

Cessation of petroleum activities

How can existing Norwegian decommissioning regulation be made more compatible with objectives of the circular economy?



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Abstract

This thesis examines how the existing Norwegian decommissioning regulation can be made more compatible with key objectives of the circular economy. The research will be carried out through legal doctrinal research, and will focus on the Norwegian Petroleum Act, OSPAR and UNCLOS. The legal main rule is that redundant oil facilities shall be removed, but in some cases that might be impossible due to safety, economic or environmental reasons. It is therefore possible to derogate from this main rule in limited cases. Climate change is a reality that requires urgent action, and the transformation of the decommissioning framework can be a step towards a more sustainable future. In the years to come it is predicted that many facilities will be decommissioned, and it is therefore important that this process happen in the most environmentally friendly way. In conclusion this thesis has shown the problems with the existing Norwegian legal framework and how it can be improved to be more compatible with the circular economy.

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Abbreviations

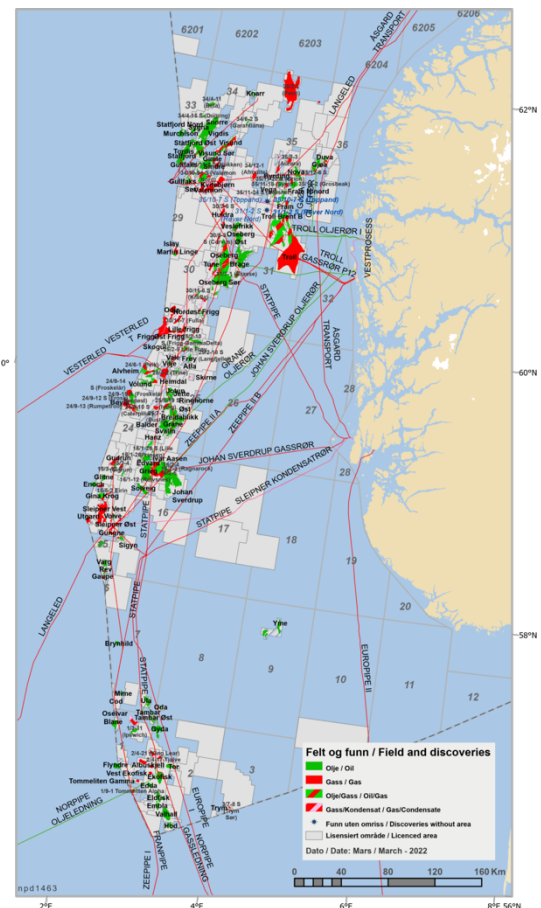
CE	Circular economy
EEZ	Exclusive economic zone
FPSO	Floating production storage and offloading
GHG	Green House Gases
IMO	International Maritime Organization
MPE	Ministry of Petroleum and Energy
NCS	Norwegian Continental Shelf
NPD	The Norwegian Petroleum Directorate
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
PDO	Plan for development and operation of a petroleum deposit
SDG	Sustainable Development Goals
TCP2	Treatment and Compression Platform 2
UKCS	United Kingdom continental shelf
UN	United Nation
UNCLOS	the United Nations Convention on Law of the Sea

1 Preface

1.1 Background of the thesis

Climate change is one of the biggest challenges facing the world today, with its consequences already manifesting in different parts of the world. It is becoming evident that these consequences are not some future problems but a reality that we face today. The World Health Organization estimates that the consequences of human induced climate change already cause 150,000 deaths annually.¹ With the change to the climate being attributed to CO₂ and other greenhouse gases (GHGs)² from the burning of fossil fuels. Therefore, for oil economies like Norway, they must adapt to the change of the legal and physical landscape brought on by climate change.

In Norway, decommissioning of offshore facilities³ is an essential process in protecting the environment and promoting sustainable development. It can often be a costly operation, though some of these costs can be mitigated if the Norwegian oil sector was more compatible with the circular economy. However, existing regulations for decommissioning are often not compatible with circular economy practices. This raises a pressing need to re-evaluate Norway's decommissioning regulation to ensure they are more effective and compatible with circular economy practices. A circular economy moves away from a linear take-make-dispose model by utilizing resources to their maximum potential while minimizing waste.⁴ This means creating new economic opportunities while reducing pressure in the planet's natural resources. It offers a unique opportunity for Norway's decommissioning industry to move towards regenerative practices and promote innovation, job creation, and an overall reduction in greenhouse gas



Picture 1: Fields and discoveries in the North Sea.

¹ World Health Organization, «Climate change and health».

² Carbon dioxide (CO₂) make up the majority of GHGs emissions, but smaller amounts of methane, nitrous oxide and water vapor are also emitted to the atmosphere.

³ The terms installations and facilities will both be used for petroleum production facilities in this thesis.

⁴ Burton et al, *Etter oljen - vår bioøkonomiske framtid*.

emissions. The main objectives in relevance of the thesis are finding ways to reduce waste and maximize the reuse of materials and equipment that would otherwise be disposed of.

Climate change is an undeniable reality that requires urgent action. Norway must reevaluate its approach to decommissioning of offshore facilities, ensuring that they align with circular economy. The focus must shift to long-term solutions to environmental challenges. This research question aims to explore how effective Norway's current regulations on decommissioning offshore facilities are and how they can be made more compatible with the objectives of the circular economy. Traditional linear practices are increasingly being viewed as unsustainable, paving the way for the adoption of circular economic principles.

1.2 A brief overview of the sources of law in cessation of petroleum activities

The sinking of Brent Spar in the North Sea in 1995 was met with significant public protests and sparked a global debate on the environmental impact of decommissioning activities.⁵ In response, international and national regulations have become increasingly stringent and now include provisions for minimizing environmental impacts, ensuring stakeholders engagement and consultation, and promoting transparency and accountability.⁶ The Brent Spar incident played a critical role in shaping the decommissioning rules we know today, as it demonstrated the importance of considering environmental and societal impacts when planning decommissioning activities.

Decommissioning forms part of the cessation of petroleum activity in the operational lifecycle. Cessation is a comprehensive process, and there are few oil fields and installations that have been decommissioned. At the start of 2023 there were 93 fields in production: two in the Barents Sea, 70 in the North Sea and 21 in the Norwegian Sea.⁷ Installations often stay on the fields longer than expected, and before the considerations of decommissioning it is important to explore all opportunities for further use of the facilities.⁸ One of the most important considerations when it comes to processing a decommissioning plan are that the facility has recovered all oil and gas resources. The resources in the world are under pressure, and it is therefore important that our natural resources are being used more effectively so that we reduce

⁵ BBC, «Brent Spar fate to be announced».

⁶ Vaughan, «Shell begins huge task of decommissioning Brent oil rigs».

⁷ Norwegian Petroleum. «Fields».

⁸ Norwegian Petroleum. «Cessation and decommissioning».

the need for new resources. This is where developing the circular economy is important for the oil sector. A circular economy is about making the resources last as long as possible, repair and upgrade them, and use them as much as possible again.⁹ If the products cannot be reused, they should be recycled and used as raw materials in new production.¹⁰

There are two main questions in this thesis, how can the Norwegian framework for decommissioning be made more compatible with the circular economy? And, how can decommissioning be carried out with the current regulations. In the current Norwegian framework it is said explicitly that you have to assess the environmental consequences in your decommissioning plan.¹¹ To clarify, it is important to thoroughly look at the current Norwegian regulations. The main Norwegian legal sources for cessation of petroleum activities and disposal are the Petroleum Act and Petroleum Regulations.¹² Norway also has to act in accordance with its international obligations contained within conventions and treaties like The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)¹³, the United Nations Convention of the Law of the Sea (UNCLOS)¹⁴, guidelines from the international Maritime Organization (IMO)¹⁵ and the petroleum industry.

In UNCLOS article 60 section three it is said that all installations and structures shall be removed.¹⁶ This article is about installations in the economic zone, but there is also an equivalent provision about the continental shelf in article 80. When the installations or structures are being removed international standards for removal established by the competent international organization shall be considered.¹⁷ In this case the competent international organization is the International Maritime Organization (IMO). The International Maritime Organization is a specialized agency under the United Nations (UN) and is the leading global

⁹ Miljødirektoratet. «Sirkulær økonomi».

¹⁰ Miljødirektoratet. «Sirkulær økonomi».

¹¹ Act 29 November 1996 No. 72 relating to petroleum activities (the Petroleum Act) § 5-3.

¹² Act 29 November 1996 No. 72 relating to petroleum; Regulation 27 June nr. 653 to the petroleum act.

¹³ Oslo-Paris Convention (OSPAR) Decision 98/3 on the Disposal of Disused Offshore Installations. Date enacted: 22-09-1992. In force: 25-03-1998. Paragraph 2.

¹⁴ United Nations Convention on the law of the Sea (UNCLOS). Done at: Montego Bay. Date enacted: 1982-12-10. In force: 1994-11-16.

¹⁵ 1989 Guidelines and standards for the removal of offshore installations and structures on the continental shelf and in the exclusive economic zone. Date of Adoption: 19-10-1989. Done in London, United Kingdom.

¹⁶ UNCLOS article 60.

¹⁷ UNCLOS article 60.

authority for making standards about security, safety, and environmental performance of international shipping.¹⁸

The Oslo-Paris Convention (OSPAR) Decision 98/3 on the disposal of Disused Offshore installations say that dumping and leaving wholly or partly is prohibited, and exceptions from this shall remain exceptionally. The competent authority of the contracting party may allow to leave installations or parts of an installation in place in some cases, this includes among other steel installations weighing more than ten thousand tones in air.¹⁹ The competent authorities in Norway for this type of decisions is the Storting (Norwegian parliament). According to OSPAR there are more than 1,350 offshore installations that are still operational in their maritime area and so far 170 have been decommissioned, and only ten derogations have been granted.²⁰ It is also relevant to mention that the OSPAR regulation is only applicable on offshore installations or structures, and not on pipelines.

