

CLIMATE IMPACT REPORT

Stena Recycling Group 2023





STENA NORDIC RECYCLING CENTER / SWEDEN 2022

About Stena Recycling

Stena Recycling is one of Europe's leading recycling companies, offering comprehensive solutions in recycling and circular services. Every year, around six million tonnes of waste and end-of-life products are recycled from more than 100,000 customers across a range of industries. Operations are conducted in Sweden, Norway, Denmark, Finland, Germany, Poland, Italy and sales operations in the US. By keeping resources in the loop, Stena Recycling plays an important and central role in the transition to a circular economy.

Stena Recycling provide reliable waste collection, innovative reuse services and advanced recycling on an industrial level. The offering includes recycling solutions and circular services, which play a key role in the transition to a circular economy.

With advanced recycling processes, Stena Recycling transform huge quantities of complex waste into high-quality recycled raw materials for use in production instead of virgin natural resources. These recycled raw materials include ferrous and non-ferrous metals, plastics and paper and are sold to the manufacturing industry for use in new products. The company work with customers in most sectors, including manufacturing, automotive, retail, energy, transport and logistics, and municipalities. The target for Stena Recycling is to create value that benefits customers, partners and the society.

3,800
EMPLOYEES

6,000,000
TONNES COLLECTED
AND RECYCLED

178
BRANCHES

This is circular economy

The circular economy is a model for production and consumption that aims to extend the lifecycle of products and materials as much as possible, as well reducing waste to a minimum.

This can be done through several different measures, including reducing unnecessary consumption and waste but also through refurbishing, reusing, and recycling existing products and materials.

By extending the lifetime of products and materials, their value is maintained for much longer, which has both economic and environmental benefits. Extracting and processing virgin raw materials has a significant impact on the environment as nearly half of global greenhouse gas emissions stem from

the way we make and use products, materials and food.

To address the emissions, we need to move away from the current linear economy that dominates global consumption patterns, which is based on a take-make-waste approach towards material resources. In addition to causing high levels of greenhouse gas emissions, the linear economy also leads to risk of resources scarcity and increasing waste levels.

By transitioning towards a circular economy, we can make much better use of our existing resources, derive more value, and at the same time create more sustainable systems for production and consumption – benefiting both people and the planet¹.

NEW PROCESS TO INCREASE PLASTIC RECYCLING

Every year 500,000 tons of plastic waste is generated in Sweden, but only 10% is recycled. To increase plastic recycling rates, Stena Recycling has inaugurated a new recycling process in Lanna, Sweden, enabling more plastic types to be recycled. The plant has the capacity to process 15,000 tons of hard plastic per year that can be recirculated into new products. The process consists in an initial separation of the plastic material from irons and metals, followed by a wet part to sort different types of plastic based on float or sink technologies, drying steps, flakes granulation and flake sorting. With this new facility Stena Recycling takes steps towards circularity and offering new recycling solutions.

BATTERY RECYCLING KEY FOR DECREASING CLIMATE IMPACT

As the world shifts away from fossil fuels toward cleaner energy sources to decrease the climate impact, batteries are becoming an essential part of the puzzle. Electrification of industry, transport and the automotive sectors will increase the demand for batteries, but also the need of reuse and recycling of materials.

In March 2023, Stena Recycling inaugurated a new battery recycling centre, in Halmstad, Sweden, which is one of the first industry scale facilities in Europe enabling the recycling of 95 % of a vehicle lithium battery. The facility, co-founded by the Swedish Energy Agency, has an initial yearly recycling capacity of 10,000 tons and will be able to separate and produce recycled plastic, copper, aluminium and the highly valuable black mass containing metals like lithium, cobalt and nickel.

1

Ellen MacArthur foundation: Completing the picture – How the circular economy tackles climate change, 2021

Stena Recycling's climate impact and science based targets

STENA RECYCLING AND CLIMATE IMPACT

Stena Recycling's operations serve as an important function by ensuring that customers' waste is handled safely and in an environmentally responsible manner and turning it into valuable resources that can be useful in society again. About half of global emissions come from extraction and production of materials, products and food². Adapting a more circular approach can therefore be a significant part of the fight against climate change. Recycling is an effective and well-established approach to circular use of resources and helps reduce CO2 emissions and decrease the need for

extraction of virgin resources. However, even though there is a positive climate aspect of recycling to consider, the collection, processing and logistics of waste for recycling also generates CO2 emissions. It is therefore important for Stena Recycling to not only strive to continuously develop recycling efficiency and circular solutions, but also to take a systematic approach to measuring and reducing the climate impact.

