REPORT

From waste to business – implementation of a circular economy in the Arctic

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Summary

This report gives an overview of the current plastic economy and the challenges attached to it. It lists the global and local actors working with marine litter recycling, in order to give the reader an indication of the potential that lies within marine litter recycling, especially when it comes to recycling abandoned, lost or otherwise discarded fishing gear in the Norwegian Arctic.

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PREFACE

This report on recyclability of marine litter related to fisheries and fish farming in the Norwegian Arctic is a part of the Work Package 3, “From Waste to Business – implementation of the circular economy in the Arctic” in the project “New knowledge for reduction and utilization of marine waste from fisheries (RE-D-UCE)”.

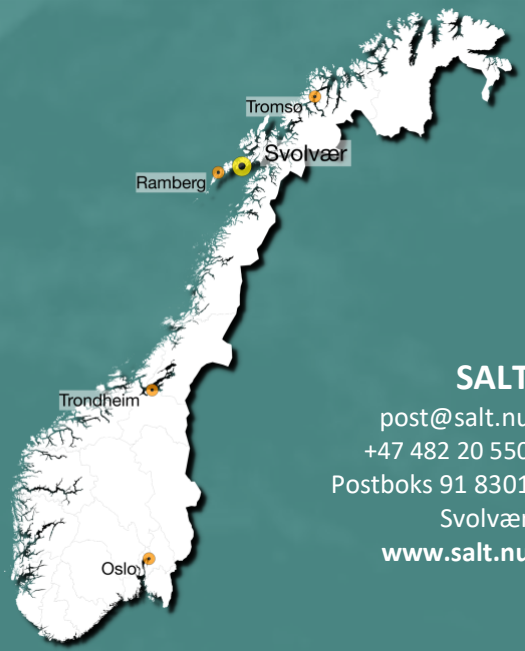
Due to the global concern over marine litter, the interest in finding solutions at all levels of the waste stream is increasing. The decrease of inflow of plastic into the oceans needs to be prioritized, as this is the most efficient way to combat marine litter. However, simultaneously focusing on finding sustainable end-of-life solutions for marine litter is necessary as the current rate of leakage of plastic into the oceans is 15 tons per minute.

This report gives an overview over the current plastic economy and the challenges attached to it. It lists the global and local actors working with marine litter recycling, especially when it comes to recycling abandoned, lost or otherwise discarded fishing gear in the Norwegian Arctic. Finally, the report includes some reflections on some of the potential that lies within marine litter recycling in the region.

It may be feasible to create recycling systems for fisheries-related marine litter in the Norwegian Arctic, since a great proportion of the litter collected in the region is indeed related to fisheries. In addition, the region is known for its high fishing activity, which is why it is possible to complement the materials collected through litter clean-ups, i.e. increase the tonnage of recyclable materials by sourcing materials directly from local fisheries. However, in order to create a local, sustainable recycling system in the Norwegian Arctic, more information about the local conditions, such as stakeholders, availability of infrastructure, marine litter categories, and transportation alternatives is needed.

Tromsø, 15.09.2018

Vilma Havas, SALT



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CONTENTS

KEY TERMINOLOGY

Marine litter: *«any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. Marine litter consists of items that have been made or used by people and deliberately discarded into the sea or rivers or on beaches; brought indirectly to the sea with rivers, sewage, storm water or winds; accidentally lost, including material lost at sea in bad weather (fishing gear, cargo); or deliberately left by people on beaches and shores»* (UNEP 2005).

Marine plastic debris/marine plastic litter/marine plastic pollution/marine plastics: refers to the plastic fraction of marine litter.

Waste: *«any substance or object which the holder discards or intends or is required to discard»* (EU 2008).

Norwegian Arctic: Norwegian economic zone including Svalbard and Jan Mayen, above the Arctic Circle (66°33').

Circular plastic economy: A system where resource input and waste leakage are minimized by closing the energy and material loop, as opposed to the linear system, where materials are thrown away after use (WEF 2016).

ALDFG: Abandoned, Lost or otherwise Discarded Fishing Gear or "ghost nets", i.e. fishing gear lost in the marine environment (Macfadyen et al. 2009). Marine litter related to fisheries and fisheries-related marine litter is used as synonyms for ALDFG.

1. INTRODUCTION

This report will study the end-of-life solutions for marine litter originating from fisheries, i.e. abandoned, lost or otherwise discarded fishing gear (ALDFG). The region of interest is the Norwegian Arctic, but recycling systems and solutions outside of this region will be considered in order to create a holistic view of the existing options and potential for development. In the Nordics, around 90 % of collected marine litter is made up of plastic polymers (KNB 2018) and globally the number is somewhere between 60 and 90 % (UNEP 2016). Recycling of marine plastic litter from the fisheries will therefore be the focus of this report.