These sources of law will provide a guideline on the development in the area, as international obligations can be a minimum, meaning Norway has the potential to go further. This research examines how these domestic regulations can be made more applicable with the circular economy. It is said in multiple reports, among others «Decommissioning Insight»²¹ and «Markedsrapport knyttet til avslutning og disponering»²², that one can expect a high level of decommissioning in Norway in the upcoming years. In these rapports it is expected that 14 platforms, two floating production storage and offloading ships (FPSO) and 29 underwater installations will be brought to land for final disposal in the years leading up to 2025.²³ This will correspond to a tonnage of approximately 240,000 tons steel and 250,000 tons concrete from the 23 different projects.²⁴ But there is great uncertainty attached to these numbers, because installations can be used in a new way, and they can also get field life extension beyond what was estimated in the plan for development and operation of a petroleum deposit (PDO). Disused fields can also be used as housing or transport for other producing fields, which means that shut down fields are not necessarily removed immediately.²⁵ OSPAR have also said that as

¹⁸ International Maritime Organization. «Introduction to IMO».

¹⁹ OSPAR Decision 98/3 annex 1.

²⁰ OSPAR. «Offshore installations».

²¹ Lau et al, *Decommissioning Insight 2017*.

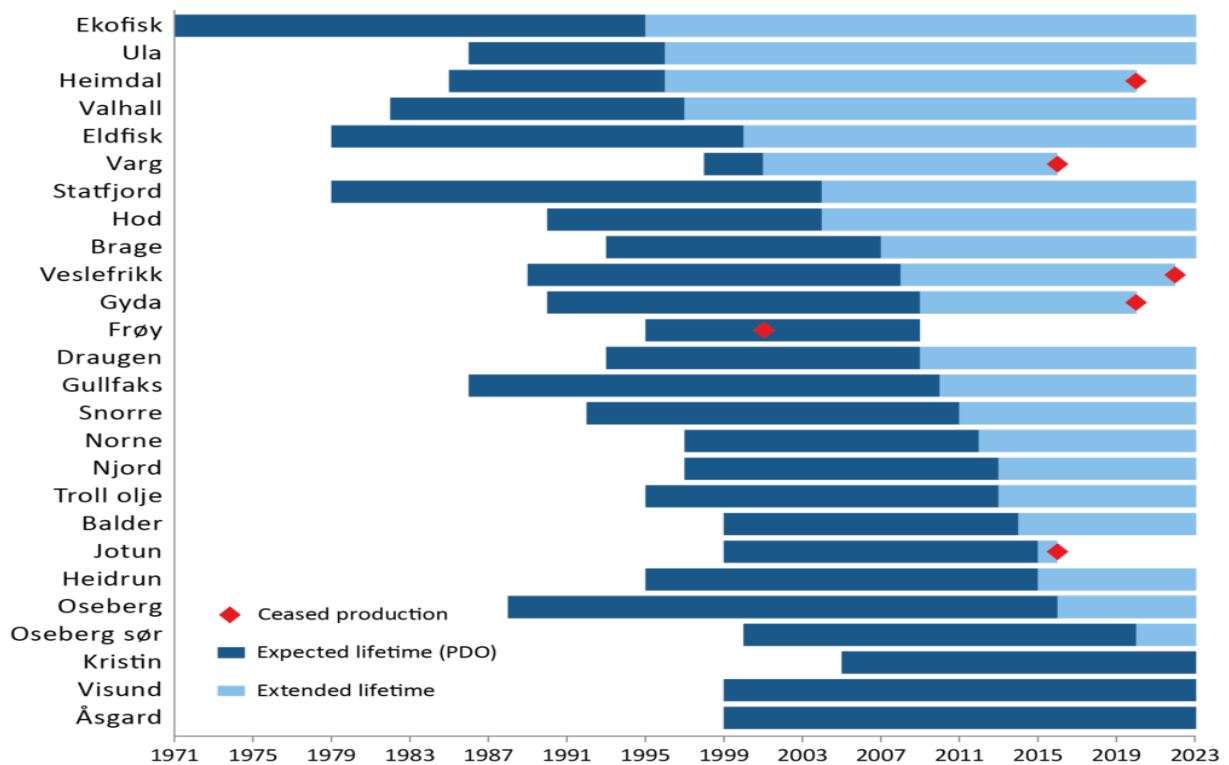
²² Meling et al., «Markedsrapport knyttet til avslutning og disponering».

²³ Meling et al, «Markedsrapport» Page 20.

²⁴ Meling et al, «Markedsrapport» Page 20.

²⁵ Meling et al, «Markedsrapport» Page 26.

the fields mature, the number of offshore installations to reach their end of life will increase in the next two decades.²⁶



Picture 2: Expected lifetime for selected fields.²⁷

1.3 Methodology and Sources

In legal research, the doctrinal serves to be the core of any academic piece, in developing the methodology, and in general, the doctrinal method of legal analysis is my starting point, with a feature-by-feature analysis informing the examination of the law. With this in mind, an approach rooted in legal pragmatism is adopted to address the issues.²⁸ Though doctrinal methods have been criticized for being less than proactive, and more reactive,²⁹ this provides a framework for the examination of the law to be carried out. Legal methodologies are useful in providing a road map as to how to address a problem, but often without an appreciation for the theory and philosophy of the law, it almost becomes a mechanistic pursuit – a means to an end.³⁰ But often, legal audiences are more concerned with the practical application of the law. Even so, doctrinal analysis even in the changing landscape does not have to justify itself. It has

²⁶ OSPAR. «Offshore Installations».

²⁷ Norwegian Petroleum. «Cessation and decommissioning».

²⁸ Lange, «How to think about 'nature-society' interactions in environmental law 'in action'», page 29.

²⁹ Van Gestel, «Methodology in the New Legal World».

³⁰ Van Gestel, «Methodology in the New Legal World».

value and it serves as good starting point for legal research of any type.³¹ In the midst of developing critical theories that doctrinal analysis does not have to be based upon the narrow confines of the traditional conceptions. For research question one, this establishes context and identifies the appropriate legal framework. A feature-by-feature analysis will be used to identify these main legal provisions. Further, the research will use Norwegian legal source doctrine in that a feature-by-feature examination will take place concerning the Norwegian legal sources. With Norwegian legal source doctrine, this is a method looks to adopt a pragmatic view of the provisions, clarifying the content of the provision looking at the meaning and application of the wording. In identifying the appropriate legal provisions. This is relevant for the understanding of Law of the Sea (UNCLOS), IMO and OSPAR. This legal method will be used because these regulations must be interpreted on the basis of international law. It is important to note that the rules given through treaties are only binding for the state when they have been approved through the state's own internal procedures, thus, where appropriate, a case law analysis will be used and draw to show the effect of the legal provisions.

The thesis will focus on how the different regulations about disposal methods in the decommissioning phase can be made more compatible with a circular economy, and it will also examine the existing rules applicable to concrete installations. These have been chosen because this type of structure raises many legal questions about decommissioning and disposal solutions. Concrete installations can be more difficult to remove, and they can in limited cases be left at sea, this is therefore the core focus of the thesis. The research is specific in that it focuses on the Norwegian Petroleum act §§ 5-1 and 5-3 in relation to disposal method, as well as the international sources OSPAR and UNCLOS. According to «Oil and Gas Activities in Norway» by Bustnesli et al. the Norwegian legal framework for decommissioning is made up by three main components; international obligations, applicable legislation and contractual obligations between licenses and unitization agreements,³² this thesis will focus on the first two. Therefore, the associated infrastructure like pipelines will not feature because they fall outside of the scope of OSPAR, and this research. Although themes of the green transition and emissions will feature, this is beyond the immediate scope of this dissertation, and will only be mentioned as a secondary consequence. Other regulations and sections of the Petroleum Act will not be discussed because it falls outside the scope of this thesis. The Petroleum regulations

³¹ Smits, «What is legal doctrine?».

³² Bustnesli et al, *Oil and Gas Activities in Norway*, page 121.

will not be discussed in this thesis because this regulates what the decommissioning plan shall contain and is therefore not considered relevant for this thesis.

It is a small methodological challenge that there are limited sources about the topic both nationally and international. Many of the Norwegian sources are from around the year 2000 when the decommissioning of the Frigg-field. Now that many of the fields are maturing it is relevant to have a careful and critical review of the Norwegian and the coincident international rules about decommissioning. And more relevant than ever is the rules effect on the environment. Norway has a well-established and comprehensive regulatory framework for offshore oil and gas activities, which include regulation of the decommissioning phase. The Petroleum Act of 1996 lay out the legal requirements for decommissioning, but the act is limited by international obligations such as UNCLOS and OSPAR. Due to the lack of relevant sources in relation to the thesis, it will mostly focus on these primary sources. There have in recent year been produced some relevant reports about the possibilities for redundant offshore platforms that will help with answering the research question. But apart from this there have been little to no research on the impact decommissioning can have on the circular economy and its benefits.

1.4 Structure of the Thesis

This thesis is divided into four main chapters. In the second chapter, the circular economy and its connection to offshore structures will be explained and discussed. This chapter aims to provide a clear understanding of the concept of the circular economy and how it can be applied to the offshore industry. The third chapter revolves around the current framework for decommissioning offshore structures in Norway. National and international regulations and frameworks will be analyzed in this section, and an effort will be made to connect the national and international sources of legislation. The fourth chapter will concentrate on available disposal solutions under the petroleum act. This part will demonstrate the legal options available for disposal of offshore decommissioning structures. In the final main section, the findings will be presented, highlighting any challenges posed by regulations, and how they can be made more compatible with the circular economy. Recommendations and approaches that can help align existing Norwegian regulations with the objectives of the circular economy. In summary, the thesis seeks to analyze current regulations governing offshore decommissioning, identify any potential issues, and propose workable solutions to these challenges.

2 The circular economy and offshore structures

In 1987 with the publication of the Brundtland report, themes of technology and human influence over the environment were echoed in the 1987 publication of «Our Common Future» by the World Commission on Environment and Development.³³ Our Common Future stressed that as the use of certain technologies allowed for greater human influence over the environment, there was an increase in the risk of environmental harm. Ultimately the report stressed for more sustainable use of natural resources, as the current capitalist economic structure were facilitating a consumption culture that placed existing resources under pressure. The report echoed themes of intergenerational equity and emphasized that the present generation cannot compromise the environmental quality for the future generations unborn.³⁴ It is therefore important for the climate that the nature and the resources that we are being used in a much more effective way.