Stena Recycling's impact

Transport, handling and processing of the waste generates CO2 emissions in scopes 1,2 and 3.



2 Ellen MacArthur foundation: Climate and a circular economy

STENA RECYCLING'S SCIENCE-BASED TARGETS

To make a clear commitment to setting ambitious and relevant climate targets, the Stena Recycling companies on all markets sent in a joint commitment to the Science Based Targets initiative in April 2022, that were validated and approved in August 2023. This is the second Climate Impact Report Stena Recycling are publishing.

The science-based targets set by Stena Recycling are to reduce greenhouse gas emissions (GHG) from own operations

(Scope 1 & 2) with 50% by 2030 from a 2021 base year, and to reduce absolute scope 3 GHG emissions from purchased goods and services, upstream transportation, and downstream transportation by 25% within the same timeframe.

In addition to the 2030 target, Stena Recycling has submitted a commitment to set net-zero targets for 2050, which yet remains to be validated.

ABOUT THE SCIENCE BASED TARGETS INITIATIVE

The Science Based Targets initiative (SBTi) drives ambitious climate action in the private sector by enabling organizations to set science-based emissions reduction targets. The SBTi is a partnership between CDP, the United Nations Global Compact, World Resources Institute (WRI) and the World Wide Fund for Nature (WWF). The SBTi call to action is one of the We Mean Business Coalition commitments.

Learn more on www.sciencebasedtargets.org

“

Together with our customers we are already contributing to reducing climate impact, by turning their waste into new resources through our advanced recycling technologies. But we are also determined to reduce our own climate impact in Stena Recycling.

The science-based target commitment supports us in continuously developing the best services within recycling and circular solutions, while also ensuring that we will do so with a low climate impact throughout our operations and values chain.



KRISTOFER SUNDSGÅRD

CEO of Stena Recycling Group



DRIVERS’ BEHAVIORAL CHANGES AS A SHORTCUT TO CO2 REDUCTIONS

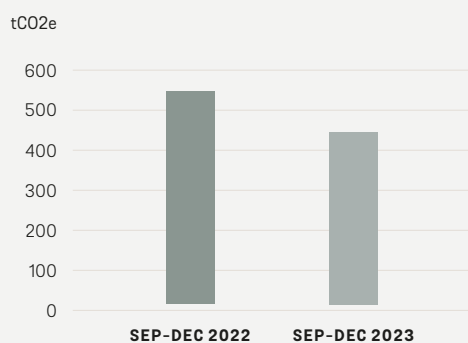
The drivers’ driving patterns and route optimizations. This is the reason behind a CO2 emissions reduction of 18% in Stena Recycling Denmark during the last four months of 2023, compared to the same period the previous year.

Stena Recycling Denmark initiated a pilot project in the spring of 2023 focused on changes in driving behavior among Stena’s drivers associated with the Vissenbjerg branch. The purpose of the pilot project was to test which behavioral changes approach is most effective measured in driving performance, employees’ experiences with the changes,

and working environment. Also, the company wanted to collect data on the savings potential associated with changing behavior. Drivers of hazardous waste, where the majority of Stena Recycling’s own trucks are located, were also included in the project. During 2024, additional drivers will be involved. The changes have been implemented with employee involvement and ongoing follow-ups. An application is used as a tool for measurement and follow-up, which drivers can also download as an app on their phones and track their own data in real-time.

Additionally, logistics for hazardous waste has systematically worked on logistics optimizations to cover the fewest possible kilometres with the highest possible load capacity.

CO2 reductions



Emissions by scope and country

In scope 1 Stena Recycling's most significant CO2 emissions are generated from fuel consumption in working machines and own trucks. There are also some emissions from composting, biological processes, gas leakages and landfills.

Stena Recycling controls two landfill sites in Sweden and one in Finland. There is a continuous ongoing work to reduce the amount of material deposited in landfill and to increase the sorting of easily biodegradable material before deposit.

In total, the CO2 emissions in scope 1 constituted 7% of total emissions in 2023. Scope 2 refers to emissions from purchased electricity and district heating and constituted 4% of total emissions.

