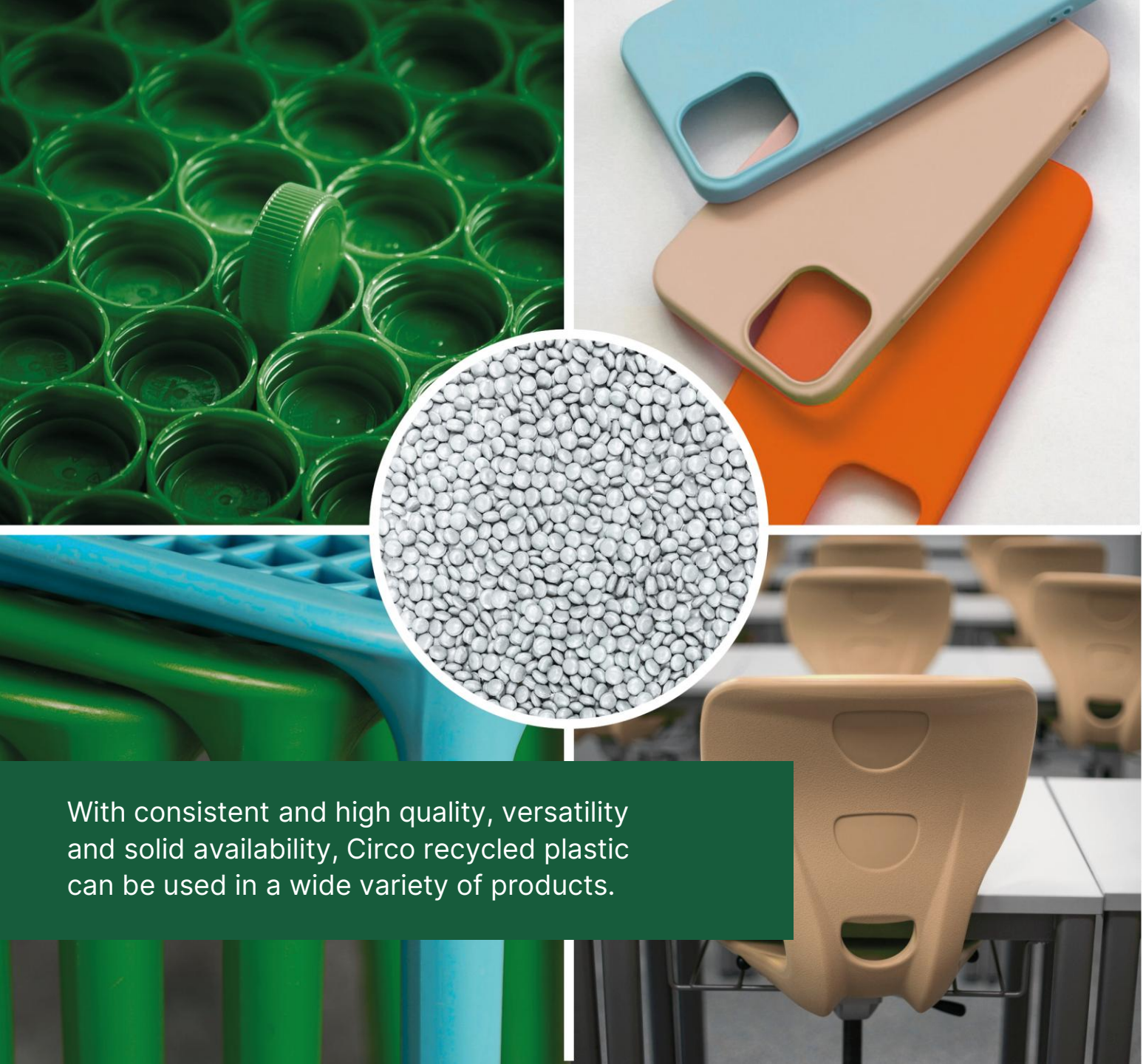
Circo® Recycled Plastics LCA Study

Recycled sustainable alternatives
are here to replace virgin plastics

NG Nordic



With consistent and high quality, versatility and solid availability, Circo recycled plastic can be used in a wide variety of products.

CIRCO®

Recycled plastics

Circo® is a plastic recyclate produced from post-consumer plastic waste collected from households. With consistent and high quality, versatility and solid availability, Circo recycled plastic can be used in a wide variety of products.

The Circo basic grades are 100% post-consumer recycled (PCR) plastic and compounds are supplemented with selected additives to improve the technical and environmental properties of the material.

Through our CircoLab concept, we modify and tailor Circo compounds together with our customers to suit their specific needs.

Circo is made with no compromises: it is a safe and reliable solution for sustainable plastics production.

NG Nordic

The carbon footprint of Circo recyclates is up to 70% lower than that of virgin plastics.

Some plastics are better than others

This analysis contains carbon footprint study of Circo® recycled plastic basic grades and compounds published 2022 and additional environmental impacts of basic grades from Life Cycle Assessment study published 2019.

