the work with the NCCS research consortium as a Ph.d. candidate at the Nordic Institute of Maritime Law.

Heidi Sydnes Egeland,

Oslo, 16.11.2020

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1 Introduction

1.1 Research question and its significance for CCS in Europe

The research question of this thesis is whether the economic incentive set forth by the European Union emissions trading system ('ETS') to avoid emissions by employing carbon capture and storage ('CCS') technology is available for a CCS process that employs mobile CO_2 transport. This section provides a brief overview of the topic and why there is an urgent need for this analysis.

The threat posed by global warming prompts an acute need for greenhouse gas (GHG) emission reductions. To meet this need, the European Union (EU) legislator has adopted several legal instruments to obligate and incentivise emission reductions. The legal cornerstone of this climate policy is the European emissions trading system.[1] The ETS is the world's first and largest market for trading emission allowances.[2] The system's prime objective is to incentivise cost-effective emission reductions efforts.[3]

The ETS is based on the 'cap and trade' principle, where a cap is set on the total amount of GHGs that may be emitted by the activities subject to the scope of the market.[4] Any operator that seeks to perform these activities must obtain an emission permit ('ETS operators'). The cap is divided into emission allowances that are allocated to participants in the market, primarily by auctioning, and may subsequently be freely traded. The 'cap' is reduced over time in order to reduce total emissions. The ETS operators are required to surrender allowances equal to the total emissions from the preceding year, thus 'paying' for the GHGs emitted.

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1 Directive 2003/87/EC as amended, COM(2019) 640 final p. 6-5, European Commission a (nd).

2 Although others exist, see generally Newell *et al* (2013). China recently announced that 2020 will see a breakthrough for its efforts to establish a national carbon trading system, see Reuters (2020).

3 Directive 2003/87/EC as amended, Article 1.

4 See chapter 2 for a comprehensive overview of the ETS.

The market mechanism incentivises emission reduction efforts where that cost less than acquiring allowances.

Employing CCS is one option for avoiding emissions under the ETS. The CCS process consists of 'the capture of carbon dioxide (CO_2) from industrial installations, its transport to a storage site and its injection into a suitable underground geological formation for the purposes of permanent storage'.[5] ETS operators of industrial installations may thus reduce the number of allowances to be surrendered by employing a CCS process sanctioned and promoted by the ETS.[6]

Although the EU legislator has anticipated large-scale European CCS projects for some time, no concrete projects have materialised until now.[7] There is therefore great expectations associated with the forthcoming large-scale CCS projects in Europe. The two furthest progressed projects are the Norwegian Langskip ('Longship') project[8] and the Dutch Porthos project.[9] A key feature of these projects is the ability to employ *mobile transport modalities*, such as ships and trucks, to connect decentralised capturing points to a pipeline network that sends the CO_2 to permanent storage ('cluster projects'). Employing mobile connections allows for flexibility and enhances cost-efficiency depending on the distance travelled and volumes transported.[10]

These are the first large-scale CCS projects in Europe that aim to benefit from the economic incentive provided by the ETS for emission reductions by CCS. It is therefore a paradox that the ETS legal framework appear to solely enable CO_2 transport by *pipelines*, when the long-awaited forthcoming CCS projects rely on a business model that include mobile transport connections within the CCS process. It is this disparity that

5 Recital 4 to Directive 2009/31/EC.

6 Directive 2003/87/EC as amended, Article 12 nr. 3a.

7 See generally COM(2013)180, and Lupion & Herzog (2013).

8 The name 'Longship' was introduced as of the government investment decision in September 2020. The preliminary name 'Norwegian full-scale project', originally used in this thesis has been replaced by the new name prior to publication. Regjeringen.no (2020)c.

9 For a description of each project see section 1.2.2 below. Porthos is currently planned with pipelines, but envisage mobile transport if possible. Tamme (2020).

10 IPCC (2005), p. 5, Seglem (2020).

prompts the need for an analysis of the ETS legal framework and its application to mobile CO_2 transport within a CCS process.

The CCS-specific rules under the ETS aim to provide a clear economic incentive to reduce emissions by utilizing CCS technology, while simultaneously ensuring the environmental integrity and effectiveness of the process. The latter is sought ensured by imposing liability for any emissions associated with the separate phases of the CCS process. The current legislative design fails, however, to account for the mobile CO_2 transport connecting the separate CCS installations. A literal interpretation of the monitoring and reporting rules on CO_2 transfers, therefore, suggest that *all* CO_2 transferred to a mobile transport provider will be counted as liable 'emissions' under the ETS. This result is indicated by how the wording of those rules does not facilitate monitoring, reporting and verification of CO_2 onboard a mobile transport modality. This legal effect – essentially imposing liability for avoided emissions – would deprive the forthcoming CCS cluster projects of the economic incentive provided for CCS under the ETS.

This conundrum prompts the fundamental question of what 'emissions' the ETS imposes liability for: Does the ETS solely impose liability for CO_2 that is *definitively released into the atmosphere* or also CO_2 that *'leaves' the ETS scope of liability* in order to account for all potential release into the atmosphere?

The EU Court and the European Commission appear to be in disagreement with regard to this fundamental question. In the case C-460/15 *Schafer Kalk* the Court interprets the ETS Directive to impose liability for release of CO_2 into the atmosphere *only*, presupposing an implementing framework that manages to identify *actual* emissions. The Commission, which facilitates harmonised implementation of the ETS, has, however, adopted rules that by a literal interpretation impose liability on all CO_2 leaving the scope of the ETS – apparently without regard to whether that CO_2 is ever *actually* released into the atmosphere or not. This latter feature of the Commission rules is the reason why CO_2 transferred to a mobile CO_2 transport modality in a CCS process seems to be treated as 'emissions' by those implementing rules – even though that transport is undertaken as a necessary step in an emission reduction process.

It thus appears that the wording of the Commission rules on CO_2 transfers is in conflict with the superior norms set forth by the ETS Directive. The fact that a purely textual interpretation could produce conflict within the ETS hierarchy of norms indicates the need for an analysis of a possible alternative interpretation.

This thesis proposes a teleological interpretation that accommodates the use of mobile CO_2 transport in a CCS process within the current ETS legal framework. The current framework does not positively *enable* mobile CO_2 transport, but may arguably *accommodate* it. By employing a broad interpretation of the scope of an 'installation' performing a CCS-activity subject to liability under the ETS, the CO_2 transferred to the mobile transport phase will not entail an exit from the scope of the ETS. The proposed interpretation thus solves the challenge posed to the forthcoming CCS cluster projects, and furthermore resolves the conflict within the ETS hierarchy of norms with respect to the subject matter of mobile CO_2 transport.

No available legal opinion or literature provides an in-depth analysis of the ETS and its application to CCS processes with mobile transport modalities.[11] On July 27th 2020 the European Commission issued an opinion on the Longship project in response to questions sent by the Norwegian environmental authorities.[12] As discussed further in sections 1.3.2 and 4.3.3, the Commission's answer does not solve the question addressed in this thesis. The only pieces of legal opinion that briefly address this issue conclude that a transfer of captured CO_2 to a mobile transport modality instigates liability for not emitted CO_2.[13] By considering a broader scope of relevant legal sources, I reach a different

[11] As far as I have been able to research.

[12] The letter from the Norwegian environmental authorities was sent in August of 2019, see Norwegian Environmental Agency (2019). The answer was sent from the Commission on the 27th of July 2020, after the submission of this thesis, and mailed to me by the environmental authorities in September 2020, see Ministry of Climate and Environment (2020).

[13] A high-level legal report by Global CCS Institute & Bech-Bruun (2012), reiterated briefly in Global CCS Institute (2019), p. 33, and a recent master thesis that consult the wording of the framework, but not the implications of the case law and hierarchy of norms. O'Brien (2019), p. 21–22, O'Brien (2020)

conclusion. However, as the wording of the current ETS legal framework prompts diverging conclusions, there is a strong case for a revision of this framework in order to promote legal certainty for future CCS projects.

1.2 Background and topicality

1.2.1 Climate mitigation and the role of CCS

As explained above, the role and function of the forthcoming CCS 'cluster projects' are intrinsically linked to the need for emission reductions efforts to mitigate climate change. This section briefly introduces the role of CCS in the global fight against climate change (1.2.1), before the subsequent section presents the role of mobile CO_2 transport in the forthcoming European CCS cluster projects (1.2.2). The ETS and CCS legal frameworks are introduced in chapter 2.

The Paris Agreement acknowledges the need to mitigate global warming to 'well below' 2 degrees compared to pre-industrial levels.[14] It further recognises that halting the temperature increase to every fraction of a degree closer to 1.5 degrees is likely to induce consequences considerably less perilous for humans and the environment.[15] At the time of writing this thesis, the world is experiencing the COVID-19 pandemic with its detrimental consequences for human health and the global economy. Employing efforts to mitigate climate change is important for, *inter alia*, decreasing the risk of future pandemics.[16]

A variety of measures to mitigate climate change should be taken within all sectors of society in order to rein in the temperature increases.[17]

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[14] Paris Agreement Article 2(a), UNFCCC (2019), The Paris Agreement of 2015 is the most recent treaty in the United Nations Framework Convention on Climate Change (UNFCCC).

[15] UNFCCC (2019), COM(2018) 773 final, p. 2, endorsed by European Parliament 2019/2582(RSP).

[16] On the anticipated relationship between climate change and infectious diseases see Dunne (2020), Harvell *et al* (2002) and Altizer *et al* (2013). WHO (n.d.).

[17] For a range of envisaged measures see the EU policy framework set forth for climate and energy between 2020–2030 in COM(2014) 15 final.

Among these possible mitigation measures are also CCS technologies.[18] The interest in carbon capture, transport and storage technologies is driven by the need for emission reduction efforts that may be reconciled with the global economy's reliance on activities which produce GHG emissions.[19] Both the International Energy Agency ('IEA') and the International Panel on Climate Change includes CCS as an essential part of different viable pathways to mitigate dangerous climate change.[20]

For European leaders, the idea of CCS has gone from representing a purely transitional tool for the continued use of fossil fuels, to being a part of the long-term solution in order to produce hydrogen, decarbonise industries where the production of CO_2 is inevitable, and to achieve negative emissions with CCS applied to biogenic sources.[21] CCS now constitutes one of seven pillars in the vision for a climate-neutral Europe by 2050 published by the European Commission.[22]

The CCS process is sometimes referred to as the 'CCS value chain' or 'full-scale CCS'; there is no common definition for these terms, but they both refer to the three-phase process of capture, transport and permanent storage.[23] The emission sources form a CCS process include both emissions from leakage of captured CO_2 ('leakage emissions') and emissions from the operation of the process itself ('operative emissions').

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18 See Millar & Allen (2020) on the role and science of CCS in meeting the ambitious climate goals.

19 COM(2008) 18 final, para. 1.

20 IPCC 2014 *summary for policymakers*, IPCC 2018 *summary for policymakers* for an overview of the potential role of CCS in the viable pathways to towards the 2-degree and 1,5-degree targets respectively. And IEA (2016) for an overview of CCS application so far and its future role. IAMC (2018–2019) for a compilation of the emission scenarios for curbing global warming to 1,5 degrees. See also Haszeldine & Ghaleigh (2018), p. 30 making the case that no CCS = no 2-degree target, similarly Cicero (2020), CSLF (2017), p. 1.

21 Roggenkamp (2018), p. 245 on the role of CCS as a transitional tool, COM(2018) 773 final, p. 15.

22 COM(2018)773 final, p. 15. See also the role of CCS envisaged as part of the EU Green Deal in COM(2019) 640 final p. 6 and 8.

23 Recital 4 to Directive 2009/31/EC, See Holwerda (2014) p. 18–32 for a succinct overview of CCS – the concept and technology, and Bui & Dowell (2020) for a comprehensive scientific overview of CCS.

Carbon capture and utilisation (CCU) is another type of emission reduction option associated with capture technology.[24] Some CCU technologies aim to permanently store some, or all, of the CO_2 used, thus representing a *form* of CCS, or 'CCUS'.[25] The term 'CCU' will be used in this thesis as it is the term adopted by the legal frameworks. The appeal of CCU relates to how the CO_2 may be sold as raw material rather than solely stored, making a more substantial business case for the potential emission reductions.[26] This thesis focuses on the CCS processes and related transport options. However, the analyses demonstrate how the legal obstacle posed to the use of mobile CO_2 transport mirror the obstacles to the deployment of CCU for emission reduction purposes.

1.2.2 CCS in Europe and the role of mobile CO_2 transport

The three phases of CCS are separate but related. When regulating these phases, it is, therefore, important to take into account both their interdependence and the different manners in which a CCS process may be designed, including the use of transport modalities.

In terms of CO_2 transport, there are a variety of transport options technically available. The transport options include trains, trucks, pipelines, marine tankers (shipping), compressed gas cylinders, and a combination of them all.[27] Among these options, it is pipeline transport and shipping that are perceived to have the most significant potential.[28] Safety concerns, public opinion and lack of suitable storage sites associated with land storage have altered the focus from onshore to offshore storage possibilities.[29] This change prompts a shift in focus from pipeline transportation to shipping, as marine transport becomes

[24] For an overview of the different types of CCU/CCUS, see Ramirez (2020).

[25] Also referred to as CCUS (carbon capture utilisation and storage), see Monteiro (2018) however, as the term 'CCU' is the one used by the ETS legal framework, this is also the term used in this thesis.

[26] IOGP (2019).

[27] CSLF (2017), p. 18 and Holwerda (2014), p. 23–24.

[28] Ibid., Woerdman *et al* (2015), p. 183.

[29] Roggenkamp (2018), p. 246.

cost-competitive with pipelines over longer distances, depending on the volume transported.[30] If the storage site is far away from the capturing facility, it may even be economically *more* attractive to ship the CO_2 at least part of the distance.[31] In addition to the cost-advantage from reduced infrastructure cost, the mobile transport modalities of ships and trucks allow for flexibility in routes and no need for large-scale excavations to the detriment of on- or offshore environment.

The two CCS projects already in operation in Europe capture CO_2 in conjunction with the production of natural gas and LNG at the offshore petroleum platforms in the North Sea, off the coast of Norway.[32] The CCS operation at Sleipner has been in operation since 1996, while the operation at Snøhvit started in 2008.[33] Both operations transport the captured CO_2 to the storage fields by pipelines only, which best facilitates the transport of CO_2 from a single source CO_2 production unit to the geological storage sites.[34] The two CCS projects are commercially viable partly due to the imposition of the Norwegian CO_2-tax that applies to mineral products and therefore the production of natural gas.[35] These CCS processes do not concern emissions that are subject to liability under the ETS.[36] The projects are therefore not eligible for the economic incentive set forth under the ETS to employ CCS.

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30 See estimate made in 2005 by the IPCC Special Report on Carbon dioxide Capture and Storage, IPCC (2005), p. 5 and p. 192. Seglem (2020). See also CSLF (2017), p. 18–19, reviewing, *inter alia*, the potential for a combination of ships and pipelines, a likely design for cluster-projects with off-shore storage.

31 Roggenkamp (2018) p. 257.

32 Norsk Petroleum a. (2020).

33 Ibid.

34 Ibid. Sleipner Vest (2014/2020). Snøhvit/Hammerfest LNG (2014/2020).

35 The gas from the field contains a high amount of CO_2, of which large parts must be separated in order to obtain the desired composition of natural gas, making the CO_2 tax highly effective in incentivising CCS, see Norsk petroleum b. (n.d). Regjeringen. no (2020)b. NOU 2015:15, p. 63 on the effect of a carbon tax in petroleum industries. COM(2013)180 final, p. 14–15. See also Banet (2017) on the effectiveness in climate regulation of this concomitant imposition of two regulatory instruments that put a price on carbon.

36 It is only CO_2 captured from activities included under Annex I of the ETS that may lead to subtraction from the total emissions of an installation, see Commission Regulation No 601/2012 as amended, Article 49.

The price of CCS has, compared to the price of paying for emissions under the ETS, so far been a deterrence to deploying other types of large-scale CCS projects in Europe.[37] However, prompted by the rising price of CO_2 allowances under the ETS[38] in combination with widespread determination to cut emissions from national authorities and private entities, there is more traction for CCS in Europe at the moment. There are currently ten large-scale CCS projects underway in Europe, all at various stages of development.[39]

The main focus for these novel initiatives is to facilitate 'cluster projects' where a common transport and storage infrastructure can receive CO_2 from different capturing points that can individually connect, by different transport modalities, to the network injection area.[40] This cluster-focus helps reduce unit costs and enhances the storage efficiency of the projects.[41] These features fit well with the primary objective of the ETS; to let the market mechanism enable cost-effective emission reductions.[42] The two most advanced projects are the Norwegian Longship project, currently furthest progressed, and the Porthos project in the Netherlands. Both projects are recognised as 'Projects of Common Interest' by the European Commission.[43]

The Longship project is a collaboration between the Norwegian Government, Equinor, Shell, Total, Fortum Oslo Varme and Norcem.[44] The aim of the project is to 'induce new projects that may benefit from

37 European Parliament (2019). COM(2013)180, p. 14–15.

38 The price of emitting one tonne of CO_2 has steadily been rising since the fluctuations after the 2008-financial crises. Although the price plummeted pursuant to the first corona-epidemic shock, the price is, as of 18. June 2020 steadily on the rise, for live and historic price overview see Markets Insider (2020).

39 Global CCS Institute (2019), p. 43.

40 Tamme (2020), CSLF (2017), p. 18–19.

41 Global CCS Institute (2019), p. 43.

42 Directive 2003/87/EC as amended Article 1.

43 SWD (2019) 395 final p. 10. (section 12.4 – Northern Lights), and Port of Rotterdam (2019), p. 2.

44 CCSNorway (2020a), Norwegian Environmental Agency (2019), p. 1.

technology development and cost reductions through use of shared infrastructure."[45]

The design of the CCS process in the Longship project currently comprises the following phases: two decentralised points for the capture of CO_2, transfer to a proximate harbour by pipeline or mobile transport, intermediate storage, transport by ship about 700 km to a receiving terminal onshore at the West coast of Norway, intermediate storage in pressurised tanks before the CO_2 is injected in a pipeline network that sends it into one or more injection wells located on the seafloor.[46] From these currently planned capturing facilities, there is a potential of capturing 400 000 tonnes of CO_2 per year.[47] The transport network and storage field retain the capacity to receive CO_2 from about 1,5 million tonnes per year in the first phase of the project.[48] The plan is, therefore, to scale up the number of capturing plants as the project evolves.[49]

The two currently planned capturing plants comprise the cement production facility at Brevik operated by Norcem, and a waste incineration plant at Klemetsrud operated by Fortum Oslo Varme.[50] The short transport segment, connecting the capturing facilities to a proximate harbour, will be handled by the capturing facilities themselves. At the moment, it is most likely that the waste incineration plant will use trucks for intermediate transport, while the cement production facility will use a pipeline network.[51] The rest of the process, the shipping, pipeline network and storage facility, is handled by Equinor and partners.[52] The

45 Norwegian Environmental Agency (2019), p. 2.
Ibid., p. 1. Regjeringen (2020)a.

46 For an overview of the Longship project see *CCSNorway (2020a).*

47 Ibid.

48 Equinor (2020a).

49 Equinor, as the main operator of the transport and storage phases, has already signed memoranda of understanding with five additional industrial partners to develop value chains in 'CCUS' (carbon capture, utilisation, and storage) In addition to Fortum Oslo Varme and Norcem/Heidelberg Cement this includes: Air Liquide, ArcelorMittal, Ervia, Fortum Oyj, Heidelberg Cement AG, Preem, Stockholm Exergi, see Equinor (2019). This has now been extended to include Microsoft, see Fjeld & Norum (2020).

50 CCSNorway (2020a).

51 Norcem (2020a).

52 In collaboration with Total and Shell. CCSNorway (2020a).

essential point to note for the analysis below is that the envisaged CCS process may involve several mobile transport segments, depending on the nature of the project, and that different operators will commercially handle it. Offering to pick up CO_2 from a harbour proximate to the capturing plants is a central part of the Northern Lights business model and cost-effective design.[53]

There is an investment decision in place for the 'Northern Lights'-transport and storage venture between Equinor, Shell and Total.[54] The Norwegian government has, as of September 2020, decided to finance the capturing facility at Norcem, the cement production facility. The government will, however, partly support the capturing facility at Fortum Oslo Varme if sufficient additional financing sources can be retrieved.[55]

The Porthos project was initiated by the Port of Rotterdam Authority, EBN and Gasunie.[56] 'Porthos' is short for Port of Rotterdam CO_2 Transport Hub and Offshore Storage. The plan is to capture CO_2 from industry plants at the port of Rotterdam and transfer the captured CO_2 through a collective pipeline that runs through the port area.[57] The project is expected to store somewhere between 2–2,5 million tonnes of CO_2 per year.[58] If the final investment decision is made by 2021, the project may be operational by end 2023.[59] Porthos is currently planned with pipeline transport only. However, there are industries around the Rotterdam area that would be interested in sending their CO_2 to Rotterdam by non-pipeline transport.[60]

53 Feasibility report for transport made for Equinor by Gassco who on behalf of Gassnova, Seglem (2020).

54 Equinor (2020). Hovland (2020).

55 Regjeringen.no (2020)c.

56 Port of Rotterdam (2019), p. 2.

57 Rotterdam CCUS (n.d). Port of Rotterdam (2019), p. 2.

58 Ibid.

59 Ibid.

60 Tamme (2020)

1.3 Legal context, sources and methodology

1.3.1 The role of the Emissions Trading System within EU climate policy and the EEA Agreement

The ETS constitutes the central legislative tool to achieve the EU's increasingly ambitious emission reduction targets to mitigate climate change.[61] The ETS is thus part of the legislative regime set forth to attain the annual emission reductions needed to meet the Paris Agreement commitments.[62] The unique nature and functioning of the ETS are presented in chapter 2 below.

The original goal of reducing GHG emissions by at least 40 % by 2030 was proposed increased to 55 % in the recently published EU Green Deal.[63] Expanding the ETS to cover new sectors constitutes an integral part of that proposal.[64] On March 4th 2020, the European Commission proposed to adopt a 'European Climate Law' that commits the EU to a carbon-neutral economy by 2050.[65]

The legal instruments aimed at climate mitigation are adopted on the basis of Article 192(1) of the Treaty on the Functioning of the European Union (TFEU), which aims to realise the EU environmental policy set forth by TFEU Article 191 (1).[66] Combating climate change is one of the four overarching objectives of the EU environmental policy set forth by that provision. It holds that '[u]nion policy on the environment shall contribute to pursuit of the following objectives [including] promoting

61 Established by Directive 2003/87/EC.

62 Recital 2 to Regulation (EU) 2018/842.

63 Compared to pre-industrial levels, shared between both ETS and non-ETS sectors, see COM(2014) 15 final, p. 5. European Parliament (2019) COM(2019) 640 final, p. 4. Main climate legislation: Regulation (EU) 2018/841, Regulation (EU) 2018/842, Directive 2003/87/EC as amended.

64 COM(2019) 640 final, p. 4.

65 COM(2020) 80 final 2020/0036 (COD), COM(2019) 640 final, p. 2. European Parliament 2019/2582(RSP).

66 European Parliament (2019).

measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change'.[67]

Most of the EU climate legislation is incorporated in the European Economic Area (EEA) Agreement, aligning the climate mitigation measures across the EU and European Free Trade Area (EFTA) member states.[68] The ETS legal framework was included in the EEA Annex XX by the decision nr. 146/2007 of the Joint EEA Committee.[69] Aligning climate policies within the EEA enables the internal market due to how disparate environmental standards could distort competition.[70] The extension of the ETS to include the EFTA States is significant for the ability to employ pan-European CCS cluster projects, such as the Norwegian Longship project.

1.3.2 Legal sources and methodological considerations

As set out above, this thesis exposes an inherent uncertainty regarding whether the current ETS framework accommodates mobile CO_2 transport in a CCS process, and proposes to resolve that uncertainty by applying a contextual and teleological interpretation.[71] The analysis presupposes a basic knowledge of the distinctive EU 'legal order' and the fundamentals

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67 This was added to the EC Treaty by the Treaty of Maastricht. It corresponds to Article 174 of the Treaty of the European Union.

68 EFTA (2015), see Jaeger (2020). Though 'climate change' is not an explicit objective set forth in Article 73 of the EEA Agreement, which is otherwise similar to TFEU 191, it is unlikely to have any 'practical effect' on the commitments to the EU secondary law concerning climate action explicitly incorporated under Annex XX to the EEA Agreement, see to that end Arnesen et al (2018), p. 717.

69 On the inclusion of the ETS to the EEA see EFTA (2012), for reflections made prior to the inclusion see Nordic Council of Ministers (2007), p. 39–44, and on the specific relation between Norway and the ETS see NOU 2012:2 p. 567.

70 Arnesen et al (2018), p. 713.

71 The basics of EU legal methodology set forth by the European Courts of Justice is summarised succinctly as "'beginning with the ordinary meaning to be attributed to those terms in their context and in the light of the objectives of the Treaty', see i.e. case C-53/81 *Levin v Staatssecretaris van Justitie,* para 9, repeated in settled case law thereafter.

of EU legal methodology.[72] This section is limited to specific methodological issues relevant for this thesis, and significant aspects of the scope of legal sources addressed.

EU legal methodology is characterised by its emphasis on the systematic inner and outer context of the legislation set forth and the objectives it pursues.[73] These methodological features are particularly important when interpreting the ETS, considering the complex and 'closed' nature of that legal ecosystem. The directive-specific legal definitions and concepts of the ETS Directive facilitate coherent application within the ETS. There is consequently limited utility to draw from other EU secondary law instruments.[74] The legal sources in this thesis therefore primarily consist of the ETS 'legal framework' which comprises the ETS Directive as amended and the implementing regulations adopted by the Commission based on powers conferred by the ETS Directive.[75] These instruments are introduced in chapter 2.

The hierarchy of norms within the ETS legal framework dictates that the subordinate norms of the Commission's implementing regulations must be interpreted within the legislative context and boundaries set by the ETS Directive. The importance of adhering to the specific boundaries of secondary legislation is key to upholding the basic principle of subsidiarity and conferral, as set forth by Treaty of the European Union (TEU) Article 5(2) and (3) and emphasised by the access to judicial review of the legality of measures that lack competence pursuant to TFEU Articles 263

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72 Case 26/62 *Van Gend & Loos* para. 3. For a comprehensive overview of European legal methodology, see Riesenhuber (2017), in particular, pages 233–259 on the interpretation of EU secondary law.

73 For an overview of the importance of the contextual and teleological interpretation of EU secondary law see p. Riesenhuber (2017) p. 241 and 249–254, Fredriksen & Mathisen (2019) p. 396, 404–405 and 410–412. Also referred to as 'meta-teleological interpretation', see Gerards (2012), p. 34.

74 Such as the Environmental Liability Directive (Directive 2011/92/EU), as that Directive concerns pollution and 'emissions' within a different legal context.

75 Directive 2003/87/EC as amended, with implementing regulations, including but not limited to: Commission Regulation (EU) No 389/2013, Commission Regulation (EU) No 601/2012 as amended, Commission Implementing Regulation (EU) 2018/2067.

and 267.[76] The area of environmental policy set forth by TFEU Article 191, is subject to the categorisation of 'shared powers' pursuant to TFEU Article 4(2) e). Wherever the EU has exercised its legislative power within the area of the environment, such as with the ETS, this legislative effort pre-empts competing member state action, as set forth by TFEU Article 2(2).[77] However, this pre-emption only reaches as far as the limits of the specific secondary legislation enacted. Thus, the boundaries of the ETS Directive determine where the member states' competence is still intact. This means that if an implementing act, such as the Commission monitoring and reporting regulation under the ETS, expands the scope of the ETS Directive, then the Commission has illegitimately pre-empted a broader scope of the shared powers within the area of environmental policy.

The forthcoming CCS cluster projects that rely on both mobile and pipeline transport raise novel legal questions that have yet to be considered before either the CJEU or EFTA court. There are, however, two cases from the CJEU that considers two of the central directive-specific concepts central to the interpretation. Case-460/15 (*Schaefer Kalk*) addresses the directive-specific definition of 'emissions' and its implications for the rules on the Commission implementing level, as similarly addressed in this thesis. The second case, Case C-158/15 *EPZ*, guides the interpretation of the ETS directive-specific definition of an 'installation' in ETS Directive Article 3(f). Other cases consider this definition, but only the *EPZ* considers the nature of a 'directly associated activity' within the installation definition, as is the relevant consideration in this thesis. It is anticipated that Case C-617/19 *Granarolo,* currently pending before the CJEU, will provide additional guidance to this interpretation when the ruling and associated opinion are delivered.[78]

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[76] See generally Craig & de Búrca (2015) chapter 14 and 15 on the access and grounds of consideration of review of legality.

[77] Ibid., see generally p. 83–86 on shared competences and implications of pre-emption and retained powers.

[78] Case C-617/19 *Granarolo* (pending).