In order to fully comprehend the challenges related to the recycling of marine litter originating from fisheries, fish farming and recreational fishing (hereafter "fisheries"), the global challenges attached to recycling plastic materials have to be considered. There are challenges related to recycling materials within the waste stream, as well as logistical and technical challenges related to recovery and recycling of waste that has ended up outside the waste stream, such as marine litter.

In the last few decades, the production and consumption of plastic has increased exponentially, from 15 million tons in 1964 to 311 million tons in 2014 (WEF 2016). Currently the global plastic economy is more or less linear, rather than circular, with only a small fraction of plastics being recycled. Using plastic packaging, which is the largest market segment for plastic products, as an example; only 14 % of the plastic packaging produced today is recycled, with only 2% of this being recycled to materials of same or similar quality [1]. 40 % is landfilled, 14 % is burned for energy recovery, while 32 % leaks out into the environment (WEF 2016). As a result of the latter, approximately 15 tons of plastic litter ends up in the ocean every minute (Jambeck et al. 2015); an amount that is expected to fourfold by 2050. Low price of oil, high demand of plastics and fragmentation of the plastics economy are some of the main factors behind the current linear plastics economy (WEF 2016). The plastic waste that ends up in the ocean can therefore be seen as a symptom of a malfunctioning plastic economy. Recognition of the huge environmental, economic and social costs of the current plastics economy has resulted in development of strategies both at a national (KLD 2017), European (EC 2018) and global level (UNCTAD 2018) to make the plastics economy more circular.

[1] 4% is lost in the recycling process and 8% is recycled to materials of poorer quality (WEF 2016).

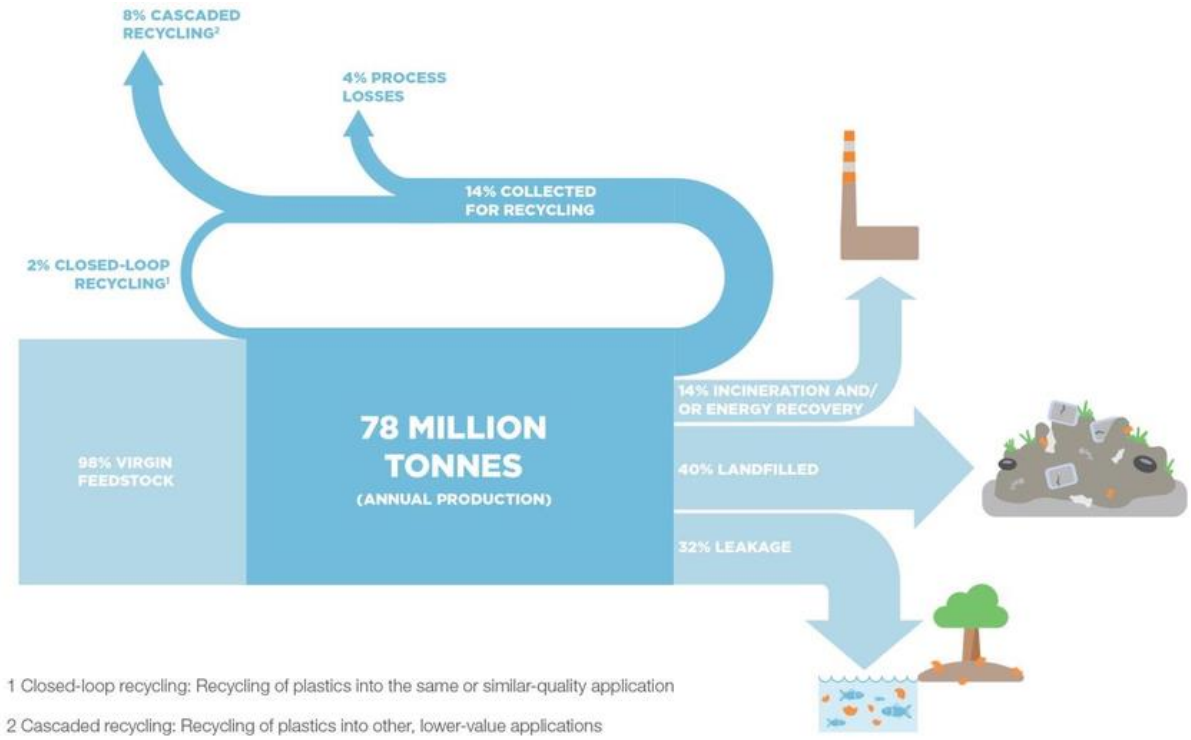


Figure 1 Global flow of plastic packaging materials in 2013. Source: WEF (2016)

As 90% of plastic polymers' feedstock is oil and gas (WEF 2016), the creation of a circular plastic economy can help to reduce gas house emissions that contribute to climate change. Currently about 6% of the world's oil production is used to produce plastics, which is equal to the oil consumption in the aviation sector (WEF 2016). If the consumption of plastic increases as expected, the production of plastic will account for 20% of the total consumption of oil by 2050 (WEF 2016). This would also mean that the plastic sector[2] will account for 15% of the global annual carbon budget. Currently the plastic sector counts for around 1% of the carbon budget (WEF2016). Therefore, finding smart solutions for keeping plastics in a circular loop contribute to the fight against climate change – especially if the materials are recycled as locally as possible.