Since its publication «sustainable development» has been a focus in global development, from the Millennium development goals, to current UNSDGs. In 2015 all United Nations Member States agreed upon 17 Sustainable Development Goals (SDG). These goals are going to transform the world by 2030 to a better place. According to the UN these goals «recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests».³⁵ The 17 goals are unified, which means that change in one area will effect another area, and that the development of the goals must balance social, environmental and economic sustainability.³⁶ The circular economy may be an important tool for achieving many of the SDGs. Goal number 12 about responsible consumption and production are an important goal relating to circular economy. The part of circular economy relating to reuse, repairing, and recycling are an essential part of the solution to this SDG.³⁷ Goal 14 about life below water is an important goal for the oil and gas sector. Offshore drilling creates the risk of disruption or damage to marine habitats. According to a mapping of the oil and gas industry to the SDGs, the oil and gas sector could contribute across all SDGs, either by bettering their positive contributions or avoid or mitigate negative impacts.³⁸

³³ Brundtland, «Our Common Future».

³⁴ Brundtland, «Our Common Future»

³⁵ United Nations, «The 17 goals».

³⁶ United Nations Development Programme, «The SDGs in Action».

³⁷ Kruchten, «Circular Economy & SDGs», page 47.

³⁸ UNDP, IFC and IPICEA. «Mapping the oil and gas industry to the sustainable development goals: an atlas».

The use of nature and its resources in a more effective way may create a problem for Norway as it is heavily reliant on the oil and gas energy (OGE) for its economy. But broadly this is an issue that has arisen due to the nature of the fossil fuel industry. Often, components and installations are abandoned or unable to be recycled which means that we produce and then it is effectively discarded. For Norway and the oil and gas sector to become more sustainable, more innovative developments and research can highlight how it can reuse and eventually recycle the products that have already been produced. To reach this goal many different stakeholders along the supply chain must go from a linear economy to a circular economy. For example, Equinor will try to reach a more sustainable economy in the decommissioning phase by ensuring sustainable use of materials and components in their value chain.³⁹ The complexity of the oil and gas sector (from downstream to mid-stream, and then upstream) will mean that the challenges in transitioning will need to be overcome by many of the entire supply chain and production activity working in synergy. The OGE sector is integral to the global economy, and as such, it cannot shake its responsibility toward the environment and climate overall.

2.1 The linear economy v. the circular economy

2.1.1 The linear economy

Our society is based on a linear economy, wherein we extract raw materials, utilize them, and subsequently discard them.⁴⁰ We have had this type of economy because of the perceived ease in the exploration and utilization of the world's natural resources. Over time, individuals have grown accustomed to sourcing fresh raw materials, only to dispose of them once their immediate purpose is fulfilled. However, the foremost predicament with the linear model lies in the substantial waste it generates. We find ourselves squandering valuable resources that could otherwise be repurposed, thus constituting a substantial issue. The impact of this type of waste can be split into three; firstly, it means that valuable materials are not being used, secondly it means that we must extract more raw materials from the Earth, and thirdly it promotes a consumption culture where the value of materials is insufficiently recognized.⁴¹

³⁹ Equinor, «Equinor's commitment to a just energy transition».

⁴⁰ Burton et al, *Etter oljen - vår bioøkonomiske framtid*. Page 56.

⁴¹ Taylor, «What is the linear economy and why do we need to go circular?», Planet Ark, Date: October 14, 2020.

2.1.2 The circular economy

The circular economy (CE) can be seen as a tool towards a more sustainable future. Circularity has for many years been evident throughout nature, and in particular the natural carbon, water, oxygen and nutrient cycles.⁴² CE is a concept with a main goal to provide an alternative to the linear economy⁴³, where it imitates this natural process created by the Earth. Essentially it aims to better use resources and to close the loops of resource flow. There is extensive literature that has looked to shape and define the precise parameters of what exactly CE would entail, however one of the most used and accepted definitions of CE is:

A circular economy describes an economic system that is based on business models which replace the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations.⁴⁴

This definition was made after 114 definitions of CE was analyzed, and the definition was made to capture everything that circular economy is about, and not just the economic and environmental aspect. Impact on social equity and future generations is rarely mentioned in other definitions.⁴⁵ According to the definition CE is an economic system that will replace the linear economy and contribute to continued use of materials. Through this definition both consumers, companies and countries are outlined as enablers of the circular economy, and they have lastly managed to include every aspect of the circular economy and not just the economic and environmental. In accordance with the OGE sector every link through the process could be made more sustainable, from the choice of materials to the construction and decommissioning phase. Even though removal of oil and gas facilities can be thought of as the most sustainable, it might promote environmental quality and benefit future generations if the facilities are left *in situ*.

In the context of oil and gas decommissioning the circular economy can be viewed as finding ways to reduce waste and maximize the reuse of materials and equipment that would otherwise

⁴²Taylor, «What is the linear economy and why do we need to go circular?», Planet Ark, Date: October 14, 2020.

⁴³ Burton et al, *Etter oljen - vår bioøkonomiske framtid*. Page 56.

⁴⁴ Kirchherr et al, «Conceptualizing the circular economy», page 224.

⁴⁵ Kirchherr et al, «Conceptualizing the circular economy». Page 221.

be disposed of. In relevance to this thesis CE is understood as a way of minimizing the use of raw materials and use technology to design products in a way so that they can easily be taken apart and reused, and as a way of making the resources last as long as possible with both reuse and recycling in mind.⁴⁶ A more effective way of using the resources will reduce our emission of greenhouse gases, limit the loss of natural diversity, and contributes to new green workplaces and business models. To reach the UNs sustainability goals and to become a low-emission society, a change towards a circular economy is necessary⁴⁷, as previously mentioned. More than 70 countries, including the biggest polluters have net-zero target, covering around 76% of global emissions.⁴⁸ Net zero means cutting GHG emissions as close to zero as possible, but this is one of the greatest challenges humankind has faced according to the UN.⁴⁹

2.1.3 The Green deal

In 2019 the European Commission introduced "the Green Deal". The European Green Deal is a response to the requirements of reducing global GHG emissions, and it is:

A new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy, where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use.⁵⁰

The goal of climate neutrality in EU in 2050 are a guidance for way to reach a more sustainable and circular economy. The transformation to a more circular economy is one of the main parts of the Green Deal.⁵¹ The transition to a more circular economy will reduce the use of raw materials and create sustainable progress.⁵² The Green Deal targets circular economy through the entire life cycle of products.

In the Green Deal the commission stated that they are going to make a new regulatory framework with claims that products have to be designed and produced in a way that they can be used as long as possible and be recycled. According to the EU as much as 80 percent of the total environmental load are determined in the design phase.⁵³ Through the Green Deal EU have made some objectives which will make it easier to achieve a circular economy. The objectives

⁴⁶ Burton et al, *Etter oljen - vår bioøkonomiske framtid*. Page 56 and 57.

⁴⁷ Miljødirektoratet, «Sirkulær økonomi».

⁴⁸ United Nations, «For a livable climate: Net-zero commitments must be backed by credible action».

⁴⁹ United Nations, «For a livable climate: Net-zero commitments must be backed by credible action».

⁵⁰ European Commission. «The Green Deal». Page 2.

⁵¹ European Commission, «Circular economy action plan».

⁵² European Commission, «Circular economy action plan».

⁵³ Miljødirektoratet, «Sirkulær økonomi».

are that products must be designed better by taking environmental effects into account throughout their life cycle, the products must last longer, and the resources in the products when it turns to waste must be used more efficient. The commission have chosen some areas that are being prioritized in the beginning of the work towards CE; electronics, batteries, scrapped vehicles, packaging, plastic, textiles, and construction.⁵⁴ This means that the oil and gas sector are not a part of the initial focus area of the EU, but the oil and gas sector can still be an important sector in the way to a circular economy.



2.2 The offshore industry and the circular economy

In 2022 it was produced 232 million salable standard cubic meters of oil equivalents (Sm³ o.e.) on the Norwegian continental shelf.⁵⁵ The production in 2022 was 12 percent lower than the record year in 2004, and slightly higher than in 2021.⁵⁶ Just under half of the expected recoverable resources have been found on the NCS, but at the same time many of the facilities on the shelf are getting to the end of their lifetime.⁵⁷ Even though there are many installations on the NCS, there are relatively few installations that have been decommissioned compared to on the United Kingdom continental shelf (UKCS).⁵⁸

⁵⁴ European Commission. «The Green Deal».
⁵⁵ Norsk petroleum, «Historisk produksjon».
⁵⁶ Norsk petroleum, «Historisk produksjon».
⁵⁷ Norsk petroleum, «Avslutning og disponering».
⁵⁸ Bustnesli et al. *Oil and Gas Activities in Norway*, page 121.

As previously stated, CE is a model that will make us produce less waste. But when it comes to the current facilities they have already been produced, so in accordance with the CE this is about using the materials as long as possible and recycle if necessary. Through this model one should try to maximize the reuse of materials and equipment that would otherwise be disposed of. The oil and gas sector are one of the leading energy sectors in the world, and for this sector to aim for a transition to CE will contribute significantly to the global economy.⁵⁹

Decommissioning of oil and gas facilities has become an important issue in the recent years due to that many countries now are addressing climate change, and especially the use of fossil fuel. The oil and gas sector has in the last couple of years recognized the benefits of circular economy and are trying to find suitable solutions for this method.⁶⁰ The circular economy can be applied to oil and gas decommissioning in a few ways. Among other instead of disposing decommissioned platforms entirely, different parts can be reused both in other parts of the oil industry or in other industries. The use of CE in the oil and gas sector can be an effective way to reduce environmental impacts of decommissioning by promoting reuse and recycling and minimizing waste. To reach the goal of circular economy in the oil and gas sector, it must be regulated in legal regulations both internationally and nationally. If it is legally regulated the enablers have to promote a circular approach and should not be able to make choices that is not in line with the circular economy.

For the oil and gas sector to move towards a more circular economy they have to move away from a use and waste concept of the offshore facilities. Offshore facilities are big, they take a long time to make, and they cost a lot of money to make, operate and maintain. From the definition the most relevant part relating to the oil and gas sector is about reusing and recycling materials and creating environmental quality through these processes. Circular economy is therefore highly relevant in relation to the decommissioning of offshore facilities due to the enormous potential the facilities have for resource reuse and recycling.

⁵⁹ Lau et al., «Paving a way toward circular economy for oil and gas industry».

⁶⁰ Epstein et al, «North Sea Oil and Gas Rig Decommissioning & Re-use Opportunity Report».