As is the common trait for CJEU case law, these preliminary rulings are limited in detail. The associated Advocate General Opinions are, therefore, addressed as part of the analysis in order to shed light on the ruling insofar as the courts rely on the reasoning of the Advocate General opinion.[79]

There are relevant Commission guiding documents on the interpretation of the ETS legal framework. Commission guiding documents are considered part of the EU 'soft law', generally defined as 'rules of conduct which have no binding legal force but which nevertheless may have practical effects'.[80] Although not formally binding, it was stated quite clearly in already in the Case C-322/88 *Grimaldi* case that soft law 'cannot be regarded as having no legal effect,' and that national courts are urged to 'take into consideration' relevant soft law.[81] Whenever specifically or generally relevant soft law instruments induce harmonised praxis, it will be particularly important to consider by the courts and national authorities to attain uniform application of community law.[82] The guiding documents and their suggested application of the secondary law are, therefore, important to consult, but do not prevail if it comes to a clear conflict with the relevant provisions they interpret. There are also a few supplementary guiding documents issued by the national authorities that enforce the ETS.[83] However, these do not elaborate on the relevant concepts in this thesis beyond that of the Commission guiding documents.

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79 Craig and De Búrca (2015), p. 61. See also comment on how AG opinions influence the workings of the EFTA Court in Skouris (2014), p. 10–12. Fredriksen & Mathisen (2019) p. 417–418.

80 Definition proposed by Snyder (1993), p. 32. Soft law includes not only opinions and recommendations, but also resolutions, declarations, action programmes and plans, communications, notices, guidelines and inter-institutional arrangements, see Stefan (2013) for a comprehensive overview of EU soft law in court.

81 Case C-322/88 Grimaldi, para 18.

82 See generally Kovács et al (2016), Stefan (2012), Stefan (2013) Chapters 6–8.

83 Danish authorities refer to the Commission documents, see Danish Energy Agency (n.d). UK issues their own guidance, which mostly consist of a simplified version of the Commission guiding documents, see Environemental Agency UK (2018). The emission permits issued by Norwegian authorities refer to the Commission MR Guidance Document 1, see inter alia, Sleipner Vest (2014/2020), p. 24.

The European Commission has issued a short opinion to the Norwegian government on the legal status of the mobile CO_2 transport segment in the Norwegian Longship project. This opinion, requested in 2019, was not received until July 2020, after the submission of this thesis.[84] The opinion is, therefore, not integrated into the analysis below.[85] The Commission shares the view of the Norwegian Environmental Authorities, as well as the main conclusion of this thesis, that the mobile CO_2 transport segment does not deprive the stakeholders in the project of the incentive set forth by the ETS to employ CCS. The opinion does not, however, address any of the legal issues that arise with such a conclusion, nor the inconsistencies in the legal framework. It merely accepts the practical solution suggested by the Norwegian authorities. The analysis in this thesis thus remains relevant for understanding the complexity and inherent problems associated with the legal status of different CCS projects under the ETS.

The opinion issued by the Commission does not retain any binding legal effect on its addressee,[86] and is considered a 'soft law' instrument – thus not strictly binding on a court. However, it does retain a certain practical 'self-binding' effect on the Commission itself, as a consequence of the fundamental legal principles that direct and contain the use of executive power.[87] According to settled case-law, the principles of, *inter alia*, protection of legitimate expectations, non-discrimination and legal certainty, denote that the Commission may only deviate from soft law instruments that it issues if there is a sufficiently good reason and the deviation does not breach the general principles.[88]

As the Commission is not competent to instigate proceedings concerning the application of the ETS legal framework within the EFTA member

[84] The Ministry of Climate and Environment (2020). The thesis was submitted at the 22nd of June 2020.

[85] Norwegian Environmental Agency (2019).

[86] TFEU Article 288(5).

[87] See Kovács *et al* (2016), p. 67.

[88] See inter alia, C-189/02 P *Dansk Rørindustri* para. 209–211 and C-167/04 P *JCB* para. 207 with further references. For a general overview of the conditions of deviation see Stefan (2013), p. 201–227.

states, the 'self-binding'-effect will not have practical implications in relation to Norwegian authorities. It could, however, become relevant if the Commission pursued proceedings in relation to the Dutch Porthos project, provided that the subject matter is sufficiently similar.[89] In terms of the application of the opinion in an encounter between EFTA Surveillance Authority (ESA) and the Norwegian authorities, it is clear that ESA is free to interpret the legal framework independent of the Commission. However, the two institutions are likely to find common ground in their efforts to achieve regulatory homogeneity within the EEA.[90]

The letter from the Norwegian Environmental Agency to the Commission outlines a possible way of practically accommodating the mobile CO_2 transport segments under the ETS legal framework. The legal reasoning is sparse, as the letter is not meant as a final legal opinion from the Agency, but as a request for an opinion from the Commission on the correct interpretation.[91] As this letter is neither a final legal opinion nor an illustration of actual praxis, and therefore not a legal source, I will only refer to it where it contributes to the discussions in my analysis. Within the scope of this thesis, the main function of this letter is how its existence demonstrates the uncertainty associated with the application of the ETS to mobile CO_2 transport modalities, and how there is a consequent need for an in-depth consideration of this subject matter.

This thesis is solely concerned with the interpretation and application of EU law. It falls outside the scope of this thesis to consider any nuances that may arise from the application of the ETS within the EFTA pillar. Wherever this thesis refers to the Lonship project, it is meant as an *example* of a CCS project that uses mobile CO_2 transport. The analysis does not, therefore, intend to make any definitive conclusions regarding

89 TFEU Article 258(2) provides the Commission with broad powers to bring infringement proceedings against member states in case the process for achieving an amicable solution pursuant the amicable procedure in Article 258(1), see Craig & De Búrca chapter 12. The EFTA Surveillance Authority retains similar powers in respect of incompliance by EFTA States pursuant to the SCA Article 31.

90 The Commission and ESA retain the same objective of surveying the internal market and are even obliged to cooperate within the area of competition, see EEA Agreement Article 58, and Arnesen *et al* (2018), p. 566–567.

91 Norwegian Environmental Agency (2020).

the application of EEA law to that project. It is, however, unlikely that the interpretation and application of the ETS will retain any notable differences within the two legal orders due to the common objective of attaining judicial homogeneity within the EEA.[92] Both the CJEU and the EFTA Courts have repeatedly confirmed the principle of homogeneity by adopting uniform application of the relevant EEA law.[93] Uniform application of the ETS legal framework within both the EU and EFTA pillars is imperative for the well-functioning of the EEA Single Market and similarly for the forthcoming pan-European CCS projects.[94]

1.4 Outline

This thesis aims to answer the question of whether the economic incentive set forth by the ETS to employ CCS is available for CCS projects that use mobile CO_2 transport. This question may only be answered by reference to the nature and functioning of the ETS legal framework and its application to CCS. These general, but necessary, points of departure are introduced in chapter 2.

Chapter 3 analyses the prerequisites that operators involved in a CCS process must observe in order to attain the economic incentive set forth for using CCS as an emission reduction option under the ETS. The chapter concentrates on how the relevant provisions apply to the CO_2 transport segment. The analysis demonstrates how the wording of the Commission implementing rules on CO_2 transfers solely facilitate the use of pipeline transport. The effect of such a textual interpretation appears to instigate a duty to 'pay' for CO_2 transferred to a ship or a truck – as if that CO_2 was emitted into the atmosphere. The chapter concludes by discussing how

92 Recital 15 to the EEA agreement, Article 6 EEA Agreement and Art 3(2) SCA.

93 These cases demonstrate how the principle of homogeneity prompts the convergence of interpretation of the EU and EFTA courts: E-9/07 and E-10/07 *L'Oréal*, E-28/15 *Jabbi*, E-4/19 *Campbell* and finally C-897/19 *I.N.* See generally Skouris (2014) on EEA and the Role of the CJEU. There is, however, a possibility for *ultra vires* challenge of the Committees decision to include the ETS under the EEA Agreement, as settled by Case E-6/01 *CIBA* para. 33, see generally Arnesen et al (2018), p. 917.

94 Skouris (2014), p. 5.

that textual interpretation not only undermines the aim of incentivising CCS by means of the ETS, but also appears to be in conflict with superior norms within the ETS legal framework.

Chapter 4 builds on the findings in chapter 3 by considering a teleological interpretation of the same provisions considered in chapter 3. The interpretation centres on the ability to include a mobile CO_2 transport segment within the scope of liability of one of the CCS installations it connects, i.e. the capturing facility. This inclusion implies that any leakage of the captured CO_2 onboard a mobile CO_2 transport segment is accounted for within the ETS scope of liability. This interpretation prompts the related question of whether the capture facility operator, as one of the installations potentially responsible for the mobile CO_2 transport phase, also incurs liability for the operative emissions of the mobile transport segment. This latter question is addressed separately in chapter 4. The interpretation proposed in that chapter makes the economic incentive set forth for CCS under the ETS available for CCS processes that employ mobile CO_2 transport, while at the same time ensuring the integrity of the system through monitoring and control with emissions.

Chapter 5 provides a summary of conclusions, recommendations for how the ETS may be amended to not only accommodate, but more directly *enable* mobile CO_2 transport, and finally some reflections on the ETS and its ambition to facilitate emission reductions.

The legal issues addressed in this thesis could be presented in many ways. I have chosen this structure to emphasise the inherent problems in the system and to demonstrate the possible interpretative solution available within the current framework.

2 The Emissions Trading System and its application to CCS

2.1 Introduction

Since its simple beginnings in 2005, the ETS has become a large and complex legal 'eco-system' developed through distinct trading phases.[95] It was adopted to aid the EU in meeting its Kyoto Protocol emission reduction targets,[96] and now represents a cornerstone of the EU's contribution to the emission reduction targets of the 2015 Paris Agreement.[97] The ETS' scope and efficiency will be reviewed in conjunction with each global stocktake under the Paris Agreement.[98]

The scope and obligations of the ETS are thoroughly revised with each new trading phase.[99] The first ETS Directive provided for the two introductory phases of the ETS: the first 'trial and error' trading phase form 2005–2007, and the second trading phase from 2008–2012.[100] The ETS is currently in phase three (2013–2020), which came with the 2009-amendment of the ETS Directive.[101] The 2018-amendment of the ETS Directive mainly prepares for the fourth trading phase commencing in January 2021.[102] The subsequent trading periods will each last seven years.[103]

95 Directive 2003/87/EC as amended.

96 Recitals 1-5 to Directive 2003/87/EC. See for a general introduction to the Kyoto Protocol within the EU see Massai (2011).

97 Recitals 1-4 to Directive (EU) 2018/410. European Commission (2015), p. 8. See Ellerman *et al* (2016) for an overview of the history and evolution of the ETS.

98 Paris Agreement Article 14, recital 24 and Article 1(37) of Directive (EU) 2018/410 amending Article 30 of Directive 2003/87/EC (the ETS Directive), European Commission b (n.d); first stocktake expected to take place in 2023.

99 European Commission (2015), p. 4. Zeben (2014), p. 109.

100 Directive 2003/87/EC amended by Directive 2004/101/EC, the 'linking directive', establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms.

101 Directive 2009/29/EC amending Directive 2003/87/EC.

102 Directive (EU) 2018/410, European Commission b. (n.d)

103 Van Calster (2017), p. 258. (no official reference found)

CCS was not a reduction emission option explicitly enabled by the ETS until the commencement of the third trading phase.[104] When eventually included under the ETS, the CCS process was introduced into a compliance regime based on the idea of emissions from distinct industrial installations – not a framework designed to accommodate an integrated emission reduction process. It is through this disparity that the challenges posed to CCS processes employing mobile CO_2 transport arise. In order to correctly interpret and provide suggestions as to how the ETS may accommodate the forthcoming CCS cluster projects, it is therefore necessary to introduce the main elements and mechanisms set forth by the complex ETS system.

This chapter explains the main elements of the ETS legal framework, which is necessary for the in-depth analysis of the CCS-specific provisions in chapters 3 and 4. The chapter starts by, firstly, introducing the ETS Directive as the constituting legislative act (2.2), and thereafter the subordinate Commission regulations that implement the ETS through a rigorous system of monitoring, reporting and verification of emissions (2.3). Thereafter, I go on to explain the 2009-legislative effort to promote CCS in Europe: the adoption of rules on the safe geological storage of CO_2 in the CCS Directive, and the amendment of the ETS legal framework to accommodate CCS as an emission reduction option (2.4). The final section (2.5) considers whether or not the CCS-specific rules were designed to intentionally inhibit the use of mobile CO_2 transport, which provides an important backdrop for the analyses in chapters 3 and 4.

2.2 The Emissions Trading System Directive

2.2.1 Overview

The ETS Directive as amended sets forth the ambitious legal framework that establishes the EU emissions trading market.[105] The main objective is

[104] Directive 2009/29/EC amending Directive 2003/87/EC.

[105] For further literature on the ETS see, inter alia, Woerdman et al (2015) chapter 3, Spinelli (2017), chapters 1 and 4. Krämer (2019), chapter 9. Weishaar (2009), Zeben (2014), Ellerman *et al* (2010).

to 'promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner' and to escalate emission reductions 'as to contribute to the levels of reductions […] necessary to avoid dangerous climate change'.[106]

As the title suggests, the commodity traded on the market is emission allowances. One 'allowance' gives permission to emit one tonne of CO_2.[107] A 'cap' is set for the total amount of GHG emissions that may be emitted by the activities subject to the scope of the ETS.[108] This cap is divided into allowances, distributed among the operators of the activities within the market and subsequently freely traded.[109] This is known as the 'cap and trade' approach of emissions trading.[110]

Each operator is obligated to 'pay' for the emissions that fall within its scope by annually surrendering the number of allowances that corresponds to the total GHGs emitted.[111] The default method for the distribution of allowances is through auctioning.[112] Ensuring compliance with this basic obligation is key to attaining the emission reductions that the ETS aims to facilitate. Compliance is motivated by the hefty fine imposed on the operators that fail to surrender the requisite number of allowances.[113]

The scope of liability of each ETS operator is facilitated by subjecting the *installations* that perform *activities* listed in the Directive's Annex I to liability for emissions. As of the start of the ETS in 2005, no operator of an installation may perform an Annex I activity without holding an emission permit issued by the relevant national authority.[114] That emission

106 Directive 2003/87/EC as amended Article 1.

107 Directive 2003/87/EC amended Article 3(a).

108 European Commission a (n.d).

109 Ibid.

110 Woerdman *et al* (2015), p. 48.

111 Directive 2003/87/EC as amended, art. 12 nr. 3.

112 Recital 8 to Directive (EU) 2018/410. See Weishaar (2009) for an analysis of the transition towards auctioning from a law and economics perspective, and Ellerman et al (2007) for an introduction to the previous system of allocation within the ETS.

113 Directive 2003/87/EC as amended, art. 16.

114 Ibid., Article 4. 'Greenhouse gas emission permit' defined by art. 3(d) as the permit issued in accordance with Articles 5 and 6.

permit includes 'an obligation to surrender allowances equal to the total emissions of the installation in each calendar year […]'.[115] In other words, participation in and adherence to the ETS is mandatory for the operation of activities within its scope.

The environmental integrity and effectiveness of the ETS are ensured by requiring stringent monitoring and reporting of all relevant emissions. Submitting a comprehensive monitoring and reporting plan is, therefore, decisive for obtaining the emission permit. Article 6 nr. 1 of the ETS Directive thus requires that the competent authority may only issue such a permit if 'it is satisfied that the operator is capable of monitoring and reporting emissions'.[116]

Depending on the nature of the activity performed, the possible emission reduction options include changing from fossil fuels to renewable energy sources, becoming more energy-efficient, storing CO_2 in products (CCU), or employing CCS.[117] The variety of possible emission reduction options underscore the ETS' ambition to facilitate emission reduction technologies, including CCS, in a technology-neutral manner.[118] As long as GHGs are not emitted, then there is no obligation to surrender allowances, regardless of which emission reduction option is used. In addition to this neutral economic incentive, however, the ETS also facilitates funding of low-carbon technology, such as CCS.[119] One could question whether the principle of advancing emission reductions in a technology-

115 Ibid., Article 6(e).

116 Ibid., as amended Article 5(a), (c) and (d).

117 Recital 14 to Directive (EU) 2018/410, see also Woerdman *et al* (2015), p. 47.

118 COM(2008) 16 final, p. 49: 'In order to exploit the potential of CCS in the longer term, the further development of CCS to contribute to mitigating GHG emissions under economic conditions is necessary. Economic incentives have to be provided, which help to advance CCS in a technology neutral manner'.

119 Directive 2003/87/EC as amended Article 10a(8). European Commission f(n.d). Money for the Innovation Fund comes from the revenue of the ETS, as well as any unspent funds from the previous ETS fund called the NER300 programme. Commission Delegated Regulation (EU) 2019/856 (on the operation of the innovation fund).

neutral manner is inhibited by such additional funding. However, it falls outside the scope of this thesis to pursue that discussion.[120]

In order to reduce emissions over time, the cap is reduced at an annual rate of 1,74 %, which will increase to 2,2 % in January 2021 when the fourth trading phase commences.[121] If a company holds more allowances than they need to surrender, they may keep them for the next year or sell them on the market.[122]

A general problem for the functioning of the ETS is the existence of allowance surplus, which results in prices lower than what is necessary to attain the required emission reductions.[123]

Unexpected downturns in emissions during the 2008-financial crisis, as well as the possibility to use so called 'international credits', are causes for this surplus.[124] A Market Stability Reserve (MSR) was therefore introduced in 2019 to handle excess allowances. The MSR addresses the current surplus of allowances, but also 'improves the systems resilience to major shocks by adjusting the supply of allowances to be auctioned'.[125] It seems that the ETS allowance price has passed the COVID-19 'stress test'. The prices level is now normalised after sharp price drop in mid-March 2020.[126] The resilience is attributed to the recent reinforcements made to the ETS, including the introduction of the MSR.[127]

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120 This funding is meant to bridge the gap between the price of an allowance and the price of storing CO_2, effectively undermining the short-term cost-effectiveness of the ETS, in this regard see Woerdman *et al* (2015), p. 188.

121 Article 1(11) of Directive (EU) 2018/410 amending Directive 2003/87/EC.

122 European Commission a (n.d).

123 A criticism of the ETS has been that the low allowance prices fails to induce emission reductions. A recently published paper explains how the ETS has successfully induced emission reductions, despite low prices, see Bayer & Aklin (2020).

124 Decision (EU) 2015/1814 as amended, see also European Commission c (n.d). For more information on the use of international credits from the Kyoto Protocol Clean Development Mechanism and Joint Implementation mechanism under the ETS for the remainder of the third trading phase, and information on how ETS may constitute part of international flexible mechanisms under the Paris Agreement Article 6, see European Commission g (n.d).

125 European Commission c (n.d).

126 Markets Insider (2020).

127 Hatherick (2020).

2.2.2 Key definitions

The ETS centres on three directive-specific legal definitions in order to facilitate the emission reductions it is set forth to achieve. In short, the ETS facilitates liability for *'emissions'* from *'industrial installations'* by holding a designated *'operator'* responsible for the emissions corresponding to each installation performing an ETS-activity. These definitions are also central to the analyses in chapters 3 and 4 and are therefore briefly introduced in this section.

ETS Directive Article 3(b) defines this directive-specific concept of 'emissions' to mean 'the release of greenhouse gases into the atmosphere from sources in an installation or the release from an aircraft performing an aviation activity listed in Annex I of the gases specified in respect of that activity'. This definition of emissions limits the liability of an ETS operator, other than aviation, to the scope of the *installation* it is responsible for.

The directive-specific definition of 'installation' includes two elements: firstly, the 'stationary technical unit where one or more activities listed in Annex I are carried out', and, secondly, 'any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution.'[128] The inclusion of the emissions from the 'associated activities' to the scope of responsibility of the 'main' ETS activity ensures the environmental effectiveness of the carbon market. The two elements of the 'installation'-definition thus ensures that all emissions necessary for the operation of an Annex I activity is subject to liability under the ETS.

An ETS operator is 'any [physical or legal] person, who operates or controls an installation or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the installation has been delegated'.[129] The operator-definition dictates what entity may be the designated operator of an installation with ref-

[128] Directive 2003/87/EC as amended, Article 3e).

[129] Articles 3(f)-(g) of Directive 2003/87/EC as amended.

erence to its scope and nature.[130] The ETS allows an emission permit to cover 'one or more installations on the same site operated by the same operator'.[131] By providing a broad definition of the term 'operator' and no definition of the term 'site', the framework aims to facilitate different national procedures for issuing greenhouse gas emission permits.[132] The main obligation for the member states competent authorities is, therefore, to ensure that all 'emissions' associated with the scope of an 'installation' are accounted for by one designated operator that retains *practical or economic control* over that installation.[133]

The broadly phrased definition allows for flexible transposition into the context of existing national frameworks. The Commission guidance documents on the interpretation of the ETS explicitly states that in order to accommodate diverging national transpositions, it does not provide further interpretative guidance on the 'operator'-term.[134]

2.2.3 Core principles and objectives

This section addresses three core principles and objectives pursued by the ETS and how they are used in this thesis: *cost-efficiency*, *environmental integrity and effectiveness*, and *the polluter-pays principle*.

Firstly, by setting a price on emissions, the market mechanism induces emission reduction efforts that represent a cheaper alternative than buying allowances. This design promotes the objective of *cost-efficiency* by allowing the market mechanism to decide how and where it costs the least to cut emissions.[135] Cost-efficiency in climate mitigation is an important feature of international climate law found in the UN Convention on

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130 See section 4.3.2 below. See Feiring (2019), p. 11–15 for a discussion of the Norwegian transposition of the term 'operator' related to the similar definition of an operator of a storage site under the CCS Directive (Directive 2009/31/EC) Article 3(10).

131 Directive 2003/87/EC as amended Article 6(1), second subparagraph.

132 European Commission (2010), p. 4.

133 European Commission (2010), p. 4.

134 European Commission (2010), p. 4.

135 Woerdman *et al* (2015), p. 50 on the concept of cost-efficiency in emission trading schemes.

Climate Change through, inter alia, the flexible mechanisms facilitated through Article 6 of the Paris Agreement.[136]

Although it seems that ETS uses the term 'cost-effectiveness' to describe the aim of reducing emissions at the lowest possible cost, it is by associated literature referred to as cost-efficiency and efficiency properties.[137] In this thesis, I use the term 'cost-efficiency' to refer to the same ultimate objective: attaining emission reductions at the lowest possible cost.[138]

Secondly, in order to ensure effective climate mitigation through market-based mechanisms, such as the ETS, it is imperative to adopt rules that observes *the principles of environmental integrity and environmental effectiveness*.

There is no set definition of the principle of environmental integrity in relation to carbon markets, but it is often interpreted as a requirement for environmentally robust accounting.[139] Within the ETS, the principle is used to refer to the legislative design needed to ensure compliance with the fundamental obligation to surrender allowances for relevant liable emissions.[140]

The consideration of environmental effectiveness can refer to both the broader question of expanding the scope of the ETS to include new emission sources in order to increase total reductions, but also more narrowly to how 'effectively' the ETS attains the emission reductions it aims at.[141] The latter is ensured by promoting environmental integrity within the legislative design. In this thesis, I will refer to the considerations of

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136 See generally Gupta (2009) on Clean Development Mechanism (CDM) under the Kyoto Protocol, and Olsen et al (2018) on lessons learned from the CDM for adoption of flexible mechanisms under Paris Agreement Article 6.4.

137 Directive 2003/87/EC as amended Article 1 uses the terms 'cost-effective and economically efficient manner', it is however, clear from the legislative context that the aim of the market based approach is to cut emissions where it costs the least to cut.

138 As referred to in Woerdman *et al* (2015) p. 50.

139 For the role of this principle, see, inter alia, Schneider & Theuer (2019) and Warnecke (2014).

140 COM(2008) 16 final section 3.1.4. See, inter alia, recital 29 to Directive (EU) 2018/410, COM(2008) 16 final, p. 32.

141 COM(2008) 16 final, p. 15.

environmental integrity and effectiveness in this latter sense – ensuring environmental integrity in order to effectively attain the emission reduction targets set by the current scope of liability.

Thirdly, the ETS aims to fully implement the *'polluter-pays' principle* by gradually moving from free allocation to auctioning of emission allowances, as emphasised by the preamble to the 2018-amendment of the ETS.[142] The ETS Directive thereby constitutes part of the secondary law that fulfils the objective of enhancing the polluter-pays principle explicitly set forth in TFEU 191(2).

The exact contents and implications of the principle are contested. The main idea is that it is 'an economic principle […] expressing the concept that the cost of environmental impairment, damage and clean-up should not be borne via taxes by society, but that the person who caused the pollution should bear those costs'.[143]

It has been argued that the ETS constitutes a version of the polluter pays principle, even when allowances are freely allocated.[144] It falls outside the scope of this thesis to address how, and to what degree, the liability imposed on emitters by the ETS currently entails a coherent implementation of this principle. For the purposes of the following analysis, it is enough to note that the transition from free allocation to auctioning of allowances enhances the objective of internalising the cost of climate damage at the hand of the emitter of GHGs.

142 Recital 7-8 to Directive (EU) 2018/410 amending Directive 2003/87/EC.

143 Krämer (2015), p. 27–28.

144 See Woerdman *et al* (2008) for a nuanced discussion in terms of the whether the free allocation of allowances ('grandfathering') is inconsistent with the polluter-pays principle within emission trading schemes by providing a taxonomy of interpretations. The authors conclude that '[f]irst, contrary to what some have claimed, grandfathering is compatible with an efficiency interpretation of the polluter-pays principle. Second, only auctioning is consistent with an extended form of this principle,' p. 3.

2.2.4 Material and geographic scope

The material scope of the ETS comprises certain greenhouse gases emitted from specific activities.[145] It is by imposing liability for these emissions that the EU seeks to facilitate the desired emission reductions.

The GHGs subject to the ETS are listed in Annex II to the ETS Directive and include Carbon dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur Hexafluoride (SF_6).[146] The relevant gas for CCS is CO_2. However, it is only CO_2 from *fossil sources* that are subject to liability under the ETS, as emissions from biomass sources are 'zero counted'.[147] EU policy measures targeting emission reduction from biomass sources are forthcoming.[148] These measures will be part of the EU effort to achieve negative emissions.

The activities subject to the scope of the ETS are listed in Annex I to the ETS Directive. The activities comprise two main categories: industrial production installations and aviation activities.[149] Activities included in Annex I are hereafter referred to as 'ETS activities'. Activities related to aviation fall outside the scope of this thesis as CCS is an emission reduction option is solely available for industrial activities.[150] ETS' scope of application thus notably omits all transport but aviation. Extending the ETS to include other transport sectors is a subject of constant debate and is of significance for the question of whether and how the ETS accommodates mobile CO_2 transport, as I will elaborate further in section 2.5.

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145 Directive 2003/87/EC as amended Article 2.

146 This definition was aligned with the definition under the UNFCCC as of the 2009-amendment, see recital 9 of Directive 2009/29/EC amending Directive 2003/87/EC.

147 Commission Regulation (EU) No 601/2012 as amended Articles 38(2) and 43(4), European Commission Guidance Document on Biomass Issues EU ETS (2017).

148 COM(2018) 773 final, p. 7: '[…] additional action need to be explored on how biomass can be supplied in a sustainable way while enhancing our natural sink or in combination with carbon capture and storage that both can lead to increased negative emissions'. Lack of incentive mechanism for bio-CCS mentioned in Woerdman *et al* (2015), p. 214–215. See IPCC (2018) Annex I: Glossary p. 554 for definition of negative emissions.

149 Directive 2003/87/EC as amended Installations: Articles 2(1) and chapter III article 3h. Ibid., aviation activities: Art. 2(1) and chapter II Article 3a.

150 Directive 2003/87/EC as amended Article 12 nr. 3a.

The scope of the ETS has evolved through the distinct trading phases, gradually expanding to include new activities and GHGs. The current scope covers around 45 % of the EU's total GHG emissions and limits emissions from over 11,000 energy-intensive installations and the airlines operating within the EU and EFTA member states.[151] Following the inclusion of the ETS in the EEA agreement, the geographic scope the ETS applies to 31 countries (28 EU countries and 3 EEA countries).[152]

The limited material scope implies that not all emission sources within the geographic scope are accounted for under the ETS scope of liability. In terms of the Longship project, the ETS only applies to the emissions from one of the two capturing plants currently encompassed by the project. Cement production is part of Annex I while waste incineration is excluded.[153] In addition, both capturing plants have the potential of capturing a mix of fossil and biogenic CO_2.[154]

The ETS Directive allows for *individual inclusion* of new activities and GHGs. This system helps accommodate problems or conflicting interests associated with the delineation of what falls within and outside its scope. This inclusion is contingent on the approval of the Commission, which must take into account 'the effects on the internal market, potential distortions of competition, the environmental integrity of the ETS and the reliability of the planned monitoring and reporting system' pursuant to ETS Directive Article 24. Relevant case law from the EU

151 European Commission a (n.d).

152 Directive 2003/87/EC Article 1 and 2(3), EEA Joint Committee decision nr. 146/2007 of 26 October, 2007, incorporating the ETS Directive in Annex XX to the EEA Agreement. See also Europalov (2019).