The importance of finding local solutions for plastic recycling is underlined due to the recent developments in the global trade of plastic waste. For about three decades, high income countries have been exporting their plastic waste to Asian countries. Most of the plastics have ended up in China, accounting for 45,1 % of all cumulative plastic imports (Brooks et al. 2018). The greatest exporters of plastic waste have been the European countries, the United States and Japan. Most European companies handling plastic waste related to fisheries and fish farming in Europe, have also been sending some of the waste to Asia for recycling (GI Waste Solutions 2014).

[2] Including production and after-use treatment.

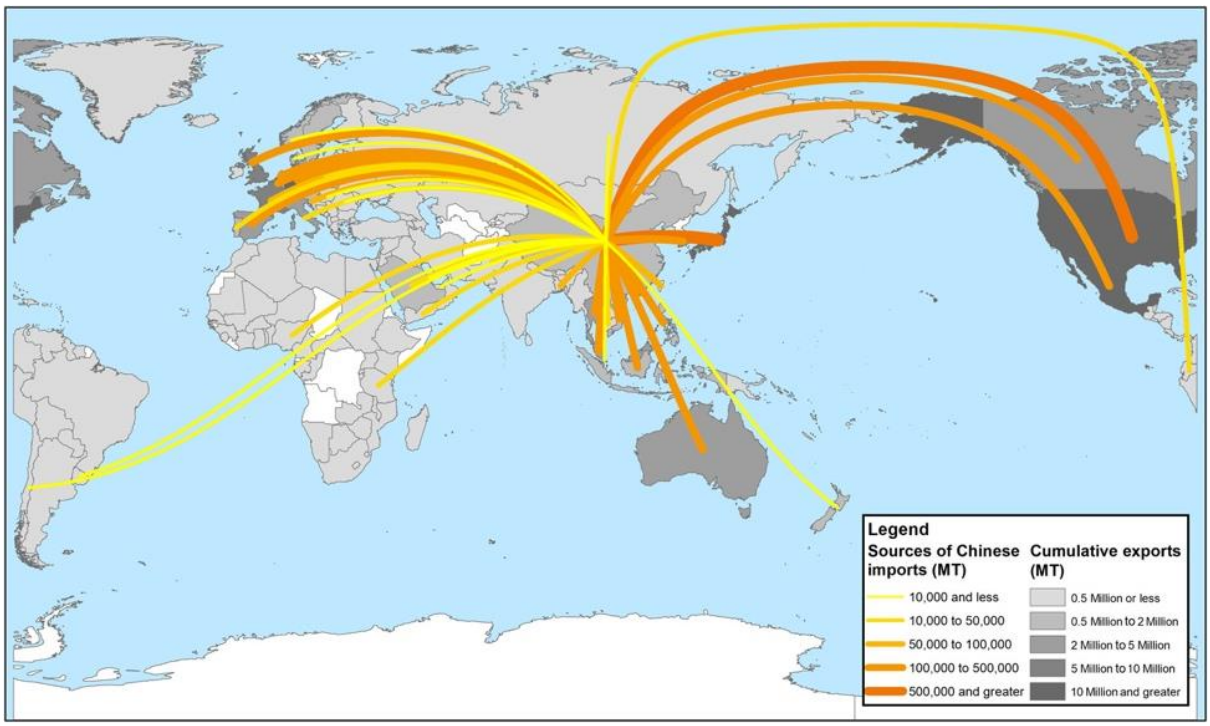


Figure 2 Sources of plastic waste imports into China in 2016 and cumulative plastic waste export tonnage (in million MT) in 1988–2016. Source: Brooks et al. 2018.

In 2017, China stopped importing plastic waste, due to environmental concerns. China closing its doors to plastic waste could displace up to 111 million metric tons of plastic waste by 2030, according to a new study by Brooks et al. (2018). The study points out that this recent ban on plastic imports in China may increase the illegal flow of plastic waste, as well as export of plastic waste into Asian countries lacking sufficient waste management systems. Therefore, the suggestion made by Brooks et al. (2018) is for the exporting countries to take immediate action to avoid increased leakage of plastic waste to the oceans, by developing domestic markets for plastic recycling.