3 Existing framework in Norway

Norway's regulations of offshore decommissioning have its origins in the 1970s and 1980s. During this period, the Norwegian government recognized the need to regulate decommissioning activities to protect the environment and the public from the impact of abandoned offshore facilities. At the time decommissioning was seen as a minor part of the petroleum lifecycle and gained little attention from stakeholders. However, several incidents during this time, such as the sinking of the Brent Spar, raised public awareness of the environmental risks posed by abandoned offshore facilities.⁶¹

The obligation to carry out decommissioning of installations has become a very important part of the Norwegian legal framework. Decommissioning has important economic and environmental implications, and therefore both the Norwegian state and the licensee have a great interest in ensuring that the legal framework is as good as possible.⁶² Despite decommissioning being the final stage of oil production in Norway, many challenges and uncertainties surround the process. This chapter seek to explore these challenges, focusing on existing legal framework and highlight the key provisions that ensure the environmentally responsible decommissioning of offshore facilities.

3.1 The legal sources

The need for thorough regulation of the decommissioning process of offshore installations lies in the substantial environmental and economic cost related with the activity. Environmental cost is understood as the cost to prevent, repair, or reduce the damage to the environment arising from a company's operating activities.⁶³ In Norway there are many legal sources relating to petroleum law. The Norwegian regulations will make the basis for the rules about decommissioning, but the international legal framework will work as a limitation on the national regulations. Together these legal sources will express the applicable law. The main purpose of decommissioning rules is that the oil companies do a thorough evaluation of the disposal of facilities upon cessation of production, and preform the activities as determined by the MPE.⁶⁴

⁶¹ BBC, «Brent Spar fate to be announced».

⁶² Bustnesli et al, *Oil and Gas Activities in Norway*, page 121.

⁶³ Terna Driving Energy, «Costs for the environment».

⁶⁴ Bustnesli et al, *Oil and Gas Activities in Norway*, page 122.

3.1.1 The use of international law in Norway

Norway is based upon a dualistic approach, which means that rights and obligations cannot be based directly on international law that is not incorporated into national law.⁶⁵ This can be done by incorporating obligations under international law into laws or regulations, or by introducing a corresponding rule in national legislation.⁶⁶ If the government has bound the state by ratifying a treaty, a rule of international law is not a part of Norwegian national law before it is incorporated. In recent times, the incorporation into national law has gained such a large scope that it no longer has a practical significance that Norway is based upon a dualistic approach. In Norway, we find that the principle of presumption of treaty conform interpretation (*presumpsjonsprinsippet*) also contributes to national law being in accordance with international law. National courts will according to this principle try to interpret international law in a way to avoid conflict with national law to the possible extent.⁶⁷ In case of conflict, domestic law will conquer international law (*forrangsprinsippet*).⁶⁸ The treaties that are not incorporated into Norwegian law are not directly applicable for the state or the citizens, but it still plays an important role in the understanding of the Norwegian legal regulations.

Norway is bound by UNCLOS since it ratified it in 1996.⁶⁹ But the convention is not incorporated into Norwegian law - but it is regarded as a codification of customary international law, thus, Norway abides by the obligations, but in accordance with the principle of presumption, the convention is relevant in the interpretation of domestic law, including issues relating to decommissioning of offshore facilities.⁷⁰ The IMO guidelines that supplement UNCLOS is only recommendations, but as a contracting state Norway must consider them when making a decision about disposal.

The OSPAR convention was ratified by Norway in 1996 and they therefore had to implement the provisions as well as relevant decisions and recommendations following the convention. OSPAR decision 98/3 about disposal of disused offshore installations give requirement relating

⁶⁵ Jusleksikon, «Dualisme».

⁶⁶ Jusleksikon, «Dualisme».

⁶⁷ Pereira et al, *The regulation of decommissioning, abandonment and reuse initiatives in the oil and gas industry* page 545.

⁶⁸ Pereira et al, *The regulation of decommissioning, abandonment and reuse initiatives in the oil and gas industry* page 546.

⁶⁹ FN-sambandet, «Havrettskonvensjonen».

⁷⁰ Pereira et al, *The regulation of decommissioning* page 546.

to removal and decommissioning. This decision is not legally binding, but Norway has regarded this decision as binding in relation to decommissioning matters.⁷¹

3.2 The Norwegian Petroleum Act

The Norwegian Petroleum Act is the most important primary legal source about decommissioning of disused offshore platforms.⁷² Chapter 5 of the Petroleum Act regulates the cessation of petroleum activities, including decommissioning plan and the MPEs decision relating to disposal.⁷³ The regulations in the Norwegian Petroleum Act are elaborated in the Petroleum Regulations.⁷⁴ The most relevant provisions from the Petroleum Act are §§ 5-1, 5-2 and 5-3. § 5-1 regulates elements in connection with the submission of the decommissioning plan. It stipulates what needs to be in the plan, and if the plan is not sufficient the MPE can ask for additional information. The MPE can even demand a new or improved plan.⁷⁵ What the plan needs to contain is more thoroughly regulated in the Petroleum Regulations §§ 43 – 45 and the Framework regulation § 30.⁷⁶

The act does not contain a definition of the term decommissioning plan. Since the Norwegian Petroleum Act does not contain a clear definition, it can create several issues. Firstly, it creates uncertainty, without a clear definition there may be uncertainty about what is required for a company to submit a compliant plan to the authorities. Secondly, it can lead to inconsistency. The lack of a definition can lead to an inconsistent understanding and implementation of decommissioning plan requirements by different companies and regulatory authorities. Thirdly, it can lead to delayed decisions. If the regulatory authorities do not have clear guidance on how to assess a decommissioning plan, it can lead to delay and inaction in the decision-making process, which can prolong the decommissioning process and increase cost. Finally, it can lead to ambiguity. The lack of a clear definition may create ambiguity in contractual agreements, making it challenging to resolve disputes, project uncertainties and concerns beforehand. Therefore, having a clear definition of «decommissioning plan» is vital, as it helps to ensure consistency and clarity in the decommissioning process and avoid unnecessary delays, disputes,

⁷¹ St.prp.nr. 51 (2001-2002) Om disponering av Ekofisk-tanken med beskyttelsesvegg punkt 5.

⁷² The Petroleum Act § 1-4; Bustnesli et al. *Oil and Gas Activities in Norway*, page 59.

⁷³ The Petroleum Act Chapter 5.

⁷⁴ The Norwegian Petroleum Regulations will not be explained further because it will be outside the scope of this thesis. Cessation plan is also elaborated in the Framework regulations § 30.

⁷⁵ The Norwegian Petroleum act § 5-1.

⁷⁶ The Petroleum Regulation § 43; Forskrift om helse, miljø og sikkerhet i petroleumsvirksomhet og på enkelte landanlegg § 30.

and costs. From a general understanding it is clear that it is about a plan that regulates the termination of petroleum activities. The purpose of the plan will help with the understanding of the term, and in the preparations for the Norwegian Petroleum Act the purpose of the plan is described like this:

[---] the decommissioning plan shall form the basis for the overall authority processing of the questions regarding closure of production and disposal of the facilities. The authorities must carry out an assessment of the relevant disposal alternatives and view these in relation to the effects on the environment, fishing, transport at sea, the economy, and the other matters of social significance.⁷⁷

It is said after this that «the authorities' objective is that the proceedings should start at the earliest stage that a decision on disposal can be made in a reasonable time before the permit expires or the use ceases».⁷⁸ The decommissioning plan will therefore work as a tool for the MPE so they know everything about the closing phase and will also work as a foundation before the MPE decide on disposal.⁷⁹ After the petroleum act § 5-1 it is the obligated party's duty and responsibility to make a decommissioning plan and show it to the authorities. Who is considered an obligated party according to the law is regulated in the petroleum act § 1-6 letter j.⁸⁰ The plan will be sent to the MPE and they will make a decision based on the petroleum act § 5-3. The authorities must also coordinate with other countries authorities if the decommissioning plan is about facilities on their territory, or they want to derogate from the international law.⁸¹

The duty of submitting a decommissioning plan to the MPE applies to facilities that are covered by the scope of the Norwegian Petroleum Act.⁸² The obligated party does not have to make a decommissioning plan if they only are allowed to search for hydrocarbons, this is especially relevant for facilities that have been placed into North Sea just for the search. The obligated

⁷⁷ My translation. Original text: «(---) avslutningsplanen skal danne grunnlaget for den samlede myndighetsbehandling av spørsmålet om avslutning av produksjonen og disponering av innretningene. Myndighetene må foreta en vurdering av de aktuelle disponeringsalternativene og se disse i forhold til virkninger for miljø, fiske, ferdsel til sjøs, økonomi og andre forhold av samfunnsmessig betydning.» Ot.prp.nr.43 (1995-96) s. 21.

⁷⁸ My translation. Original text: «Myndighetenes målsetting er at saksbehandlingen skal starte på et så tidlig stadium at vedtak om disponering kan foreligge i rimelig tid før tillatelsen utløper eller bruken av innretningen opphører». Ot.prp.nr. 43 (1995-96) s. 21.

⁷⁹ Ulf Hammer mfl. *Petroleumsloven*. Page 412.

⁸⁰ «Licensee, physical person or body corporate, or several such persons or bodies corporate, holding a licence according to this Act or previous legislation to carry out survey, production, transportation or utilisation activities. If a licence has been granted to several such persons jointly, the term licensee may comprise the licences collectively as well as the individual licensee», petroleum act § 1-6 litra j.

⁸¹ Ulf Hammer mfl. *Petroleumsloven*. Page 412 – 413.

⁸² Petroleum Act § 1-4.

party must on the other hand submit a decommissioning plan to the MPE before a license expires according to the petroleum act §§ 3-3 or 4-3, or the use of a facility is terminated permanently.⁸³ The license holder may present a joint decommissioning plan for more than one facility, but if there is more than one licensee there should be more than one plan if there is not sufficient connection between the facilities or if it follows from the agreement between the licensees.