153 Directive 2003/87/EC Annex I. The Commission comments on the prevailing exclusion of waste incineration thus; 'This sector is already covered by both the Waste Incineration Directive and IPPC as there is a need for careful control of other pollutants from waste incineration. In addition, MRV requirements are likely to be complex due to the high variability in the composition of the waste stream,' see COM (2008) 16 final, p. 36.

154 Norwegian Environmental Agency (2019), p. 2. The problematic aspects of capturing CO_2 from a mixture of sources within and outside the scope of the ETS should be subject to further research but falls outside the scope of this thesis. See description of these issues in the Norwegian Environmental Agency (2019), p. 7–8. Waste incineration retains great potential for emission reductions with CCS, see recent feature on the Norwegian perspective by Topdahl (2020).

Courts demonstrates that the Commission retains a wide margin of discretion as to how conflicting objectives should be balanced in terms of such opt-in applications.[155] This 'opt-in' procedure previously allowed for opt-in of individual projects, but now only allows for the inclusion of categories of activities and GHG.[156]

2.3 Harmonised implementation of the Emissions Trading System by the European Commission

2.3.1 Overview

The European Parliament and European Council confer powers onto the Commission to implement the ETS Directive in order to facilitate harmonised implementation across the ETS geographic scope. The Commission regulations adopted based on this power are thus subordinate to the ETS Directive, within the legal hierarchy of the ETS framework.[157] These powers mainly concern the rules needed to establish a rigorous system for monitoring, reporting and verification of emissions,[158] as well as establishing the Union Registry, which tracks the emissions trading.[159] The Commission faces a difficult task: implementing a highly complex and technical emission trading system without exceeding the boundaries set on the powers conferred. This balancing act is at the heart of the issues posed to mobile CO_2 transport at the implementing level of the ETS legal framework, as the analyses in chapters 3 and 4 will demonstrate.

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155 Case T-16/04, *Arcelor v Parliament and Council* demonstrates that where the private entities as disadvantaged by an inclusion under the scope of the ETS, this may be justified if it is considered necessary and proportionate to the environmental protection pursued.

156 For an overview of the use and obstacles associated with the opt-in mechanism during phases 1, 2 and start of phase 3 see Ellerman *et al* (2010), p. 261–263.

157 See Directive 2003/87/EC as amended Articles 14(1) and 15(3).

158 Commission Implementing Regulation (EU) 2018/2067, competence set forth by Directive 2003/87/EC as amended Article 15, see also Article 10, and Commission Regulation (EU) No 601/2012 as amended, competence set forth by Directive 2003/87/EC as amended Article 14(1).

159 Commission Regulation (EU) No 389/2013, competence set forth by ETS Directive as amended Article 19.

The following section provides an overview of the powers conferred upon the Commission to adopt rules that implement the ETS. The main focus will be on the regulation on monitoring and reporting of emissions, as this is the most significant regulation for the legal questions addressed in this thesis. Section 2.3.2 begins with an overview of the form of powers conferred upon the Commission to implement the ETS, and how these powers were recently revised. Section 2.3.3 provides a brief overview of the monitoring and reporting regulation adopted based on this power. Section 2.3.4 explains the significance of the revision of powers concerning rules CO_2 transfers that are specifically important for the analyses in chapters 3 and 4.

2.3.2 Powers conferred upon the Commission to adopt rules on monitoring and reporting of emissions

ETS Directive Article 14(1) confers powers onto the Commission to adopt 'implementing acts concerning the detailed arrangements for the monitoring and reporting of emissions'.[160] The provision constrains the power of the Commission materially to the subject matter of 'monitoring and reporting of emissions' and formally within the limits of an 'implementing act'.

Powers conferred in the form of an 'implementing act' constitutes part of the formal hierarchy of norms introduced by the Treaty of Lisbon in 2009.[161] In this system of a formal hierarchy of norms, the basic legislative act – here the ETS Directive – may confer powers in the form of either a 'delegated act' or an 'implementing act' pursuant to TFEU Articles 290 and 291(1).[162] The difference between the two acts are still somewhat am-

[160] Article 14(1) of Directive 2003/87/EC as amended by Directive (EU) 2018/410.

[161] See Craig & De Búrca chapter 4 for an overview of the transition to the new system of the conferred powers.

[162] The ETS Directive is a legislative act adopted by the ordinary legislative procedure as set forth by TFEU Article 289(1). Delegated and implementing acts are subject to different oversight mechanisms, and only the implementing acts are subject to the updated comitology oversight system on Commission implementing powers, see Regulation (EU) No 182/2011.

biguous, despite the simplification objective.[163] The key material difference appears to be that the implementing acts are meant to be *solely executive*, while the delegated act may 'supplement or amend certain non-essential elements' of the basic act, thus retaining a 'quasi-legislative' power.[164] In other words, if ETS Directive Article 14(1) had conferred power in the form of a delegated act, then that would have provided the Commission with a slightly broader scope of power to adopt rules on the monitoring and reporting of emissions.

The fact that the Parliament and the Council chose to confer powers to adopt the monitoring and reporting rules in the form of an 'implementing act' is notable because the Commission proposed to confer power in the form of a 'delegated act'.[165] Apparently, the Commission felt that the type of 'quasi'-legislative power retained by a delegated act under TFEU 290 was warranted for the task of adopting rules on the monitoring and reporting of emissions.[166] As the Directive ended up with solely delegating power in the form of an 'implementing act', it seems the Commission 'lost' the power struggle concerning the boundaries set on the delegation of powers to adopt the monitoring and reporting rules.[167]

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163 Bergström and Ritleng (2016), p. 109. The Working Group XI on simplification that suggested these provisions in the Treaty of Lisbon warned, fittingly, that 'nothing is more complicated than simplification', see CONV 424/02, relayed by Craig and De Búrca (2015) p. 110.

164 This is the understanding of the Commission as set forth in COM(2009)673 final p. 3–4, and reiterated Craig and De Búrca (2015) p. 117. The efficacy of the delineation between the two types of legislative acts have been criticised by legal scholars, inter alia Craig and De Búrca, as whether the basic legislative act should provide the Commission with the power to adopt an implementing or delegated act is a decision that must be made at an early stage. Which of the two types of conferred powers are needed to properly implement the basic act may not become clear until after the adoption of the legal instruments, see Craig and De Búrca (2015) p. 118–120.

165 COM/2015/0337 final – 2015/0148 (COD), p. 23, para (12).

166 As set forth in the Commissions comment on the proposed TFEU 290 in COM(2009)673.

167 It is suggested that the Commission prefers delegated act over an implementing act and that the Parliament and Council prefers the one that provides them with the greatest review powers, see a discussion on this in see Bergström and Ritleng (2016) p. 107–108.

The ETS Directive was not updated to follow the Lisbon-system of conferred powers until its first revision post-2009 in 2018.[168] Prior to the 2018-revision of the ETS Directive, Article 14(1) similarly conferred power to adopt rules on monitoring and reporting of emissions, though not limited by the boundaries set on an 'implementing act', but by the wording 'that measure, designed to amend non-essential elements of this Directive by supplementing it'.[169]

The transition from the powers conferred by ETS Directive Article 14(1) pre-Lisbon to the post-Lisbon system seems to represent a slight *curtailment* of the Commission's power. This is due to the fact that the Commission is now limited to solely *executing* the ETS Directive with regard to a monitoring and reporting emissions, while the prior version allowed the Commission to amend certain elements, albeit non-essential ones.

2.3.3 The Commission Regulation on Monitoring and Reporting of Emissions

The Commission adopted the 'Commission regulation on the monitoring and reporting of emissions' ('the MRR') based on ETS Directive Article 14(1). This regulation sets forth the main part of the 'compliance cycle' that the operators of the ETS must adhere.[170] The purpose of this rigorous compliance regime is to ensure the environmental integrity and effective operation of the market-based emission reduction system set forth by the ETS Directive.[171] In addition to the MRR, the Commission has also adopted a separate regulation on the verification of emissions.[172] This regulation mainly sets forth the rules for the use of third-party verification of the monitoring undertaken in compliance with the MRR. It is thus

168 Directive (EU) 2018/410 amending Directive 2003/87/EC.

169 Article 14(1) of the Directive 2003/87/EC as amended by Article 1(17) of Directive 2009/29/EC.

170 See generally European Commission d(n.d).

171 See recital 2 to Commission implementing regulation (EU) 2018/2066.

172 Commission Implementing Regulation (EU) 2018/2067, competence set forth by Directive 2003/87/EC as amended Article 15, see also Article 10.

the rules set forth by the MRR that determine the main obligations for the ETS operators within the compliance regime, such as the monitoring plan submitted with the emission permit application.

As its title suggests, the subject matter of the MRR is to establish rules on monitoring and reporting of GHG emissions and activity data pursuant to the ETS Directive.[173] Its geographic scope mirrors that of the Directive.[174]

The subject matter of the MRR is facilitated through the obligation to submit and maintain the monitoring plan associated with the emission permit.[175] Based on the findings from the monitoring of emissions, the operators file an annual emission report to the competent national authority.[176] The verified emission report constitutes the basis for the number of allowances that the operator is obligated to surrender.[177]

The MRR provides general and specific rules, and guidance, as to how the monitoring boundaries of each installation should be set in order to account for all relevant emission sources.[178] These rules, in addition to the specific rules on transfers of CO_2 in MRR Article 49, are central to the discussion of whether and how the ETS accommodates mobile CO_2 transport (see chapters 3 and 4).

The monitoring and reporting obligations set forth in the MRR are founded on, and should be applied on the basis of, the principles of completeness, consistency, comparability and transparency, accuracy, integrity of methodology, and finally, continuous improvement.[179] These principles ensure compliance with the obligations in the ETS Directive and thus aim to facilitate its effective operation.[180]

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173 Commission regulation (EU) No 601/201 as amended, Article 1.

174 Ibid., Article 2.

175 Commission regulation (EU) No 601/201 as amended chapter II, Directive 2003/87/EC as amended Article 6.

176 Directive 2003/87/EC as amended Article 14(3).

177 Directive 2003/87/EC as amended Article 12 nr. 3, referring to the verification procedure set forth by Commission implementing regulation (EU) 2018/8589.

178 Commission regulation (EU) No 601/2012 as amended Article 20 and Annex IV.

179 Ibid., Articles 4-9.

180 Ibid., Recital 1, and recital 2 to Commission regulation (EU) 2018/2066.

The current Commission regulation on the monitoring and reporting of GHG emissions regulates the third trading phase ('MRR phase 3').[181] This regulation was adopted on the basis of the 2009-version of the ETS Directive. MRR phase 3 ends when the fourth trading phase begins in January 2021.[182] In 2018 the Commission adopted a new monitoring and reporting regulation for the next trading phase based on the 2018-version of the ETS Directive (MRR phase 4).[183]

This means that the existing version of the MRR, adopted on the pre-Lisbon system of conferred powers, runs until the end of 2020, while the regulation adopted on the post-Lisbon powers commences as of 2021. Although the form of conferred powers is not the exact same, it does not change the fact that the scope and subject matter of MRR phase 3 and 4 are largely overlapping. The main objective of MRR phase 4 is to improve, simplify and clarify the reporting and monitoring rules.[184]

2.3.4 Specifically about the revision of the rules on CO_2 transfers

A central provision for the analysis in this thesis is MRR Article 49, which governs the transfer of contained CO_2 from one entity to another. The current version of Article 49 of MRR phase 3 was revised by the regulation that sets forth the rules for MRR phase 4.[185] This means that the regulation that sets forth the rules on monitoring and reporting for the remainder of trading phase 3, consists partly of rules adopted on the basis of the *previous* version of the ETS Directive Article 14(1), while Article 49, is adopted on the basis of the *new* version of ETS Directive Article 14(1).

Amending Article 49 with competence in the revised ETS Directive Article 14(1) seems to imply that the interpretation of MRR Article 49 must adhere to the limitations that follow an *implementing act* conferred

181 Commission regulation (EU) No 601/2012012 as amended.
182 Commission implementing regulation (EU) 2018/2066, recital 26, Articles 1 and 77.
183 Commission implementing regulation (EU) 2018/2066.
184 Ibid., recital 3.
185 Article 76 (3) of Commission Implementing Regulation (EU) 2018/2066.

on the Commission pursuant to TFEU Article 291(2).[186] The rules on CO_2 transfers may, therefore, solely *execute* the ETS Directive – they may not amend the Directive norms it implements. The boundaries set for the CO_2 transfer rules will thus remain the same for the remainder of trading phase 3 and trading phase 4.

2.4 CCS Directive and the Emissions Trading System amendments to include CCS

2.4.1 Overview

EU policy instruments that promote CCS are a relatively new phenomenon, although the idea of CCS dates back to 1977.[187] The role of CCS in climate mitigation was, and to some degree still is, a controversial topic within the EU.[188] With time, however, CCS has come to represent part of the envisaged solution in order to 'reconcile the need for urgent action to tackle climate change with the need to ensure the security of energy supply'.[189]

In 2009, two important legislative instruments were adopted to pave the way for CCS in Europe: the CCS Directive[190] and the amendment of the ETS Directive for the third trading phase, to facilitate CCS as an emission reduction option.[191] The two legislative instruments retain distinct, but related, functions for the regulation of CCS in Europe: The CCS Directive focuses on the environmentally safe storage of CO_2 in order to minimise risk to human health and the environment, while

186 I have not found any literature that discusses this particular question, neither specifically, nor generally. It is, in any case, a transitory problem as MRR phase 3 will be replaced all together in January 2021.

187 Marchetti (1977).

188 EU CCS funding has been on the table for a long time, see inter alia COM/2011/0112, p. 5, 9–10. For a brief overview of the evolution of EU policy on CCS see Billson & Pourkashanian (2017). See Simon (2019) for an opinion on the status of political backing for CCS, but still bureaucratic funding procedures.

189 COM(2008) 18 final, para 1.

190 Directive 2009/31/EC.

191 Directive 2009/29/EC amending Directive 2003/87/EC.

the amendment of the ETS provides an economic incentive for CCS and subjects any associated emissions to its scope of liability.

As the explanation of the ETS in section 2.3 demonstrates, the fundamental obligation to impose liability for emissions is centred on the idea of emissions originating from *distinct industrial installations*. It was into this system that CCS as an emission reduction option was introduced as of the third trading phase. The legal uncertainty posed to the use of mobile CO_2 transport modalities, like a ship, arise from this injunction: the effort to fit a technical emission reduction process with several integrated phases, into a system focused on activities performed by separate installations.

The present section introduces the process of amending the ETS to accommodate CCS (2.4.2), and its relation to the CCS Directive (2.4.3). These introductory sections are necessary in order to prepare for the specific analyses chapters 3 and 4 that consider of how the ETS applies to, and possibly may accommodate, mobile CO_2 transport.

2.4.2 The CCS-specific provisions in the Emissions Trading System Directive

CCS was not a generally recognised emission reduction option under the ETS until its explicit inclusion under the ETS Directive for trading phase 3 (2013–2020).[192] The legislative design of the CCS-specific rules was a result of specific considerations made prior to this amendment. This section provides an overview of these considerations, in order to understand the currently applicable rules and the objectives that the legislative design pursues.

The explicit inclusion of CCS under the ETS came about in order to promote CCS as an emission reduction option in a harmonised manner

[192] Ibid. Woerdman *et al.* (2015), p. 187–188 brief overview of ETS as the main incentive for CCS.

across the ETS' geographic scope.[193] The EU legislator sought to amend the ETS to contribute to:[194]

> "[…] the exploitation of the long-term potential offered by Carbon Capture and Storage to achieve the GHG emission reductions set by the EU Heads of State and Government by including CCS in the EU ETS, thereby providing necessary financial incentives to promote and use CCS, in particular in the long term."

The aim to provide a clear economic incentive to employ CCS must be understood in light of the prior possibility to employ CCS under the ETS. The only option for using CCS prior to the 2009 amendment was to include individual CCS projects under the then available opt-in mechanism in ETS Directive Article 24.[195] At the time, Article 24 allowed for opt-in of individual projects, not just activities and gases as is the case today.[196] Such opt-in of CCS was envisaged to include the whole CCS process under the scope of responsibility of one installation.[197] I have not found any examples of completed inclusions under this mechanism.[198]

The opt-in mechanism had three main disadvantages. Firstly, it was not readily available, but contingent on a comprehensive application by a single member state and the Commission's approval.[199] Secondly, it did not promote cross-border projects as it primarily facilitated member-state specific applications. Thirdly, it failed to facilitate different commercial operators of the different phases of the three-part process because all phases would be included under *one* installation and thus only allow for *one* designated operator.

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193 Recital 39 to the preamble of Directive 2009/29/EC amending Directive 2003/87/EC.

194 COM(2008) 16 final, p. 49,

195 Ibid.

196 Directive 2003/87/EC unamended Article 24.

197 COM(2008) 18 final, section 5.2 para. 96.

198 Dixon et al (2009) describes several commenced opt-in procedures set forth by the UK that contributed to important monitoring and reporting guidance for hypothetical CCS and EOR-projects. It appears from the article, however, that none of those were completed before the amendment of the 2009-ETS to include CCS more generally.

199 COM(2008) 16 final, p. 49.

These drawbacks were important considerations when considering alternative legislative designs to promote CCS in Europe with the 2009-amendment. These considerations are clearly stated within the impact assessments accompanying the proposals for the CCS Directive and the amendment of the ETS Directive.[200] The assessments relay the following main considerations for including CCS under the ETS: 1) providing a clear economic incentive to accommodate a range of CCS technologies, and 2) the need to ensure environmental integrity and effectiveness of CCS as an emission reduction option.[201]

Two main regulatory options were considered to facilitate these objectives:[202]

> "Option 3.11: Opt-in of classes of project: Admit classes of projects one by one, through the current opt-in procedure, but with a harmonised generic approval possible for any opt-in, applicable throughout the EU.
>
> Option 3.12: Mandatory inclusion of all CCS: Include all CCS projects up front, by explicit reference to CCS in Annex I of the Directive"

Option 3.12 was chosen because it was perceived superior for facilitating 'certainty and transparency for developers and investors, which might bring about a **broader range** of CCS technologies [than in the case of option 3.11]' (emphasis added).[203]

The ETS legislative framework was thereby amended to accommodate 'all CCS' by means of two sets of rules at the ETS Directive level: ensuring the economic incentive for CCS in ETS Directive Article 12 nr. 3a, and ensuring the environmental integrity and effectiveness of the emission reduction process by inclusion of CCS activities in ETS Directive Annex I.

Article 12 nr. 3a states that:

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200 COM(2008) 18 final, p. 27–29 and COM(2008) 16 final p. 49–52.

201 COM(2008) 18 final, p. 27–29 and COM(2008) 16 final p. 49–52.

202 COM(2008) 16 final, p. 50.

203 Ibid., p. 52.

> "An obligation to surrender allowances shall not arise in respect of emissions verified as captured and transported for permanent storage to a facility for which a permit is in force in accordance with [the CCS Directive]."

This provision essentially says that emissions avoided by employing the sanctioned type of CCS process are 'valued at the carbon price' of the market.[204] The prerequisites for qualifying for this incentive is the main topic of the analyses in both chapters 3 and 4.

The second set of rules consisted of the inclusion of the following three separate CCS activities under the scope of liability of Annex I. This imposes liability for all emissions, both leakage from the captured CO_2 and operational emissions:

- "Capture of greenhouse gases from installations covered by this [ETS] Directive for the purpose of transport and geological storage in a storage site permitted under [the CCS Directive] [CO_2]"

- "Transport of greenhouse gases by pipelines for geological storage in a storage site permitted under [the CCS Directive] [CO_2]"

- "Geological storage of greenhouse gases in a storage site permitted under [the CCS Directive] [CO_2]"

The syntax of the sentences describing the first two activities may be slightly confusing as to what 'permission' it refers to in the CCS Directive. It is, however, clear from the general context and the type of permits found in the CCS Directive that this refers to a *storage permit*.[205]

The two sets of rules that apply to the CCS process at the level of the ETS Directive are implemented through the CO_2 transfer rules in MRR

[204] COM(2008) 18 final p. 2.

[205] See section 2.4.3.

Article 49. Those transfer rules seek to ensure that all emissions associated with a CCS process, both operative and leakage emissions, are accounted for by an ETS operator by only allowing CO_2 transfers between CCS installations listed in Annex I.

In summary, the general inclusion of CCS under the ETS sought to facilitate the following objectives: providing a clear economic incentive to promote a broad range of CCS technologies, ensuring harmonised CCS legislation across the ETS geographic scope and ensuring the environmental integrity for the CCS process.

The notable 'omission' in this legislative design is any reference to mobile transport modalities. The question of what this implies for a CCS process that employs mobile CO_2 transport is the subject matter of chapters 3 and 4 of this thesis.

2.4.3 An introduction to the CCS Directive and its relation to the Emissions Trading System regarding CO_2 transport

The CCS-specific rules under the ETS all require that the captured CO_2 is transported and stored in a storage facility *permitted under the CCS Directive*. For this reason, the CCS Directive is important for CCS employed as an emission reduction option under the ETS and consequently the question of CO_2 transport. This section explains the subject matter and function of the CCS Directive within EU legislation on CCS.

Both the subject matter and title of the CCS Directive, formally known as 'the directive on the geological storage of carbon dioxide', imply that the Directive does not intend to comprehensively regulate the whole CCS process (capture, transport and storage).[206] The overwhelming emphasis of the CCS Directive is on the *storage phase* of the CCS process. For example, it is notable that the only emissions the CCS Directive refers to are leakage emissions from the *storage site*.[207] The popular name 'CCS

[206] Directive 2009/31/EC, Article 1. See also the Directive 2009/31/EC implementing report COM/2019/566 final, progress report COM(2015) 576 final, and generally Holwerda (2014), p. 33–46.

[207] Directive 2009/31/EC, Article 3(5).

Directive' is therefore slightly misleading, as it suggests a broader scope.[208] For relevant community legislation concerning the capture and transport segments of the CCS process, the Directive refers mainly to existing legislation like the Environmental Impact Assessment Directive and the Industrial Emissions Directive.[209]

The main functions of the CCS Directive are to establish a mandatory licensing and permit system for exploration-, establishment- and operation of CO_2 storage facilities.[210] The storage permit of the CCS Directive is the permit that must be obtained in order to benefit from the economic incentive set forth by the ETS Directive to reduce emissions by CCS, as set forth by ETS Directive Article 12 nr. 3a mentioned above. The purpose of the CCS Directive is, as the ETS Directive, to contribute to the mitigation of climate change. However, the immediate focus of the CCS Directive is to mitigate the risks to human health and the environment that may occur from the geological storage of CO_2.[211]

The 'geological storage of CO_2' is defined as 'injection accompanied by storage of CO_2 streams in underground geological formations.'[212] Storage sites for the purpose of research and testing, and with an intended capacity of fewer than 100 kilotonnes CO_2, falls outside the scope of the CCS Directive.[213] This consequently implies that any CO_2 captured in such facilities would not require nor be able to receive a permit.[214]

The CCS Directive applies to the geological storage of CO_2 both onshore in the territory of the EU member states and EFTA states, and

[208] The term 'CCS Directive' is i.e. used by the Commission, see European Commission e(n.d). The Norwegian translation of 'the CCS Directive', is in fact 'the storage Directive' (lagringsdirketivet). See, inter alia, Europalov (2020b).

[209] Directive 2009/31/EC recitals 16-17 referring to Directive 2011/92/EU and Directive 2010/75/EU.

[210] Directive 2009/31/EC, chapters 2–4.

[211] Ibid., Article 1(2) and recital 1-3. The Directive is adopted on the basis of Article 192(1) of the TFEU, concerning the environmental and climate policy of the EU.

[212] Ibid., Article 3(1).

[213] Ibid., Article 2(2).

[214] This means that although the Longship project is called a 'demonstration project' by its facilitators it does not fall under this 'testing' category of the CCS Directive because it is estimated that about 400 000 tonnes of CO_2 per year could be captured by the currently planned capturing facilities, *CCSNorway (2020a).*

offshore in their exclusive economic zones and continental shelves.[215] Storage of CO_2 outside this area is prohibited.[216] It follows that a storage field that crosses the Norwegian/UK border in the North Sea could pose a problem post Brexit.[217] Further inquiry to such cross-border issues falls outside the scope of this thesis.[218]

The states may individually decide whether they wish to provide suitable storage sites within their territory.[219] The CCS Directive, therefore, facilitates cross-border access to transport networks that connect to storage sites in order to accommodate member states that either do not wish to store CO_2 within their territory/jurisdiction or do not have suitable storage sites.[220] 'Transport networks' are defined as 'the network of pipelines, including associated booster stations, for the transport of CO_2 to the storage site'.[221] The ability for an emitter in one member state to inject and store CO_2 in another member state accentuates the basic principles of free movement of goods, services and capital within EU law.[222] The emphasis on *pipelines* in the CCS Directive is, therefore, not necessarily intended to favour pipeline transport. Rather, it seems that the intention is to ensure that permanent CCS infrastructure facilitates open access in order to pave the way for pan-European CCS projects.

It has been suggested that the definition of transport networks in the CCS Directive is an obstacle for mobile transport in the ETS.[223] This obstacle comes about because the MRR refers to the same definition.[224] However,

215 Directive 2009/31/EC Article 2. Directive 2009/31/EC incorporated in the EEA Agreement by decision nr. 115/2012 by the EEA Joint Committee.

216 Ibid., Article 2(3).

217 See Feiring (2019) for a comprehensive analysis of the rules pertaining to the CO_2 storage phase, inter alia, problems posed to EU/UK CCS projects, p. 22.

218 See generally Bankes (2020) p. 406–416, for an overview of the legal framework on 'The Use of Sub-Seabed Transboundary Geological Formations for the Disposal of Carbon Dioxide'.

219 Directive 2009/31/EC Article 4(1).

220 Ibid., Recital 38 and chapter 5.

221 Ibid., Article 3(22).

222 TFEU Article 26(2), Roggenkamp (2018) p. 245.

223 O´Brien (2019), p. 21–22, O'Brien (2020).

224 Commission Implementing Regulation (EU) 2018/2066, Article 3(63): 'transport network' means transport network as defined in Article 3(22) of Directive 2009/31/EC.'

although that definition poses a problem to mobile transport within the context of the *ETS*, as explained below in chapter 3, it does not restrict mobile transport within the CCS Directive. The function of the definition within the context of the CCS Directive is merely to facilitate third party access. This means that the problems posed to mobile CO_2 transport within the ETS may be solved within the context of the ETS legal framework. It is not a problem that needs to see an amendment of the CCS Directive.

The use of CCS under the ETS is contingent on obtaining the storage permit set forth by the CCS Directive.[225] Any limitations on the transport phase under the ETS due to the rules under the CCS Directive must therefore be found within the conditions to attaining a storage permit, as analysed in section 3.2.2 below.

2.5 Output and backdrop for the following analysis

The CCS specific rules of the ETS are most notable for what it does not address: alternative transport options to pipelines. Chapters 3 and 4 consider these rules and whether there is a textual or teleological interpretation that may accommodate a CCS process with mobile CO_2 transport. This section provides a backdrop to those analyses by considering possible *reasons* for the omission of transport other than pipelines. The aim is to ascertain whether the lack of mention of mobile transport was *intended to inhibit* such transport in a CCS process under the ETS. Such an intent could have bearings on the interpretative analyses below.

Firstly, the ETS scope of application does not include mobile transport apart from aviation. As noted earlier, the question of expanding the ETS to include additional transport sectors, notably road- and maritime transport, is subject to debate.[226] The discussion is particularly fraught

[225] Directive 2003/87/EC as amended Article 12 nr. 3a, description of activities in Annex I, and MRR art. 49.

[226] See European European Commission s(n.d) and European Commission t(n.d) for information on the EU climate policy on road and shipping transport, respectively. See Bragadóttir et al (2016) for a report made for the Nordic Council of Ministers on sectoral expansion of the EU ETS, focusing on road transport as a main GhG emitter in the Nordic countries.

concerning maritime transport. The International Maritime Organisation ('IMO') is working for a global solution for emission reductions, though it is taking longer than expected.[227] The latest development on this issue is that the European Commission has proposed in the EU Green Deal to include the maritime transport industry under the scope of the ETS, but still coordinate the efforts with the IMO.[228] This decision was received with mixed reactions: Some consider that resorting to a regional solution, like the ETS, may hinder an international agreement.[229] Other voices within the industry, however, pushed for this vote to promote emission reductions.[230] These reactions mirror the mixed reception of the inclusion of the aviation sector.[231] Details on how the maritime industry would be included in the ETS, remain undecided.

One could speculate that the intense debate on whether maritime transport should be included under the ETS or not has had a chilling effect on the specific inclusion of CO_2 *shipping*. However, as it would not be necessary to include all shipping transport in order to include the specific activity of CO_2-transport, it seems unlikely that this general debate could substantiate a specific intention to inhibit the use of ships in a CCS process under the ETS. After all, the separate activity of CO_2 *transport by pipeline* was included as a novel ETS activity when the CCS specific rules were adopted.

Secondly, it has been suggested that shipping was left out due to the fact that the legislators did not envisage the use of ships for transpor-

227 See generally IMO (2020), Woerdman et al. (2015), p. 55. In support of the IMO efforts, the EU adopted a regulation for the monitoring, reporting and verification of emissions from large ships (5,000 gross tonnes) Regulation (EU) 2015/757. However, it does not, however, obligate the maritime sector to an emission reduction goal, see recital 10.