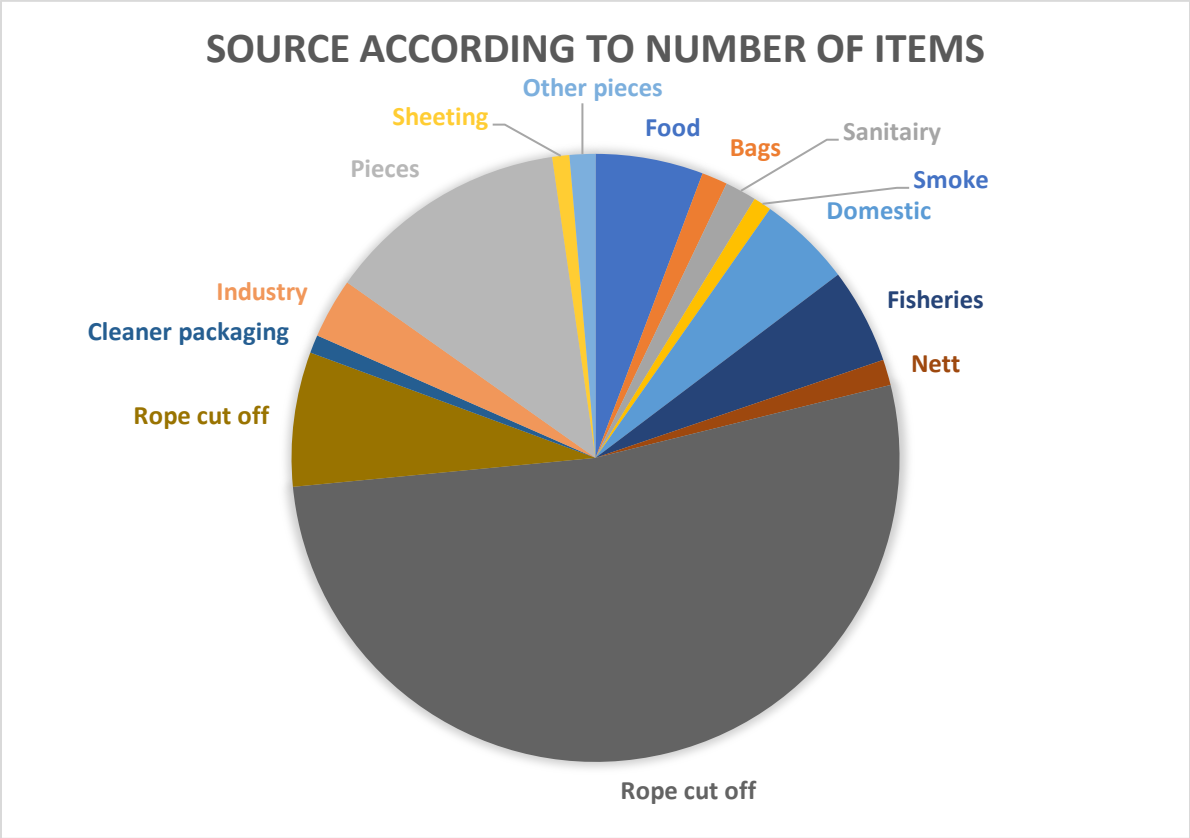
Localising plastic recycling systems has become a focus in the last few years. One of the driving forces in Europe is the ambitious plastic strategy put forward by the European Union. The main goals of the strategy are that by 2030 all plastic packaging placed on the EU market is either reusable or recyclable, that more than half of plastics waste generated in Europe is recycled and that sorting and recycling capacity should be fourfold, compared to the 2015 numbers (EC 2016). In order to be able to reach these goals, all European countries must start focusing on extending producer responsibility and developing local recycling systems.

The United Nations (UN) Sustainable Development Goals (SDGs) that target various environmental and societal issues also includes goals of relevance to the plastics economy. The SDGs, '*Responsible consumption and production*' and '*Life below water'*, emphasise the importance of implementing a circular economy and reducing of marine plastic pollution. In order to combat the growing issue of marine pollution, a paradigm shift in the whole plastic economy is required. The whole life cycle of plastics has to be reconsidered in order to avoid plastic leakage into the oceans and inefficient use of resources. According to the waste hierarchy, reduction of waste is the most efficient alternative, i.e. the best way to avoid environmental costs related to waste treatment. However, due to the increase in fishing and fish farming activity, the amount of gear is also increasing (Brodbeck 2016). Therefore, it is important to focus on creating sustainable end-of-life solutions for both the marine litter related

to fisheries and fish farming that has ended up outside the waste stream, and for the used equipment that is within the waste stream.

Fisheries are a major source of marine litter globally. It is estimated that around 10% of marine litter globally is from ALDFG (UNEP 2016). The Norwegian Arctic has a relatively low population but there are large fisheries along the entire coast. Thus, the marine industry is believed to be the largest source of marine litter in the region (UNEP 2016). According to a report by Keep Norway Beautiful (KNB), up to 37% of the collected marine litter comes from fisheries, both in Norway and the Nordic countries (KNB 2018). The relative amount of marine litter coming from fisheries is somewhat similar, if not higher, in the Norwegian Arctic, as indicated by the data collected from OSPAR beaches and through beach clean-ups in the Lofoten islands (Falk-Andersson et al, submitted). The Lofoten waste-management company, Lofoten Avfallselskap (LAS), has been registering marine litter findings in the archipelago since 2011. According to their report from 2016 the percentage of marine litter related to fisheries collected in 2016 was 38,6 (LAS 2016).