Circo® HDPE, LDPE and PP basic grades and compounds were assessed using the LCA method and comparing them to virgin granulates.

The product life cycle is assessed from resource extraction to the refinery gate (cradle-to-gate) in both studies.

The results showed Circo® is more sustainable in all studied aspects, significantly lowering the carbon footprint of products and contributing to the fight against climate change. The carbon footprint of Circo recyclates is up to 70% lower than that of virgin plastics.*

*71% lower for PP, 67% for HDPE and 64% for LDPE.

NG Nordic

Circo contributes to several UN Sustainable Development Goals (SDGs) on the journey towards a low-carbon society.

Sustainable in every sense

Replacing virgin plastic with Circo® will not only help reach your company's sustainability goals, it also contributes to several key UN Sustainable Development Goals.

The environmental effects of plastics have been widely discussed. However, for many uses, their versatility, durability, light weight and safety are hard to match. Plastics also hold value and can be recycled up to ten times.

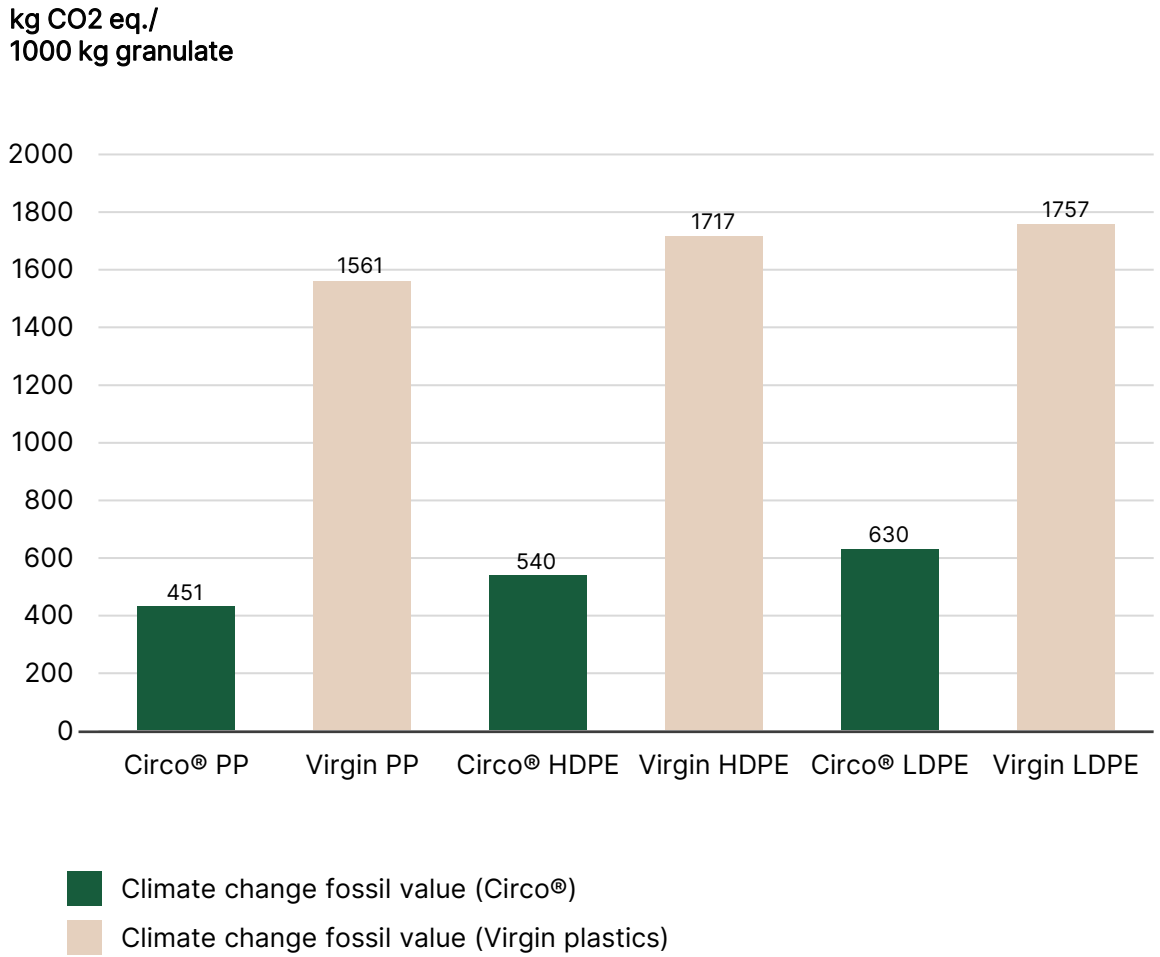
There are differences in plastics when it comes to sustainability. The origin of the feedstock material and the way the plastic waste is treated plays a key role in the sustainability of the recyclate and its production. By having the whole recycling process of Circo® in our own hands, we can guarantee transparency and sustainability throughout the production process.