In order for the rules on presenting a decommissioning plan to apply, it is a basic condition that a facility must have been used. In the Petroleum Act § 1-6 part d facility is defined as «installation, plant and other equipment for petroleum activities, however, not supply and support vessels or ship that transport petroleum in bulk».⁸⁴ In the preparations for the petroleum act they gave an explanation to which facilities that are in need of making a decommissioning plan:

Production platforms, underwater production facilities, pipelines and cables used in the petroleum industry are examples of facilities for which a decommissioning plan must be submitted. Shutting down wells does not trigger a requirement to submit a closure plan. On the other hand, ceasing to use a riser platform or a similar device will trigger the obligation to submit a decommissioning plan.⁸⁵

The content of the decommissioning plan is regulated by the petroleum act § 5-1. The plan shall comprehend proposals for continued production for the facilities or shutdown of the production. The plan shall contain information according to § 5-3 so that the MPE can make a decision relating to disposal. This information can be connected to technical, safety, environmental and economic aspects of the disposal. According to both § 5-1 og 5-3 there is no focus on a circular economy or the reusing of equipment. This may lead to missed opportunities for companies to reduce costs and environmental impact by reusing decommissioned equipment. Furthermore, without a clear guidance on issues surrounding circular economy and the reuse of equipment, companies may face uncertainty and confusion when attempting to reuse equipment, which could lead to inefficiencies and delays in the decommissioning process. Therefore, it is essential

⁸³ Petroleum Act § 5-1.

⁸⁴ Petroleum Act § 1-6 part d.

⁸⁵ My translation. Original: «Produksjonsplattformer, undersjøiske produksjonsanlegg, rørledninger og kabler som er benyttet i petroleumsvirksomheten er eksempler på innretninger som det må fremlegges en avslutningsplan for. Nedstengning av brønner utløser ikke krav til fremleggelse av avslutningsplan. Derimot vil opphør av bruk av en stigerørsplattform eller en lignende innretning utløse plikten til å legge frem en avslutningsplan.» Ot.prp.nr. 43 (1995-96) s. 49.

to consider the circular economy objectives and reusing equipment's in the Norwegian Petroleum Acts relevant sections to promote sustainable decommissioning practices.

3.3 The United Nations Convention on Law of the Sea

UNCLOS was adopted in 1982 and was ratified by Norway in 1996.⁸⁶ UNCLOS lays down a complex system of law about the world's oceans and determines rules governing all use of the oceans and their resources. According to UNCLOS article 60 section 3 any installation which are abandoned or disused shall be removed.⁸⁷ This article is applicable to installations in the exclusive economic zone (EEZ), but is also applicable on the Norwegian continental shelf (NCS) according to article 80. This is the Law of Seas main rule about disused or abandoned installations, and this basis is given to ensure safety of navigation. In accordance with the last part of article 60 section 3 the removal shall also have due regard to the protection of the marine environment, fishing, and the rights of other states.

It could be suggested that UNCLOS mainly focuses on the protection of navigation rather than environment and sustainability. There are references to the treaty regime as far as environmental protection is concerned – but these are at best minimal standard. Due to this, questions may arise when protection of the environment and protection of navigation safety stand against each other.⁸⁸ Full removal of a facility might be good for the navigation safety but be bad for the environment, unfortunately UNCLOS do not have any clear guidelines on how to solve this type of conflict. UNCLOS was established to provide a framework for the sustainable use and conservation of the world's oceans and resources, and they recognize that global trade and cooperation are essential drives for economic growth while also protecting the marine environment. However, article 60 section 3 appears to prioritize navigation safety over environmental protection, which can create a potential conflict of interest.⁸⁹ This preference for commerce over the environment can be a challenge when it comes to implementing circular economy objectives, which seek to minimize waste and promote resource efficiency. Therefore, it is important that the international community ensures that UNCLOS and other regulatory framework prioritize both commerce and the environment to ensure sustainable development.

⁸⁶ FN-sambandet, «Havrettskonvensjonen».

⁸⁷ UNCLOS article 60.

⁸⁸ UNCLOS article 87.

⁸⁹ UNCLOS article 60 section 3.

3.3.1 International Maritime Organization

According to UNCLOS article 60 a «competent international organization» can establish international standards, and in this case the organization is IMO. The guidelines developed by IMO will therefore function as a supplement to UNCLOS, even though they are not a part of UNCLOS but only a set of recommendations for the coastal states. The guidelines are therefore not binding under international law but will in most cases be obeyed by the states,⁹⁰ and they are especially relevant when the articles in UNCLOS are vague and imprecise, just like article 60 section 3. In UNCLOS it is said that a facility shall be removed to ensure safety of navigation, but according to IMO facilities can in some limited cases, be left behind if some terms are fulfilled: installations or structures standing in less than 75 m of water and weighing less than 4000 tons in air (100 m of water if placed on seabed after 1 January 1998) or, complete removal is not technically possible or will result in extreme costs or, complete removal will result in an unacceptable risk to personnel and the marine environment.⁹¹

If an installation is partially left behind and is not visible on the water surface it must be a water column of at least 55 meters between the highest point on the installation and the water surface to achieve safe navigation.⁹² However, this requirement does not take into consideration the potential impacts on the marine environment and the surrounding ecosystems. Abandoned offshore installations can contain a wide range of hazardous materials, including oil and gas residues, heavy metals, and harmful chemicals, which may leak into the water column and affect the surrounding ecosystem. Additionally, the presence of these structures can impact the physical and biological characteristics of the environment and potentially cause changes in the sedimentation patterns. Therefore, it is important to recognize the impact of abandoned offshore installations on the environment and prioritize sustainable solutions for their proper disposal. This can include decommissioning and removal of the installations, as well as evaluating the potential for their repurposing, recycling, or integrating them into artificial reefs to support local marine biodiversity on the NCS. By considering both navigation safety and environmental sustainability in the decision-making process we can ensure the responsible and sustainable use of our oceans for future generations.

⁹⁰ Ulf Hammer et al. *Petroleumsloven*. Page. 455.

⁹¹ IMO Resolution A.672 (16) section 3.

⁹² IMO Resolution A.672 (16) section 3.6.

3.4 Convention for the Protection of the marine environment of the North-east Atlantic (OSPAR)

The purpose of OSPAR is to prevent and eliminate ocean pollution and to create a sustainable use of the North-East Atlantic, the convention entered into force on 25 March 1998 and was ratified by Norway in 1996. In connection to decommissioning of offshore facilities OSPAR decision 98/3 is of special relevance and Norway accepted this decision 9 of February 1999. Decision 98/3 prohibit «the dumping, and the leaving wholly or partly in place, of disused offshore installations»⁹³ within the North-East Atlantic. This prohibition is not absolute because the Norwegian authorities may allow that installations are left partly or wholly. The MPE may decide this if they are «satisfied that an assessment in accordance with annex 2 shows that there are significant reasons why an alternative disposal (...) is preferable to reuse or recycling or final disposal on land (...)».⁹⁴ This option is limited to some installations that have been defined in OSPAR decision 98/3 annex 1. This limitation implies among other that steel-installations placed after 9 February 1999 must be removed in its entirety.⁹⁵

Before any of the states can make a derogation from OSPAR the authorities are required after decision 98/3 section 4 to consult the other parties of the treaty, the detail of this consultation is set in annex 3 of decision 98/3.⁹⁶ This mandatory consultation system in case the state wants to derogate guarantees an existence of control, international monitoring, and the protection of common interests.⁹⁷ This type of process was carried out in 2002 when Norway wanted to leave the concrete supporting structure TCP2 on the Frigg field.⁹⁸ None of the convention parties had any objections, just comments upon the proper marking, safety for fishing and shipping and supervision of the deterioration.⁹⁹

When the MPE have made decisions about different decommissioning plans, they have made it clear that Norway follows OSPAR decision 98/3, this means that it is prohibited to leave installations *in situ* and derogations must follow OSPAR. The authorities confirmed this when they made a decision about the disposition of the Ekofisk-tank with protective wall:

⁹³ OSPAR decision 98/3 section 2.

⁹⁴ OSPAR decision 98/3 section 3.

⁹⁵ Ulf Hammer et al. *Petroleumsloven*. Page 457.

⁹⁶ Bustnesli et al. *Oil and gas activities in Norway*. Page 255.

⁹⁷ Trevisanut, «Decommissioning of Offshore Installations: a Fragmented and Ineffective International Regulatory Framework», page 451.

⁹⁸ Bustnesli et al. *Oil and gas activities in Norway*. Page 255.

⁹⁹ Bustnesli et al. *Oil and gas activities in Norway*. Page 255.

Decisions on disposal must be made in accordance with chapter 5 of the Petroleum Act and the OSPAR decision of 1998 on the disposal of decommissioned offshore installations, cf. st.prp.no 8 (1998-99), given certain criteria, exceptions to the general prohibition against leaving offshore installations can be granted. The Norwegian authorities have consulted the other OSPAR countries, as the decision requires if one considers granting such an exception. During the consultation process, there have been no objections to leaving the Ekofisk tank and the protective wall behind.¹⁰⁰

3.5 Applicable law

Due to the nature of international law in regulating decommissioning, neither the IMO guidelines nor OSPAR decision 98/3 are legally binding, though principles of customary international law underpin the law – thus parties choose to follow them. In some regulations there are some disposal solutions that is prohibited, but the Norwegian legal framework is more open, and case-to-case regulated.

It is generally accepted the main rule is wholly or partially removal in the international and regional legal framework. It can also be important to remember that many of the old facilities are not build and designed with re-use and recycling in mind. But there is no common agreement on how this shall happen or what the criterion's for a derogation is. With no common agreement it can lead to delays and uncertainty in the decommissioning process, without this clear understanding companies can struggle to plan and execute their activities effectively. In summary, the lack of common agreement can cause delays, inconsistency, higher costs, and environmental risks, making it crucial to establish a comprehensive and harmonized framework. The generally accepted main rule about removal of offshore disused facilities cannot be interpreted into the Norwegian regulations in the Petroleum Act §§ 5-1 and 5-3. In these rules it is mentioned four different disposal methods, and this can be interpreted as that the Norwegian government has a great freedom when it comes to choosing a disposal method. In the Norwegian petroleum act § 5-1 it is said that the decommissioning plan shall contain «the information and evaluations deemed necessary in order to make a decision according to Section

¹⁰⁰ St.prp.nr. 51 (2001-2002) Om disponering av Ekofisk-tanken med beskyttelsesvegg punkt 5. My translation. Original text: «Vedtak om disponering skal fattes i overensstemmelse med kap. 5 i petroleumsløven og OSPAR-konvensjonen av 1992. I henhold til OSPAR-beslutningen av 1998 om disponering av utrangerte offshore installasjoner, jf. st.prp. nr. 8 (1998–99), kan man gitt visse kriterier, gi unntak fra det generelle forbudet mot etterlatelse av offshoreinstallasjoner. norske myndigheter har konsultert de andre OSPAR-landene, slik beslutningen krever dersom man vurderer å innvilge et slikt unntak. Det har i løpet av konsultasjonsprosessen ikke kommet noen innsigelser mot at Ekofisk-tanken samt beskyttelsesveggen etterlates.»