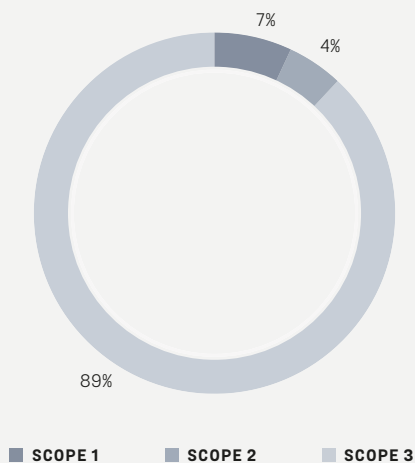
The majority of Stena Recycling's CO2 emissions for 2023, 89%, occurred in scope 3. The main source of emissions come from externally purchased transportation, by road, sea freight and rail (category 4 and 9). A significant share can also be derived from purchased goods and services and capital goods (category 1 and 2). For the baseline year 2021, CO2 emissions from those four categories amounted to over 75% of Scope 3 targets. Since those categories were identified as the most significant sources of emissions in the value chain, the Scope 3 target was set to cover those particular categories*.

Use of sold products (category 11) is also a category with some notable CO2 emissions in Stena Recycling's Scope 3.

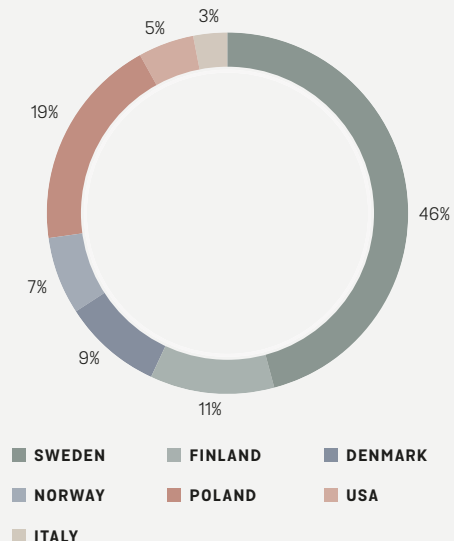
Stena Recycling recycles some fractions (wood and oils) that can be used as fuels, and for Stena Recycling, category 11 refers to emissions from when these fuels are combusted. However, since it can be argued that such recycled fuels are a more sustainable alternative than fuels produced from virgin resources, the target for reducing Scope 3 emissions does not include category 11.

The main part of CO2 emissions stem from operations related to Stena Recycling Sweden and where about half of the 178 sites are located. Most of the externally purchased transportation is also coordinated from Sweden. Stena Recycling Poland stands for a relatively large part of the emissions, especially in Scope 2, which is due to the largely fossil-based electricity mix that is prevalent in Poland. Emissions from the other markets are quite evenly distributed in relation to the size of the operations. Stena Recycling Germany is not visible in the chart, as operations in Germany currently only consist of a small staff of office workers, and emissions are negligible.

Stena Recycling emissions by scope 2023



Stena Recycling emissions by country 2023



* In accordance with the science-based targets framework, Scope 3 targets need to cover at least 67% of total Scope 3 emissions.

Climate impact 2023

In total, Stena Recycling’s Group CO2 emissions for the science based target scope increased with 9% between 2021 and 2023 (for total emissions, including categories outside of the target scope, the increase was 6%). This development is caused by an increase in emissions for Scope 3, which went up with 13% during the year in the categories covered by the target. One of the reasons for this is due to an increased spend for capital goods with investments being done in Sweden, Finland, Italy and Norway. The method for establishing CO2 emissions from purchased goods and services and capital goods is based on spend. Inflation was high during 2022 and 2023, but adjustments have been made to somewhat mitigate its impact. Purchased goods and services category increased with 15% during the year.

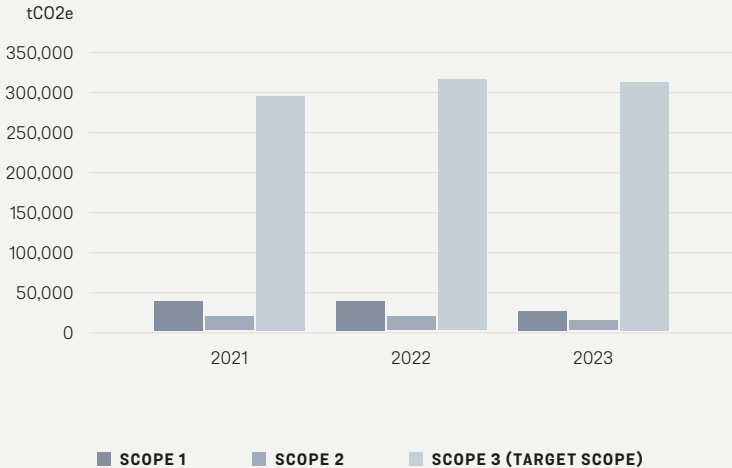
CO2 emissions from purchased transports also increased during the year, where the categories upstream and downstream transports together saw an increase of 12% compared to the base year 2021. One part of the reason for this increase