228 COM(2019) 640 final, p. 11.

229 Haanperä & Graichen (2020), and IMO (2017).

230 Stoefs (2020).

231 See generally Gattini (2012) and the case C-366/10 IATA challenging the validity of including the aviation sector into the EU.

tation of CO_2 in large-scale CCS.[232] In 2009 the two only CCS projects in operation were solely based on pipeline transport. The prevalence of pipeline transport could thus be a reason for the focus on pipelines in the legislative process. Such processes are known to foster legislation centred on well-known and uncontroversial territory. This perception seems, however, to be contradicted by how shipping and pipelines are mentioned as the 'two main kinds of technology that are likely to be used in the EU for transport of CO_2' in the impact assessment of the CCS Directive.[233] Moreover, CO_2 shipping was already in 2005 envisaged by the IPCC special report on CCS as potentially more cost-efficient than pipelines '[f]or amounts smaller than a few million tonnes of CO_2 per year or for larger distances overseas.[234] Although it is within the context of the ETS, and not within the CCS Directive, that this poses a challenge to mobile CO_2 transport, it is still remarkable that both the CCS Directive and the ETS Directive fails to address and thus positively *enable* other types of transport.

Thirdly, the focus on pipelines could be due to how the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the 'London Protocol') prevented cross border transport of CO_2 for permanent storage until a preliminary exception was allowed for as of October 2019.[235] The then prevailing CCS projects centred on single-source capturing facilities connected to a proximate storage facility by pipelines, keeping within national borders.[236] However, an amendment to the London Protocol that would allow cross border CO_2

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232 O'Brien (2019), p. 22 referring to Boekholt (2013) p. 33, which states that 'when the CCS Directive was drafted, the parties had not envisaged the use of ships for transportation of CO_2', but with no source of reference. It has been difficult to find sources that substantiates this perception.

233 Impact assessment COM(2008) 18 final, section 4.3 para. 75, the omission of shipping is further emphasised as remarkable by Woerdman *et al* (2015), p. 196.

234 Impact assessment COM(2008) 18 final, section 4.3 para 75, and IPCC (2005) p. 5 and 186–187.

235 'Transboundary export of carbon dioxide (CO_2) for the purpose of carbon capture and storage (or 'sequestration') can now be provisionally allowed under certain circumstances', IMO (2019).

236 See description of the two Norwegian projects in section 1.2.2.

for permanent storage has been in play for over ten years. The amendment in question was adopted in 2009 but has since failed to receive the necessary two-thirds majority required for it to enter into force.[237] Considering this timeline one could, on the one hand, wonder why the EU would not want to adopt an amendment of the ETS regarding CCS in 2009 that anticipated this ratification. On the other hand, however, one could speculate whether the EU held off in order to not presuppose an incumbent ratification and thus impose undue pressure on its member states to ratify the amendment to the London Protocol.

Finally, it has been suggested that the gap in the CCS and ETS legislative framework is due to the 'quite extensive international maritime safety regulation CO_2 shipping is subject to'.[238] However, these other legislative instruments do not solve the question of whether shipping of CO_2 on its way to permanent storage may be employed as part of an emission reduction technology under the ETS. This depends on the rules of the ETS alone, as a closed legal eco-system setting forth a complex market mechanism.

For these reasons, it seems that failing to explicitly mention mobile CO_2 transport within the ETS legal framework, in particular shipping, was not intended to *inhibit* such use. This means that it is down to the grammatical, contextual and teleological interpretation of the legal framework to determine whether the incentive to employ CCS under the ETS is available for a process that employs mobile CO_2 transport.

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237 Resolution LP.3(4) to the London Protocol.

238 Holwerda (2014), p. 39–40, noting that 'no EU ETS permit is required for the transport of greenhouse gases (for storage) by ship' and that a reason could be the other substantial regulation on maritime transport, referring to those instruments as listed in Com(2008) 18 final, para. 86–89. However, the author does not identify this as an impediment to CO_2 shipping in Europe, as is the subject matter of this thesis.

3 Legal Issues Confronting Mobile CO_2 Transport under the Emissions Trading System – a Textual Focus

3.1 Introduction

CO_2 captured and stored in a manner sanctioned by the ETS Directive does not incur liability for emissions. For the stakeholders in a CCS process, it is imperative to clarify the content of the prerequisites set forth to obtain this incentive, pursuant to Article 12 nr. 3a. These stakeholders include the competent national authorities in charge of enforcing the ETS,[239] any ETS operator that seeks to buy CCS services in order to reduce emissions and any ETS operators offering those services to the market.

The economic incentive to employ CCS is particularly important for industrial activities where other emission reduction options are less effective. An example of this is the production of cement clinker, where it is not the combustion of fossil fuels but the production process itself that produces CO_2.[240]

This chapter identifies and analyses the prerequisites associated with CCS as an emission reduction option in light of the design of the forthcoming Longship project. As introduced in chapter 1, that CCS project offers transport and storage services (known as 'the Northern Lights' project) to installations that produce and capture CO_2. Equinor will operate Northern Lights in cooperation with Shell and Total.[241] An essential part of the Northern Lights business model is to pick up the captured CO_2 at a proximate harbour to the capturing facility, thereby connecting decentralised capturing points to the permanent pipeline and storage infrastructure.[242] As an illustration, the shipping distance from the

[239] Directive 2003/87/EC as amended Article 18.

[240] Norsk betongforening (2019), p. 11. See generally Hills *et al* (2020).

[241] Equinor (2020).

[242] Equinor (2020a), Seglem (2020).

capturing facility at the cement production plant at Brevik operated by Norcem to the injection point of the pipeline network is about 700 km.[243]

The subject matter of chapter 3 is to analyse the prerequisites pursuant to ETS Directive Article 12 nr. 3a in order to ascertain whether the economic incentive will be available for a CCS process that employs mobile CO_2 transport. The present chapter starts with an overview of the structural context and function of Article 12 nr. 3a and thereafter the two key prerequisites set forth: the storage permit requirement and the verification requirement (3.2). The Commission implementation of the verification requirement, and its implications for mobile CO_2 transport, necessitates a closer look at the directive-specific concept of 'emissions' and its implications for the Commission's implementing powers to adopt rules on the transfer of responsibility for CO_2 in a CCS process (3.3).

3.2 Avoiding liability for emissions by employing CCS under the Emissions Trading System

3.2.1 CCS as a conditioned emission reduction option – Article 12 nr. 3a

The role and function of Article 12 nr. 3a is twofold: it signals that CCS is an available emission reduction option under the ETS, *and* it conditions the type of CCS that is recognised by the ETS.

The economic incentive is evident from the first part of the provision (emphasis added):

> "**An obligation to surrender allowances shall not arise in respect of** emissions verified as captured and transported for permanent storage to a facility for which a permit is in force in accordance with [the CCS Directive]."

The provision is phrased as a conditioned freedom from the fundamental obligation set forth by Article 12 nr. 3 (emphases added):

[243] *CCSNorway (2020a).*

> "[...] Member States shall ensure that, by 30 April each year, **the operator of each installation surrenders a number of allowances**, that is **equal to the total emissions from that installation** during the preceding calendar year as verified in accordance with Article 15, and that those allowances are subsequently cancelled [...]"

In other words: Where an operator of an installation successfully avoids emissions by employing CCS, then that operator need not surrender allowances for the CO_2 produced. The incentive to employ CCS arise where the price of obtaining an allowance to emit one tonne of CO_2 surpasses that of capturing, transporting and storing 1 tonne of CO_2. This is the general incentive to employ emission reduction options under the ETS, as emphasised in the preamble:

"[t]he main long-term incentive arising from [the ETS directive] for the capture and storage of CO_2 ('CCS'), for new renewable energy technologies and for breakthrough innovation in low-carbon technologies and processes, including environmentally safe carbon capture and utilisation ('CCU'), is the carbon price signal it creates and the fact that allowances will not need to be surrendered for CO_2 emissions which are avoided or permanently stored."[244]

In terms of emission reduction efforts by CCS, however, it seems that it is not enough to merely *avoid emissions* in order to obtain the economic incentive, additional prerequisites must be observed. This is evident from the latter part of Article 12 nr. 3a, which emphasises a certain verification process and a storage permit requirement (emphases added):

> "An obligation to surrender allowances shall not arise in respect of **emissions verified as captured and transported for permanent storage** to a facility **for which a permit is in force in accordance with [the CCS Directive]**."

Within the meaning of this provision, it is apparent that the term 'emissions' must be interpreted within the natural meaning of that word, to refer to the act of *producing* CO_2 by releasing carbon into the air to react

[244] Recital 14 to Directive (EU) 2018/410 amending Directive 2003/87/EC.

with oxygen. This means that the term is used inconsistently with the directive-specific definition of 'emissions', which would require the CO_2 to be released into the *atmosphere*[245] prior to capture.[246] This definition is addressed in detail in section 3.3.2 below.

In terms of the transport phase, it appears from a *prima facie* encounter that Article 12 nr. 3a does *not* condition the economic incentive on the type of transport used. The emphasis is on the *storage phase* and its adherence to the CCS Directive storage permit.

Refraining from restrictions on capture and transport technology would presumably enable the market to determine what providers offer the best services in terms of the state of technology and the most cost-efficient solutions for the CCS process in question. Such a consideration enhances the basic idea of the ETS: letting the market mechanism decide how and where it costs the least to cut emissions.[247]

It is, however, only by a closer analysis of the verification requirement and the storage requirement that the potential accommodation of mobile CO_2 transport may be determined. While the storage permit requirement aims to ensure safe geological storage, the verification requirement ensures the environmental integrity for the CCS process sanctioned under the ETS. The following sections review each of these requirements in order to ascertain whether the economic incentive is available for a CCS process that employs mobile CO_2 transport.

3.2.2 The storage permit requirement and its implications for CO_2 transport

This section reviews whether the storage site requirement limits the type of CO_2 transport used in a CCS process under the ETS. The ETS Directive only sanctions storage of CO_2 in 'a facility for which a permit is in force

[245] 'Atmosphere' is not defined by the ETS but is generally known to as: 'The atmosphere is divided into five different layers, based on temperature. The layer closest to Earth's surface is the troposphere, reaching from about seven and 15 kilometres (five to 10 miles) from the surface.' National Geographic (n.d).

[246] Directive 2003/87/EC as amended Article 3(b).

[247] Directive 2003/87/EC as amended Article 1.

in accordance with [the CCS Directive]', as emphasised by both Article 12 nr. 3a and the CCS activities subject to liability for emissions as included in Annex I to the ETS Directive.[248] This ensures that the CO_2 is stored in compliance with the objectives of safe geological storage as pursued by the CCS Directive.

It has been suggested that the interrelation between the CCS and ETS Directive that restricts any other transport modality than pipelines.[249] However, the CCS process under the *ETS Directive* is solely contingent on the storage permit provided for by the CCS Directive, as emphasised above in chapter 2. The aim of looking into the permit requirement pursuant to the CCS Directive is, therefore, to understand whether those rules impose any restrictions on the type of CO_2 transport employed in a CCS process under ETS Article 12 nr. 3a.

It is the 'facility' where the CO_2 is 'permanently stored' that must hold a 'permit' in accordance with the CCS Directive pursuant to ETS Directive Article 12 nr. 3a. As the only 'permit' that may be acquired pursuant to the CCS directive is a 'storage permit'[250] that provides for CO_2 storage in a 'storage site'[251], it follows from the context that it is this permit that Article 12 nr. 3a refers to.

Do the obligations associated with acquiring a storage site permit, restrict the transport modality used in the CCS process? These obligations stem from CCS Directive chapter 3, Articles 6–11. Article 6 nr. 1 holds that (emphases added):

> "Member States shall ensure that no **'storage site'** is operated without a **'storage permit'**, that there shall be only one **'operator'**

[248] Ibid., Annex I.

[249] O'Brien (2020), O'Brien 2019, p. 22.

[250] A 'storage permit' means 'a written and reasoned decision or decisions authorising the geological storage of CO_2 in a storage site by the operator, and specifying the conditions under which it may take place, issued by the competent authority pursuant to the requirements of this Directive' Directive 2009/31/EC., Article 3(11).

[251] Ibid., Article 6. The term 'storage site' is defined by the CCS Directive as 'a defined volume area within a geological formation used for the geological storage of CO_2 and associated surface and injection facilities,' Ibid., Article 3(3).

> for each storage site, and that no conflicting uses are permitted on the site."

The 'operator' is defined by the CCS Directive to mean:

> "[…] any natural or legal, private or public person who operates or controls the storage site or to whom decisive economic power over the technical functioning of the storage site has been delegated according to national legislation."[252]

The definition of 'operator' in the CCS Directive thus corresponds with the broad definition in ETS Directive Article 3(f), allowing for the same operator of a storage facility under the ETS Directive and the CCS Directive.

The requirements associated with a CCS Directive storage permit mainly pertain to the *storage site*. There are, however, a few prerequisites associated with the transport phase that the storage operator under the CCS Directive must adhere to, even if the transport phase may be operated by a different entity under the ETS Directive.

There are three main prerequisites which the storage site operator must adhere to concerning the transport phase.

Firstly, as part of the permit application, the potential storage site operator must include information about 'the prospective sources and transport methods according to Article 7 nr. 4 of the CCS Directive.[253]

Secondly, the storage site operator must include the environmental impact assessment required by the directive on the on the assessment of the effects of certain public and private projects on the environment, according to Article 7 nr. 9.[254] This environmental assessment could potentially require information about the transport phase of the CCS process, if, pursuant to the specific requirements of this regulation, the transport phase is seen as part of the same 'project' as the storage

[252] Ibid., Article 3(10).

[253] Ibid., Article 7(4).

[254] The directive referred to in Directive 2009/31/EC Article 7 nr. 9 is Directive 85/337/EEC. That directive was repealed and replaced by Directive 2011/92/EU (Article 14).

site.[255] This prerequisite requires compliance with that particular impact assessment, but does not *per se* limit the type of transport used.[256]

Thirdly, Article 8 nr. 1a) holds that the competent authority must be satisfied that 'all relevant requirements of this Directive and of other relevant community legislation are met' before issuing a storage permit.[257] Relevant legislation for the transport segment includes the Environmental Impact Assessment Directive[258] as well as the Industrial Emissions Directive[259], as referred to in the preamble of the CCS Directive.[260] However, none of those Directives limit the type of CO_2 transport that may be used in a CCS process.

To summarise, it seems that the only restrictions on the use of mobile CO_2 transport that arises from the storage requirement is by reference back to the ETS Directive as part of 'other Community legislation'. The CCS Directive itself does neither obligate nor restrict the use of mobile CO_2 transport.[261] This implies that the solution to accommodate mobile CO_2 transport in Community legislation may be found solely within the parameters of the ETS legal framework. Amendments of the CCS Directive is, therefore, not needed to enable mobile CO_2 transport in a CCS process employed to reduce emissions under the ETS.

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255 Directive 2011/92/EU Article 5 nr. 1(a).

256 Directive 2011/92/EU refers explicitly to CO_2 transport by pipelines as a «project» in Annex I in accordance with Article 4(1), and could indirectly refer to other types of transport as part of that project or as part of one of the general project categories in Annex II as referred to in Article 4(2).

257 Directive 2009/31/EC Article 8 nr. 1a.

258 Directive 2011/92/EU.

259 Directive 2010/75/EU. The Directive mainly concerns the capture facility, but it also refers indirectly to the transport phase in Article 36 (b) by requiring a prior assessment of CO_2 transport options.

260 Recitals 15-17 to Directive 2009/31/EC.

261 It does, however, amend other Community legislation to exclude CO_2 shipping from their scope of application. This appears to be an effort to remove existing barriers for such transport in Community legislation, see recital 46 of the preamble to Directive 2009/31/EC.

3.2.3 The verification requirement and restrictions on CO_2 transport

The question for this section is whether and how the verification requirement limits the type of transport used in a CCS process sanctioned by the ETS Directive. Any emissions avoided by employing CCS must be 'verified as captured and transported for permanent storage' in order to obtain the economic incentive set forth in ETS Directive Article 12 nr. 3a.

Article 12 nr. 3a does not itself stipulate a verification procedure but refers to the monitoring, reporting and verification regime within the Commission implementation level of the ETS legal framework, introduced in chapter 2 above. The main provision for the verification process indicated in Article 12 nr. 3a is MRR Article 49, concerning the rules on CO_2 transfers. However, the wording of Article 12 nr. 3a does itself imply two key features of those verification rules.

Firstly, the terms 'for permanent storage' indicates a requirement for the *purpose* of the CCS process, not a strict condition that no CO_2 may ever leak. This is apparent from the mechanisms in the CCS Directive and ETS that imposes obligations to monitor and rectify the leakage, thus acknowledging that there is no geological process that may *guarantee* leak-free storage.[262]

Secondly, the expression 'captured and transported for permanent storage' indicates that the freedom from surrendering allowances for the avoided emissions arise *prior* to the actual storage of the captured CO_2. That freedom is solely contingent on the verification of the act of capture and transport. This part of Article 12 nr. 3a refers to a system where the responsibility for captured CO_2, and thus liability for any emissions from leakage, is transferred between the different operators that take part in a CCS process. Transferring CO_2 out of the scope of responsibility of

[262] See, inter alia, Deng et al. (2017) for an example of how the risk of CO_2 leakage and its consequences continues to be an area of research. See, for example, the provisions concerning leakage from storage sites in the CCS Directive's chapter 3 and chapter 4, Commission Regulation (EU) No 601/2012 as amended Article 20 nr. 2 and nr. 23 of Annex IV, and Directive 2009/31/EC Articles 9 nr. 6, 11 nr. 3a, 13, 14 and 16.

an ETS operator is subject to 'very specific conditions' in order to 'close potential loopholes' associated with that transfer.[263]

The transfer rules in MRR Article 49 nr. 1 reads as follows (emphases added):

> "1. **The operator shall subtract from the emissions of the installation** any amount of CO_2 originating from fossil carbon in activities covered by Annex I to [the ETS Directive] that **is not emitted from the installation, but:**
> **(a) transferred out of the installation to any of the following:**
> (i) a capture installation for the purpose of transport and long-term geological storage in a storage site permitted under [the CCS Directive]
> (ii) a **transport network** with the purpose of long-term geological storage in a storage site permitted under [the CCS Directive]
> (iii) a storage site permitted under [the CCS Directive] for the purpose of long-term geological storage;
> (b) transferred out of the installation and used to produce precipitated calcium carbonate, in which the used CO_2 is chemically bound."[264]

The entities listed in (i)-(iii) represent each of the three stages of a CCS process; (i) the capturing installation, (ii) the transport network and (iii) the storage site. Article 49 facilitates the transfers of responsibility for CO_2 between the different operators of the CCS activities listed in Annex I that may take part in a CCS process. As explained in Chapter 2, the ETS Directive allows an operator to obtain an emission permit for more than one ETS activity.[265] Thus, there may be one operator of all the activities in a CCS process, so that no transfer of responsibility is required,

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263 Recital 13 to Commission Regulation (EU) No 601/2012, note that the recital retains an inadvertence as 'Union's greenhouse gas emission allowance trading scheme' is repeated twice, where it is apparent that it is meant to refer to the CCS Directive at the latter mention.

264 Article 49(1) of Commission Regulation (EU) No 601/2012 as amended by Commission Implementing Regulation 2018/2066 Article 73(3).

265 Directive 2003/87/EC as amended Article 6(1), second subparagraph.

or up to four different ETS operators and consequently three transfers of responsibility, as provided for by Article 49. Any such transfers of responsibility under Article 49 ensure that if the contained CO_2 leaks into the atmosphere after the transfer, then it is the operator of the receiving installation that retains the responsibility to surrender allowances for those emissions.

An installation receiving CO_2 produced in an activity outside the scope of the ETS can never subtract that amount from their ETS emission accounting. This is because only CO_2 transferred from 'activities covered by Annex I' to the ETS Directive may be subtracted from the transferring installation. This implies that the emissions accounting of an ETS installation can never be in *negative figures,* ensuring that the ETS imposes liability for the actual emissions produced within its scope of liability.

This mechanism, for the transfer of responsibility in Article 49, corresponds to how the freedom from the obligation to surrender allowances in ETS Directive Article 12 nr. 3a arises before the CO_2 is *actually* stored. There is, however, a nuance between the two provisions regarding the time of when that freedom arises. ETS Directive Article 12 nr. 3a holds that the obligation to surrender allowances does not arise in respect of CO_2 that is verified as captured *and* transported for permanent storage. MRR Article 49, however, allows for subtraction of CO_2 transferred between the operator of the activity that produces CO_2 and a potentially different operator that captures the CO_2. This nuance between ETS Directive Article 12 nr. 3a and MRR Article 49 could potentially imply that the operator that produces the CO_2 ('operator A') could, according to Article 12 nr. 3a, be liable for the same leakage of CO_2 as the capturing operator (operator B), if leakage incurred prior to the transfer to the transport network. However, as the aim of both provisions is to ensure liability for any release of CO_2 occurring during the CCS process, it seems to be enough to facilitate that objective that the transferred CO_2 is verified as *added* to the capturing installation's scope of liability, in accordance with MRR Article 49. It seems, therefore, that this nuance between ETS Directive Article 12 nr. 3a and MRR Article 49 cannot be interpreted

to require that operator A and operator B are liable for the same CO_2 concomitantly.

The problem incurred for mobile CO_2 transport in a CCS process arises from how MRR Article 49 determines the possible destinations for transfer. The transport phase envisaged by Article 49 is indicated by 'transport networks' in Article 49 nr. 1(a)(ii). 'Transport networks' are defined by the MRR with reference to the definition outlined in the CCS Directive.[266] The terms 'transport network' is in the CCS Directive defined as 'the network of pipelines, including associated booster stations, for the transport of CO_2 to the storage site'.[267] As noted in section 2.4.3, this definition does not pose a problem within the context of the CCS Directive, which merely facilitates third party access to that transport network.

Within the MRR Article 49, however, the definition of 'transport networks' seems to imply that it is only by transferring CO_2 to a *pipeline network* operator that the capturing installation may subtract that CO_2 from its scope of responsibility.[268] With this definition of 'transport network', it appears that the list of sanctioned destinations for transfer in a CCS process in MRR Article 49 nr. 1 (a) corresponds exactly with the list of CCS activities included under the ETS scope of liability, as set forth by Annex I. This exact overlap ensures that all the emissions associated with CCS as an emission reduction option are accounted for under the ETS scope of liability.

The emphasis on pipelines in Article 49 prompts the existential question for CCS projects relying on mobile transport: what is the consequence of transferring CO_2 to a mobile transport modality, prior to or instead of a pipeline network?

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266 Commission Implementing Regulation 2018/2086 Article 3(63) referring to Directive 2009/31/EC Article 3(22). A definition of 'transport networks' does not exist in MRR phase 3 (Commission Regulation (EU) No 601/2012 of 21). The emphasis on pipeline transport is there indicated by the definition of "CO_2 transport" in Article 3 item 52, and the link between Article 49 and the CCS activities listed in Annex I.r

267 Directive 2009/31/EC, Article 3 nr. 22.

268 Commission Regulation (EU) No 601/2012 Article 3(52), and Commission Implementing Regulation (EU) 2018/2066 Article 3(55).

As the objective of Article 49 is to close 'loopholes' associated with transfers of CO_2, it appears that the list of explicit transfer destinations is exhaustive.[269] The wording of Article 49 thus seems to imply that the capturing installation may not subtract CO_2 transferred to an entity other than the ones explicitly listed in that provision.

This implication prompts another question: is the operator of the capturing installation, as illustrated by Norcem within in the Longship project, obliged to surrender allowances for CO_2 transferred to the shipping segment on its way to permanent storage?

Such a conclusion does indeed appear to be the consequence derived from the wording of Article 49, as pipeline transport, corresponding to the Annex I pipeline transport activity, is the only transport activity that can *receive responsibility* for the CO_2 under the ETS. Consequently, if the CO_2 transferred to the mobile transport modality is subtracted from the capturing installation, then there is no means of imposing liability for any leakage that may happen during that transport phase. The wording consequently seems to imply that CO_2 transferred to another type of transport may not be verified as captured and transported for permanent storage as required by ETS Directive Article 12 nr. 3a. The effect is, in other words, that the capturing installation would have to 'pay' for the CO_2 transferred the mobile transport provider, even if it never enters the atmosphere.

A high-level legal review performed for the Global CCS Institute from 2011 concludes that the wording of Article 49 implies that any CO_2 transferred to a ship will continue to constitute part of the capturing installation's total emissions.[270] A recent master thesis concludes that this implies liability for that CO_2 at the hand of the capturing operator, as though the CO_2 sent off to storage was emitted.[271]

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269 Recital 13 to Commission Regulation (EU) No 601/2012.

270 Global CCS-Institute Bech-Bruun (2012) p. 11. The report also suggests that the storage operator would have to add the CO_2 to their emissions. That appears a questionable conclusion as that CO_2 is already accounted for under the ETS by the capturing installation, thus implying double liability.

271 O'Brien 2019, p. 22 and O'Brien (2020).

Ensuring the environmental integrity of the CO_2 in transit is an important consideration. However, it is highly problematic if the economic incentive set forth for CCS in ETS Directive Article 12 nr. 3a is not available for a CCS process that employs mobile transport to enable a cost-efficient design. Particularly considering how the forthcoming CCS cluster-projects are the first large-scale CCS projects that aim to achieve commercial viability in part based on the incentive mechanism set forth by the ETS. The potential business case for CCS under the ETS relies on the 'right' to not surrender allowances for CO_2 that is permanently stored.

The wording of MRR Article 49 is not only problematic in terms of how it seemingly inhibits the ETS Directive's aim to incentivise CCS. The main problem of concluding that the transfer rules imply liability for CO_2 transferred to a mobile transport modality is that it is inconsistent with the implications of the directive-specific concept of 'emissions'. By limiting the transfer in Article 49 to transfer to pipeline transport, the Commission is suggesting that the obligation to surrender allowances is not only instigated by releasing CO_2 into the atmosphere. Rather, it is suggesting that the obligation to surrender allowances arises merely from the fact that transferring CO_2 to a mobile transport modality is not listed as an option in Article 49.

The question becomes whether this is a legal effect that the Commission is empowered to adopt within limits set on the powers conferred by ETS Directive Article 14(1). The two forthcoming sections considers the CO_2 transfer rules in MRR Article 49 in light of the concept of 'emissions' as a superior norm set forth by the ETS Directive. The sections investigate whether a potential conflict with the superior norms of the ETS Directive and the reasons for the amendments of MRR Article 49 suggest that a teleological interpretation, rather than a strictly textual interpretation, is called for.

3.3 The concept of 'emissions' within the Emissions Trading Directive and its implications for the Commission's implementing powers

3.3.1 Overview

This section considers the concept of 'emissions' within the ETS legal framework and what this directive-specific concept implies for the Commission's power to adopt the rules on CO_2 transfers within the MRR.

In 2018 the transfer rules in MRR Article 49 were amended on the basis of the revised Article 14(1) of the ETS Directive (emphasis added), as explained in section 2.3 above:[272]

> "The Commission shall adopt implementing acts concerning the detailed arrangements for the monitoring and reporting of emissions…
>
> […]
>
> **Those implementing acts** shall be adopted in accordance with the examination procedure referred to in Article 22a(2)."

MRR Article 49 must thus be interpreted within this context: the concept of 'emissions' as set forth by the ETS Directive, as well as the boundaries set on implementing acts pursuant to TFEU Article 291 nr. 2. As discussed in section 2.3.4 above, the boundaries set on implementing powers imply that the content of the transfer rules in Article 49 is subject to the sole *execution* of the ETS Directive's obligations related to emissions.[273] The interpretative result of the content in Article 49 may thus no longer 'amend non-essential elements' of the ETS Directive, as was the boundary set on the power to adopt Article 49 prior to the latest revision.[274]

The inquiry in this section starts with an analysis of the directive-specific definition and concept of 'emissions' in ETS Directive Article

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[272] Commission Implementing Regulation (EU) 2018/2066, Article 76(3).

[273] Generally on the implementing acts see COM(2009)673 final p. 3–4, Craig & de Burca (2015) p. 117.

[274] Article 14(1) of Directive 2003/29/EC as amended by Directive 2009/29/EC.

3(b) and its implications for the Commission's implementing powers (3.3.2). Central to that analysis is the case C-460/15 *Schaefer Kalk* which considered a similar question concerning the transfer of CO_2 for the production of precipitated calcium carbonate (3.3.3). That preliminary ruling provides some critical insights to how the EU Court perceives the objectives of the ETS Directive in terms of facilitating emission reduction options by means of CO_2 capture technology (3.3.4). The case led to the revision of MRR Article 49 to explicitly include the transfer option now available in Article 49 nr. 1(b). The final section of this chapter considers what transfers of CO_2 are available under MRR Article 49 in the wake of *Schaefer Kalk* and the revision of Article 49 (3.3.5).