5-3». This means that it opens for many different types of relevant information and the legislator could in this case make it mandatory for the licensee to explain how they can be in accordance with the circular economy based on the chosen disposal method.

4 Disposal solutions

Brent Spar was a redundant oil storage installation in the North Sea. In 1995 it arose a public dispute over the decommissioning and disposal of the oil storage installation. Originally Brent Spar was meant to be dumped in deep sea in the Atlantic Ocean. The public dispute, among other from Greenpeace, resulted in a change of disposal plan where Brent Spar was towed to Norway and later dissembled. The public dispute and political impact lead to a change in how redundant installations would be decommissioned and disposed. The decommissioning of Brent Spar led to changes in OSPAR so that dumping is no longer allowed.¹⁰¹ In this chapter the different disposal solutions mentioned in the petroleum act § 5-1 will be discussed.

4.1 The Petroleum Act

The Norwegian Petroleum Act § 5-1 lists four different ways to dispose of an offshore facility. The list is not exhaustive, but it is difficult to think of other disposal methods than the ones mentioned in the provision. According to the provision the decommissioning plan shall contain a proposal «for continued production or shutdown of production and disposal of facilities.»¹⁰² If the licensee choose to shut down the facilities, disposal method may *inter alia* compose further use in petroleum activities, other uses, complete or partially removal, or abandonment.¹⁰³ The disposal methods can also be used together, e.g., a partially removal will also include a partially abandonment of the facility, unless this part can be covered by other use. In Norway the most common way of disposal is to take the whole facility or a part of it to shore for dismantling and recycling of the material.¹⁰⁴

According to the Norwegian Petroleum Act § 5-3 the MPE shall, among other things, emphasize technical, safety, environmental and economic conditions, as well as other users of the sea when deciding about the decommissioning plan.¹⁰⁵ Navigation safety or consideration

¹⁰¹ Royal Dutch Shell plc, «Brent Spar Dossier»; Store norske leksikon, «Brent Spar», av Marie Smith-Solbakken. 2.2.2023. https://snl.no/Brent_Spar.

¹⁰² Petroleum Act § 5-1.

¹⁰³ Petroleum Act § 5-1.

¹⁰⁴ Meling et al, «Markedsrapport», chapter 11.

¹⁰⁵ The Petroleum Act § 5-3.

of other users of the sea is an important element behind the IMO guidelines and UNCLOS. The effect on other users of the sea has to be minimal, and the assessment is stricter when it is about areas with more extensive ship traffic.¹⁰⁶ The facility can be used as a navigation mark if it is marked with lights and on a map. One also must think about military traffic, both surface vessels and submarines.¹⁰⁷ Therefore the government can be forced to choose a decommissioning plan and disposal solution that is in agreement with military strategic assessments.¹⁰⁸

Safety is an important factor for the choosing of a disposal method. This is mainly about the safety of personnel involved in the removal of the facility. It is important to remember that there will always be risk connected with offshore work, but sometimes this risk will be considered to big and involve too many uncertainties to justify the removal of the facility. In accordance with preparatory work to the Petroleum Act the Norwegian state will cover a big part of the cost relating to the decommissioning of structures.¹⁰⁹ The government will therefore conduct a broad assessment where the cost-benefit analysis is central. The authorities can therefore choose to overlook important environmental and circular objectives because the cost will be too big. This despite the fact that the government already know that there will be cost in relation to the decommissioning when the project start. If the government were to think about this from an earlier point, they could find a more financial beneficial way to finance this and be in accordance with sustainable environmental practices such as the circular economy.

4.2 Further use

The first disposal method in § 5-1 is further use in the petroleum sector. Further use of a facility in the offshore industry can among other things become relevant if the field does not have its own resources of petroleum. Then the facility can be used as a service platform for another close by field which is still in production. Today, many main platforms on producing fields are moveable facilities. This is especially normal on fields with short expected lifetime and few resources but can also be found on fields with bigger resources and longer expected lifetime. It is usually used a FPSO unit which will have a lifetime beyond the fields, and further use in the petroleum sector is therefore usually recommended. FPSO is a floating production system that receives fluids from subsea reservoirs, and then separates the fluids in the topsides production

¹⁰⁶ NOU 1993:25.

¹⁰⁷ NOU 1993:25.

¹⁰⁸ NOU 1993:25.

¹⁰⁹ NOU 1993:25.

facilities on board.¹¹⁰ Lifespan of oil and gas fields usually range from 15 to 30 years, but production can last up to 50 years or more in fields with bigger deposits.¹¹¹ Before a facility can still be used in the petroleum sector, they must get the necessary approvals from the MPE and other authorities. It is not normal for topsides and jackets, but more common for new ship-shaped facilities, like FPSO.¹¹² In Norway they have among other made further use of the FPSO Petrojarl 1 and Jotun in other fields.¹¹³ Petrojarl 1 has been rebuild and upgraded by dutch company Damen and Aibel and has been on a five-year contract with Queiroz Galvao on the Atlanta-field in Brazil.¹¹⁴ Jotun FPSO lies in dry dock after over 20 years of production in the North Sea. The ship is being refitted for a new period on the NCS, but this time on the Balder field.¹¹⁵ But it is also important to remember that if further use is to be approved the condition of the facility must be satisfactory in accordance with Norwegian legislation.

4.3 Other use

Installations that are used in the petroleum sector are big and expensive to build, so if they cannot be used further in the petroleum sector an alternative could be to find other uses for the installation. With this disposal method the installation will get a new life outside of the oil and gas sector. The facility will remain on approximately the same location, but if the facility needs to be relocated, they also need approval to use removal as disposal method. There are many ways an installation can be used, some mention artificial reefs, research purpose, military, or training facility for both military, divers, and other offshore personnel.¹¹⁶

After offshore installations has been on the NCS for several years they often serve as an ecosystem for a variety of different marine species. Species like barnacles, mussels and shrimp rely on the structures.¹¹⁷ By extending the lifetime of the facility it is possible to protect the ecosystems and avoid the environmental damage that comes from removal of facilities. The continued use of different parts of the facilities can also reduce energy consumption and helping towards the challenges with reducing emissions. Other use will work as a good alternative to

¹¹⁰ MODEC, «FPSO/FSO».

¹¹¹ Planete energies, «The Life Cycle of Oil and Gas Fields».

¹¹² Meling et al, «Markedsrapport».

¹¹³ Meling et al, «Markedsrapport».

¹¹⁴ Meling et al, «Markedsrapport» page 86.

¹¹⁵ SAFE. «Arbeidsplassbesøk på Rosenbergverftet».

¹¹⁶ NOU 1993:25, page 17 and following.

¹¹⁷ National Oilwell Varco, «Repurposing Offshore Rigs and Platforms».

removal and later dumping or towing to land.¹¹⁸ This disposal method will secure a longer use of a facility that represent big investments, and it can also delay the cost of decommissioning.¹¹⁹ It is also a requirement that the other use that is suggested in the decommissioning plan is a realistic alternative. The new user must be able to be responsible for maintenance and damage, and the new user must be able to continue the new use until eventually the MPE make a new decision about the decommissioning and disposal.¹²⁰

Other uses of offshore facilities can be in line with the circular economy because these facilities often contain valuable materials and infrastructure that can be repurposed or upgraded for alternative offshore activities, such as renewable energy applications, or for onshore uses. For example, an offshore drilling rig may be converted into a wind power platform or a center for aquaculture. This approach supports the objectives of the circular economy by extending the life of offshore assets, reducing waste, and promoting resource efficiency within the offshore sector.

4.3.1 Coral reefs

After the protest regarding the decommissioning of Brent Spar, governments became more careful of dumping of installations at deep sea. But it is important to remember that there is a difference between disposal at sea and conversion to an artificial reef.¹²¹ Because the facility will not be used in the oil and gas sector the facility will therefore not be left behind according to the OSPAR regulations, and there are no requirements of a 55 meters water column.

In the US they have changed many facilities into artificial coral reefs and the government have created a rig-to-reef program for this process.¹²² The program include that the obligated party donate their facility to the program, and after the surrender the licensee is no longer responsible for the installation.¹²³ The facility will be overturned on spot or moved to another location, and before this happen the facility must be cleaned of polluting chemicals. The US government have cooperated with different fisheries organizations to figure out where the best places to

¹¹⁸ NOU 1993:25, page 17 and following.

¹¹⁹ NOU 1993:25, page 17 and following.

¹²⁰ NOU 1993:25, page 17 and following.

¹²¹ Meling et al, «Markedsrapport», Chapter 11.4.

¹²² Bureau of Safety and Environmental Enforcement. «Rigs-to-reef».

¹²³ NOU 1993:25.

establish artificial reefs are. In these places it can be dozens of facilities, and the reefs are used in both sport and commercial fishing.¹²⁴

The facilities that are on the NCS have a small reef-effect, but there is still lack in the scientific foundation.¹²⁵ Around 70-80 % of the NCS in the North Sea only consist of sand and clay bottom and is often called a desert area. As a starting point fishing in these areas will not be profitable, but the facilities can make an important factor in making it more profitable. It has although been clear that the concentration of fish around the facilities is higher than other places in the desert area on the NCS.¹²⁶ The fishing opportunities will only increase if the artificial reefs are made in these desert areas outside the Norwegian trench and not further out in the sea than 150 meters. The Norwegian trench is an elongated depression in the sea floor of the coast of Norway, the trench is between 50 and 95 kilometers wide and up to 700 meters deep.¹²⁷ Artificial reefs can make an obstacle for trawlers, and they have expressed that they do not want this type of solution and believe that artificial reefs will have a marginal effect on the fish yield in the North Sea¹²⁸. There have been many indications that show that artificial reefs can be profitable on the NCS, but for it to be a real disposal alternative a licensee has to make way and try the solution and be willing to manage the eventual negative review.¹²⁹

If one chose to make a facility into an artificial reef the licensee will have all the responsibility, to contrast from the US where the licensee gives the responsibility to the government. So, if one where to establish artificial reefs on the NCS it must be clear regulations about who is responsible, and that should preferably be the government or any other who wants the responsibility. OSPAR has made a guideline on artificial reef, but it has not been signed by Norway.¹³⁰ This means that Norway is able to make more derogations than the other OSPAR countries, and do not have to follow specific criteria for the materials to be used in artificial reefs.¹³¹

¹²⁴ NOU 1993:25.