Beach litter registration is the only marine plastics indicator that gives an indication of the sources of the litter. However, since these registrations normally only record the number of items, not the mass of these items, they are likely to underestimate large items. Fisheries-related litter are often large, making it likely that the relative contribution of marine litter from fisheries in terms of weight is higher than what is reflected by beach litter data recording the number of items. Figure 3 shows beach litter analysis conducted by SALT in Vardø, Finnmark. It illustrates the difference in dominating litter category if the registrations are done by counting the number of items from different sources, versus the weight of the items. Fisheries makes up a smaller part of the pie when looking at the number of items, compared to weight. It is also important to note that floats and other fisheries related items that can be re-used is often picked up by the local fishers, resulting in these items being underestimated in beach litter registrations. The “rope” categories are also interesting, as cut-offs from repairing fishing nets make up a large proportion of the litter both in terms of numbers and weight (Falk-Andersson, SALT, pers.com). To find out how much fisheries-related litter is available in the region, there is a need to conduct studies of representative beaches where the weight of these items is recorded.



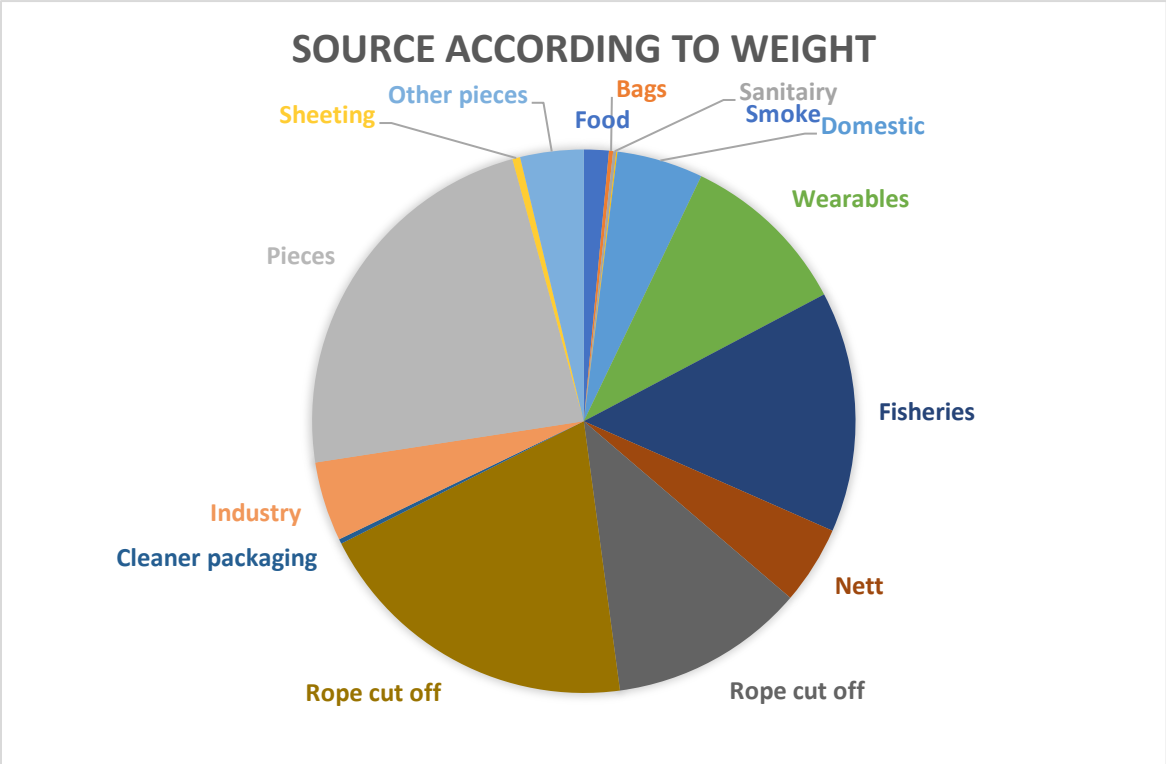


Figure 3 Sources of marine litter according to number of items and according to weight. Collected by SALT from Vardø.

The fact that high amounts of fisheries-related litter are found in Northern Norway, either from local or non-local sources, suggests that the potential for developing recycling systems for this type of litter is high in the region. However, there is a need for more knowledge on in particular the type of plastic that fisheries-related litter represents and how much could be collected annually.