3.3.2 The concept of 'emissions' in Emission Trading System Directive Article 3(b)

ETS Directive Article 3(b) defines the directive-specific concept of 'emissions' to mean (emphases added):

> "**the release of greenhouse gases into the atmosphere from sources in an installation** or the release from an aircraft performing an aviation activity li**sted in Annex I of the gases specified in respect of that activity;**"

This definition facilitates the fundamental objective of the ETS: imposing liability for GHGs released into the atmosphere from sources in ETS installations. This definition thus adheres to the limited scope of the ETS; not all release of GHGs from the geographical scope of the ETS are included. However, the definition does not explicitly require that the CO_2 is produced by the installation that remains responsible for the release. This feature allows for the transfer of responsibility of the CO_2 between the CCS activities listed in Article 49 nr. 1.

The definition does not specify a time frame for the 'release' of the GHG. This lack of specificity prompts the question of whether the definition could be circumvented by temporarily containing the CO_2, and later releasing it from a location outside the installation. Limiting

the definition to 'direct and immediate emissions' would arbitrarily limit the scope of liability of the ETS operators and thus undermine the objective of the ETS to effectively induce actual emission reductions.[275] The definition of emissions must, therefore, be interpreted to mean *the release of GHGs produced within the scope of the ETS at any time after production and from any location*.

In terms of the powers conferred by ETS Directive Article 14(1), the directive-specific definition of emissions in Article 3(b) implies that the Commission is empowered to:

> "[…] adopt implementing acts concerning the detailed arrangements for the monitoring and reporting of [the release of greenhouse gases into the atmosphere from sources in an installation or the release from an aircraft performing an aviation activity listed in Annex I of the gases specified in respect of that activity]"

This scope of competence must be read in light of the fundamental objective of the ETS: to induce emission reduction efforts by imposing liability on emissions. The fact that it is the release of GHGs into the atmosphere, and not merely the production of GHGs, that incurs liability, prompts the question of what this implies for both ETS Directive Article 12 nr. 3a and MRR Article 49.

As stated before, ETS Directive Article 12 nr. 3a sets forth the incentive to employ CCS thus:

> "An obligation to surrender allowances shall not arise in respect of emissions verified as captured and transported for permanent storage to a facility for which a permit is in force in accordance with [the CCS Directive]."

From an antithetical interpretation of this wording the question becomes: if CO_2 is stored in a storage facility without a CCS Directive storage permit, does the obligation to surrender allowances for avoided emissions

[275] As underscored by General Advocate Sharpston in the associated opinion to Case-460/15 *Schaefer Kalk,* para. 39.

still arise? This is likely to remain a theoretical question, due to sanctions set forth in the CCS Directive for anyone not complying with the permit requirement. It does, however, demonstrate a tension within the ETS Directive itself: Does Article 12 nr. 3a expand the scope of liability to *not only* CO_2 released into the atmosphere, *but also* CO_2 that is captured, but not stored in a manner sanctioned by Community regulation? Although apparently inconsistent with the logic of the ETS to incur liability to mitigate climate change, it is a provision at the directive-level and therefore not subordinate to Article 12 nr. 3 or the definition of emissions.

This seems to imply that the provision does, in fact, expand the scope of the obligation set forth in Article 12 nr. 3 specifically in terms of CCS, and not, *inter alia*, in terms of emission reductions from CCU. The latter aims at the same type of capture technology but aims at permanent storage in materials rather than an underground geological storage site, as briefly explained in chapter 1. The aim of such an implication seems to be the necessity to ensure safe geological storage as provided for under the CCS Directive-regime.

In terms of the transfer rules in MRR Article 49, however, it is clear that those rules are subordinate to the obligations and associated definitions at the directive-level. This seems to imply that MRR Article 49 may not impose liability on *not* emitted CO_2 apart from CO_2 not stored in a facility for which a CCS Directive storage permit is in force, suggested by the wording of Article 12 nr. 3a.

It, therefore, seems that the implications for employing mobile CO_2 transport under the current transfer rules – that the CO_2 transferred to a mobile transport modality may not be subtracted from the transferring installations emissions – goes beyond the scope of what the Commission is empowered to adopt, under ETS Directive Article 14(1). It falls upon the Commission to facilitate rules that ensure the environmental integrity of the ETS without restricting legitimate CO_2 transfers for emission reduction purposes.

Considering the hierarchy of norms within the ETS and the concept of 'emissions' at the ETS directive-level, it seems that a literal interpretation of MRR Article 49 would be invalid insofar as it imposes liability for CO_2

captured and transported by a mobile transport modality for permanent storage in a facility for which a CCS Directive storage permit is in force.

However, although it seems highly problematic to disallow a transferring installation to subtract CO_2 transferred to a mobile CO_2 transport modality, it seems similarly problematic to merely conclude that this effect of MRR Article 49 is 'invalid' and consequently disregard the transfer rules at this point until revised. ETS Directive Article 12 nr. 3a still requires the CO_2 to be verified as captured and transported for permanent storage. The latter objective ensures that any leakage is accounted for.

The implications of the current transfer rules are, however, not only problematic for CO_2 transfers to a mobile CO_2 transport provider. It is also a significant issue for CO_2 transfers for emission reduction purposes by utilising the captured CO_2. Failing to accommodate CCU for emission reduction purposes seems to contradict the clear intention that the ETS should indeed facilitate such emission reduction efforts, as emphasised in the recital to the 2018-amendment of the ETS Directive (cited above).[276]

The only type of CCU currently facilitated by Article 49 is CO_2 transfers for the production of precipitated calcium carbonate (PCC), see Article 49 nr. 1(b). Article 49 was revised to accommodate production of PCC as a consequence of the preliminary ruling in C-460/15 *Schaefer Kalk* from 2017. The reasoning in that case is illuminating for the Court's perspective on the concept of emissions and the power of the Commission to adopt rules of CO_2 transfers. *Schaefer Kalk* considered a previous version of MRR Article 49 and its ruling lead to the revised version of Article 49 analysed so far in this chapter.

3.3.3 Case C-460/15 *Schaefer Kalk*

The case C-460/15 concerned a request for a preliminary ruling on the validity of the former version of MRR Article 49 nr. 1 and MRR point 10 of Annex IV.[277] The request originated from the proceedings between Schaefer Kalk GmbH & Co. KG ('Schaefer Kalk') and Germany on behalf

[276] Recital 14 to Directive (EU) 2018/410 amending Directive 2003/87/EC.

[277] Case-460/15 *Schaefer Kalk*, para. 1.

of the German Emissions Trading Authority at the Federal Environment Agency, ('the DEHSt').[278]

MRR Article 49 nr. 1 was at the time worded as follows (emphasis added):

> "Article 49
>
> Transferred CO_2
>
> 1. The operator shall subtract from the emissions of the installation any amount of CO_2 originating from fossil carbon in activities covered by Annex I to Directive 2003/87/EC, which is not emitted from the installation, but transferred out of the installation to any of the following:
>
> (a) a capture installation for the purpose of transport and long-term geological storage in a storage site permitted under [the CCS Directive]
>
> (b) a transport network with the purpose of long-term geological storage in a storage site permitted under [the CCS Directive]
>
> (c) a storage site permitted under [the CCS Directive] for the purpose of long-term geological storage.
>
> **For any other transfer of CO2 out of the installation, no subtraction of CO2 from the installation's emissions shall be allowed."**

The other contested provision was a part of the sector specific monitoring and reporting rules in MRR Annex IV point 10(b), and was at the time worded as follows (emphasis added):

> "[W]here CO_2 is used in the plant or transferred to another plant for the production of PCC (precipitated calcium carbonate)**, that amount of CO2 shall be considered as emitted by the installation producing the CO2."**

[278] Ibid., para. 2. 'the DEHSt' stands for Deutsche Emissionshandelsstelle im Umweltbundesamt (German Emissions Trading Authority at the Federal Environment Agency, see para. 21.

Schaefer Kalk operates an installation for the calcination of lime in Germany.[279] This activity is subject to the scope of liability of the ETS.[280] The calcination of limestone produces quicklime and excess carbon dioxide (CO_2).[281] Instead of releasing this excess CO_2 into the atmosphere, it may be transferred to another installation that uses it for the production of precipitated calcium carbonate (PCC).[282] Production of PCC is not an activity subject to the scope of the ETS.

Schaefer Kalk applied for the ability to subtract the CO_2 transferred to the production of PCC from its scope of responsibility.[283] This was submitted as part of the monitoring plan associated with the emission permit of the installation pursuant to ETS Directive Article 5-6. Schaefer Kalk reasoned that as the CO_2 was transferred for use in the production of PCC, and not for release into the atmosphere, then that transfer could not constitute 'emissions' in terms of the ETS Directive.[284]

The DEHSt denied this request with reference to the then prevailing wording of MRR Article 49 nr. 1 and point 10(b) of the sector specific monitoring rules set forth in Annex IV.[285]

Schaefer Kalk brought the final rejection from the DEHSt to the Administrative Court of Berlin, relying on the illegality of the second subparagraph of Article 49 nr. 1 and point 10(b) to Annex IV. The company argued that 'those provisions, which subject CO_2 bound in PCC and transferred for the production of that substance to mandatory participation in the EU-ETS, are not covered by the powers granted under Article 14(1) of [the ETS Directive]'.[286]

279 Case-460/15 *Schaefer Kalk*., para. 20.

280 Directive 2003/87/EC Annex I.

281 The National Lime Association (2020).

282 Ibid.

283 Case-460/15 Schaefer Kalk, para. 21.

284 Ibid.

285 Commission Regulation (EU) No 601/2012 Article 49(1) and point 10 of Annex IV thereto

286 Case-460/15 Schaefer Kalk, para. 23.

The Administrative Court of Berlin referred this issue to the CJEU, where the First Chamber of the Court summarised the issues before it in paragraphs 26–27 as follows:

> "By its questions, which it is appropriate to consider together, in essence, the referring court asks the Court to rule on the validity of those provisions in so far as, by systematically including the CO_2 transferred for the production of PCC in the emissions of a lime combustion installation, regardless of whether or not that CO_2 is released into the atmosphere, those provisions go beyond the definition of emissions as provided for in Article 3(b) of [the ETS Directive].
>
> In that regard, it should be noted that Regulation No 601/2012 [MRR phase 3] was adopted on the basis of Article 14(1) of [the 2009-amendment of the ETS Directive], according to which the Commission is to adopt a regulation, inter alia, for the monitoring and reporting of emissions, that measure being designed to amend non-essential elements of the directive by supplementing it. Consequently, an assessment, in the present case, of the validity of the provisions at issue from that regulation requires determination whether the Commission, by adopting those provisions, did not exceed the limits as provided for in [the ETS Directive]."

The boundaries set on the Commission powers by Article 14(1) was at the time of the case subject to the pre-Lisbon system of conferred powers, as introduced in section 2.3.2 above. The boundaries set forth by Article 14(1) allowed the measure set forth in the monitoring and reporting of emissions to amend 'non-essential elements' of the ETS Directive by 'supplementing it'. This is a slightly broader scope than the current powers provided by the current Article 14(1), which merely empowers the *execution* of the ETS Directive.

The Court centred its analysis of the contested rules on the directive-specific 'emissions'-definition in Article 3(b). The central question for the Court was therefore:

> "[…] for the purposes of determining whether the CO_2 resulting from the activity of lime production by an installation such as that

> at issue in the main proceedings falls within the scope of Directive 2003/87, under Article 2(1) thereof, and Annexes I and II thereto, it is necessary to ascertain whether such lime production leads to the release of CO_2 into the atmosphere."[287]

In this relation the court stated that '[i]t appears from the material before the Court, which has not been disputed, that the CO_2 used for the production of PCC is chemically bound in that stable product'.[288]

The Court thus reasoned that the contested provisions created an irrefutable assumption that the CO_2 transferred for the production of PCC constituted 'emissions', without that CO_2 necessarily ever being released into the atmosphere.[289] The Court held that such a presumption essentially expanded the scope of the directive-specific definition of 'emissions', which requires release of CO_2 into the atmosphere.[290]

On the basis of these considerations the Court concluded as follows in paragraphs 48–49 (emphasis added):

> It follows from all the foregoing considerations that the Commission, having altered an essential element of [ETS Directive] when it adopted the second sentence of Article 49(1) of Regulation No 601/2012 and point 10(B) of Annex IV to that regulation [MRR phase 3], overstepped the limits laid down in Article 14(1) of that directive.
>
> Consequently, the answer to the questions referred is that the second sentence of Article 49(1) of Regulation No 601/2012 and point 10(B) of Annex IV to that regulation **are invalid in so far as they systematically include the CO2 transferred to another installation for the production of PCC in the emissions of the lime combustion installation, regardless of whether or not that CO2 is released into the atmosphere."**

[287] Case C-460/15 Schaefer Kalk para. 37.

[288] Ibid., para. 38.

[289] Ibid., para. 40–41.

[290] Ibid.

3.3.4 An analysis of *Schaefer Kalk* in light of the broader objectives of the CO_2 transfer rules and the overarching objectives of the Emissions Trading System

The Court's reasoning in *Schaefer Kalk* clearly states that the Commission was not empowered to restrict CO_2 transfers without regard to whether or not that CO_2 would actually be released into the atmosphere, as provided for by the directive-specific concept of 'emissions'.

Certain features of the Court's reasoning warrant a closer analysis with regard to the issue addressed in this thesis: whether the revised version of the transfer rules, in the current version of Article 49, creates a similarly 'invalid' presumption with regard to transfers of CO_2 to a mobile transport modality. That is, as the wording seemingly creates an irrefutable presumption that all CO_2 transferred to the mobile transport modality are counted as 'emissions' at the hand of the transferring operator.

These features are first and foremost related to how the Court emphasises the economic logic of the ETS to solely impose liability for *actual* emissions, while there is very little regard to how this system may be implemented. Understandably, the latter feature was, and still is, the focus of the Commission.

The contested provisions in *Schafer Kalk* created an irrefutable presumption that any other transfer but the CCS process listed in Article 49 would constitute emissions at the hand of the transferring operator, as provided for by the then applicable second subparagraph.

As part of the proceedings in *Shaefer Kalk*, the Commission submitted that the restrictions on transfers to any other destination than the CCS process then listed in Article 49 nr. 1(a)-(c) was justified on the basis of Article 12 nr. 3a of the ETS Directive.[291] The argument of the Commission appeared to be that as the only type of transfers expressly indicated by the Directive was the CCS process in Article 12 nr. 3a, then it followed that no other transfer should be facilitated by the implementing transfer rules.

[291] Case-460/15 *Schaefer Kalk*, para. 34.

The Court did not accept the Commission's submissions regarding ETS Directive Article 12 nr. 3a. The Court's reasoning in paragraphs 33–36 illustrates the tension between the Directive and the Commission's implementation by stating that (emphasis added):

> "Indeed, it should be noted in that regard that Article 12(3a) of [the ETS Directive] provides that, subject to certain conditions, emissions which have been captured and transported for their permanent geological storage to a facility for which a permit is in force in accordance with [the CCS Directive] are not subject to the allowance surrender obligations.
>
> **Nevertheless, and contrary to the submissions of the Commission, that does not mean that the EU legislature considered that operators are exempt from the obligation to surrender only in the sole instance of permanent geological storage.**
>
> By contrast to the last paragraph of Article 49(1) of Regulation No 601/2012 [MRR phase 3 unamended], which provides that for any other transfer of CO_2 no subtraction of CO_2 from the installation's emissions is to be allowed, Article 12(3a) of [the ETS Directive] contains no similar rule.
>
> The latter provision, which refers only to a particular situation and is intended to encourage the storage of greenhouse gases, was not intended to, and did not, amend the definition of 'emissions' within the meaning of Article 3 of [the ETS Directive], or even, by implication, the scope of that Directive as established in Article 2(1) thereof."[292]

The reasoning of the Court and the submissions of the Commission regarding Article 12 nr. 3a divulge a notable disparity in their perceptions of the ETS.

[292] The reasoning of the last paragraph is notable in relation to the question prompted by an antithetical interpretation of Article 12 nr. 3a discussed above: would CO_2 produced within the ETS and stored in a storage site without a storage permit instigate an obligation to surrender allowances? The Courts reasoning seems to suggest that the answer to that question is no. The problem with that conclusion is that it would deprive Article 12 nr. 3a of its aim to ensure geological storage in compliance with the CCS Directive. However, as this was not the question before the Court one cannot rule out the possibility that it would reason differently if presented with this question outright.

The Court emphasises the economic logic of the ETS and the fundamental obligation set forth by Article 12 nr. 3: 'it is therefore crucial, for the correct operation of the scheme established by [the ETS Directive], for those emissions to be identified which must be taken into account by operators in that regard'.[293] This is essential to ensure 'that the reductions of greenhouse gas emissions required to achieve a predetermined environmental outcome take place at the lowest cost', which is the main objective of the ETS as set forth by ETS Directive Article 1.[294] This conception suggests that the Court puts decisive emphasis on the role of the obligation in Article 12 nr. 3: where the conditions that instigate that obligation do not exist, then there is a freedom from that obligation, a 'right' to not surrender allowances.[295]

The Commission's perspective is, on the other hand, on the implementation of these fundamental ideas and objectives. Tasked with the implementation of the ETS and ensuring the environmental integrity of the system, the Commission understandably emphasises the need to restrict transfer to ensure liability for all release of CO_2 into the atmosphere that is originally produced within the scope of the ETS. The Commission's perspective on the role of Article 12 nr. 3a suggest that it considers the ETS as a closed ecosystem out of which no CO_2 should escape, and that this is a legitimate objective to pursue at the implementing level, regardless of whether that implies liability for some CO_2 that is never released into the atmosphere. The Commission thus implements the ETS Directive with emphasis on the need to hold an ETS operator responsible for emissions that could occur at any place and at any point in time after its production within the ETS scope of liability.

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293 Case C-460/15 *Schaefer Kalk*, para. 31.

294 Ibid., para. 29. The Court's analysis of the concept of 'emissions' received approval for its logic and coherence by the one legal article on this case that I have unearthed, see Siwior and Bukowska (2018), p. 26. That article was published before the amendments of the MRR.

295 This discourse aligns with the analytical framework of 'rights' proposed by Wesley Newcomb Hohfeldt, see Hohfeldt (1913–1914), see also the recent discussion on the nuances of Hohfeldt's analytical framework presented by Wibye (2018), Lindberg (2020)

The advantage of the Commission's perspective is that it enables a clear-cut manner in which to ensure the environmental integrity of all CO_2 produced within the scope of the ETS. It also aligns with some of the discourse within the literature that refers to how Article 12 nr. 3a defines what 'counts' as emissions in terms of geologically stored CO_2.[296] The disadvantage of that strategy is that, without detailed regulation for all the types legitimate transfers of CO_2, it undermines the incentive set forth by the market mechanism to find optimal ways to contain and use CO_2 that entail emission reductions.

The clear logic and advantage of the Court's reasoning is of course the idea that only emissions should incur a cost. The problem is, however, that the Court does not properly address the implementation of that logic in its reasoning. Although it makes perfect sense to allow any type of CO_2 transfers out of the ETS scope of liability as long as there is an emission reduction purpose, there is still the question of how the monitoring, reporting and verification system could account for potential CO_2 leakage into the atmosphere after the CO_2 leaves the ETS scope of liability.[297]

In relation to the specific case of CO_2 transferred for the production of PCC, the Court evaded these important nuances by stating that '[i]t appears from the material before the Court, which has not been disputed, that the CO_2 used for the production of PCC is chemically bound in that stable product'.[298] With this pronouncement it seems that the Court reasons that the CO_2 will never leak into the atmosphere. Thus, the Court inferred logically that not allowing for transfer of excess CO_2 would contradict the fundamental incentive mechanism of the ETS.[299]

However, the risk of leakage associated with PCC was, in fact, contested between the parties. The issue was that those submissions was not brought before the national courts and could therefore not be considered

296 'The idea is that every tonne of geologically stored CO_2 will count as not having been emitted under the ETS,' see Woerdman *et al* (2015), p. 187.

297 The German Environmental Authority comments on this issue and issued a report on the potential and problems associated with CCU in terms of emission reductions under the ETS, see German Environment Agency (2019).

298 Case C-460/15 Schaefer Kalk para. 38.

299 Case C-460/15 Schaefer Kalk para. 41.

as part of the preliminary ruling.[300] The Advocate General (AG) Opinion elaborates on this point as follows:[301]

> "It is therefore not for this Court to assess whether part of the carbon dioxide transferred from Schaefer Kalk's installation to another installation for producing PCC was (or might plausibly be) lost during transport or was indeed released into the atmosphere as a result of that production. In any event, it is common ground that at least the major part of the carbon dioxide used in the chemical process for producing PCC is chemically bound to that product. It is against that background that I shall address the questions referred. It will be for the referring court, where appropriate, to carry out the necessary verifications of fact."

This statement presents a problem with the interpretation of the Court: Does the Court's conclusion encompass transfer of CO_2 where there is no risk of leakage, or transfer of CO_2 where at least the 'major part' will never be emitted?

As the Court states in its ruling 'that the CO_2 used for the production of PCC is chemically bound in that stable product', it appears that the Court refrained from commenting on the situation where transferred CO_2 poses a risk for leakage. The Court does, however, indirectly comment on the risk of leakage in the final paragraphs of the ruling. After the Court stated that the Commission had expanded the scope of 'emissions' by adopting the contested provisions, it considered whether those provisions were necessary in order to prevent circumvention of the obligation to surrender allowances for actual emissions.

To this consideration the Court stated in paragraphs 43–44 that:

> "Moreover, it does not appear, in the first place, that the guarantees taken as a whole arising, on the one hand, from the monitoring and reporting scheme provided for in [ETS Directive], and from the

[300] Advocate General Opinion to Case-460/15 Schaefer Kalk para 32, citing settled case law on TFEU Article 267 regarding the procedure for reviewing requests for preliminary hearings.

[301] Advocate General Opinion to Case-460/15, para. 32.

> provisions of Regulation No 601/2012 [MRR phase 3] other than those at issue in the main proceedings, and arising, on the other, from the powers of review and verification conferred on the competent authorities of the Member States [...] would not be sufficient to avoid the risk of circumventing the emissions allowance scheme upon the transfer of greenhouse gases to an installation, such as that where the PCC is produced, not subject to that scheme.
>
> Against that background, although the second sentence of Article 49(1) of Regulation No 601/2012 [MRR phase 3] and point 10(B) of Annex IV to that regulation ensure that the CO_2 transferred to an installation, such as that where the PCC is produced, whether or not released into the atmosphere, is always regarded as an emission into the atmosphere, such a presumption, in addition to prejudicing the coherency of the scheme put in place as regards the objective of [ETS Directive], goes beyond what is necessary for attaining that objective."

The general reference to the 'guarantees taken as a whole' arising from the monitoring, reporting and verification and inspection regime, appears to indicate that ensuring compliance with the obligation to surrender allowances is important, but that the Commission cannot impose rules that risks imposing an obligation to surrender allowances for GHGs that are never released into the atmosphere.

On the basis of the logic of Schafer Kalk it appears that the ETS Directive requires an implementing framework that facilitates CO_2 transfers for all emission reduction purposes. Considering the issues still posed to the use of mobile CO_2 transport in a CCS process, and other uses of CO_2 that may lead to emission reductions, it seems that the Commission still struggles to find that balance within the rules on CO_2 transfers in MRR Article 49.

3.3.5 The implications and limitations of *Schaefer Kalk* for CO_2 transfers to mobile transport modalities

This section summarises the implications of Schaefer Kalk for the interpretation of the current transfer rules in MRR Article 49 and its apparent restrictions on transfer of CO_2 to a mobile transport modality.

Article 49 seems, *prima facie*, to imply that the transfer options listed are exhaustive, as suggested in the prior discussions of that Article. The revision of Article 49, in the aftermath of *Schaefer Kalk,* renders that conclusion less certain.

In recital 17 of the preamble to the regulation that revised Article 49 subject to the ruling in Schaefer Kalk, the Commission solely comments on the need to account for the production of PCC specifically. That recital does not seem to indicate any ambition to facilitate other CO_2 transfers associated with CO_2 capture technology than the ones now explicitly listed in Article 49.[302] However, rights and obligations may not be derived from the recitals of a preamble only.[303] The possibility for other transfers than the ones explicitly listed must therefore be determined by interpreting the revised version of Article 49 in light of the boundaries set by the ETS Directive.

The amendment of Article 49 nr. 1 in 2018 consisted of removing the second subparagraph of Article 49, which previously stated the following:[304]

> "For any other transfer of CO_2 out of the installation, no subtraction of CO_2 from the installation's emissions shall be allowed."[305]

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302 Recital 17 to Commission Implementing Regulation (EU) 2018/2066.

303 See for example this stated in Case 345/13 *Karen Millen Fashions* para 31: "…it should be borne in mind that the preamble to a Community act has no binding legal force and cannot be relied on either as a ground for derogating from the actual provisions of the act in question or for interpreting those provisions in a manner clearly contrary to their wording…"

304 Commission Implementing Regulation (EU) 2018/2066 Article 76(3) amending Regulation (EU) No 601/2012 Article 49.

305 Commission regulation (EU) No 601/2012 Article 49 unamended.

In its place, the following was added:

> "(b) transferred out of the installation and used to produce precipitated calcium carbonate, in which the used CO_2 is chemically bound."[306]

Merely including the transfer option in b) would likely have sufficed to account for the specific conclusion in Schaefer Kalk, which stated that the contested provisions were only invalid in so far as they restricted CO_2 transfers for the production of PCC.[307]

By not only including Article 49 nr. 1(b), but also removing the explicit provision which restricted any other transfer, the Commission appears to acknowledge the Courts reasoning in so far as restricting CO_2 transfers that do not lead to emissions would be incompatible with the powers conferred. Particularly in light of the recent curtailment of those powers to the sole implementation of the ETS Directive, see section 2.3.2 above.

These considerations suggest that the list of transfer options enabled by Article 49 is no longer necessarily limited to the explicit options in nr. 1 (a)-(b).

This conclusion seems encompassed by the procedural rules set forth by Article 49 nr. 2. That provision sets forth how a transfer under Article 49 should be accounted for the annual emission reports by holding that (emphasis added):

> "In its annual emissions report, the operator of the transferring installation shall provide the receiving installation's installation identification code recognised in accordance with the acts adopted pursuant to Article 19(3) of [the ETS Directive], if the receiving installation is covered by that Directive. **In all other cases, the operator of the transferring installation shall provide the name, address and contact information of a contact person for the receiving installation.**

[306] In addition to this removal, the fourth subparagraph of point 10.B, specifically stating that transferred CO_2 to a PCC installation should count as emissions on the hand of the transferring lime installation, was also removed from the Annex IV.

[307] Case C-460/15 *Schaefer Kalk* para. 49.

> The first subparagraph shall also apply to the receiving installation with respect to the transferring installation's 'installation identification' code."

The act referred to in Article 19(3) of the ETS Directive is the regulation that establishes the Union Registry for the carbon market.[308] The purpose of the Union Registry is to ensure the accurate accounting of transactions of emission allowances under the emissions trading scheme.[309] However, the Union Registry also records 'annual verified CO_2-emissions from installations and aircraft operators'.[310]

The second sentence of Article 49 nr. 2 states that CO_2 may be transferred to installations that *do not* retain a unique identifier in the Union Registry. This part of Article 49 thus facilitates transfer of CO_2 'out' of the scope of the ETS, as defined by ETS Directive Annex I. The purpose of including this option could simply be to account for the transfer now possible through option b), as the production of PCC is not subject to the scope of the ETS. However, as the prohibition in the second subparagraph is now removed, and the technical accounting for transfer out of the scope of the ETS in Article 49 nr. 2 is not specified to solely be a facility for the production of PCC, then there is a plausible case to be made for how the list of destinations in Article 49 nr. 1 is not exhaustive.

It thus seems that Article 49 is not necessarily limited to the transfer options listed in (a)-(b). However, possible transfers 'out' of the scope of responsibility of the ETS must be reviewed in light of how the directive-specific concept of emissions encompasses the release of GHGs at a later point in time and at another location than where it was produced. This seems to imply that the current transfer rules facilitate CO_2 transfers 'out' of the ETS scope of liability in terms of transfers with *no* risk of leakage. It would contradict the integral objective of the ETS Directive,

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308 Commission Regulation (EU) No 601/2012 Article 49(2) as amended, referring to Article 19(3) of the Directive 2003/87/EC as amended that provides the basis of competence for the regulation establishing Union Registry, the Commission Regulation (EU) No 389/2013.

309 Recital 1 to Commission Regulation (EU) No 389/2013

310 European Commission (n.d.*Union Registry*)

and the definition of 'emissions', to allow for any transfer of CO_2 that would undermine the environmental integrity of the market.

CO_2 transfers associated with no risk of leakage may encompass the situations where the CO_2 is chemically bound and stable in a certain type of product produced. It must be borne in mind, however, that it was contested between the parties in *Schaefer Kalk* whether the production of PCC could lead to CO_2 emissions or not.

In terms of transferring captured CO_2 to a mobile transport modality, however, it is apparent that the current state of technology does not guarantee that there will be no leakage emissions during transport. It must consequently be concluded that the current transfer rules do not allow for transfer of CO_2 out of the scope of the ETS to a mobile transport modality, as there would be no account of the leakage onboard.

