PUBLISHED MARCH 2025

CLIMATE IMPACT REPORT

Stena Recycling 2024

About Stena Recycling

Stena Recycling is one of Europe's leading recycling companies, offering comprehensive solutions in recycling and other circular services. Every year, around six million tonnes of waste and end-of-life products are collected from more than 100,000 customers across a range of industries. Operations are conducted in Sweden, Norway, Denmark, Finland, Germany, Poland, and Italy, with 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.

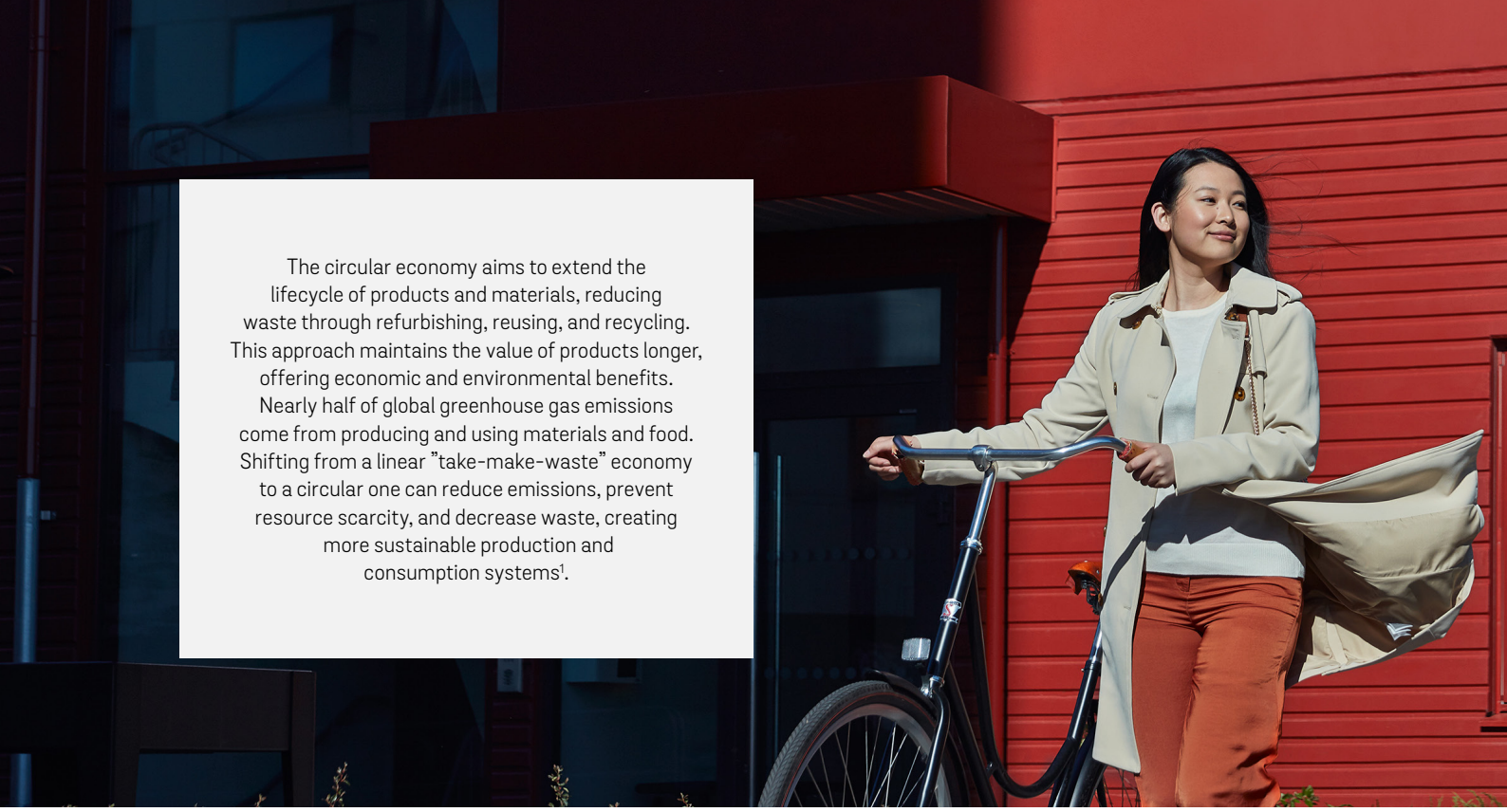
Stena Recycling provides reliable waste collection, innovative reuse services and advanced recycling on an industrial level. The offering includes recycling solutions and circular services, which play a key role in the transition to a circular economy.