2. RECYCLING OF ALDFG

The greatest challenge in relation to recycling of gear from fisheries is the need to separate unrecyclable materials, such as metals, prior to recycling. According to a study by Brodbeck (2016), approximately 10% of an average net's composition is made up of so called 'contaminants', i.e. metals, floats, etc. Removing such materials is very costly, as it has to be done manually - especially in Norway, where labour costs are relatively high (Brodbeck 2016). In addition to these issues, fishing gear that has been in the nature is most likely polluted and biofouled to some extent, increasing treatment costs.

In 2017, volunteers collected 1400 tons of marine beach litter in Norway. Of this, over 500 tons came from fisheries (KNB 2018). Estimation of the amount of fisheries-related litter collected only in the Norwegian Artic is beyond the scope of this study. This would require an in-depth analysis of beach litter data in the region, which would only yield the number of items, not the weight of the items, that are related to fisheries. Thus, new field data is needed to get weight estimates per plastic type. Furthermore, while the current stock of beach litter is high, as cleaning has just been going on for a couple of years, it is expected that the density of litter will decrease over time as historic litter is removed from the beaches.

As discussed in the previous section, fisheries-related litter is likely to be the dominating source of marine plastic litter in the Norwegian Arctic also in terms of weight, and is therefore believed to have high potential for recycling. Therefore, being able to (ideally locally) recycle and reuse ALDFG could support the local economies and reduce the impact of plastic pollution, both in regards to the added value of marine litter collection and the reduction in demand for petroleum[3].

In addition, most of the plastic marine litter found on the sea floor in the Norwegian Arctic[4] comes from fisheries (Bergmann et al. 2017; Buhl-Mortensen & Buhl-Mortensen 2017), increasing feasibility of creating local recycling systems. There are no clean-up actions that focus on the sea floor, but litter from the sea floor is continually delivered through the Fishing For Litter (FFL) project. FFL is established in three marinas in the Norwegian Arctic, Båtsfjord, Tromsø, and Stamsund. Tromsø is the collection point where most of the litter has been delivered throughout the project (2016-2017); 74,5 tons of marine litter were delivered though FFL in Tromsø during this period. As collection points in Båtsfjord and Stamsund are newly established, there is no data available from these marinas as of today.

Recycling of plastic marine litter is relatively costly and time consuming as most of the plastics retrieved from the ocean are fouled and weathered to some extent and may contain persistent organic pollutants and other toxins. Most of the marine plastics must therefore be sorted and cleaned thoroughly before recycling. Experience from Fishing for Litter shows that there is a great variation in regards to cleanliness of the collected litter. Some of the litter has been in the ocean for a short period of time, and is therefore very little fouled. In addition, the litter can be rinsed to some extent when it is dragged through the water column and onto the vessels. However, if different types of materials and equipment are mixed under transport and if the equipment has been in the ocean for long enough time to become fouled and weathered, entanglement, contamination, and fouling

[3] 90% of plastic polymers' feedstock is oil and gas (WEF 2016).
[4] Both on the coast and offshore.

are issues. Results from the Fishing For Litter project also show that sorting and rinsing marine litter on board on fishing vessels can be extremely demanding.

There are currently nine active collection points in the project, and the two most active ones are in Ålesund and Tromsø. In Tromsø, the local waste management company does not sort the litter, but receives the litter sorted into two categories by the fishers, "recyclable fishing gear" and "regular waste". In Ålesund, the waste management company sorts the litter, even after it has been sorted on board the vessels. Due to the waste management company's willingness to sort the litter, the proportion of recycled waste is much higher in Ålesund than in Tromsø (NEA 2018). This emphasises the need for professional sorting, if the goal is to recycle as much of the ALDFG[5] as possible.

The identification of type of plastic can also be demanding, as the composition and quantity of additives may differ among plastic manufacturers. Due to the variation in quality of the materials, it is challenging to maintain a constant supply of marine plastics that can be recycled to new products. However, there are several companies currently using plastic marine litter, especially marine litter from fisheries, in production[6]. This may be a result of increased concern over marine litter amongst consumers[7]. Currently there is little or no information available about the end-of-life solutions for collected marine litter, which is why a holistic assessment of the impact of marine litter cleaning on the environment, including an analysis of the downstream waste treatment solutions is needed (Schneider et al. 2018).

Professional beach cleaning is being tested through the Proof Clean project, led by SALT. The goal of this project is to streamline beach cleaning operations, through the use of knowledge of marine litter density along the coast, as well as use of professionals and technology in the implementation of the clean-ups. In addition, the project focuses on finding sustainable end-of-life solutions for the collected litter (SALT 2017). As the clean-ups are implemented by professional litter collectors, who are familiar with the recycling categories, sorting litter on-site is relatively easy. Sorting the marine litter under 'regular' beach clean-ups implemented by volunteers is more demanding, as it cannot be expected that the partakers have enough knowledge about materials to be able to identify plastic materials, nor cleanse 'contaminated' materials[8]. Therefore, the litter has to be sorted by, for example, a waste management or a recycling company after the clean-up action. An economic analysis in regards to which collection method is most feasible is thus needed in order to reduce the recycling costs and to be able to recycle as much of the collected litter as possible.