However, it seems equally clear that it is not within the power of the Commission to adopt a rule that considers *all* CO_2 transferred to a mobile transport modality on its way to permanent storage in a facility for which a CCS Directive permit is in force as 'emissions' at the hand of the transferring operator.

This leaves the current wording of Article 49 insufficient to facilitate the transfers of CO_2 apparently sanctioned at the directive-level, both in terms of including the forthcoming CCS cluster projects that rely on mobile transport modalities and in terms of transfers of CO_2 for uses that avoid emissions. It falls outside the scope of this thesis to analyse problems and solutions associated with CCU-transfers. I will, however, revisit the implications of the considerations in this thesis for CO_2 transfers for CCU in the final chapter.

3.4 Findings and implications

This chapter has considered whether the economic incentive for employing CCS under the ETS, as set forth by ETS Directive Article 12 nr. 3a, is available for the CCS projects that employ mobile CO_2 transport. The analysis demonstrated how the issues regarding mobile CO_2 transport do not arise from the wording of the Directive-level provision, but rather

from the wording of the Commission regulation that implements the Directive. It seems that a textual interpretation of the implementing CO_2 transfer rules in MRR Article 49 suggest that CO_2 transferred to a mobile transport operator will constitute liable emissions at the hand of the transferring operator.

This finding is not only problematic in the sense that it contradicts the objective to promote a range of CCS technologies by means of the ETS, but also by how such a textual interpretation seems to imply a content beyond that which the Commission is empowered to adopt based on the powers conferred upon it through the ETS Directive. The reasoning in *Schaefer Kalk* showed how the Commission is not empowered to adopt rules that create an irrefutable presumption that *all* CO_2 transferred out of the scope of the ETS constitutes liable 'emissions', without considering whether that CO_2 enters the atmosphere.

It is a major challenge for the business case of the forthcoming CCS cluster projects that a literal interpretation of MRR Article 49 only facilitates CO_2 transfers to a pipeline operator. In terms of the Longship project, for example, the business model relies on the ability for Norcem, operating the cement production facility and the capturing installation, to transfer CO_2 to the ship provided by the Northern Lights transport and storage project, operated by Equinor. The business model consequently necessitates a transfer of responsibility from the capturing operator to the CO_2 shipping segment.[311] It is similarly consequential for the Dutch Porthos project, as that project may be able to expand to additional capturing units if mobile CO_2 transport is viable under the ETS.

Furthermore, it comes across as a paradox that the only current CCS projects that the transfer rules enable are the ones that capture CO_2 from an activity that is not subject to the scope of the ETS, namely the CCS projects at Sleipner and Snøhvit. These two projects are commercially

311 *CCSNorway (2020a).*

viable partly due to the unique Norwegian CO_2 tax, as explained in chapter 1.[312]

This seems to suggest that an amendment of the problematic rules is necessary, in order to align the norms within the ETS legal hierarchy and achieve the objective to promote emission reductions by CCS. Such an amendment process is, however, a time-consuming effort and thus primarily a long-term solution. Another alternative is the opt-in of mobile CO_2 transport as a new ETS activity through the inclusion mechanism in ETS Directive Article 24. However, as briefly introduced in chapter 2, this is a problematic solution for several reasons. In terms of practicalities, it is problematic that the mechanism is primarily aimed at inclusion within a single member state, and that it takes time to receive approval from the Commission. The time aspect is problematic in light of the forthcoming investment decisions where there is a short window of opportunity. In terms of legislative design, it is clear that the opt-in would not obtain the harmonised application of legislation on CCS that the current rules are intended to facilitate. The analyses in this chapter demonstrates an additional problem: yielding to the opt-in option essentially accepts that there is no manner in which the current transfer rules can be interpreted to adhere to the hierarchy of norms within the ETS.

The drawbacks of a lengthy amendment process on the one hand, and the shortcomings of the inclusion mechanism on the other hand, prompts the need for considering an interpretative solution within the context of the current framework. Chapter 4, therefore, considers a teleological interpretation that potentially resolves the problems incurred for mobile CO_2 transport under the textual interpretation considered in chapter 3. The problematic aspects produced by the textual approach include the potential conflict within the ETS hierarchy of norms and the need to ensure environmental integrity by fulfilling the basic verification requirement of ETS Directive Article 12 nr. 3a.

[312] Sleipner Vest (2014/2020), Snøhvit/Hammerfest LNG (2014/2020). These projects are only subject to *liability* for emissions for the CCS activities performed, as listen in Directive 2003/87/EC as amended.

The ultimate objective of chapter 4 is, in other words, to assess whether a teleological approach to the rules on CO_2 transfers may accommodate the use of mobile CO_2 transport in a CCS process under the ETS. If such an interpretation is viable, then that would render the economic incentive for CCS under the ETS available for the design of the forthcoming CCS cluster-projects that employ mobile CO_2 transport.

4 A Teleological Interpretation that Accommodates Mobile CO_2 Transport Within the Current Emissions Trading System

4.1 Introduction

When the ETS Directive was amended to include CCS, it was an explicit objective that the incentive mechanism should aim to promote a broad range of CCS technologies.[313] Despite this clear intention, it appears from the analysis in chapter 3 that a literal interpretation of the CO_2 transfer rules in the Commission monitoring and reporting regulation does not support CCS processes that employ mobile CO_2 transport. The wording of those rules seems to unintentionally inhibit the business case for CCS in Europe as envisaged by the forthcoming CCS cluster projects.

The key problem within the current framework is that it does not include mobile CO_2 transport within the ETS scope of liability. This problem stems from how the CCS process was introduced into a system centred on emissions from separate industrial installations, as noted in section 2.4 above. The ETS was not designed to account for emissions associated with an integrated emission reduction process constituting several transport phases. The result is that there are no ways in which to monitoring leakage from the mobile transport phase, as the only transport activity currently included under the ETS is pipeline transport.

As demonstrated in Chapter 3, a literal interpretation of the current framework raises several issues, suggesting that an amendment is necessary to accommodate CCS cluster projects employing mobile transport. In this chapter, however, a teleological interpretation is presented, which facilitates mobile CO_2 transport within the current legal framework. In this interpretation, the mobile CO_2 transport phase is considered as an integrated part of either one of the CCS installations it connects. This

[313] COM(2008) 16 final, p. 52.

interpretation is possible through a broad interpretation of the directive-specific definition of 'installation', in light of its legislative context and according to the ETS Directive's objectives.[314]

This chapter begins with interpreting the scope of an ETS installation as provided for under the ETS legal framework (4.2) and subsequently applies that definition to the mobile transport phase in a CCS process (4.3). The suggested interpretation prompts the related question of liability for the operative emissions of the mobile transport modality, which is addressed separately in (4.4).

4.2 The scope of an 'installation'

4.2.1 The function of the term 'installation' within the ETS scope of liability

The ETS facilitates liability for emissions under the 'cap' of the market by ensuring that no activity subject to its scope may be performed without obtaining an emission permit.[315] That emission permit encompasses the emissions from the *installation* that performs the liable activity included under ETS Directive Annex I.[316] It is, therefore, the scope of the specific 'installation' that determines what emission sources the operator of that installation must surrender allowances for, as required by ETS Directive Article 12 nr. 3.

One emission permit may cover 'one or more installations on the same site operated by the same operator'.[317] As mentioned in chapter 2, the term 'site' is not defined.[318] The generality of the site-definition enables the issuance of emission permits to one operator covering a large geographical area. The main concern of the ETS Directive is that *there is* a designated responsible operator for all emissions occurring within the

[314] Directive 2003/87/EC as amended Article 3(f).

[315] Ibid., Article 4.

[316] Ibid., Article 6 (1).

[317] Ibid.

[318] European Commission (2010), p. 4 states that no guidance is provided to allow for flexible transpositions.

scope of the ETS, not how many installations that operator is responsible for. The operator of an installation must, however, retain either practical or economic control over the installations in question, as required by Article 3(e) ETS Directive.[319] This requirement is set to ensure that the designated entity is able to comply with the numerous obligations set forth by the ETS legal framework.

The main question for the following three sections is what constitutes the general scope of an ETS installation. The natural starting point for this analysis is the definition of the term 'installation' in the context of the ETS Directive (4.2.2). Thereafter the analysis proceeds to the general and sector-specific monitoring rules set forth by MRR Annex IV, which aim to facilitate harmonised transposition of the installation-definition across the different industries (4.2.3). The final section discusses the case C-158/15 *EPZ*, which provides guidance for what may constitute 'directly associated activities' within the installation definition (4.2.4).

4.2.2 The definition of an 'installation' – Emissions Trading System Directive Article 3(e)

ETS Directive Article 3(e) defines 'installation' as (emphases added):

> "a **stationary technical unit** where one or more activities listed in Annex I are carried out and any **other directly associated activities** which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution;"

By the inclusion of the word 'and', the provision indicates two main elements of what comprises an ETS installation. The first part is the 'stationary technical unit' that carries out an activity listed in Annex I of the ETS Directive. Stationary does not mean it must be permanently

[319] Directive 2003/87EC as amended, Article 3(f): 'operator' means any person who operates or controls an installation or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the installation has been delegated;"

stationary, but that when it is stationary it would fall under the scope of the ETS if it performs an activity listed in Annex I of the ETS Directive.[320] An example would be a mobile platform performing an Annex I activity when stationary.[321]

The second part of what comprises an installation is 'any directly associated activity' that have a 'technical connection with the activities carried out on that site' and 'which could have an effect on emissions and pollution'. It is clear from the syntax of Article 3(e) that the term 'stationary' applies to the *stationary technical unit*, not the associated activities. The 'directly associated activities' themselves need not be listed in Annex 1 of the ETS Directive.[322]

The definition of 'directly associated activity' within Article 3(e) does not specify whether the associated activity must be co-located with the stationary technical unit. The wording seems to indicate that this is not required, because it merely requires a 'technical connection' between the associated activity and the Annex I activities 'carried out on that site' of the main technical unit. This implies that the boundaries of an installation could encompass a considerable geographical scope, depending on the associated activities in question, and that an operator may not circumvent liability merely by distancing the associated activities from the main technical unit.

The only additional guidance within the ETS Directive on the scope of an installation is found in Annex I nr. 5. It holds that '[w]hen the capacity threshold of any activity in this Annex is found to be exceeded in an installation, all units in which fuels are combusted, [...] shall be included in the greenhouse gas emission permit'. By including all ancillary combustion units to the main ETS activity, it seems that the scope set for

320 European Commission (2010), p. 6.

321 I.e connecting to offshore industry and when stationary combustion of fuels with a total rated thermal input exceeding 20 MW, see Directive 2003/87/EC as amended, Annex I.

322 Underscored in Advocate General Opinion in the Case C-158/15, *EPZ*. para 29: where she holds that 'it follows from the very definition of 'installation' that other activities are also to be attributed to the installation if they are directly associated with the main activity…'

the installation in question should be comprehensive. The Commission guiding document on Annex I activities underscores this point by holding that '[t]he installation boundaries should be set as broad as possible'.[323]

The inclusion of 'directly associated activities' within the scope of liability of an installation aligns with the logic of the ETS which seeks to put a 'carbon price' on the activities listed in Annex I.[324] The carbon price on the Annex I activities must include the associated activity that is necessary for the functioning of the main technical unit. If this ancillary activity and its emissions were excluded, then there would not be a 'true' carbon price on the Annex I activity. The directive-specific definition thereby contributes to ensuring the environmental integrity and effectiveness of the ETS by imposing liability for all emissions directly associated with Annex I activities. A prime objective of the installation-definition is thereby 'to take full account of the relevant environmental effects [it] regulate[s]'.[325] The interpretation of what encompasses an installation thus implies that the elements of the installation-definition cannot be interpreted conservatively as that risks exclusion of relevant emission sources from the ETS.[326]

4.2.3 The scope of an 'installation' by reference to the monitoring boundaries

Considering the hierarchy of norms within the ETS legal framework, it is the provisions of the ETS Directive that determine the rights and obligations of any operator subject to its scheme, including the scope of an installation. However, as explained above, there is need for general monitoring boundaries for different industrial activities in order to

323 European Commission (2010)., p. 7.

324 Similarly emphasised in Advocate General opinion to Case C-158/15, *EPZ*, paras 38–39, specifically in para. 38: 'This view is based on the idea that the market mechanism for trading in emissions allowances should ensure that operators of installations minimise as far as possible the CO_2 emissions arising in the course of their activities'.

325 Advocate General opinion to Case C-158/15, *EPZ*, para. 35.

326 Ibid., similarly underscored in para. 28.

promote harmonised transposition and promote the environmental integrity and effectiveness of the ETS.

The regulation on the monitoring and reporting of emissions thereby provides additional guidance and rules on how to set the monitoring boundaries of an installation with respect to the various activities listed in Annex I. The additional rules set forth in the MRR may not, however, amend more than 'non-essential elements' of the ETS Directive throughout the third trading phase, and, as of the fourth trading phase, the Commission may not amend the ETS Directive at all, pursuant to the boundaries set for the forthcoming implementing act, as explained in section 2.3.2 above. The monitoring boundaries set forth within the MRR must, in other words, be interpreted within the boundaries set by the installation-definition and the description of the activities in Annex I.

The Commission provides both general and specific rules and guidance as to how the operator of an installation should set its monitoring boundaries. The sector-specific monitoring boundaries in MRR Annex IV provide the specific rules that each type of activity is obligated to observe pursuant to Article 20 nr. 2. The general rules and guidance supplement those sector-specific minimum standards.[327]

Most of the rules in the MRR, as well as the Commission guiding documents that accompany the ETS legal framework, underscores the importance of including all relevant emission sources associated with the Annex I activities carried out on an installation. This emphasis is evidenced, *inter alia*, by the first paragraph of Article 20(1) which holds that (emphasis added):

> "1. An operator shall define the monitoring boundaries for each installation.
>
> Within those boundaries, the operator **shall include all relevant greenhouse gas emissions** from all emission sources and source streams belonging to activities carried out at the installation and listed in Annex I to [the ETS Directive], as well as from activities and greenhouse gases included by a Member State pursuant to Article 24 of [the ETS Directive]."

[327] Commission Regulation No 601/2012 as amended Article 20(2).

Article 20(1), therefore, both aligns with and underscores the provisions and purpose of the ETS Directive as it relates to the concept of an 'installation' and the objective of retaining the environmental integrity of the ETS. This objective is further ensured by the principle of 'completeness' set forth by Article 5 of the MRR, which holds that (emphasis added):

> "Monitoring and reporting shall **be complete and cover all process and combustion emissions from all emission sources and source streams belonging to activities listed in Annex I to** [the ETS Directive] and other relevant activities included pursuant to Article 24 of that Directive, and of all greenhouse gases specified in relation to those activities […]"

The principle of completeness thereby underscores how directly associated activities constitutes an obligatory part of the scope of liability of an installation. The application of the installation definition to a concrete Annex I activity was considered by the CJEU in case C-158/15 (*EPZ*). That case is considered in the following as it provides general guidance as to how the 'directly associated activities'-part of the installation definition should be interpreted.

4.2.4 Case-158/15 EPZ on 'directly associated activities'

The central case on the interpretation of 'directly associated activities' pursuant to Article 3(e) of the ETS Directive is Case C-158/15 ('EPZ').[328] The EPZ concerned whether

> "[…] a fuel storage site of a coal-fired power plant [...] constitutes an 'installation' within the meaning of Article 3(e) of [the ETS Directive], taking into account in particular the fact that it is situated approximately 800 metres from that power plant, which is separated from it by a public road, and that the fuel is transported from

[328] Referred to, inter alia, by C-457/15 *Vattenfall para.34*. However, the case does not consider the directly associated activity part of the definition, merely the EPZ interpretative guidance on 'installation' more generally.

> that site to the power plant by means of a conveyor belt which crosses that public road."[329]

The coal storage was in itself not an activity subject to Annex I of the ETS because it did not reach the threshold of 20 MW required for the activity, specified as '[c]ombustion of fuels in installations with a total rated thermal input exceeding 20 MW]'.[330] The potential emissions from the storage facility, in the form of self-heating of the coal, would therefore only be subject to the scope of responsibility of the operator of the power plant if that coal storage was considered a 'directly associated activity' to the power plant as the main technical unit.[331]

With regard to the definition of 'directly associated activities', it was clear that the coal storage could have 'an effect on emissions' because of the self-heating.[332] Thus, the question was whether it otherwise fulfilled the prerequisites for being a 'directly associated activity' within the meaning of ETS Directive Article 3(e).

In its characteristically succinct manner, the Court reasoned as follows (emphases added):[333]

> "[...] that **the fact that the coal is essential to the functioning of the power plant is in itself sufficient for the view to be taken that the storage is directly associated with that plant's activity.** That direct association is, moreover, evidenced by the existence of a technical connection between the two activities. As the Advocate General proposes in point 30 of her Opinion, such a connection should be assumed if the relevant activity is integrated into the same technical process as the power plant's combustion activity.
>
> […] Such a connection exists in any event, for a coal storage site such as that at issue in the main proceedings, by reason of the very fact of the practical organisation of that site and the presence of a conveyor belt located between the coal park and the power plant.

329 Case C-158/15, *EPZ*, para 24.
330 Directive 2003/87/EC Annex I, first category. Case C-158/15, *EPZ*, para 20.
331 Case C-158/15, *EPZ*, para 29.
332 Case C-158/15, *EPZ*, para 33.
333 Case C-158/15, *EPZ*, para. 30–32.

> [...] **The other facts mentioned by the referring court, namely that the storage site and the power plant are situated approximately 800 metres from each other** and are separated, moreover, by a public road, are of no relevance in that regard."

On the basis of this reasoning, the Court concluded that the storage facility constituted a directly associated activity and thus was subject to the scope of the power plant installation pursuant to Article 3(e) of the ETS Directive.[334]

The particularly interesting feature of the Court's reasoning is how it emphasises that the coal 'is essential to the functioning' of the power plant and therefore is 'in itself sufficient' for the view to be taken that the storage is directly associated with that plant's activity.[335] This seems to indicate a holistic approach to the installation-definition, where an associated activity may exist either due to its role as an *essential function* to the main technical unit, *or* it may be evidenced by a technical connection. The latter 'should be assumed if the relevant activity is integrated into the same technical process as the power plant's combustion activity'.[336]

A directly associated activity will often retain both of these characteristics, as was the case for the coal storage facility connected to the power plant by the conveyor belt. By emphasising that the essential function of the coal was enough to see the coal storage as an 'associated activity', the Court appears to signal that an operator should not be able to circumvent liability for an emission source originating from an activity that is essential to the functioning of the main activity. That is, neither by rearranging the site so that the connection does not appear sufficiently 'technical', nor by expanding the distance between the associated activity and main activity. This perspective on the installation-concept supports the objective of the ETS legal framework to incentivise cost-effective emission reductions by setting a carbon price on the Annex I activities that encompass all directly relevant ancillary emission sources.

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[334] Ibid., para. 34.
[335] Ibid., para. 30.
[336] Ibid.

The parties did bring up the question of whether a different organisation of the site might impact the status of the coal storage facility. While the Court remains concise in its reasoning regarding the organisation of the storage, the Advocate General offers some illuminating insights as to whether 'if the storage were organised differently, this would potentially rule out its inclusion as part of the power plant installation'.[337]

In that regard, the Advocate General points out that the definition of a 'directly associated activity' may not depend on the commercial organisation, such as outsourcing of the activities involved,[338] nor the choice of 'technical means to connect the different parts of the installation'.[339] That is, as long as those parts of the installation are 'connected within the same technical process'. On this basis, she notes concerning the conveyor belt that 'other more flexible connections, such as lorries, would also be conceivable'.[340] This interpretation is possible because 'the term 'technical unit' is not defined within the directive and can therefore be interpreted with greater flexibility and primarily regarding what activities are integrated in the same technical process that performs the Annex I activity.[341]

This reasoning aligns with the idea that an operator should not be able to circumvent responsibility by choosing a mobile rather than a stationary technical connection. The arguments made by the Court and the Advocate General demonstrates how the installation-definition seeks to avoid arbitrary exclusion of relevant emission sources.

While the Court considers the distance between the storage facility and the coal power plant of 'no relevance', the Advocate General applied a more nuanced approach. She noted that in assessing the integration of an associated activity in the main technical process, the 'distance […] cannot be more than indicative'. However, she added that '[t]he further

337 Advocate General opinion to Case C-158/15, *EPZ,* para. 44–51.

338 Case C-158/15, *EPZ* para 45. This also seems to imply that all directly associated activities must be operated by the same operator as the main technical unit, as discussed in 4.3.2 below, though the *EPZ* does not address this directly.

339 Advocate General opinion to Case C-158/15, *EPZ,* para. 48.

340 Ibid.

341 Ibid., para. 26–27.

they are away from each other, the more unlikely it is that there is a direct technical connection'. This latter notion does not seem substantiated by the Courts reasoning, which emphasises the question of whether the potentially associated activity is essential for the functioning of the main activity, more than the specific distance involved. However, it could be that the question of geographic scope would be subject to greater scrutiny if the storage facility was placed at considerably more remote location than what was the situation before this Court.

Both the reasoning of the Court and the reasoning of the Advocate General are firmly rooted in the belief that the scope of an installation must enable the main function of the ETS: to put a true carbon price on the activities subject to its scope. This conception is well illustrated by how the Advocate General refutes *EPZ*'s submission that it should not be responsible for the self-heating emission because it could not prevent those emissions. The Advocate General Kokott states decisively in that regard that:

> "Even if one takes it for granted that the operator of a coal storage facility really cannot avoid self-heating, EPZ nevertheless fails to recognise that included in the market mechanism is a measure whereby certain activities will in some circumstances cease completely if they are no longer competitive due to the cost of their unavoidable emissions. [...] The objectives of [ETS Directive] therefore similarly confirm the inclusion of the coal storage facility in the power plant installation."

With these considerations in mind, the question for the following section is how this approach to the installation-definition applies to the CCS projects that employ mobile CO_2 transport.

4.3 The scope of CCS installations applied to mobile CO_2 transport

4.3.1 Mobile CO_2 transport as a 'directly associated activity' within a CCS process

The question for this section is whether a mobile CO_2 transport segment may constitute 'a directly associated activity' to a 'stationary technical unit' that carries out either the capturing activity, the transport by pipelines or the storage activity, as listed in Article 49 nr. 1(a) (i)-(iii), and listed in ETS Directive Annex I.

Although the mobile transport segment could potentially connect the capturing activity directly to the injection point of the storage facility, it is primarily envisaged as a flexible connection between the capturing points and the pipeline network in the forthcoming cluster projects.[342]

In terms of the design of the Longship project, the question becomes whether the shipping segment could be considered a directly associated activity to either the capturing activity at the cement production facility or to the pipeline network. If the answer is yes, then the transfer rules in MRR Article 49 would not pose a problem to employing mobile CO_2 transport, as the CO_2 in transit would be accounted for by an ETS operator at all times.

The analysis of the directive-specific definition of 'installation' demonstrated how the elements of the definition should not be interpreted restrictively, as this would risk excluding relevant emission sources from the scope of the ETS. The reasoning of the Court in the case *EPZ* demonstrated how the question of what activities constitute part of an ETS installation must take into account the function and integration of that activity in relation to the main Annex I activity.

The scope of the installations that perform the CCS activities listed in Annex I and MRR Article 49 must be determined by reference to the specific Annex I activities they perform, as the above analyses relay.

[342] See chapter 1.

The liable CCS activities are described in Annex I as follows (emphases added):

> "Capture of greenhouse gases from installations covered by this Directive **for the purpose of transport and geological storage in a storage site permitted under [the CCS Directive]**
>
> "Transport of greenhouse gases by pipelines for geological storage in a storage site permitted under [the CCS Directive]"
>
> "**Geological storage** of greenhouse gases in a storage site permitted under [the CCS Directive]"

These three activities all pursue the same purpose within the same process: geological storage of captured CO_2 in a storage site permitted under the CCS Directive, as indicated by the emphases. Prior to the explicit inclusion of CCS under the ETS, the available option was to include a whole CCS process under the scope of the same installation.[343] A central aim of including the phases of CCS as separate activities in Annex I was to facilitate commercial operation by different designated entities.[344] Separating the three activities was, in other words, not intended to disjoin the process that begins with the production and capture of CO_2 and ends with geological storage in a storage site with a CCS Directive permit.

The nature and interdependence of the phases of a CCS process provide the backdrop for the question of what may constitute 'directly associated activities' to the main stationary technical units performing these Annex I activities.

The relevance of the reasoning in the case of *EPZ* must be viewed in light of the differences between the practical scenarios of the coal-fired power plant and a CCS project employing a mobile transport segment as part of that process. A key difference is that the coal storage facility serves the fuel of the coal-fired power plant. It is, therefore, 'essential' for

[343] As explained in sub-chapter 2.4 above.

[344] This is perceived as an explicit objective of the current system see Dixon et al (2009), p. 4449–4450 and the motifs set forth in the Commission impact assessment in sub-chapter 2.4 above.

the functioning of the power plant.[345] CO_2 transport from a capturing facility to, inter alia, a pipeline network, does not retain a 'technical connection' with the *individual activity* of capturing CO_2 itself, nor the *individual activity* of transport by pipelines. For many ETS activities, this would be enough to say that it is *not* part of that installation pursuant to the definition in ETS Directive Article 3 e). However, the purpose of the different CCS activities listed in Annex I is not limited to 'CO_2 capture' *only*, nor to 'pipeline transport' *only*. The activities of *merely* capturing or transporting CO_2 is, in fact, not subject to the scope of the ETS. The two activities are instead only subject to the scope of the ETS when they facilitate emission reductions by geological storage of captured CO_2.

With these considerations in mind it seems that the activities of the CCS process could be perceived to be part of the same integrated process. A mobile CO_2 transport phase within a CCS project, thereby, constitutes an *integrated* part of the emission reduction process. It is an activity that enables the captured CO_2 in reaching the ultimate objective of the process: geological storage in a site permitted under the CCS Directive.

Though the mobile transport segment is not essential to the separate technical processes of the CCS activities considered in *isolation*, it is essential to attaining the obligatory purpose of those activities within the specific CCS project. That is true, regardless of whether the transport segment is long or short. It still serves an integrated element within a three-part technical process for the permanent storage of CO_2. In terms of the design of the Longship project, this implies that even the protracted shipping segment may be considered a 'directly associated activity' to both the capturing unit and the pipeline network.

It is further evident that a mobile transport activity may have an effect on the emissions of the main Annex I activity, as required by the definition in ETS Directive Article 3(e). Both leakage emissions and operative emissions mean that the transport activity could affect the emissions of the main technical unit, as required in order to consist a 'directly associated activity' pursuant to ETS Directive Article 3(e).

345 Case C-158/15, *EPZ* para 30.

This interpretation does not appear to be in conflict with the sector-specific monitoring boundaries set forth in MRR Annex IV nr. 21–23 as those monitoring boundaries presume a seamless scope of the CCS process from the capturing installation to the storage facility.

With regard to the capturing installation, nr. 21 of Annex IV states that:

> "[…] All parts of the installation related to CO_2 capture, intermediate storage, transfer to a CO_2 transport network or to a site for geological storage of CO_2 greenhouse gas emissions shall be included in the greenhouse gas emissions permit and accounted for in the associated monitoring plan. […]"

We here see that 'transfer' to a pipeline network, or a storage site, should be included. The modality of transfer is not given. As the regulation that sets forth the rules for MRR phase 4 specifically defines 'the transport of CO_2 by pipelines for geological storage in a storage site permitted under [the CCS Directive]',[346] it seems that the 'transfer' in this sector-specific boundary is meant to be over a relatively short distance to the proximate pipeline network or the injection point of the storage facility. In other words, 'transfer' does not *prima facie* seem to indicate a significant CO_2 transport segment, such as 700 km of maritime transport. However, 'transfer' is not specifically defined within these monitoring rules. As a teleological interpretation of the installation-concept to accommodate mobile CO_2-transport seems possible, then 'transfer' may be interpreted likewise.

With regard to the pipeline network, the sector-specific monitoring boundaries in Annex IV, nr. 22, does not include an explicit 'transfer'. In relation to the other CCS activities it merely specifies that:

> "Each transport network shall have a minimum of one start point and one end point, each connected to other installations carrying

[346] Commission Regulation (EU) No 601/2012 as amended Article 3(52), and Commission Implementing Regulation (EU) 2018/2066 Article 3(55).

> out one or more of the activities: capture, transport or geological storage of CO_2."

This statement implies that the scope of each of the installations in MRR Article 49 should be connected. The aim is to prevent loopholes between the scopes of responsibility of the CCS operators in question. The fact that there is no explicit mention of transfer with respect to the pipeline does not mean that it contradicts an interpretation where a mobile transport segment could constitute part of its installation. The inclusion of a mobile transport segment is not determined by these monitoring boundaries in the MRR, but rather by the interpretation of 'installation' in ETS Directive Article 3(e). The MRR merely implements the ETS Directive. Thus, as long as there is no explicit contradiction between the MRR and the ETS Directive, as was the case in *Schaefer Kalk*, then these two instruments should be interpreted to be aligned within their common objective to establish a well-functioning carbon market.