in emissions from transportation is a normalization of business volumes following the slow-down during the Covid year 2021.

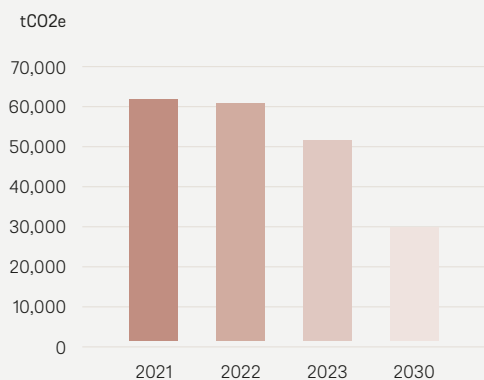
Scope 1 emissions have shown a notable reduction of 13%. This decrease can partly be explained by a reduction in the utilization of fossil fuels for own trucks and working machines, resulting in reductions of 17% and 10% respectively. The reduction in emissions for own trucks and working machines aligns with the strategy of transitioning away from fossil fuels towards the adoption of biofuels and electrification of vehicles and machinery.

Scope 2 CO2 emissions have also shown a decrease of 7% compared to 2021. This can be explained by the fact that from 2023, Italy is buying renewable energy to cover its entire energy needs.

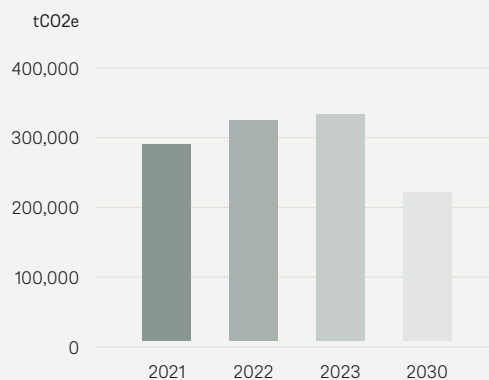
Total emissions 2021, 2022 and 2023



**Total emissions
scope 1 & 2**



**Emissions scope 3
(target scope)**



ACTIVITIES AHEAD

Stena Recycling has initiated several activities and actions to take a systematic approach towards reducing CO2 emissions and reaching the targets. Project groups have been established for the major emission categories to coordinate and align best practices across all countries.

The targets have also been broken down on country level, where local plans are established so that each country can focus on reductions for their most significant CO2 emissions categories locally. Some of the prioritized activities for the upcoming year are to investigate opportunities to electrify a larger portion of the vehicle fleet, increase the amount of sustainable sourced biofuel and to increase the use of renewable energy. There will also be a focus on purchased transport

and logistics to investigate how to achieve efficient reductions in this significant emissions category, in collaboration with logistics partners.

For the purchasing-related CO2 emissions, a more detailed emissions mapping will be conducted to identify which suppliers, goods and services categories that generate the most emissions, followed by an investigation of how these emissions can be addressed. To ensure continuous monitoring and follow-up of the progress towards the targets, reporting is made on tertial basis, providing an update of performance against the targets three times per year. The reporting frequency facilitate continuous analysis and management of the Group’s climate impact.

Emissions by category

According to the GHG Protocol guidelines, emissions are categorized into different scopes. Scope 1 includes direct emissions from sources that are controlled by the business. Examples include emissions from company-owned work machines and trucks. Scope 2 includes indirect emissions

from purchased energy, where the emissions occur during the production of the energy. Scope 3 includes other indirect emissions that result from the business's operations which are not included in Scope 1 or Scope 2. These emissions can be both upstream and downstream in the business's value chain.