With advanced recycling processes, Stena Recycling transforms 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 aim for Stena Recycling is to create value that benefits customers, partners and the society.

3,975
EMPLOYEES

6,000,000
TONNES COLLECTED FOR RECYCLING

178
SITES



The circular economy aims to extend the lifecycle of products and materials, reducing waste through refurbishing, reusing, and recycling. This approach maintains the value of products longer, offering economic and environmental benefits. Nearly half of global greenhouse gas emissions come from producing and using materials and food. Shifting from a linear "take-make-waste" economy to a circular one can reduce emissions, prevent resource scarcity, and decrease waste, creating more sustainable production and consumption systems[1].

Transitioning towards a more circular economy

Stena Recycling continuously invests in new technology and sites that contribute to developing the circular economy. Below are two examples of recent investments.

NORWAY LAUNCHED EUROPE'S FIRST COMPLETE VALUE CHAIN FOR THE REUSE OF ELECTRIC CAR BATTERIES

The growing electric car fleet in Europe, expected to reach at least 30 million by 2030, has increased the demand for lithium-ion batteries. In June 2024 Stena Recycling Norway announced the launch of Europe's first complete and scalable value chain for the reuse and recycling of electric car batteries. This innovative project is being established at Stena Recycling's new battery management facility in Ausenfjellet, Norway, in collaboration with the technology company EV HUB AS. The project aims to provide efficient solutions for reusing and recycling these batteries. Once fully operational, the facility will handle up to 3,000 tons of high-energy batteries annually, equivalent to 6,000 – 8,000 electric car batteries. The project includes developing advanced infrastructure, AI algorithms for assessing battery health, innovative disassembly and diagnostic methods, and a modular battery storage bank for second-life applications.

STENA RECYCLING BOOSTS AEROSOL RECYCLING CAPACITY WITH NEW DANISH FACILITY

Stena Recycling has inaugurated a new aerosol facility in Vissenbjerg, Denmark, to handle discarded spray cans. This facility, which is a significant investment, features an advanced technology including airtight collection systems to capture excess gas for energy production. The facility increases recycling capacity from 700 to 1700 tons annually and improves the recycling rates for materials like liquids, iron, metal, and plastic. Additionally, new robotic technology enhances working conditions for employees. This initiative aligns with Stena Recycling's strategic focus on hazardous waste management.

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 are important to ensure 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 food[2]. 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 CO_2 emissions and decrease the need for extraction of virgin resources.

However, even though there is a positive climate aspect of recycling, the collection, processing and logistics of waste for recycling also generates CO_2 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 CO_2 emissions in scopes 1,2 and 3.

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

STENA RECYCLING'S SCIENCE BASED TARGETS

The science based targets set by Stena Recycling aim 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 near-term target, Stena Recycling also has net-zero targets. The net-zero target commits Stena Recycling to reach net-zero greenhouse gas (GHG) emissions across the value chain by 2050. This means reducing absolute scope 1, 2, and 3 GHG emissions by 90% by 2050 from a 2021 base year.

This is Stena Recycling's third Climate Impact Report.

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 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 value chain.

KRISTOFER SUNDSGÅRD
CEO of Stena Recycling Group

Emissions by scope and country

In scope 1 Stena Recycling's most significant CO_2 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. Emissions from landfills decreased with 37% during 2024.