¹²⁵ NOU 1993:25; Osmudsen and Tveterås, «Decommissioning of petroleum installations – major policy issues».

¹²⁶ NOU 1993:25.

¹²⁷ Store norske leksikon, «Norskerenna», av Inge Bryhni og Knut Barthel, 25.02.2023.

<https://snl.no/Norskerenna>.

¹²⁸ NOU 1993:25.

¹²⁹ Meling et al, «Markedsrapport». Page 108.

¹³⁰ Verbeek et al, «Worldwide rigs-to-reef experiences», page 38.

¹³¹ Verbeek et al, «Worldwide rigs-to-reef experiences», page 38.

4.4 Complete or partially removal

Complete or partially removal of the facility implies that the facility is removed from its original location, or a part of the installation is left *in situ*. Removal includes both partially removal, on-site overturning, and full removal.¹³² The structure of the facility will determine what type of removal that is possible. As an example, one has never taken a concrete base to shore for scrapping and reuse, but this is more common for steel chassis. According to OSPAR decision 98/3 leaving a disused offshore installation partly in place is prohibited, but there can be derogations such as steel installations weighing more than ten thousand tons in air, and gravity based concrete installations. But as one of the derogations the competent authority can decide that wholly or partially removal is a better disposal alternative than reuse and recycling.¹³³ Partial removal and on-site overturning are especially used for facilities it will be expensive or technical difficult to remove wholly.¹³⁴ If the facility is partially left behind one have to remember the IMO guidelines about a 55-meter water column over the remaining part of the facility.

If removal is the chosen disposal method the licensee has to describe how this is going to take, the extent of the removal and in which order the different parts of the facility is being removed in the decommissioning plan. The parts of the facility that is not being removed will be covered by the pollution term in the Norwegian Pollution Act, as well as the parts that is removed and dumped elsewhere.¹³⁵

4.5 Abandonment

After the protest regarding the choice of disposal of Brent Spar in deep sea in 1995, dumping as disposal method has not been approved for any other facility in the North Sea, even though the protest was based on content of environmental toxins and radioactive deposits in the loading buoy.¹³⁶ When a facility is abandoned it is left in its original positions, tilted, or dumped on-site, and the disposal method is often used together with another disposal method such as partial removal. Abandonment as method of disposal is relevant for facilities where removal will cause a significant safety risk and/or high costs.

¹³² NOU 1993:25 page 13 section 4.4.5.

¹³³ OSPAR decision 98/3 section 2.

¹³⁴ NOU 1993:25.

¹³⁵ NOU 1993:25.

¹³⁶ Meling et al, «Markedsrapport», chapter 11.2.

As seen in OSPAR decision 98/3 leaving wholly or partly in place is prohibited, but they have made derogations from this main rule. The member states can derogate from this if the competent authority finds that there are significant reasons for why they would choose abandonment over reuse or recycling.¹³⁷ This means that OSPAR does not exclude abandonment as a disposal method for disused facilities in the North Atlantic. In some limited cases both national and international therefore allow the abandonment of disused offshore facilities.

4.5.1 Abandonment of concrete structures

Abandonment of concrete structures at their original placement have been generally accepted due to the weight and difficulty of removal. OSPAR regulations allows the abandonment of concrete structures if the state can prove that this is the best solution. The first structures placed in the North Sea is not made to endure being removed, but in 1978 the NPD introduced a design requirement that would make removal of concrete structures a more up-to-date solution.¹³⁸ Many analyses shows that there is a significantly smaller risk and cost connected to leaving the structures in place rather than wholly or partial removal.¹³⁹

If a concrete structure is going to be abandoned at its original location one must remove the deck, shut down the systems, clean the pipes, remove all steel on the outside of the platform, waste on the seabed must be removed, and navigation equipment must be mounted.¹⁴⁰ There are no examples of concrete structures on the NCS that have been removed by refloating, this can partially be explained by that two of the first platforms on the NCS, Frigg TCP2 and Statfjord A, was not constructed to be removed.¹⁴¹ The other explanation is that many of the other concrete facility is still being used in production.

The abandonment of offshore facilities can have both positive and negative impacts on the circular economy. On one hand, decommissioning offshore structures in a sustainable way can contribute to the circular economy by recovering and repurposing materials and equipment. This approach can create opportunities for recycling, reuse, or resale of materials and assets that would otherwise be discarded. On the other hand, the abandonment of offshore facilities can also have negative impacts on the circular economy if it results in unnecessary waste and

¹³⁷ OSPAR decision 98/3 section 3.

¹³⁸ Meling et al, «Markedsrapport» page 55.

¹³⁹ Meling et al, «Markedsrapport» page 55.

¹⁴⁰ Meling et al, «Markedsrapport» page 56.

¹⁴¹ Meling et al, «Markedsrapport» page 67.

environmental damage. For example, if decommissioned offshore structures are not properly handled and disposed of, they can contribute to marine pollution and the accumulation of waste in landfills. To ensure that the abandonment of offshore facilities aligns with the principles of the circular economy, it is important to consider sustainable decommissioning practices that promote resource efficiency and minimize waste. This approach may involve repurposing components of the offshore structure, recycling or recovering valuable materials, or exploring alternative uses for the facility.

4.6 The best sustainable alternatives

Today, the most sustainable solution is considered cutting structures into small pieces and transport them to shore for recycling and reuse.¹⁴² The process of decommissioning and disposal is long, dangerous, expensive, and in the North Sea you are heavily dependent on good weather. The industry could start considering more environment friendly options such as artificial reefs, but there are few or no operators that wants to be first with this solution. The industry seems to be more interested in developing a faster disposal method, than to find the most sustainable one.¹⁴³ Because of many relevant elements that the MPE have to consider when choosing a disposal method, other elements than environment can be the most important one, this can cause a conflict of interest for the MPE. Which can result in the disposal method to not be in accordance with objectives of the circular economy.

5 Issues with the existing legal framework

The decommissioning of offshore facilities in the Norwegian Continental Shelf is an intricate and significant process that demands attention with respect to environmental protection and sustainable utilization of resources. The circular economy has emerged as a promising concept that can help achieve the objectives of sustainability in the decommissioning process. The circular approach prioritizes a closed loop system, which values resources and maximizes their utilization while minimizing impacts on the environment. However, the existing Norwegian legal framework for decommissioning of offshore facilities poses challenges to the circular economy concepts due to its rigidity and limitations. This chapter explore the issues with the current legal framework for decommissioning of offshore facilities in Norway and how the adoption of the circular economy can address them.

¹⁴² Khan and Islam, *The Petroleum Engineering Handbook*, Page 387.

¹⁴³ Khan and Islam, *The Petroleum Engineering Handbook*, Page 387.

5.1 The climate lawsuit

In 2020 the Norwegian Supreme Court made a judgement on the climate provision in the Norwegian constitution¹⁴⁴ in connection with extraction permits for oil and gas in the Barents Sea.¹⁴⁵ The climate lawsuit has gained significant attention as it challenges the Norwegian government's decision to award oil drilling licenses to companies despite the country's commitments to reduce emissions and slow climate change. The Supreme Court of Norway did not make a final decision on whether the risk of dangerous climate change actualizes the states security obligations under the European Convention on Human Rights. In spite of this the Supreme Court still made some important remarks in relation to the climate. The majority of 11 judge's states that § 112 in the constitution can give the state a «right and obligation» to refuse approval to extract localized oil and gas if «consideration for the climate or environment otherwise» indicates it.¹⁴⁶ The Supreme Court does not clarify when the state has to refuse the approval, but the Norwegian National Human Rights Institution states in an *amicus curiae*¹⁴⁷ that a limit will be reached by the exercise of authority that entails significant GHG emissions that are incompatible with Norway's responsibility for reaching the 1.5 degree target.¹⁴⁸

The lawsuit has implications for the decommissioning of offshore facilities as it highlights the need for stronger environmental regulations and policies. The current legal framework for decommissioning lacks clear guidelines on environmental protection and sustainability. The climate lawsuit emphasizes the urgency to address the gaps in the legal framework to ensure a sustainable future for the Norwegian petroleum industry. Adopting a circular economy approach to the decommissioning phase can help address the environmental concerns and contribute to the goals of reducing emissions and slowing climate change, as emphasized in the Norwegian climate lawsuit.

¹⁴⁴ The Norwegian Constitution § 112.

¹⁴⁵ HR-2020-2472-P.

¹⁴⁶ HR-2020-2472-P.

¹⁴⁷ *Amicus Curiae* is referring to a person or group who is not a party to a legal case but has a strong interest in the matter. The interested party will assist the court by submitting a brief with information or insight on the issues in the case, such briefs are known as *amicus curiae*.

¹⁴⁸ *Amicus Curiae* from the Norwegian National Human Rights Institution Part 2.6.4.

5.2 The issues

The oil and gas industry has been an essential part of Norway's economy for decades, and the country has taken a leading role in developing the technologies and practices to extract these resources. However, the world moves towards a more sustainable future, and the focus is increasingly shifting towards the decommissioning and re-use of existing offshore facilities, and in relation to this there are several challenges in getting the current legal framework in accordance with objectives of the circular economy.