SCOPE 1

	2021	2022	2023
1.1. Company cars	1,534	1,575	1,507
1.2. Own trucks	9,773	8,922	8,091
1.3. Working machines	21,264	20,668	19,038
1.4. Process energy	1,880	1,949	2,396
1.5. Heating	1,519	2,263	954
1.6. Emission landfill	1,143	988	845
1.7. Composting	314	290	288
1.8. Gas leakage	2,785	2,322	1,843
1.9. Biological processes	1,380	1,380	1,296
TOTAL SCOPE 1 tCO2e	41,590	40,432	36,257

SCOPE 2

	2021	2022	2023
2.1 Electricity	16,654	13,787	15,162
2.2. District heating	1,169	1,071	1,472
TOTAL SCOPE 2 tCO2e	20,016	20,009	16,634

SCOPE 3

	2021	2022	2023
1. Purchased goods and services*	57,453	78,708	62,260
2. Purchased capital goods*	17,860	18,383	24,278
3. Fuel- and energy-related activities	12,709	12,933	11,931
4. Purchased transports (paid by Stena)*	186,427	218,083	207,607
5. Emissions from waste treatment	12,769	13,976	14,955
6. Business travel	557	1,124	1,062
7. Employee commuting	3,809	4,132	4,258
9. Purchased transports (paid by customer)*	34,356	33,127	38,990
11. Use of sold products	66,924	58,008	63,796
13. Downstream leased assets	508	128	110
TOTAL SCOPE 3 tCO2e	394,733	430,272	429,248

Total emissions target scope tCO2e (1, 2, *3.1, 3.2 3.4 & 3.9)	357,701	400,411	385,745
Total all scopes 1, 2 & 3 tCO2e	456,339	490,712	481,858

EMISSIONS OUTSIDE OF SCOPE

For transparency, emissions that according to the GHG protocol end up outside the scopes are also reported. These are emissions generated from the incineration of waste that goes to energy recovery.

EMISSIONS OUTSIDE OF SCOPE

	2021	2022	2023
Energy recovery tCO ₂ e	778,414	550,212	338,816

SCOPE 2 CALCULATION METHOD

According to the GHG protocol, the Scope 2 emissions for purchased electricity and heat can be calculated using two different methods. The location-based method is based on the emissions from the actual local use and the market-based method is based on the source of the electricity you

buy through an agreement, for example guarantee of origin. Stena Recycling Group has chosen to use the market-based method in the Climate Impact Report. In accordance with the GHG protocol, the emissions of both methods are reported below:

LOCATION BASED/MARKET BASED

	2021	2022	2023
Electricity use - guarantees of origin (kWh)	79,428,913	81,601,853	107,050,594
Location based (tCO ₂ e)	15,861	16,999	20,635
Market based (tCO ₂ e)	17,823	14,859	15,162

EMISSION FROM BIOGENIC CONTENT

Emissions of carbon dioxide from biofuels which are produced sustainably, can be regarded as carbon dioxide neutral, as the carbon dioxide released during combustion is offset by the carbon dioxide sequestered during the growth phase.

According to the GHG protocol, biogenic carbon dioxide emissions are not included in the scope but must be separately reported for transparency purposes.

BIOGENIC EMISSIONS

	2021	2022	2023
Scope 1 (tCO ₂ e)	7,049	9,303	9,361
Scope 2 (tCO ₂ e)	743	640	709
TOTAL BIOGENIC EMISSION (tCO₂e)	7,792	9,943	10,070

Methodology

THE GREEN HOUSE GAS PROTOCOL

Stena Recycling Group's Climate Impact Report is prepared based on the guidelines of the Greenhouse Gas protocol (GHG protocol). The GHG protocol is the most widely used international accounting standard for understanding, quantifying, and managing emissions of greenhouse gases, both in one's own operations and in the rest of the value chain. Adhering to the standard is a requirement within the Science Based Targets initiative.

The GHG protocol is structured around five main principles.

- **Relevance:** Ensure that the Climate Impact Report reflects the business.
- **Completeness:** All sources of emissions must be reported and all exceptions must be reported.
- **Comparability:** Consistent methods must be used so that the results can be compared over time. All changes must be documented.
- **Transparency:** Clear derivation to data. All relevant assumptions must be reported.
- **Accuracy:** Ensure systematic quantification to reflect real emissions. The data must be able to be used for decision-making.

SCOPE 1, 2 AND 3

Based on the GHG protocol guidelines, the emissions are distributed on different scopes. Scope 1 covers direct emissions from sources which are controlled by the business, for example emissions from own work machines and trucks.