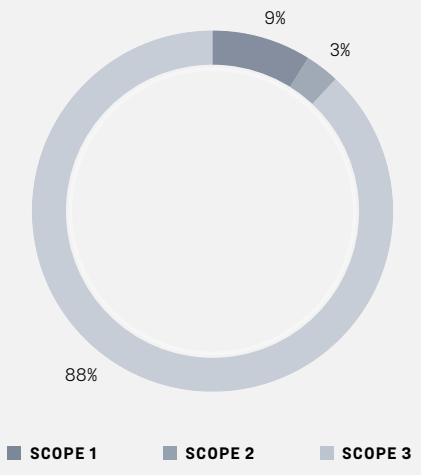
In total, the CO_2 emissions in scope 1 constituted 9 % of total emissions in 2024. Scope 2 refers to emissions from purchased electricity and district heating and constituted 3% of total emissions.

The majority of Stena Recycling's CO_2 emissions for 2024, 88 %, occurred in scope 3. The main source of emissions come from externally purchased transportation by road and sea freight (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, CO_2 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*.

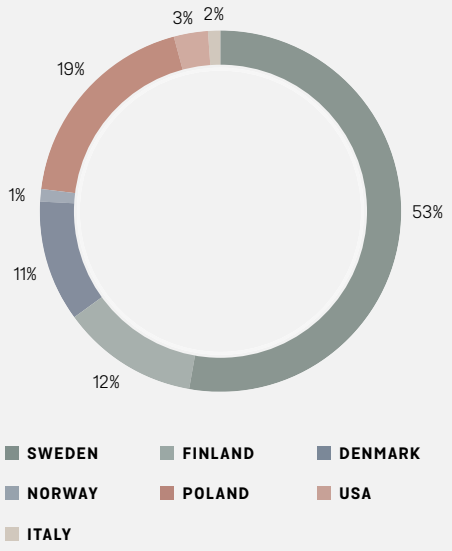
Use of sold products (category 11) is also a category with some notable CO_2 emissions in Stena Recycling's scope 3. Stena Recycling recycles some fractions (wood and oils) that can be used as fuels, and for Stena Recycling, category 11 refers to emissions from when these fuels are combusted. However, 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 CO_2 emissions stem from operations related to Stena Recycling Sweden, 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 2024



Stena Recycling emissions by country 2024



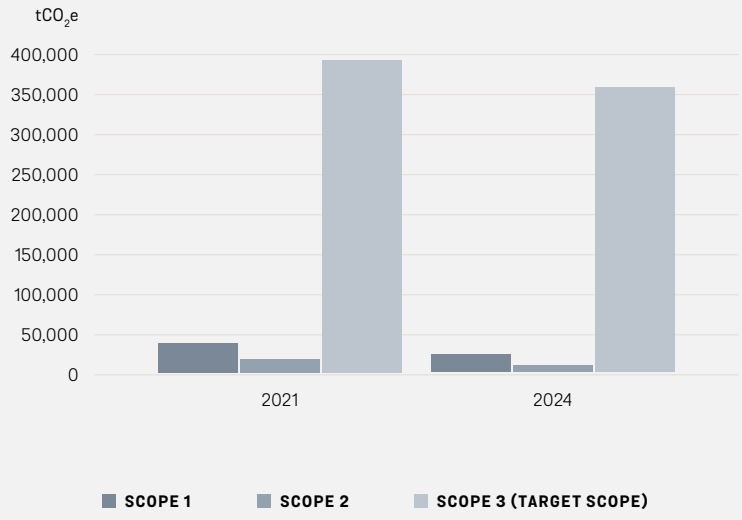
* In accordance with the science based targets framework, scope 3 targets need to cover at least 67% of total scope 3 emissions.

Climate impact 2024

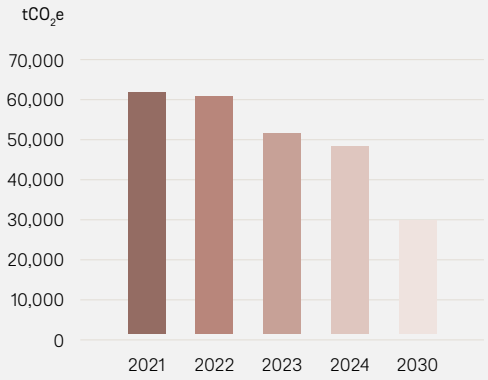
In total, Stena Recycling Group's CO_2 emissions for the science based target scope decreased with 11% between 2021 and 2024 (for total emissions, including categories outside of the target scope, the decrease was 11%). This development is caused by a decrease in emissions for all scopes. In scope 1, emission decreased with 16%. This can be explained by an increased use of fossil free fuel, electrification and reduced emissions from landfill and biological processes. 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. Emissions from scope 2 decreased with 26%. This is due to an increased purchase of certified renewable energy and installation of solar panels. During 2024, Sweden, Finland, Norway and Italy bought 100% renewable electricity. Poland bought 2 200 000 kWh renewable electricity during 2024.