Another economic consideration to be taken, is the cost of transportation. Arctic Norway is scarcely populated and somewhat isolated, indicating that complicity of logistics will become a hinder. However, the region has a relatively high density of fisheries and fish farms, increasing the potential for creating local systems for recycling fisheries-related litter and waste. The criteria for choosing the locations for recycling infrastructure needs therefore to be developed in cooperation with fisheries, fish farms, plastic recyclers, waste management companies, beach litter collectors and marine litter experts, such as researchers. Detailed knowledge about the current recycling systems that the local fisheries use, as well as knowledge about marine litter collected in the region is vital to be able to develop a maintainable system for fisheries' waste and litter.

As there are, per today, no large-scale recycling systems within the Norwegian Arctic, this study will mainly focus on the companies that are currently transporting marine litter for recycling from the region. In addition, companies operating globally will be included in order to give an overview over the current global marine litter recycling infrastructure.

[5] Applies to all ALDFG, not only that delivered through FFL.
[6] As an example, a list of companies using Econyl; nylon produced from discarded fishing and fish farming equipment: http://www.econyl.com/brands/
[7] https://www.unilever.com/news/Press-releases/2017/report-shows-a-third-of-consumers-prefer-sustainable-brands.html
[8] For example, cut off metal parts off of fishing nets.

2.1 Recycling companies operating in Norway

Currently there are a limited number of marine litter recycling initiatives that operate within the Norwegian Arctic. Several recycling companies operate globally, which means that the recyclable plastics may in some cases be transported around the world before being recycled into new products.

The Norwegian company **Nofir**, for example, recycles used gear from fishing and fish farming on a global scale. Nofir accepts gill nets, purse seine nets, trawls and ropes that are under 20 percent contaminated. The equipment collected by Nofir is further shipped to Lithuania and Turkey where the materials are dismantled and prepared for recycling. The materials are then sent either to Slovenia or Asia[9] for recycling, depending on the type of plastic (Sherrington et al. 2016). Nofir processes mainly litter directly from fisheries, but is also involved in some marine litter recycling projects, such as FFL (NEA 2018). The litter collected thorough FFL is picked up by trucks returning from Northern Norway to Southern Norway, which would otherwise drive with an empty load.

Image 3 Recyclable litter collected through Fishing For Litter. Photo: SALT

There are two companies, to our knowledge, currently developing domestic recycling systems for plastic marine litter. A Norwegian waste management company, **Plastic Recycling Norway** (PRN), located in Trøndelag, has recently started producing plastic pellets from marine plastics, which can be used as raw material in plastic production. PRN can process all types of plastics except for PVC and PEX, and has previously cooperated in plastic recycling with operators within aquaculture and fisheries. They are also able to pick up marine litter from anywhere in Norway. **Agres** in Finnmark reuses feeding pipes from aquaculture, and its subsidiary, **Brontes**, is currently developing technology which can be used to recycle plastic materials. Brontes has previously made recycled raw materials from used gear from fisheries and aquaculture, such as fishing nets and plastic pipes. Brontes is able to process any types of plastic materials.

2.2 Recycling companies operating globally

Manufacturers of clothes, hygiene products and home-ware have started to increasingly use marine plastics in their products, creating global recycling channels. Adidas is for example making running shoes and football jerseys from recycled PET bottles, and Proctor & Gamble are producing shampoo bottles made from up to 25% recycled marine plastic. These companies are cooperating with recycling companies and marine litter 'brokers', such as TerraCycle and Parley for the Oceans.

TerraCycle is an intermediary between marine litter collectors and recyclers that works with marine litter collectors globally. TerraCycle accepts rigid plastics and prefers HDPE and PET, and everything between 5 cm to items as large as big barrels, containers and fishing crates when it comes to the size of the plastic items. TerraCycle is able to rinse the plastics but cannot recycle very contaminated materials. Another recycling company working with rigid plastics is Envision Plastics, through a project called OceanBound Plastic. **Envision Plastics** operates in the U.S. and is the only plastic

[9] At least prior to the import stop in China. Whether Nofir currently sends the plastics to other Asian countries is unknown.

producer that has managed to produce food-grade post-consumer HDPE plastics. OceanBound focuses, however, on HDPE plastic at-risk of entering the oceans, i.e. plastic collected from areas that lack formal community-based waste collection, which are located within 50 km of a coast line. It is uncertain as to what degree OceanBound cooperates with marine litter collectors.

Parley for the Oceans (Parley) is an organisation that collects marine plastics from various areas, such as Hawaii, UK, Jamaica, Maldives, Australia, and Alaska. Parley works together with clean-up organisations such as Sustainable Coastlines Hawaii, Surfers Against Sewage and Gulf of Alaska Keeper. Envision recycles some of the marine plastics collected by Parley from these organisations. Parley accepts the following materials: HDPE nets, nylon 6 (PA6) nets, PP nets, fish boxes, monofilament nets, and ropes only if they are a part of nets/trawls. There is no size limit, nor specific degree of biofouling that is unacceptable. Parley is able to do light sorting and cleaning prior to processing, but the thumb rule is "the cleaner, the better"[10].