Excluding the mobile CO_2 transport modality from the scope of liability seems to omit a relevant emission source from an integrated CCS process that is otherwise accounted for under the ETS. As there are no sector-specific monitoring requirements for this type of CO_2 transport, it follows that the operators must find a monitoring solution that adheres to the basic principles for monitoring set forth by MRR Article 5-9 as required by MRR Article 4.[347] Establishing a satisfactory monitoring regime is necessary in order to obtain an emission permit for the installation that includes the mobile transport modality, as required by ETS Directive Article 6.

This application of the 'installation'-definition to the interdependent CCS process pursues the objectives of facilitating CCS as an emission reduction process under the ETS while ensuring responsibility for the environmental integrity of that process. The interpretation must necessarily expand the elements of the installation definition in light of how it has

[347] In terms of the mobile transport modalities and any leakage incurred the monitoring could possibly be solved by measuring the CO_2 injected into the ship and the CO_2 injected into the pipeline transport network.

been applied to industrial installations previously. A teleological interpretation of the installation definition is required to facilitate the economic incentive for employing CCS as it is set forth by ETS Directive Article 12 nr 3a. That provision does not condition the type of transport modality used, as discussed previously. The interpretation avoids imposing liability for *not* emitted CO_2 and thereby aligns the Commission's CO_2 transfer rules with the scope of powers conferred by the ETS Directive to adopt those rules. This interpretation consequently aligns the interpretation of MRR Article 49 with the legislative context within the relevant EU secondary law, which represents a key feature of EU legal methodology.[348]

This suggested interpretation raises the related question of whether the operator for the installation that includes the mobile CO_2 transport segment incurs liability for operative emissions, in addition to any emissions from leakage of CO_2 transport onboard. This question is considered separately in section 4.4 below. Before that analysis, I will address two related topics to the proposed interpretation. Firstly, the question of what is required of an entity that seeks to be the designated operator of the installation that includes the mobile CO_2 transport segment (4.3.2) and, secondly, the interpretative solution envisaged by the Norwegian Environmental Agency for the mobile transport segments in the Longship project (4.3.3).

4.3.2 The relation between the scope of an installation and the potential 'operator'

The inclusion of a mobile transport segment under the scope of an installation necessarily expands both the scope and nature of that installation, especially if the transport segment is protracted. This change to an installation raises the question of who qualifies to be the ETS designated 'operator' of that installation pursuant to the definition of an operator in ETS Directive Article 3(f).

The entity that becomes the designated operator of an ETS installation must retain *practical or decisive economic control* over that installation,

[348] See generally Riesenhuber (2017), p. 241.

as discussed in section 2.2.2. The objective is apparently to ensure that the designated operator of the installation retains the necessary control needed to comply with the substantial monitoring, reporting and verification requirements. It thus seems that the transport segment may not be fully outsourced from the installation it is considered part of.

In terms of the design of the Longship project, it seems to align best with the commercial organisation of that project to include the shipping segment under the pipeline network, as Equinor will be the main owner/and practical operator of the Northern Lights CO_2 transport and storage venture, which includes the shipping phase.[349] To include the 700 km shipping segment under the scope of the capturing installation seems to presuppose that Norcem obtains either practical or decisive economic control over that ship. This is not part of the current commercial design of that project.

The relation between the operator and the scope of an installation thus indicates a drawback with the proposed teleological interpretation; although the interpretation allows for the transport to be included under either of the installations it connects, it does not facilitate all types of commercial designs because there may not be a third operator. Facilitating the possibility for different commercial operators was a clear objective for including the three phases of the CCS separately in ETS Directive Annex I.[350]

This demonstrates how the suggested interpretation in this chapter should only serve as a temporary solution. Amendment of the ETS legal framework to explicitly enable mobile CO_2 transport is a preferable solution, as described in chapter 5 below.

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[349] This is what the sources I have been able to obtain suggest. Equinor (2020a), Norwegian Environmental Agency (2020).

[350] This is perceived as an explicit objective of the current system and appreciated as a significant difference to the situation prior to the general amendment that included CCS under the ETS, see Dixon et al (2009), p. 4449–4450. As alluded to in chapter 2, the previously available opt-in of CCS under Article 24 only allowed opt-in of a whole CCS process under one installation controlled by one operator.

4.3.3 The solution envisaged by the Norwegian Environmental Agency

This section briefly addresses the practical solution suggested by the Norwegian Environmental Agency in order to accommodate the mobile transport segment of the Longship project under the ETS legal framework. The Agency's suggestion was included in the letter sent to the Commission to obtain an opinion on how the ETS legal framework applies to the Longship project.[351] The teleological interpretation I have suggested above partly aligns with their solution but differs in some important respects.

In short, the Norwegian Environmental Agency suggests expanding the emission permit issued to the operator of the *capturing installation* to include one or more mobile transport segments. CO_2 leakage occurring between the capturing installation and the pipeline network would thus be the responsibility of the capturing operator.[352]

The project is, at the moment, thought to comprise two designated ETS operators, as envisaged by the private parties in collaboration with the Norwegian Environmental Agency. Norcem will be the designated operator for the cement production facility and the capturing activity.[353] The existing emission permit issued to their cement production activity would thus be expanded to include the capturing activity.[354] Equinor is anticipated as the designated operator of the pipeline transport network and the storage activity, as commented in the previous section.[355]

The only flexible connection planned to connect the capturing facility operated by Norcem and the pipeline network operated by Equinor, is the 700 km shipping segment. The connection between the cement production and capturing installations and the shipping is planned as pipelines.[356] That intermediate transfer could, however, be facilitated by

[351] Norwegian Environmental Agency (2019). The letter was developed in agreement with the Ministry of Climate and Environment.

[352] Norwegian Environmental Agency (2019), p. 6.

[353] Confirmed by Norwegian Environmental Agency (2020), supported by Norcem (2020a).

[354] Norcem Brevik (2014/2018).

[355] Norwegian Environmental Agency (2020).

[356] Norcem (2020a).

trucks in terms of other capturing units, such as will be the case for the planned waste incineration plant.[357]

The idea to include those transport segments under the capturing operator's emission permit comes from the sector-specific monitoring boundaries set forth for the capturing installation. As cited above the MRR Annex IV nr. 21 states that (emphasis added):

> "[…] All parts of the installation related to CO_2 capture, intermediate storage, **transfer** to a CO_2 transport network or to a site for geological storage of CO_2 greenhouse gas emissions shall be included in the greenhouse gas emissions permit and accounted for in the associated monitoring plan. [...]."

My impression is that the Agency does not perceive that the mobile CO_2 transport modality would constitute part of the capturing installation in order for it to be included under the emission permit.[358] The letter consequently does not address the liability for the operative emissions by the ship as they consider any mobile emission source to fall *per se* outside the scope of liability of the ETS Directive.[359]

It is unclear how the Agency concludes that a shipping segment may be included within the monitoring boundaries of an installation without constituting part of that installation. It is similarly unclear how this aligns with the system where the scope of an emission permit adheres to the boundaries of the installations it covers.[360]

The letter mentions that including the shipping segment under the scope of the capturing operator would mean that the capturing operator remains liable for leakage associated with a ship it does not control.[361] The Agency suggests that commercial arrangements may solve this. There is, however, no discussion in the letter regarding whether Norcem may be the

357 Norwegian Environmental Agency (2019), p. 1–2.

358 Confirmed in a telephone call and a meeting with the Agency spring 2020, Norwegian Environmental Agency (2020).

359 Norwegian Environmental Agency (2020).

360 Directive 2003/87/EC Articles 4–6 which facilitates the liability obligation in Article 12 nr. 3.

361 Norwegian Environmental Agency (2019), p. 6.

designated operator of an installation that encompasses such a protracted shipping segment, without that ship being within the practical economic control of that company, as required by ETS Directive Article 3(f).

Although the Agency's suggestion departs from my analyses on a few points, it is clear that both the Agency and I perceive that *not* accommodating for mobile transport in a CCS process under the ETS is inconsistent with the basic obligation to surrender allowances for actual emissions only.[362]

It is now confirmed that the European Commission shares this perspective; that the use of mobile CO_2 transport does not mean that CO_2 transferred to that vessel constitutes 'emissions' at the hand of the transferring operator.[363] In its response to the Norwegian authorities, the Commission accepts the practical solution presented concerning the mobile transport segment. The Commission requires information on the eventual design of the monitoring and reporting regime, which necessarily disclose information on the entity responsible for potential CO_2 leakage associated with the mobile transport segment. The Commission's response is, however, very brief and does not comment on the legal issues and particularities that this practical solution raises, as reviewed in this thesis. Nevertheless, it represents an important signal that the Commission allows for a practical interpretation of the sub-optimal legal framework in order to accommodate a range of CCS technologies and process designs.

[362] Norwegian Environmental Agency (2019), p. 4–5. Ministry of Climate and Environment (2020).

[363] Ministry of Climate and Environment (2020).

4.4 Operative emissions from the mobile CO_2 transport

4.4.1 The issues with the general exclusion of emissions from mobile sources

The inclusion of mobile transport under the scope of either of the CCS installations listed in Annex I prompts a related question: is the designated operator liable for the operative emissions of mobile transport?

The fundamental obligation to 'pay' for emissions in ETS Directive Article 12 nr. 3 states that '[...] the operator of each installation surrenders a number of allowances, that is equal to the total emissions from that installation during the preceding calendar year [...]'. The total emissions from an installation thus depend on the scope of the installation. It seems to follow from this that all emissions from a 'directly associated activity' to an installation performing an Annex I activity falls within the scope of liability defined by ETS Directive Article 12 nr. 3, including operative emissions from the mobile transport modality.

The second subparagraph of MRR Article 20 nr. 1, however, includes a peculiar exclusion of what appears to be potentially relevant emissions sources, by holding that:

> "The operator shall also include emissions from regular operations and abnormal events […] **with the exception of emissions from mobile machinery for transportation purposes.**"[364]

This provision prompts the question: on what basis does the Commission retain the power to exclude the emissions of all 'mobile machinery for transport purposes' from the ambit of the responsibility of an ETS operator? It could be that the Commission interprets the definition of an installation in ETS Directive Article 3(e) to exclude, categorically,

[364] The exception of mobile machinery is repeated in the Commission guiding documents on the interpretation of what constitutes an installation, and exemplified as 'trucks, forklifts, bulldozers' which has the purpose of being mobile at the moment of performing its tasks', see European Commission (2010)., p. 7 and European Commission (2017)., p. 20.

any type of mobile emission source. However, if that were apparent from the definition, there would be no need to exclude that emission source explicitly. Moreover, as noted above, it is clear from the syntax of ETS Directive Article 3(e) that the directly associated activities need not themselves be stationary.

Another argument for excluding emissions from mobile machinery could be if it were both very difficult or impractical to monitor those emissions, and that they represented a negligible source of emissions. However, those characteristics would necessarily depend on the mobile machinery in question, and they, therefore, appear unfit for substantiating a categorical exclusion of that emission category. The *per se* exclusion of emissions from mobile machinery for transportation purposes seems to lack explicit corroboration within the ETS Directive.

The fundamental obligation in Article 12 nr. 3 of the ETS Directive requires an operator to surrender allowances corresponding to 'the total emissions from that installation'. The concept of an installation is, therefore, central to the scope of that obligation. It seems, therefore, that an ETS operator should not solely rely on the guidance in MRR Article 20(1) regarding the exclusion of emissions from mobile transport sources, without substantiating it with reference to the definition of an installation in ETS Directive Article 3(e). This interpretation thus takes into account that the Commission's per se exclusion of mobile emission sources could *potentially* constitute more than merely a non-essential element of the ETS Directive, depending on the nature of the activity and installation in question. The Commission is not empowered to adopt rules with such an implication, as discussed in section 2.3.2.

An interpretative solution to this potential problem within the ETS hierarchy of norms would be to consider a mobile emission source a 'directly associated activity' to the main technical unit and interpret MRR Article 20(1) in a manner consistent with the superior norm of the Directive. This application would align the MRR with the directive-specific definition of an 'installation' and its objective to ensure 'complete' monitoring of all relevant emission sources.

It could be that the Commission has recently realised the problem of the categorical exclusion in Article 20 nr. 1. The Commission states in its guiding document on the interpretation of the MRR from 2017 in the chapter on 'completeness', that 'mobile machinery used within the installation are generally excluded'.[365] This choice of phrasing could potentially be read as a more careful approach than what comes across both in MRR Article 20 nr. 1 and the Commission guiding document on activities in Annex I from 2010. The latter guidance includes a similar categorical exclusion of 'truly mobile sources'.[366]

I stress this point about mobile machinery, and its relation to the scope of an ETS installation because the guiding documents and rules of the MRR represent important points of reference for the national authorities and private entities subject to the ETS legal framework.[367]

4.4.2 Application to the mobile CO_2 transport phase

The tension between MRR Article 20(1) and the scope of liability at the directive-level becomes particularly clear in terms of the CCS cluster projects. The 700 km shipping segment part of the Longship project would entail a substantial emission source if powered by fossil fuels. That is, not necessarily compared to the CO_2 it transports to storage, but compared to the operative emissions of the other CCS activities subject to liability under Annex I. The CCS activities listed in Annex I incur liability for both leakage and operative emissions. The responsibility for both types of emission sources follows implicitly from the scope of liability determined by ETS Directive Article 12 nr. 3, but also expressly from the sector-specific monitoring boundaries set forth in MRR Annex IV nr. 21–23.

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365 European Commission (2017)., p. 20.

366 European Commission (2010), p. 7: 'Excluded from the EU ETS is "true" mobile machinery (trucks, forklifts, bulldozers…), i.e. machinery which has the purpose of being mobile at the moment of performing its tasks.'

367 This is, *inter alia*, evidenced by the emission permits issued by the Norwegian Environmental Agency that refers to these guidance documents in relation to specific monitoring obligations, see inter alia, Sleipner (2014/2020), p. 29.

Provided that one accepts the inclusion of a mobile transport modality under the scope of a CCS installation, it follows that refraining from imposing liability for the operative emissions of the mobile transport segment would undermine the environmental integrity and effectiveness of the CCS process sanctioned by the ETS. The latter was a central consideration made prior to the inclusion of CCS under the ETS.[368] Subjecting the operative emissions of the ship to liability would also promote the objective of the ETS to induce cost-effective emission reductions.[369]

Due to the explicit provision in MRR Article 20(1), however, it seems that there is no clear answer as to whether the current legal framework requires liability for the operative emissions of the mobile transport modality if included under the scope of an installation. The conclusion to that question appears to depend on whether excluding that specific emission source based on MRR Article 20(1) would entail a correct implementation of the ETS Directive concerning the scope of liability of an installation and the directly associated activities within.

There is, however, a clear intention to put a 'true' carbon price on the CCS process as a whole, by including the all the three separate phases under the Annex I scope of liability. Thus, if a mobile transport modality is interpreted to be a directly associated part of that process, then the intention to account for all emissions associated with a CCS process suggests liability for the operative emissions of the mobile transport modality too.

4.5 Conclusion

This chapter demonstrated how the directive-specific definition of 'installation' allows for an interpretation that encompasses a mobile CO_2 transport segment with reference to the integrated nature of a CCS process. The proposed interpretation incentivises emission reductions and is consistent with the obligation to surrender emission allowances for *actual* emissions. It also ensures the integrity of the system, as any

[368] COM(2008) 18 final, p. 11, 20 and COM(2008) 16 final, p. 50.

[369] Such as electrification of the ship, wholly or partly.

emissions during the transportation phase would be accounted for by the designated ETS operator of the relevant installation.

The main conclusion is, therefore, that the economic incentive set forth by the ETS Directive Article 12 nr. 3a to employ CCS is available for the forthcoming CCS cluster projects that rely on mobile CO_2 transport. This holds true for all the forthcoming European CCS projects that plan to capture CO_2 from sources within the scope of the ETS, including the design of the Longship project and the forthcoming Dutch Porthos-project.

5 Conclusions, Recommendations and Reflections

5.1 Summary of conclusions

This thesis demonstrated how the ETS may accommodate a CCS process that employs mobile transport modalities, despite an initial legislative design that solely enables pipeline transport. The suggested interpretation renders the economic incentive for employing CCS under the ETS available for stakeholders in CCS processes that employ mobile CO_2 transport.

A key finding is that the ETS Directive requires that the Commission's implementation of monitoring, reporting and verification of emissions facilitates *all* emission reduction efforts. The current Commission regulation on monitoring and reporting of emissions, however, *prima facie* implies liability for CO_2 transfers to destinations other than the ones explicitly listed. The problematic wording effectively treats CO_2 transfers to unlisted destinations as 'emissions', regardless of whether the CO_2 is ever released into the atmosphere. Unlisted destinations that are integral parts of emission reduction technologies include, but are not limited to, mobile CO_2 transport options and various forms of CCU.

Imposing liability under the ETS for CO_2 that never constitutes 'emissions' within the meaning of the directive-specific definition, appears to be incompatible with the scope of powers conferred upon the Commission to adopt these transfer rules. It would also undermine the objective to incentivise a cost-efficient design of a CCS process. However, disregarding the transfer rules entirely would undermine another central objective of the ETS: ensuring the environmental integrity and effectiveness of the system by accounting for actual emissions, e.g. leakage from a mobile transport modality.

This conundrum may be solved by interpreting the relevant provisions within the legal framework in the light of the directive-specific definitions, objectives and purpose of the ETS Directive. In the interpretative solution proposed in this thesis, the mobile CO_2 transport phase is

considered as a 'directly associated activity' to either of the two 'technical units' it connects within the scope of an 'installation' it connects within an integrated CCS process, i.e. the capturing unit or pipeline network. This teleological interpretation ensures that an ETS operator is liable for actual emissions associated with that transport segment, and thus ensures a fundamental objective of the ETS: enabling market-based emission reduction alternatives.

5.2 Recommended amendments to enable mobile CO_2 transport

The analyses set forth in chapter 4 argues that the current framework may be interpreted to accommodate CCS processes that employ mobile transport modalities. Including mobile CO_2 transport under the scope of liability of a CCS installation should, however, only serve as a temporary solution prior to enabling amendments for three main reasons.

Firstly, the motivation for writing this analysis was the uncertainty associated with the wording of the current framework. It does not serve the cause of investor confidence that the wording of key provisions contradicts the aim to facilitate a broad range of CCS technologies. Legal uncertainty is known to represent an investment barrier when it comes to new technology and infrastructure.[370] Secondly, the current solution does not provide a clear answer as to whether the operative emissions of the mobile transport modality incurs liability. Thirdly, including a potentially significant additional activity under the scope of an installation may restrict the commercial organisation of the CCS process due to how the operator of the installation must retain practical or economic control over the installation.

The rules should therefore be amended to clearly accommodate all CO_2 transport modalities. Including mobile CO_2 transport as a separate activity under ETS Directive Annex I seems to be the amendment that would best align with the current legislative design and objectives. This

[370] See, inter alia, Davis (2017), p. 12.

inclusion would allow the mobile transport modality to retain a separate ETS operator and thus enable flexible commercial arrangements. It would also ensure that most operative and leakage emissions are accounted for under the scope of that operator's liability. And finally, sector-specific monitoring rules would then have to be provided for within MRR Annex IV, ensuring harmonised implementation within and between pan-European CCS projects.

The evident drawback of amending the ETS Directive is the extensive process associated with such amendments. An inferior, though more easily attainable alternative, would be to amend the monitoring and reporting regulation to explicitly state that mobile CO_2 transport is a directly associated to the installations taking part in the CCS process, as proposed in chapter 4. It would send a clear signal if mobile CO_2 transport was explicitly included as a potentially 'directly associated activity' to the different CCS activities described in the sector specific monitoring boundaries of the MRR.[371] Reviewing the expedience of the *per se* exclusion of emission sources from mobile transport appears a prudent part of that amendment process.[372]

5.3 Final reflections on the Emissions Trading System and its struggle to enable all emission reduction technologies

The analyses of how the ETS applies to a CCS process employing mobile CO_2 transport bears witness of a greater problem incurred under the ETS: how to accommodate the evolution and innovation of emission reduction technologies while retaining the environmental integrity and effectiveness of the market.

The main aim of the ETS is to create a market mechanism that induces cost-effective emission reductions in order to mitigate climate change. Enabling a broad range of emission reduction options is, therefore, an

[371] Commission Regulation No 601/2012 as amended, Annex IV sections 21–23.

[372] Ibid., Article 20 nr. 2.

important objective of the ETS, as explicitly stated in the preamble to the latest amendment of the ETS Directive.[373]

In order to facilitate emission reduction efforts, it is imperative that the monitoring, reporting and verification (MRV) regime manages to identify not only the GHGs *produced* within the scope of the ETS, but also the GHGs that are actually *released into the atmosphere*. This consideration draws attention to an inherent flaw within the current MRV regime: it fiercely accounts for all emissions within the ETS scope of liability but fails to facilitate CO_2 transfers out of that scope of liability for emission reduction purposes. This feature ensures that all potential emissions are 'payed for', but also potentially imposes liability for GHGs that are never emitted and thus unintentionally disincentivises potential emission reduction efforts.

The nature and ambitions of the ETS represents a potentially powerful vehicle for cost-effective emission reduction efforts through innovative CO_2 capture technology (CCS/CCU). Living up to that potential requires that the current monitoring and reporting regime is amended to facilitate a broad range of CO_2 transfers for emission reduction purposes. Either by expanding the scope of the ETS to account for possible emissions or by adopting more general transfer rules that presuppose the risk of leakage.

However, facilitating those ambitions represents a complex and challenging implementing task. In that respect, one could question whether the recent curtailment of the powers conferred to adopt the MRV regime enables or disables the Commission in this effort. Implementing a detailed and highly ambitious regime could potentially warrant the type of quasi-legislative powers that a delegated act pursuant to TFEU Article 290 provides.

[373] Recital 14 to Directive (EU) 2018/410 amending Directive 2003/87/EC.

Bibliography

International Treaties

Paris Agreement	Paris Agreement Under the United Nations Framework Convention on Climate Change, Paris, 12 December 2015.
TFEU	Consolidated version of the Treaty on the Functioning of the European Union, 2012/C 326/01.
TEU	Consolidated version of the Treaty on the European Union, 2012/C 326/01
The London Protocol	1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, London, 7 November 1996.
Resolution LP.3(4)	Resolution LP.3(4) on the amendment to Article 6 of the London Protocol, adopted on 30 October 2009. (Not in force)

European Union Sources

Directives

Directive 2003/87/EC	Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.

Directive 2004/101/EC — Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms.

Directive 2009/29/EC — Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community.

Directive 2009/31/EC — Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006.

Directive 2010/75/EU — Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).

Directive 2011/92/EU — Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment.

Directive (EU) 2018/410 — Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814.

Regulations

Commission Delegated Regulation (EU) 2019/856	Commission Delegated Regulation (EU) 2019/856 of 26 February 2019 supplementing Directive 2003/87/EC of the European Parliament and of the Council with regard to the operation of the Innovation Fund.
Commission implementing regulation (EU) 2018/2066	Commission implementing regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012.
Commission Implementing Regulation (EU) 2018/2067	Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council.
Commission Regulation (EU) No 389/2013	Commission Regulation (EU) No 389/2013 of 2 May 2013 establishing a Union Registry pursuant to Directive 2003/87/EC of the European Parliament and of the Council, Decisions No 280/2004/EC and No 406/2009/EC of the European Parliament and of the Council and repealing Commission Regulations (EU) No 920/2010 and No 1193/2011.
Commission Regulation (EU) No 601/2012	Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

Decision (EU) 2015/1814	Decision (EU) 2015/1814 of the European Parliament and of the Council of 6 October 2015 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC.
Regulation (EU) 2015/757	Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC.
Regulation (EU) 2018/841	Regulation (EU) 2018/841 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU.
Regulation (EU) 2018/842	Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013.
Regulation (EU) No 182/2011	Regulation (EU) No 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers.

Preparatory Works, Official Reports and Guidance Documents (in chronological order)

CONV 424/02	CONV 424/02, Final Report on Working Group IX on Simplification. Brussels, 29 November 2002.
COM(2008) 16 final	Commission staff working document – Accompanying document to the Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emission allowance trading system – Impact assessment.
COM(2008) 18 final	Commission staff working document – Accompanying document to the Proposal for a Directive of the European Parliament and of the Council on the geological storage of carbon dioxide – Impact assessment.
COM/2009/673 final	Communication from the Commission to the European Parliament and the Council: Implementation of Article 290 of the Treaty on the Functioning of the European Union.
European Commission (2010)	European Commission. *Guidance on Interpretation of Annex I of the EU ETS Directive (excl. aviation activities).* 18 March 2010. https://ec.europa.eu/clima/sites/clima/files/ets/docs/guidance_interpretation_en.pdf accessed 18.06.2020.
COM/2011/0112	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Roadmap for moving to a competitive low carbon economy in 2050.

COM(2013)180 final	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Future of Carbon Capture and Storage in Europe.
COM(2014) 15 final	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A policy framework for climate and energy in the period from 2020 to 2030.
COM/2015/0337 final – 2015/0148 (COD)	Proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments

COM(2015) 576 final — Report from the Commission to the European Parliament and the Council: Climate action progress report, including the report on the functioning of the European carbon market and the report on the review of Directive 2009/31/EC on the geological storage of carbon dioxide (required under Article 21 of Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC, under Article 10(5) and Article 21(2) of the Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emissions allowance trading within the Community and amending Council Directive 96/61/EC and under Article 38 of Directive 2009/31/EC of the European Parliament and of the Council on the geological storage of carbon dioxide).

European Commission (2017) — European Commission. *Guidance Document: The Monitoring and Reporting Regulation – General guidance for installations MRR Guidance document No. 1*. Updated Version of 27 November 2017. https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/gd1_guidance_installations_en.pdf accessed 18.06.2020.

European Commission Guidance Document on Biomass Issues EU ETS (2017)	European Commission. *Guidance Document: Biomass issues in the EU ETS, MRR Guidance document No. 3*. Updated Version of 27 November 2017. https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/gd3_biomass_issues_en.pdf accessed 18.06.2020.
COM(2018) 773 final	Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank: A Clean Planet for all A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy.
European Parliament 2019/2582(RSP)	European Parliament resolution of 14 March 2019 on climate change – a European strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy in accordance with the Paris Agreement.
COM(2019/) 566 final	Report from the Commission to the European Parliament and the Council on Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide.
SWD(2019) 395 final	Annex to Commission Delegated Regulation (EU) of 23 November 2017 amending Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest.

COM(2019) 640 final	Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal.
COM(2020) 80 final 2020/0036 (COD)	Proposal for a regulation of the European Parliament and of the Council establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999.

EU Case Law

Case 26/62 *Van Gend & Loos*	ECLI:EU:C:1963:1.
Case C-53/81 *Levin v Staatssecretaris van Justitie*	ECLI:EU:C:1982:105.
Case C-322/88 *Salvatore Grimaldi v Fonds des maladies professionnelles*	ECLI:EU:C:1989:646.
Case C-189/02 P *Dansk Rørindustri and Others v Commission*	ECLI:EU:C:2005:408.
Case C-167/04 P *JCB Service v Commission*	ECLI:EU:C:2006:594.
Case T-16/04 *Arcelor v Parliament and Council*	ECLI:EU:T:2010:54.
Case C-366/10 *IATA Air Transport Association of America and Others*	ECLI:EU:C:2011:864.
Case C-345/13 *Karen Millen Fashions Ltd v. Dunnes Stores*	ECLI:EU:C:2014:2013.

Case C-158/15 *Elektriciteits Produktiemaatschappij Zuid-Nederland EPZ NV v Bestuur van de Nederlandse Emissieautoriteit* ECLI:EU:C:2016:422.

Case C-457/15 *Vattenfall Europe Generation AG v Bundesrepublik Deutschland* ECLI:EU:C:2016:613.

Case C-460/15 *Schaefer Kalk GmbH & Co. KG v Bundesrepublik Deutschland* ECLI:EU:C:2017:29.

Case C-617/19 *Request for a preliminary ruling from the Tribunale Amministrativo Regionale per il Lazio (Italy) lodged on 14 August 2019 — Granarolo S.p.A. v Ministero dell'Ambiente e della Tutela del Territorio e del Mare and Others* [pending] NO ECLI identifier.

Case C-897/19 *I.N.* ECLI:EU:C:2020:262.

Advocate General Opinions

Opinion of Advocate General Kokott delivered on 3 March 2016 on the case Elektriciteits Produktiemaatschappij Zuid-Nederland EPZ NV v Bestuur van de Nederlandse Emissieautoriteit. ECLI:EU:C:2016:139.

Opinion of Advocate General Sharpston delivered on 10 November 2016 on the case Schaefer Kalk GmbH & Co. KG v Bundesrepublik Deutschland. ECLI:EU:C:2016:852.