In scope 3, emissions from capital goods increased with 9%, with investments being done in almost all countries. The method for establishing CO_2 emissions from purchased goods and services and capital goods is based on spend. The total target scope 3 emissions decreased with 9%. CO_2 emissions from purchased transports decreased during the year, where the categories upstream and downstream transports together saw a decrease of 13% compared to the base year 2021. One part of the reason for this decrease in emissions from transportation is a lower handled volumes.

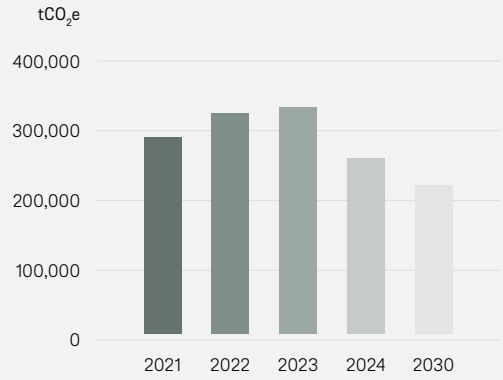
Total emissions 2021 and 2024



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 CO_2 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 CO_2 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 CO_2 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 businesses' operations which are not included in scope 1 or scope 2. These emissions can be both upstream and downstream in the businesses' value chain.

SCOPE 1

	2021	2024
1.1. Company cars	1,534	1,399
1.2. Own trucks	9,773	7,519
1.3. Working machines	21,264	19,332
1.4. Process energy	1,880	2,895
1.5. Heating	1,519	824
1.6. Emission landfill	1,143	723
1.7. Composting	314	313
1.8. Gas leakage	2,785	737
1.9. Biological processes	1,380	1,059
TOTAL SCOPE 1 tCO_2e	**41,590**	**34,800**

SCOPE 2

	2021	2024
2.1 Electricity	16,654	11,539
2.2. District heating	1,169	1,643
TOTAL SCOPE 2 tCO_2e	**17,823**	**13,182**

SCOPE 3

	2021	2024
1. Purchased goods and services*	57,453	57,322
2. Purchased capital goods*	17,860	19,551
3. Fuel- and energy-related activities	12,709	11,726
4. Purchased transports (paid by Stena)*	186,427	158,089
5. Emissions from waste treatment	12,769	13,390
6. Business travel	557	878
7. Employee commuting	3,809	4,514
9. Purchased transports (paid by customer)*	34,356	33,170
11. Use of sold products	66,924	57,460
13. Downstream leased assets	508	82
TOTAL SCOPE 3 tCO_2e	**394,733**	**356,722**

Total emissions target scope tCO_2e (1, 2, *3.1, 3.2 3.4 & 3.9)	**357,701**	**316,114**
Total all scopes 1, 2 & 3 tCO_2e	**456,339**	**404,704**

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	2024
Energy recovery tCO_2e	778,414	357,275

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	2024
Electricity use - garantees of origin (kWh)	79,428,913	116,921,916
Location based (tCO_2e)	15,861	16,742
Market based (tCO_2e)	17,823	11,539