Image 4 Parley for the Oceans X Adidas shoe, made of Econyl thread. Photo: https://www.adidas.com/us/parley

The Danish company **Plastix Global** recycles discarded fishing nets and trawls. They accept HDPE nets, Nylon 6 nets, PP nets, fish boxes, monofilament and ropes only if they are a part of nets or trawls. Since the transport from Norway to Denmark is costly, it is important that there is minimal contamination in the plastic mix. Plastix Global emphasises[11] also that the costs related to cleansing so called "ghost nets", i.e. ALDFG, can be high as these fragments are often sandy and biofouled. Therefore, the marine litter collectors have to sort and cleanse the materials prior to sending them to recycling. To our knowledge, Plastix recycles the materials at their facility in Lemvig, Denmark. Whether Plastix sends some of the materials further to other countries, is unknown.

2.3 Plastic-to-fuel recycling

Some companies have also begun converting plastics into fuels, such as the Norwegian company, **Quantafuel**. Quantafuel converts waste plastics into low-carbon, synthetic diesel, and has currently one plant in Skive, Denmark, and one under development in Oslo, Norway. Plastic based on HDPE, LDPE and PP is the desired feedstock to Quantafuel's production[12]. An UK-based company, **Plastic Energy** also uses thermal anaerobic conversion to transform plastics into fuel that can even be used to fuel planes. Plastic Energy specifically uses end-of-life plastics as feedstock and accepts all plastic materials. They have two plants in Spain, and are expanding their business to the U.S., Caribbean, Central and Latin America. Plastic-to-fuel recycling is especially interesting when it comes to marine plastics that cannot be recycled into new plastic products due to biofouling, poor or uncertain plastic quality, contamination and/or size.

There are various other smaller-scale recycling channels available globally and the number of companies working with marine plastic recycling is increasing. However, as recycling marine plastics

[10] Source: email exchange with Kahi Pacarro, leader of Sustainable Coastlines Hawai'i.
[11] Source: email exchange with Peter Buhl, Input & Logistics Manager at Plastix Global
[12] Source: email exchange with Svein E. Fjellstad, VP Sales at Quantafuel AS

is relatively costly and time consuming, the alternatives for especially long-term partnerships can be limited. In order to create robust recycling systems for marine plastics from fisheries, it is important to contact the individual recycling companies to check whether they operate in the area of interest and accept the type of plastics expected to be collected. Another consideration to take is whether it is possible to establish a network of marine litter collectors and fisheries and fish farmers locally, to secure a constant flow of materials to the recycling company, and to reduce the transportation costs.

CONCLUSION

The interest in finding local end-of-life solutions for plastic waste is increasing due to the recent publication of the European Strategy for Plastics in a Circular Economy (EC 2016) and China closing its doors for plastic waste. As marine litter from fisheries accounts for at least 10% of the marine litter globally, and 37% nationally, finding sustainable end-of-life solutions for this waste category is an important step towards a global circular plastic economy. However, recycling fishing equipment, let alone fishing equipment that has been in the ocean, is far from straight forward. The costs of recycling often outweigh the costs of using virgin materials in production, due to the biofouling, weathering and contamination of plastic collected from nature. Also, the alternatives for especially long-term partnerships within marine plastics recycling can be limited. Nevertheless, due to consumers' preference of sustainably produced goods, the use of recycled plastic in production seems to be increasing.

There are currently several global and some national incentives that work with marine litter recycling. The Norwegian companies Plastic Recycling Norway and Brontes recycle plastic materials, and have experience with recycling plastics from fisheries and fish farming. Both of the companies process the plastics domestically. Another Norwegian company, Nofir, recycles discarded fishing and fish farming gear, but sends the materials to for example Slovenia for processing. The Norwegian company Quantafuel downcycles plastics into fuel, at their plant in Denmark.

In addition to the Norwegian companies that work with plastic recycling, there are several international plastic brokers, recycling companies and goods' producers who are working with marine plastic litter, and especially marine litter from fisheries.

Even though the alternatives for recycling of ALDFG are few in the Norwegian Arctic at the moment, the region has potential for developing robust recycling channels for this waste category in the future. This is due to the region being known for its high fishing activity, which increases the likelihood of being able to create local recycling systems that can process both ALDFG and waste directly from fisheries. In order to evaluate the potential for local recycling of marine plastic waste and litter from the fishing industry, however, there is a need for new knowledge on the quantity of items of the different types of plastics that will be produced in the short- and long-term. A better understanding of the logistics of collection, transport and sorting of such waste is also needed.

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