Scope 2 covers indirect emissions from purchases energy, where emissions occur at the producer. Scope 3 includes other indirect emissions that the business gives rise to which is not included in scope 1 and scope 2. Emissions in scope 3 are divided into eight categories upstream and seven categories downstream. The upstream and downstream categories as reported in this Climate Impact report can be found in the table on page 10. In the Climate Impact Report, emissions are also reported which, according to the GHG protocol, fall outside the scope of the SBT. These emissions arise when recycled fuels are burned to generate utility in the shape of electricity or heat and substitute to fossil energy sources.

CONTROL APPROACH

Stena Recycling operates at 178 locations where facilities, equipment and vehicles may be both self-owned and leased. The Climate Impact Report is compiled based on the operational control approach since that method best describes the emissions which Stena Recycling's operations give rise to, regardless of ownership.

EMISSION FACTORS

To convert consumption and other activity data for emissions of greenhouse gases (measured in tCO₂ eq.), emission factors for each emission source have been used.

Emission factors for fuel used in the Swedish operations have been taken from The Swedish Energy Agency (which compiles the average greenhouse gas emissions for different fuels). For operations in the other countries, emission factors stem from reports from fuel suppliers and from the Department for Environment, Food and Rural Affairs in UK (DEFRA), that provides annually reviewed emission factors complying with the GHG protocol. Our ambition is to continue revise and review emission factors annually.

Emission factors for district heating reflect the emissions of the individual plants and are mainly taken from the organization Energiföretagen Sweden.

For the operations that do not purchase any specific type of electricity, the country-level residual emission factors from the Association of Issuing Bodies (AIB) have been used. For purchased goods, services, and capital goods, emissions have been calculated based on revenue. For transports, a distance-based method has been used to calculate emissions.

Sources of emission factors:

- The Swedish Energy Agency Greenhouse gas emissions for fuel
- Association of Issuing Bodies (AIB) European Residual Mix
- Department for Environment, Food and Rural Affairs in UK (DEFRA) Conversion factors

COLLECTION OF DATA

Data for scope 1 and 2 have been collected at site level through the Position Green tool. Data for scope 3 has been aggregated on country level and also reported through the Position Green tool. Purchased goods, services and capital goods are calculated using the spend-based method.

Transports (upstream and downstream) is calculated on distance-based method. The emissions for business travels are calculated based on actual travels with documentation from a travel agency and travel bills. The waste management reflects the actual waste flows from own waste and waste managed in the business that cannot be recycled for energy or materials. The emissions are calculated using generic emission factors, that is, not plant-specific factors.

BASE YEAR AND RECALCULATION POLICY

Stena Recycling Group has chosen 2021 as the base year for climate targets as it is the earliest year with complete data across all three scopes for all Stena Recycling entities.

In the event of major changes to the organization (more than 5% of the base year), through for instance acquisitions or divestments, or in the event of identified sources of error, the base year may be recalculated to better represent actual emissions.

EMISSION FROM LANDFILL


The annual emissions are determined based on the First Order Decay model, which calculates emissions arising from waste deposited at any time prior to the reporting year, using models to estimate when emissions arise because of the decay and decomposition of the waste. Using this calculation model, we can make measurements to improve the model and to evaluate methods of covering the landfill and other possible measures, while we continue our systematic work with reducing waste going to landfill.

CONTACTS FOR THE CLIMATE IMPACT REPORT

Gisela Lindstrand
Interim Head of Sustainability & Communications,
Stena Metall
+46 (0) 10-445 50 04

Linnéa Gustén
Sustainability Controller,
Stena Metall
+46 (0) 10 445 29 13

Leise Marud
Sustainability Specialist,
Stena Recycling A/S
+45 (0) 23 29 03 57



CIRCULAR ECONOMY IS NEEDED TO TACKLE CLIMATE CHANGE

Over fifty percent of global greenhouse gas emissions stem from energy and fuel production, while the remaining half comes from materials and food production.

Transitioning to renewable energy addresses only half of the dilemma.

Achieving a transition to a circular economy is also needed, where waste is minimized, pollution is avoided, products and materials circulate through reuse and recycling, and natural ecosystems are in balance¹.

1

Read more about how a circular economy can help climate change on <https://www.ellenmacarthurfoundation.org/>

PUBLISHED APRIL 2024

Find out more about our business and sustainability work at [stenarecycling.com](https://www.stenarecycling.com)

 **STENA**
RECYCLING