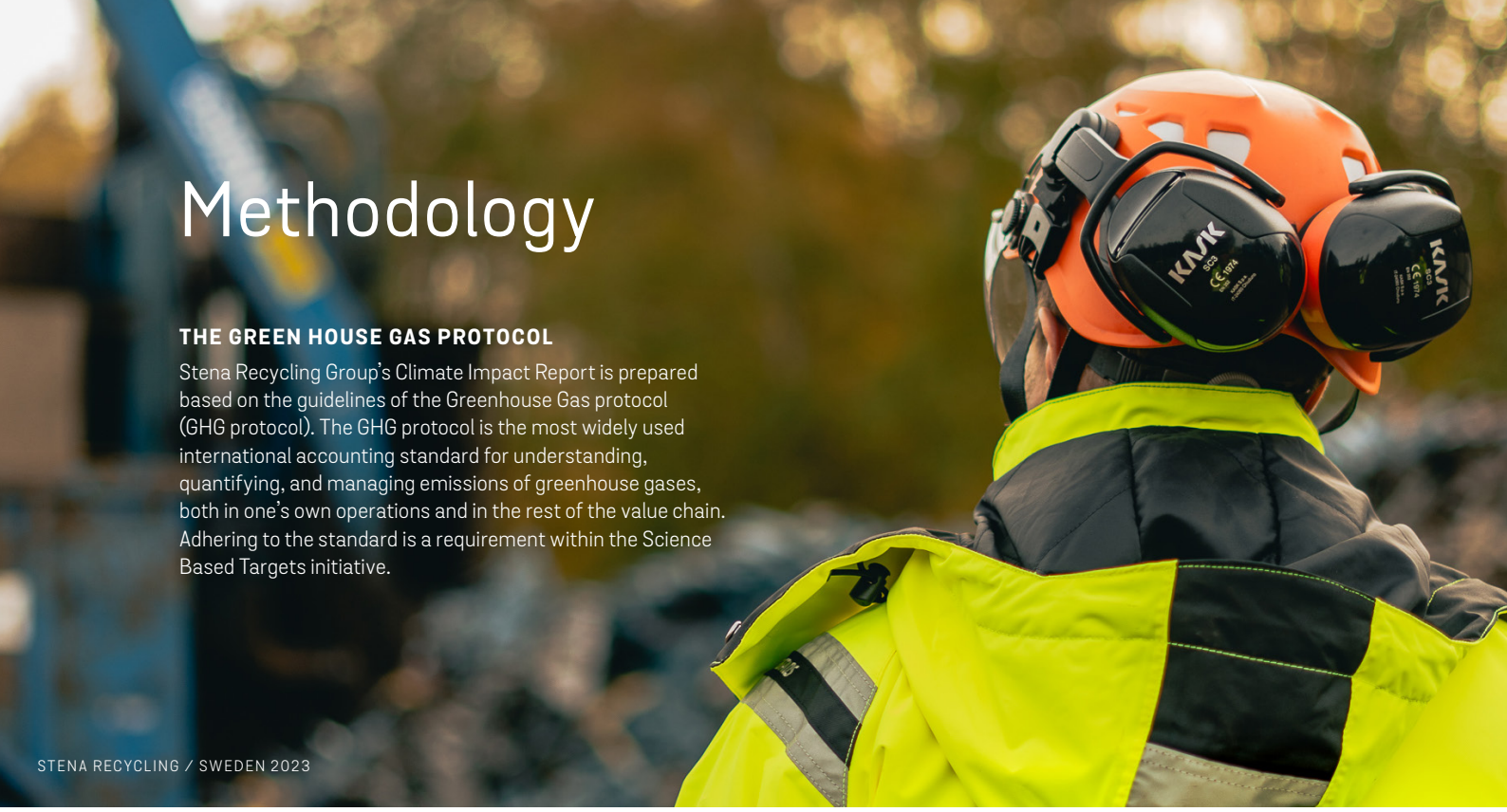
EMISSION FROM BIOGENIC CONTENT

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	2024
Scope 1 (tCO_2e)	7,049	7,977
Scope 2 (tCO_2e)	743	734
TOTAL BIOGENIC EMISSION (tCO_2e)	**7,792**	**8,711**



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.

STENA RECYCLING / SWEDEN 2023

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 purchased energy, where emissions occur at the producer. Scope 3 includes other indirect emissions that the business generates, which are 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 generate, regardless of ownership.

EMISSION FACTORS

To convert consumption and other activity data for emissions of greenhouse gases (measured in tCO_2 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. The ambition is to continue to 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 aggerated 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 with a 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, not plant-specific factors.