As previously stated in relation to the decommissioning framework is somewhat fragmented. The main source of law relating to decommissioning is the Norwegian Petroleum Act, but this is supplemented and limited by international law such as OSPAR and UNCLOS. In order to find out the legal rule and what rights and obligations the licensee have, they have to go through many layers of regulation. As an example, the Norwegian Petroleum Act list four different disposal methods, but both OSPAR and UNCLOS favors removal as disposal method. The Norwegian Petroleum Act does not favor any of these methods and the licensee can chose the one that fits the facility the best. According to OSPAR Norway is obligated to remove disused offshore facilities, but they can ask for a derogation from this rule if it is a concrete platform or if the facility fall under any of the other derogation categories. After UNCLOS installations or structures shall be removed as well «to ensure safety of navigation»¹⁴⁹, but one must also take into account the standards made by IMO. According to IMO in similarity to OSPAR, facilities can in some limited cases be left behind if some terms are fulfilled. Technically it is possible to remove to concrete structure, but it is difficult, risky and takes a lot of planning.¹⁵⁰ Therefore leaving the structure *in situ* can be favorable due to safety reasons, but also with regard to the environment. I could also be favorable if there were references in the Norwegian regulations to international law. As an example, there could be references to both OSPAR decision 98/3 and UNCLOS article 60 in the petroleum act § 5-3 to show how the international law could limit the Norwegian rules. A more robust legal framework can provide greater clarity and direction to the industry. This can ensure better management and regulation of decommissioning activities and create more transparent and accountable process.

¹⁴⁹ UNCLOS article 60.

¹⁵⁰ Oljedirektoratet, «Disponering av betonginnretninger».

In the current legal framework, there is a focus on the removal of offshore facilities. Removal is considered the most responsible approach as it minimizes environmental harm, assures compliance with the international regulations, and puts the seabed back to its original state. But for some facilities such as concrete platforms removal is a difficult disposal option. Focus on removal in both OSPAR and UNCLOS is contrary to the circular economy that focuses on resource optimization, waste reduction, and promote reuse, recovery, and recycling. Leaving the facility in situ can also be the most beneficial if it has occurred ecosystems around the facility. If the licensee chose reuse of the installation, it requires a more careful assessment of the structural integrity and the ability to withstand further use, which may not always be feasible. Also, the logistics associated with reusing offshore installations can be challenging and expensive, and that can potentially outweigh the benefits of reuse. There is still a lack of standardization and regulations surrounding the reuse of offshore installations, which may make it difficult for the legal framework to include such an approach. The licensee should also be open to reuse of the facility and making it into artificial reefs.

Decommissioning of offshore installations is a complex process that can have significant environmental impacts. Despite this, Norwegian legal framework does not provide clear guidance on the environmental impacts of decommissioning activities. This lack of guidance can make it challenging for companies and authorities to ensure that decommissioning activities are conducted in an environmentally responsible manner. By adopting circular economy objectives, it can help minimize these impacts by promoting environmental assessment, monitoring, and control, as well as the use of environmentally friendly materials and technologies. Decommissioning of offshore platforms is also a costly process. As an example, it is estimated that the decommissioning of the Gyda field will cost at least 5.7 billion Norwegian kroners,¹⁵¹ and decommissioning of facilities on the NCS between 2020-2027 will cost around 49 billion NOK.¹⁵² Decommissioning often requires significant investment for the removal, transport, and disposal of installations, and well as site remediation. Adopting circular economy objectives such as reusing, recycling, and recovering materials can reduce the economic cost of decommissioning, but it requires investment in infrastructure and technology. However, as the circular economy gains more and more attention and the technology for reusing offshore installations develops, it is possible that the relevant legal framework needs to revise their policies to include more circular options.

¹⁵¹ Stangeland, «Det vil koste 5,7 milliarder å stenge dette oljefeltet».

¹⁵² Espeland, «Forlatt i Nordsjøen».

5.3 Potential for improvement

Integrating circular economy objectives into the legal framework for decommissioning of offshore facilities can enable the transition towards a more sustainable petroleum industry in Norway. There will in the following be presented some ways that the Norwegian legal framework can improve to be more in line with the circular economy.

The framework should provide a clearer guidance on circular economy. None of the regulations mentioned above does explicitly address the objectives of the circular economy. To align the decommissioning regulations with the circular economy objectives, additional guidance, and legal framework should be provided for the oil and gas industry. This includes provisions regarding the reuse or recycling of materials, incorporation of sustainable and environmentally friendly technologies, the economic incentives that promote the circular economy, promoting circular economy in the decommissioning plan, and make clear requirements for the handling and disposal of decommissioned materials. The framework should favor the most environmentally friendly decommissioning method, and not the easiest or cheapest method. Derogations from the framework should be allowed based on environmental benefits. In an effort to reduce emissions, the electrification of offshore platforms had been a clear step in the right direction. The Norwegian decommissioning regulation can provide a clearer guidance on circular economy by encouraging the recycling and repurposing of decommissioned materials and equipment. A clear example of how this can be achieved is by value chain mapping and reverse logistics. Value chain mapping provides an analysis of the entire lifecycle of a product or equipment, from start to finish, while reverse logistics involves moving materials and equipment back up the supply chain to reclaim their value, and reverse logistics is about returning products from the end users back through the supply chain to the manufactures.¹⁵³ The Norwegian Petroleum Act could also include regulations about how licensees can be in accordance with the circular economy when they make the decommissioning plan and when the decommissioning is carried out. In both §§ 5-1 and 5-3 circular economy principles could be mentioned explicitly as a part of the assessment basis for the decommissioning plan. Environmental aspects are just one of many aspects that the MPE shall base their decision on, but if the legislative rule mentioned circular economy objectives as the main part of the assessment basis it could promote a more sustainable disposal solutions from the licensee.

¹⁵³ Olson, «How to build a Circular Value Chain»; ASCM, «What is Reverse Logistics?».

The framework should encourage a more holistic approach to the decommissioning phase. Decommissioning of offshore facilities is a complex process, requiring multiple stakeholders' involvement. This approach should focus on resource optimization, minimize waste, and promote reuse, recycling, and recovery of materials. Stakeholders should work together to assess the environmental impact of decommissioning activities, identify potential opportunities for the reuse of resources, and elevate the economic and social impact in the region. Stakeholders and other involved parties should also encourage modular offshore installations. Currently, most offshore installations are designed with a predetermined lifespan and specific purpose. Circular economy objectives suggest that modular offshore installations should be designed and constructed with modularity in mind. By constructing modular installations capable of simple dismantling and repurposing, the material can be more efficiently reused or recycled, creating a circular operating model.

Aligning Norwegian decommissioning regulations with the circular economy objectives could lead to several benefits for the government, industry players, and local communities. According to SINTEF Norway was only 2.4 % circular in 2020, so there is a considerable room for improvement.¹⁵⁴ These benefits could include resource optimization, waste reduction, and sustainable development. Improved regulations that allow derogations for the reuse, recycling, and repurposing of materials could lead to more efficient decommissioning and minimize waste. This could also lead to economic benefits by creating new opportunities for businesses to repurpose existing resources.

Even though implementing circular economy principles offers many benefits, there are also challenges and problems that must be carefully considered and addressed to ensure a successful transition. A circular approach in the legal framework may involve a different disassembly and reuse of components, which can pose safety risks. Ensuring that all disassembly and reuse activities are conducted safely and in accordance with regulations may require additional resources and expertise. As previously stated, a circular economy can reduce the cost of decommissioning, but it can also increase the costs. Additional cost such as the cost of separation and recycling materials could become relevant, and these costs may be passed to operators and could impact their willingness to invest in circular economy. It is also important

¹⁵⁴ Becidan, «CircWtE – Waste-to-Energy and Municipal Solid Waste management systems in Circular Economy».

to remember that the Norwegian regulations about decommissioning of offshore facilities are strict and designed to protect the environment and public health, and changes to these regulations must be carefully considered to ensure their compliance to regulations and international law.

6 Conclusion

As this thesis shows there are several ways the Norwegian legal framework relating to decommissioning can be made more in accordance with the objectives of the circular economy. A change towards a more circular offshore decommissioning gives Norway a unique opportunity to be first in line for the change towards a sustainable future. The reuse of steel from oil platforms and other offshore facilities, for example, can significantly reduce the carbon footprint compared to producing new steel. Sustainable development requires the simultaneous achievement of economic, social, and environmental goals. Adopting circular economy objectives into the legal framework can help balance these goals, create new jobs and businesses, and promote the replacement of harmful practices with sustainable ones. Sustainable decommissioning of offshore facilities in Norway is essential to reduce the environmental impact of petroleum operations and prepare for a more sustainable future.

Integration of circular economy objectives into the current legal framework about decommissioning presents several challenges, but also provides several benefits, such as resource optimization, emission reductions and the achievement of sustainable development goals. The inclusion of circular economy objective into the legal frameworks will be important for the continued growth of a sustainable and prosperous oil and gas industry in Norway. Ultimately, proper decommissioning regulations will allow Norway to extract value from its resources while encouraging sustainable development in a circular economy.

This research has shown the most important parts of the circular economy in relation to the offshore industry, and how the industry could be applicable to incorporate circular economy objectives. The second part of the thesis had a look at the relevant legal framework and their connection to sustainability and circular economy. Following this, the four main disposal methods mentioned in the Petroleum Act was discussed and elaborated, and they were reviewed in relation to the objectives of the circular economy. Finally, the findings of the previous chapters were reviewed and both problems and solutions were discussed.

The findings in the thesis suggest that the Norwegian legal framework needs to take a more comprehensive and proactive approach in relation to decommissioning, to ensure that materials are recycled and reused instead of being wasted. This includes establishing clear guidelines and regulations for the handling of decommissioned materials, facilitating better cooperation and communication between various actors involved in the process, and promoting the use of innovative technologies and practices. Furthermore, this dissertation highlights the importance of a clear legislative framework. If the legal framework promotes the objectives of the circular economy, it will be easier for the stakeholder to choose more sustainable options in the decommissioning phase. It is also unfortunate that some parts of the legislative framework favor one disposal method over another, it should rather be decided with regards to the most environmentally friendly solution. The stakeholders need to work together to develop a shared vision for sustainable decommissioning and to promote the benefits of circularity. While the implementations of circular economy objectives in the Norwegian framework is promising, it is also important to remember the challenges the implementing can pose. With these challenges in mind, careful planning, stakeholders' agreement, and compliance with regulations can make it possible to overcome these challenges and achieve a successful transition.

In summary this thesis investigates the Norwegian legal framework concerning offshore facility decommissioning and suggest potential enhancements to align it with the circular economy objectives. Through an analysis of the existing legal regime and circular economy principles, several areas for improvement within the Norwegian legal framework have been identified, aiming to better facilitate the sustainability agenda.

The findings and recommendations presented could potentially add to future research. As the oil industry seeks to preserve its position within energy it will need to enact serious measures for its own economic sustainability. This progress can serve as a blueprint for other jurisdictions seeking to emulate the Norwegian industry.

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