European Economic Area Sources

Agreements and Decisions

Decision of the EEA Joint Committee No 115/2012	Decision of the EEA Joint Committee No 115/2012 of 15 June 2012 Amending Annex XX (Environment) to the EEA Agreement (OJ L 270, 4.10.2012, p. 38–38).
Decision of the EEA Joint Committee No 146/2007	Decision of the EEA Joint Committee No 146/2007 of 26 October 2007 Amending Annex XX (Environment) to the EEA Agreement (OJ L 100, 10.4.2008, p. 92–98).
EEA Agreement	Agreement on the European Economic Area (OJ No L 1, 3.1.1994, p. 3; and EFTA States' official gazettes).
SCA	Agreement Between the EFTA States on the Establishment of a Surveillance Authority and a Court Of Justice (OJ L 344, 31.01.1994, p. 3; and EFTA States' official gazettes).

EEA Case Law

E-6/01	CIBA Speciality Chemicals Water Treatment Ltd and Others v The Norwegian State, represented by the Ministry of Labour and Government Administration
E-9/07 and E-10/07	L'Oréal Norge AS v Aarskog Per AS and Others and Smart Club Norge.
E-28/15	Yankuba Jabbi v The Norwegian Government, represented by the Immigration Appeals Board.
E-4/19	Campbell v. the Norwegian Government.

Literature

Altizer *et al.* (2013) — Altizer, Sonia et al. "Climate Change and Infectious Diseases: From evidence to a predictive framework." *Science* 341(6145), 2013, p. 514–519.

Arnesen et al. (2018) — Arnesen, Finn et al. (eds.). *Agreement on the European Economic Area: A commentary*. Oslo: Universitetsforlaget, 2018.

Banet (2017) — Banet, Catherine. "Effectiveness in Climate Regulation: Simultaneous Application of a Carbon Tax and an Emissions Trading Scheme to the Offshore Petroleum Sector in Norway." *Carbon & Climate Law Review* 11(1), 2017, p. 25–38.

Bankes (2020) — Bankes, Nigel. "The Use of Sub-Seabed Transboundary Geological Formations for the Disposal of Carbon Dioxide." in *The Law of the Seabed: Access, uses, and protection of seabed resources*. Catherine Banet (ed.), Leiden: Brill | Nijhoff, 2020, p. 397–430.

Bayer & Alkin (2020) — Bayer, Patrick and Michaël Aklin. "The European Union Emissions Trading System reduced CO2 Emissions Despite Low Prices." *Proceedings of the National Academy of Sciences* 117(16), 2020, p. 8804–8812.

Bergström and Ritleng (2016) — Bergström, Carl Fredrik and Dominique Ritleng. *Rulemaking by the European Commission: The new system for delegation of powers*. Oxford: Oxford University Press, 2016.

Billson & Pourkashanian (2017) — Matthew Billson, Mohamed Pourkashanian. "The Evolution of European CCS Policy." *Energy Procedia* 114, 2017, p. 5659–5662.

Boekholt (2013) — Rieks, Boekholt. (2013). *Overview of Regulatory Uncertainties With Regard to Offshore CCS* (CATO2-WP4.1-D10). Published by CATO – CO2 Carbon, Capture and Storange in the Netherlands.

Bragadóttir et al. (2016) — Bragadóttir, H. et al. (2016). *Sectoral Expansion of the EU ETS: A Nordic perspective on barriers and solutions to include new sectors in the EU ETS with special focus on road transport* (TemaNord 2015:574). Copenhagen: Nordic Council of Ministers.

Bui & Dowell (2020) — Bui, Mai and Dowell, Niall Mac (eds.). *Carbon Capture and Storage*. Cambridge: Royal Society of Chemistry, 2020.

CCSNorway (2020a) — CCSNorway. "Full-scale: Capture, transport and Storage." 2020 https://ccsnorway.com/full-scale-capture-transport-and-storage/ accessed 10.03.2020.

Cicero (2020) — Cicero. "Carbon Capture and Storage is Necessary to Keep Global Warming Below 2°C." 2020 https://cicero.oslo.no/no/posts/nyheter/carbon-capture-and-storage-is-necessary-to-keep-global-warming-below-2c accessed 06.05.2020.

Craig & de Búrca (2015) — Craig, Paul and Gráinne de Búrca. *EU LAW: Text, cases, and materials.* 6th edition, Oxford: Oxford Univeristy Press, 2015.

Danish Energy Agency (n.d) — Danish Energy Agency. "EU Emission Trading System for Installations." n.d. https://ens.dk/en/our-responsibilities/eu-emissions-trading-system/eu-ets-installations accessed 23.05.2020.

Davis (2017) — Davis, Kevin E. "The Concept of Legal Uncertainty." *SSRN Electronic Journal*, New York University School of Law, 2017.

Deng et al. (2017) — Deng, Hang et al. "Leakage Risks of Geologic CO_2 Storage and the Impacts on the Global Energy System and Climate Change Mitigation. *Climatic Change* 144(2), 2017, p. 151–163.

Dixon et al. (2009) — Dixon, Tim, Paul Zakkour and Jeff Chapman. "Trials and Tribulations of Getting CCS in an ETS: Principles for CCS in an ETS from UK work for the EU ETS." *Energy Procedia* 1(1), 2009, p. 4443–4450.

Dunne (2020) — Dunne, Daisy. "Q&A: Could climate change and biodiversity loss raise the risk of pandemics?" 2020 https://www.carbonbrief.org/q-and-a-could-climate-change-and-biodiversity-loss-raise-the-risk-of-pandemics?utm_campaign=Carbon%20Brief%20Daily%20Briefing&utm_medium=email&utm_source=Revue%20newsletter accessed 15.05.2020.

EFTA (2012) — EFTA. "Revised ETS Package Incorporated Into the EEA Agreement" 2012 https://www.efta.int/EEA/news/Revised-ETS-Package-incorporated-EEA-Agreement-909 accessed 19.06.2020.

EFTA (2015) EFTA. "Climate Policy and the EEA Agreement." 2015 https://www.efta.int/EEA/news/Climate-policy-and-EEA-Agreement-63341 accessed 15.04.2020

Ellerman et al. (2007) Ellerman, A. Denny, Barbara K. Buchner and Carlo Carraro (eds.). *Allocation in the European Union Emission Trading Scheme*. Cambridge: Cambridge University Press, 2007.

Ellerman et al. (2010) Ellerman, A. Denny, Frank J. Convery and Christian de Perthuis. *Pricing Carbon: The European Union Emissions Trading Scheme*. Cambridge: Cambridge University Press, 2010.

Ellerman et al. (2016) Ellerman, A. Denny, Claudio Marcantonini and Aleksandar Zaklan. "The European Union Emissions Trading System: Ten years and counting." *Review of Environmental Economics and Policy* 10(1), 2016, p. 89–107.

Environmental Agency UK (2018) Environmental Agency UK. "EU ETS Phase III: guidance for installations." 2018 https://www.gov.uk/government/publications/how-to-comply-with-the-eu-ets-and-small-emitter-and-hospital-opt-out-scheme accessed 19.06.2020.

Equinor (2019) Equinor. "European Cooperation On Carbon Capture and Storage." 2019 https://www.equinor.com/en/news/2019-09-cooperation-carbon-capture-storage.html accessed 22.03.2020.

Equinor (2020) Equinor. "Historic Investment Decision for Transport and Storage of CO_2." 2020 https://www.equinor.com/en/news/2020-05-northern-lights.html accessed 23.05.2020.

Equinor (2020a) Equinor. "Northern Lights CCS." 2020 https://www.equinor.com/en/what-we-do/northern-lights.html accessed 17.06.2020.

Europalov (2019) Europalov. «Kvotedirektivet (ETS): Handel med CO2-kvoter.» 2019 https://www.europalov.no/rettsakt/kvotedirektivet-ets-handel-med-co2-kvoter/id-52 accessed 26.03.2019.

Europalov (2020b) Europalov. "Karbonlagringsdirektivet: Lagring av karbondioksyd (CO_2)." 2020 https://www.europalov.no/rettsakt/karbonlagringsdirektivet-lagring-av-karbondioksyd-co2/id-875 accessed 02.05.2020.

European Commission (2015) European Commission. "EU ETS Handbook." 2015 https://ec.europa.eu/clima/sites/clima/files/docs/ets_handbook_en.pdf accessed 19.06.2020.

European Commission (n.d. *Union Registry*) European Commission. "Union Registry." n.d. https://ec.europa.eu/clima/policies/ets/registry_en accessed 28.01.2020 accessed 19.06.2020.

European Commission a (n.d). European Commission. "EU Emissions Trading System (EU ETS)." n.d. https://ec.europa.eu/clima/policies/ets referenced 28.09.2019 accessed 19.06.2020.

European Commission b (n.d) European Commission. "Revision for Phase 4 (2021–2030)." n.d. https://ec.europa.eu/clima/policies/ets/revision_en#tab-0-0 referenced 13.09.2019

European Commission c (n.d) European Commission. "Market Stability Reserve." n.d. https://ec.europa.eu/clima/policies/ets/reform_en accessed 23.03.2020.

European Commission d (n.d) — European Commission e. "Monitoring, reporting and verification of EU ETS emissions." n.d. https://ec.europa.eu/clima/policies/ets/monitoring_en accessed 15.04.2020.

European Commission e (n.d) — European Commission. "A Legal Framework for the Safe Geological Storage of Carbon Dioxide." n.d. https://ec.europa.eu/clima/policies/innovation-fund/ccs/directive_en accessed 02.05.2020.

European Commission f (n.d) — European Commission. "Innovation Fund." n.d. https://ec.europa.eu/clima/policies/innovation-fund_en accessed 24.01.2020.

European Commission g (n.d) — European Commission. "Use of International Credits." n.d. https://ec.europa.eu/clima/policies/ets/credits_en accessed 19.06.2020.

European Commission s (n.d) — European Commission. "Reducing Emissions From the Shipping Sector." n.d. https://ec.europa.eu/clima/policies/transport/shipping_en accessed 19.06.2020.

European Commission t (n.d) — European Commission. "Road Transport: Reducing CO_2 emissions from vehicles." n.d. https://ec.europa.eu/clima/policies/transport/vehicles_en accessed 20.01.2020.

European Parliament (2019). — European Parliament "Combating Climate Change." 2019 http://www.europarl.europa.eu/factsheets/en/sheet/72/climate-change-and-the-environment accessed 13.09.2019.

Feiring (2019) — Feiring, Morten Heide. *Ansvarsoverføring til staten etter nedstenging av CO2- lagringsanlegg på norsk kontinentalsokkel*. Oslo: The Faculty of Law at the University of Oslo, 2019.

Fredriksen & Mathisen (2019) — Fredriksen, Hallvard Haukland and Gjermund Mathisen. "EU-rett som norsk rettskilde." in *Juridisk metode og tenkemåte.* Alf Petter Høgberg og Jørn Øyrehagen Sunde (eds.), Oslo: Universitetsforlaget, 2019, 386–419.

Fjeld & Norum (2020) — Fjeld, Iselin Elise and Hallvard Norum. *Microsoft inn I norsk karbonfangst-prosjekt.* 2020. [https://www.nrk.no/norge/microsoft-inngar-intensjonsavtale-med-northern-lights-om-karbonlagring-1.15200618]

Gattini (2012) — Gattini, Andrea. "Between Splendid Isolation and Tentative Imperialism: The EU's extension of its emission trading scheme to international aviation and the ECJ's judgment in the ata case." *International and Comparative Law Quarterly* 61(4), 2012, p. 977–91.

German Environment Agency (2019) — German Environment Agency. (2019). *Support for the Revision of the Monitoring and Reporting Regulation for the 4th Trading Period (focus: Carbon Capture and Utilisation (CCU))* (TEXTE 36/2019) Hürth, Germany: German Environmental Agency.

Global CCS Institute (2019) — Global CCS Institute. (2019). *Global Status Report 2019.* The Global CCS Institute.

Global CCS Institute & Bech-Bruhn (2012) — Global CCS Institute and Bech-Bruhn. (2012). *EOR/CCS 360-degree legal review*. Canberra: Global CCS Institute.

CSLF (2017) — Carbon Sequestrian Leadership Forum. (2017) *CSLF 2017 Technology Roadmap.*

Gupta (2009) — Gupta, Joyeeta, Rob D. van den Berg, and Osvaldo Feinstein. "Climate Change, Development, and Evaluation: Can Flexibility Mechanisms Promote Sustainable Development?" in *Evaluating Climate Change and Development: World Bank series on development – Volume 8.* 1st edition, New York: Routledge, 2009, p. 47–64.

Harvell *et al.* (2002) — Harvell, C. Drew et al. "Climate Warming and Disease Risks for Terrestrial and Marine Biota." *Science* 296(5576), 2002, p. 2158–2162.

Haszeldine & Ghaleigh (2018) — Haszeldine, Stuart and Navraj Singh Ghaleigh. "Geological Factors for Legislation to Enable and Regulate Storage of Carbon Dioxide in the Deep Subsurface." in *Carbon Capture and Storage*. Havercroft, Ian, Richard Marcory and Richard B. Stewart (eds.), 2nd edition, Oxford: Hart Publishing, 2018, p. 3–31.

Hatherick (2020) — Hatherick, Victoria. "EU ETS passed resilience test of Covid-19." 2020 https://www.argusmedia.com/en/news/2109759-eu-ets-passed-resilience-test-of-covid19 accessed 18.06.2020.

Hills et al. (2020) Hills, Thomas P., Mark G. Sceats and Paul S. Fennel. "Applications of CCS in the Cement Industry." in *Carbon Capture and Storage*. Mai Bui and Niall Mac Dowell (eds.), Cambridge: Royal Society of Chemistry, 2020, p. 315–348.

Hohfeldt (1913–1914) Hohfeld, Wesley Newcomb. "Some Fundamental Legal Conceptions as Applied in Judicial Reasoning." *Yale Law Journal* 23(1), 1913, p. 16–59.

Holwerda (2014) Holwerda, Marijn. *EU Regulation of Cross-Border Carbon Capture and Storage: Legal issues under the Directive on the geological storage of CO2 in the light of primary EU law*. Cambridge: Intersentia, 2014.

Hovland (2020) Hovland, Kjetil Malkenes. "Vil bruke 6,9 mrd. på prestisjetung CO_2-lagring." 2020 https://e24.no/olje-og-energi/i/jdqyQn/vil-bruke-69-mrd-paa-prestisjetung-co-lagring accessed 23.05.2020.

Haanperä & Graichen (2020) Haanperä, Outi and Verena Graichen. «Extending EU Carbon Market Must Not Hinder More Urgent Reforms." 2020 https://www.euractiv.com/section/emissions-trading-scheme/opinion/extending-eu-carbon-market-must-not-hinder-more-urgent-reforms/ accessed 02.05.2020.

IAMC (2018–2019) International Institute for Applied Systems Analysis. "IAMC 1.5°C Scenario Explorer hosted by IIASA." 2018–2019 https://data.ene.iiasa.ac.at/iamc-1.5c-explorer/#/login?redirect=%2Fworkspaces accessed 06.05.2020.

IEA (2016) IEA. (2016). *20 Years of Carbon Capture and Storage*. Paris: IEA.

IMO (2017) IMO. "IMO Secretary-General Speaks Out Against Regional Emission Trading System." 2017 http://www.imo.org/en/MediaCentre/PressBriefings/Pages/3-SG-emissions.aspx accessed 02.05.2020.

IMO (2019) IMO. "41st Consultative Meeting of Contracting Parties to the London Convention and the 14th Meeting of Contracting Parties to the London Protocol (LC 41/LP 14) 7-11 October 2019." 2019 http://www.imo.org/en/MediaCentre/MeetingSummaries/LCLP/Pages/LC-41-LP-14-.aspx accessed 17.02.2019.

IMO (2020) International Maritime Organization. "Low Carbon Shipping and Air Pollution Control." 2020 http://www.imo.org/en/MediaCentre/HotTopics/GHG/Pages/default.aspx accessed 06.05.2020.

IOGP (2019) IOGP. (2019). The potential for CCS and CCU in Europe: Report to the thirty second meeting of the European Gas Regulatory Forum 5–6 June 2019. Coordinated by IOGP.

IPCC (2005) IPCC. (2005). *IPCC Special Report on Carbon dioxide Capture and Storage*. New York: Cambridge University Press.

IPCC (2014) *summary for policymakers* IPCC. (2014). "Summary for Policymakers." in *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge and New York: Cambridge University Press.

IPCC (2018) Annex I: Glossary — IPCC. (2018). "Annex I: Glossary." in *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. IPCC.

IPCC (2018) *summary for policy makers* — IPCC. (2018). "Summary for Policymakers." in *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva: IPCC.

Jaeger (2020) — Jaeger, Marc. "Climate Change Law and Policy in the EEA." in *The EEA and the EFTA Court: Decentred integration*. EFTA Court (ed.), Oxford: Hart Publishing, 2014, p. 215–235.

Gerards (2012) — Gerards, Janneke. "Judicial Argumentation in Fundamental Rights Cases: The EU courts' challenge." in *European Legal Method – in a multi-level EU legal order.* Neergaard, Ulla and Ruth Nielsen (eds.). Denmark: DJØF Publishing, 2012, 27–70.

Kovács et al. (2016) — Kovács, András, Tihamér Tóth and Anna Forgács. "The Legal Effects of European Soft Law and Their Recognition at National Administrative Courts." *ELTE Law Journal* 2, 2016, p. 53–70.

Krämer (2019) Krämer, Ludvig. *EU Environmental Law*. 8th edition, London: Sweet & Maxwell, 2015.

Lindberg (2020) Lindberg, Agnes Harriet. "Mer om Hohfelds rettigheter." *Tidsskrift for Rettsvitenskap* 1, 2020, p. 73–96.

Lupion & Herzog (2013) Lupion, Monica and Howard J. Herzog. "NER300: Lessons learnt in attempting to secure CCS projects in Europe." *International Journal of Greenhouse Gas Control* 19, 2013, p. 19–25.

Marchetti (1977) Marchetti, C. "On Geoengineering and the CO_2 Problem." *Climatic Change* 1, 1977, p. 59–68.

Markets Insider (2020) Markets Insider. "CO2 European Emission Allowances Commodity Eur 25.15." [Official Close 2/21/2020 Mi Indication] 2020 https://markets.businessinsider.com/commodities/co2-european-emission-allowances accessed 18.06.2020.

Massai (2011) Massai, Leonardo. *The Kyoto Protocol in the EU: European community and member states under international and European law*. The Hague: Asser Press, 2011.

Millar & Allen (2020) Millar, R. J. and M. R. Allen. "Understanding the Role of CCS Deployment in Meeting Ambitious Climate Goals." in *Carbon Capture and Storage*. Mai Bui and Niall Mac Dowell (eds.), Cambridge: Royal Society of Chemistry, 2020, p. 8–35.

Monteiro (2018) Monteiro, Juliana. "CCU or CCS? CCUS may be the answer." 2018 https://blog.sintef.com/sintefenergy/ccu-or-ccs-ccus-may-be-the-answer/ accessed 19.06.2020.

National Geographic (n.d.) National Geographic. "Atmosphere: Resource Library Encyclopedia." n.d. https://www.nationalgeographic.org/encyclopedia/atmosphere-RL/ accessed 17.06.2020.

Newell et al. (2013) Newell, Richard G., William A. Pizer and Daniel Raimi. "Carbon Markets 15 Years after Kyoto: Lessons learned, new challenges." *Journal of Economic Perspectives* 27(1), 2013, p. 123–146.

Nordic Council of Ministers (2007) Nordic Council of Ministers. (2007). *Emission Trading Outside the European Union* (TemaNord 2007:552). Copenhagen: Nordic Council of Ministers.

Norsk betongforening (2019) Norsk betongforening. (2019). *Lavkarbonbetong* (publikasjon nr. 37).

Norsk Petroleum a. (2020) Norsk Petroleum a. "Carbon Capture and Storage." 2020 https://www.norskpetroleum.no/en/environment-and-technology/carbon-capture-and-storage/ accessed 21.03.2020.

Norskpetroleum b. (n.d) Norsk Petroleum b. "Snøhvit." n.d. https://www.norskpetroleum.no/en/facts/field/snohvit/ accessed 19.06.2020.

Norwegian Environmental Agency (2019) Norwegian Environmental Agency. (2019). Letter to the European Commission titled "The Norwegian CCS demostration project – request for legal clarifications related to the ETS-directive and the MR-regulation." It is a public document but not available online. Passed on to me by my supervisor by e-mail (Catherine Banet 30.08.2019).

O'Brien (2019) O'Brien, Alice. "The Liability Framework for the Shipping Phase of Carbon Capture and Storage: A critical study of the liability regime for CO_2 leakage during cross-border CO_2-shipping activities in the North Sea." *MarIus* 512, 2019.

O'Brien (2020) O'Brien, Alice. "The Liability Regime for CO_2 Shipping." 2020 https://blog.sintef.com/sintefenergy/ccs/the-liability-regime-for-co2-shipping/ accessed 19.06.2020.

Olsen et al. (2018) Olsen, Karen Holm, Christof Arens and Florian Mersmann. "Learning from CDM SD Tool Experience for Article 6.4 of the Paris Agreement." *Climate Policy* 18(4), 2018, p. 383–95.

Port of Rotterdam (2019) Port of Rotterdam. "Porthos Project CO_2 Reduction Through Storage Beneath the North Sea." 2019 https://www.rotterdamccus.nl/wp-content/uploads/2020/03/Brochure-ENG-2019-2.pdf accessed 22.03.2020.

Ramirez (2020) Ramirez, Ramirez A. "Carbon Capture and Utilisation." in *Carbon Capture and Storage*. Mai Bui and Niall Mac Dowell (eds.), Cambridge: Royal Society of Chemistry, 2020, p. 426–444.

Regjeringen.no (2020)a. Regjeringen. "CCS in Norway." 2020 https://www.regjeringen.no/en/topics/energy/carbon-capture-and-storage/ccs-in-norway/id2601471/ accessed 19.06.2020.

Regjeringen.no (2020)b Regjeringen.no. "CO_2-avgiften." 2020 https://www.regjeringen.no/no/tema/okonomi-og-budsjett/skatter-og-avgifter/veibruksavgift-pa-drivstoff/co2-avgiften/id2603484/ accessed 19.06.2020.

Regjeringen.no (2020)c — Regjeringen.no «Statsrådenes innlegg: Pressekonferanse om CO_2-fangst og -lagring.» 2020 https://www.regjeringen.no/no/aktuelt/pressekonferanse-om-karbonfangst-og--lagring/id2765326/ Accessed 29.09.2020

Reuters (2020) — Reuters. "China to Make National Carbon Trading 'Breakthrough' by Year-End: Official." 2020 https://www.reuters.com/article/us-china-carbon/china-to-make-national-carbon-trading-breakthrough-by-year-end-official-idUSKBN1ZD05N accessed 19.06.2020.

Riesenhuber (2017) — Riesenhuber, Karl. *European Legal Methodology*. Karl Riesenhuber (ed.), Cambridge: Insertia, 2017.

Roggenkamp (2018) — Roggenkamp, Martha M. "Transportation of Carbon Dioxide in the European Union: Some legal issues." in *Carbon Capture and Storage*. Havercroft, Ian, Richard Marcory and Richard B. Stewart (eds.), 2nd edition, Oxford: Hart Publishing, 2018, p. 245–266.

Rotterdam CCUS (n.d) — Rotterdam CCUS. "The Project." n.d. https://www.rotterdamccus.nl/en/the-project/ accessed 22.03.2020.

Scheider & Theuer (2019) — Schneider, Lambert and Stephanie La Hoz Theuer. "Environmental Integrity of International Carbon Market Mechanisms Under the Paris Agreement." *Climate Policy* 19(3), 2019, 386–400.

Simon (2019) Simon, Frédéric. "'It's complicated': EU offers political backing but no funding for CCS." 2019 https://www.euractiv.com/section/energy-environment/news/its-complicated-eu-offers-political-backing-but-no-funding-for-ccs/ accessed 19.06.2020.

Siwior and Bukowska (2017) Siwior, Przemyslaw and Joanna Bukowska. "Commentary on European Court of Justice judgement of 19 January 2017 in case C-460/15 Schafer Kalk GmbH &Co. KG v Bundesrepublik Deutschland." *Environmental Protection and Natural Resources* 29(2), p. 25–30.

Skouris (2014) Skouris, Vassilios. "EEA and the Role of the CJEU." in *The EEA and the EFTA Court: Decentred integration*. EFTA Court (ed.). Oxford: Hart Publishing, 2014, p. 3–12.

Snyder (1993) Snyder, Francis. "The Effectiveness of European Community Law: Institutions, processes, tools and techniques." *The Modern Law Review* 56(1), 1993, 19–54.

Spinelli (2017) Chiara Spinelli. *The EU ETS and the European Industry Competitiveness – Working Towards Post 2020*. Deventer, Netherlands: Claeys & Casteels Law Publishers, 2017

Stefan (2012) Stefan, Oana. "European Union Soft Law: New developments concerning the divide between legally binding force and legal effects." *The Modern Law Review* 75(5), 2012, p. 865–893.

Stefan (2013) Ştefan, Oana. *Soft Law in Court: Competition law, state aid and the Court of Justice of the European Union*. Alphen aan den Rijn: Kluwer Law International, 2013.

Stoefs (2020) Stoefs, Wijnand. "High Time the Maritime Sector Sailed Into the EU Carbon Market." 2020 https://carbonmarketwatch.org/2020/02/27/high-time-the-maritime-sector-sailed-into-the-eu-carbon-market/ accessed 02.05.2020.

The National Lime Association (2020) The National Lime Association. "Precipitated Calcium Carbonate." 2020 https://www.lime.org/lime-basics/uses-of-lime/other-uses-of-lime/precipitated-calcium-carbonate/ accessed 19.06.2020.

Topdahl (2020) Topdahl, Rolv Christian. "Den gigantiske norske klimaløsningen." 2020 https://www.nrk.no/klima/xl/den-gigantiske-norske-klimalosningen-1.14944423 accessed 19.06.2020.

UNFCCC (2019) United Nations Framework Convention on Climate Change (UNFCCC). "The Paris Agreement." 2019 https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement accessed 10.09.2019.

Van Calster (2017) Van Calster, Geert and Leonie Reins. *EU Environmental Law.* Cheltem: Edward Elgar Publishing, 2017.

Warnecke (2014) Warnecke, Carsten. "Can CDM Monitoring Requirements Be Reduced While Maintaining Environmental Integrity?" *Climate Policy* 14(4), 2014, p. 443 – 466.

Weishaar (2009) — Weishaar, Stefan. *Towards Auctioning: The transformation of the European greenhouse gas emissions trading system*. Austin: Wolters Kluwer, 2009.

WHO (n.d) — World Health Organisation. "Climate Change and Human Health." n.d. https://www.who.int/globalchange/climate/summary/en/index5.html accessed 23.03.2020.

Wibye (2018) — Wibye, Johan Vorland. "Hohfelds rettigheter." *Tidsskrift for Rettsvitenskap* 5, 2018, p. 493–533.

Woerdman et al. (2008) — Woerdman, Edwin, Alessandra Arcuri and Stefano Clò. "Emissions Trading and the Polluter-Pays Principle: Do polluters pay under grandfathering?" *Review of Law & Economics* 4(2), 2008, p. 565–590.

Woerdman *et al.* (2015) — Woerdman, Edwin, Martha Roggenkamp and Marijin Holwerda (eds.). *Essential EU Climate Law*. Cheltem: Edward Elgar Publishing Limited, 2015.

Zeben (2014) — Zeben, Josephine van. *The Allocation of Regulatory Competence in the EU Emissions Trading Scheme*. Cambridge: Cambridge University Press, 2014.

White Papers and other sources

White Papers

NOU 2012:2 — *Utenfor og innenfor.*

NOU 2015:15 — *Sett pris på miljøet.*

Emission Permits

Norcem Brevik (2014/2018) — *Emission permit and monitoring plan for Norcem Brevik*. Permit number 2014.0073.T, version 4. https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=345528&documentType=T&companyID=18854&aar=0&epslanguage=no accessed 19.06.2020.

Sleipner Vest (2014/2020) — *Emission permit and monitoring plan for EQUINOR ENERGY AS SLEIPNER VEST*. Permit number 2014.0086.T, version 8. https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=571354&documentType=T&companyID=18821&aar=0&epslanguage=no accessed 19.06.2020.

Snøhvit/ Hammerfest LNG (2014/2020) — *Emission permit and monitoring plan for EQUINOR ASA AVD HAMMERFEST LNG SNØHVIT*. Permit number 2014.0150.T, version 7. https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=571258&documentType=T&companyID=18834&aar=0&epslanguage=no accessed 19.06.2020.

Other

Norwegian Environmental Agency (2020) — Informal meetings, telephone calls and e-mail exchanges with representatives of the Norwegian Environmental Agency (Miljødirektoratet) spring 2020.

Norcem (2020a) Norcem (2020a). E-mail correspondence with representative for Norcem/Heidelberg Cement. Date 30.03.2020.

Seglem (2020) E-mail exchange with Heidi Eikenes Seglem, Legal Counsel at Equinor, working on the Northern Lights project. 05.05.2020.

Tamme (2020) E-mail exchange with Eve Tamme at the Global CCS Institute. 30.03.2020.

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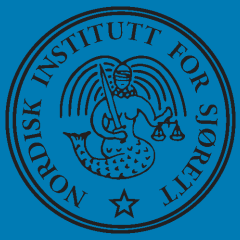

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