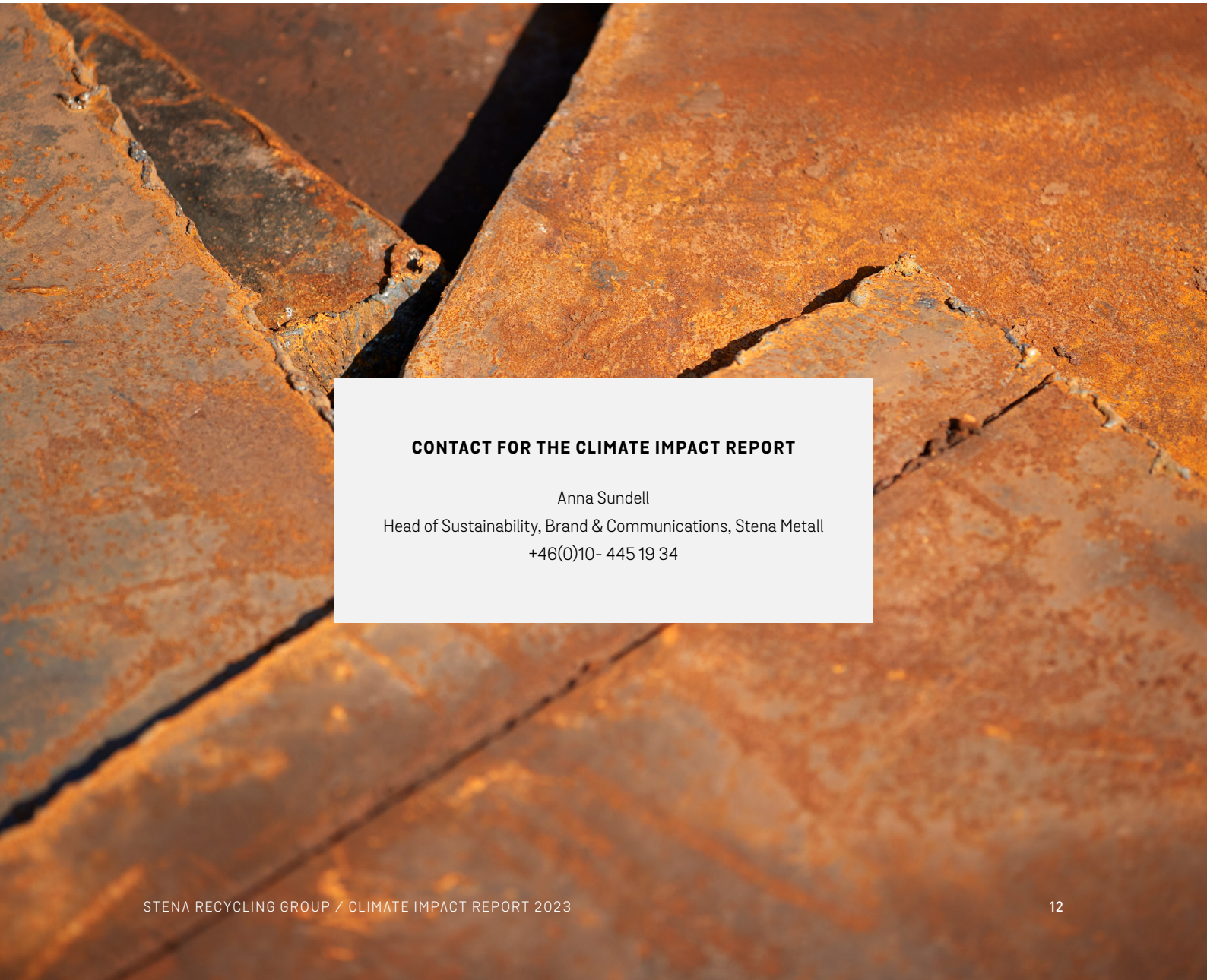
BASE YEAR AND RECALCULATION POLICY

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.

EMISSIONS 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, measurements can be made to improve the model and to evaluate methods of covering the landfill and other possible measures, while continuing the systematic work of reducing waste going to landfill.



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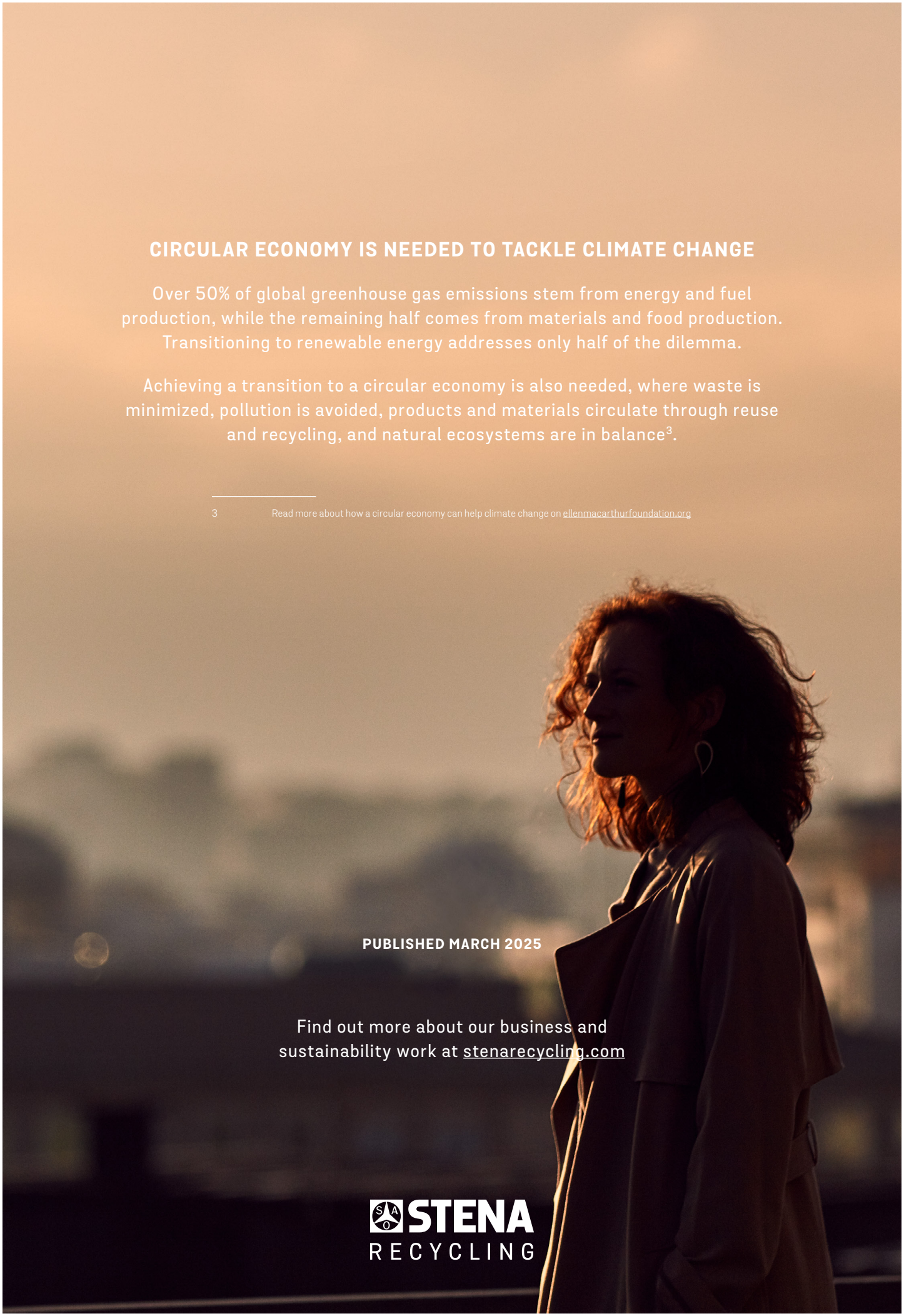
CIRCULAR ECONOMY IS NEEDED TO TACKLE CLIMATE CHANGE

Over 50% 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 balance[3].

3 Read more about how a circular economy can help climate change on ellenmacarthurfoundation.org



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Find out more about our business and sustainability work at stenarecycling.com

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