NG Nordic

Carbon footprint Basic grades

Circo® basic grades HDPE, LDPE and PP are made of post-consumer recycled (PCR) plastic.

Due to updates in our recycling process, the carbon footprint of Circo basic grades has decreased from the previous study. The carbon footprint of Circo recyclates is up to 70% lower than that of virgin plastics: 71% lower for PP, 67% for HDPE and 64% for LDPE.



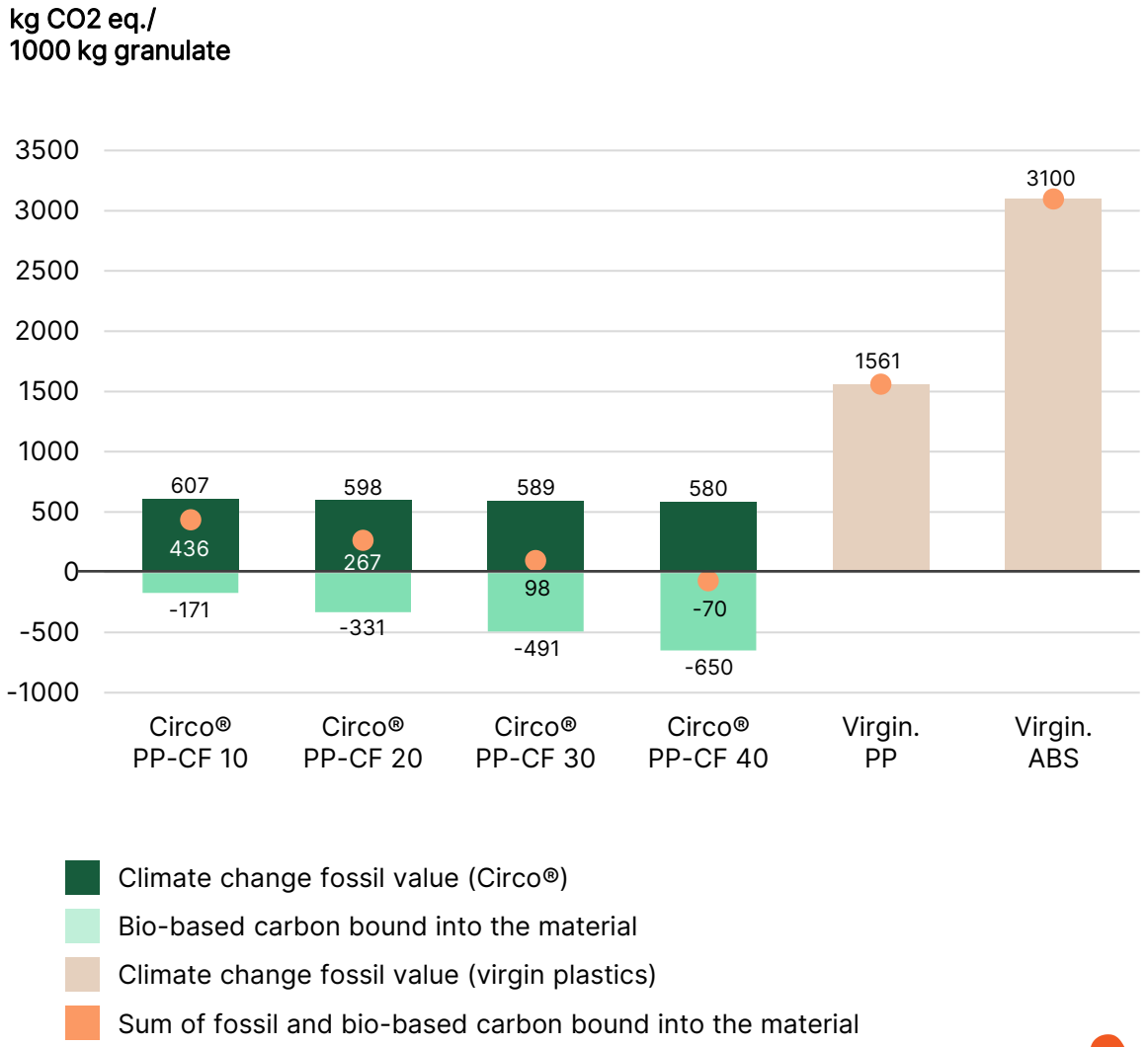
The carbon footprint i.e. climate change impact includes the generation of anthropogenic (i.e. caused by human) greenhouse gases that lead to large-scale shifts in weather patterns.

Carbon footprint PP-CF Series

The Circo® PP-CF compound is made from cellulose fibre and Circo® PP plastic. The cellulose fibres are sourced from renewable, responsibly managed forests.

When looking at fossil and biogenic carbon that is bound into the material, its Global Warming Potential (GWP) decreases significantly. The carbon-negative material is achieved through utilising a cradle-to-gate method and accounting for the bound biogenic carbon.

The carbon footprint i.e. climate change impact includes the generation of anthropogenic (i.e. caused by human) greenhouse gases that lead to large-scale shifts in weather patterns.

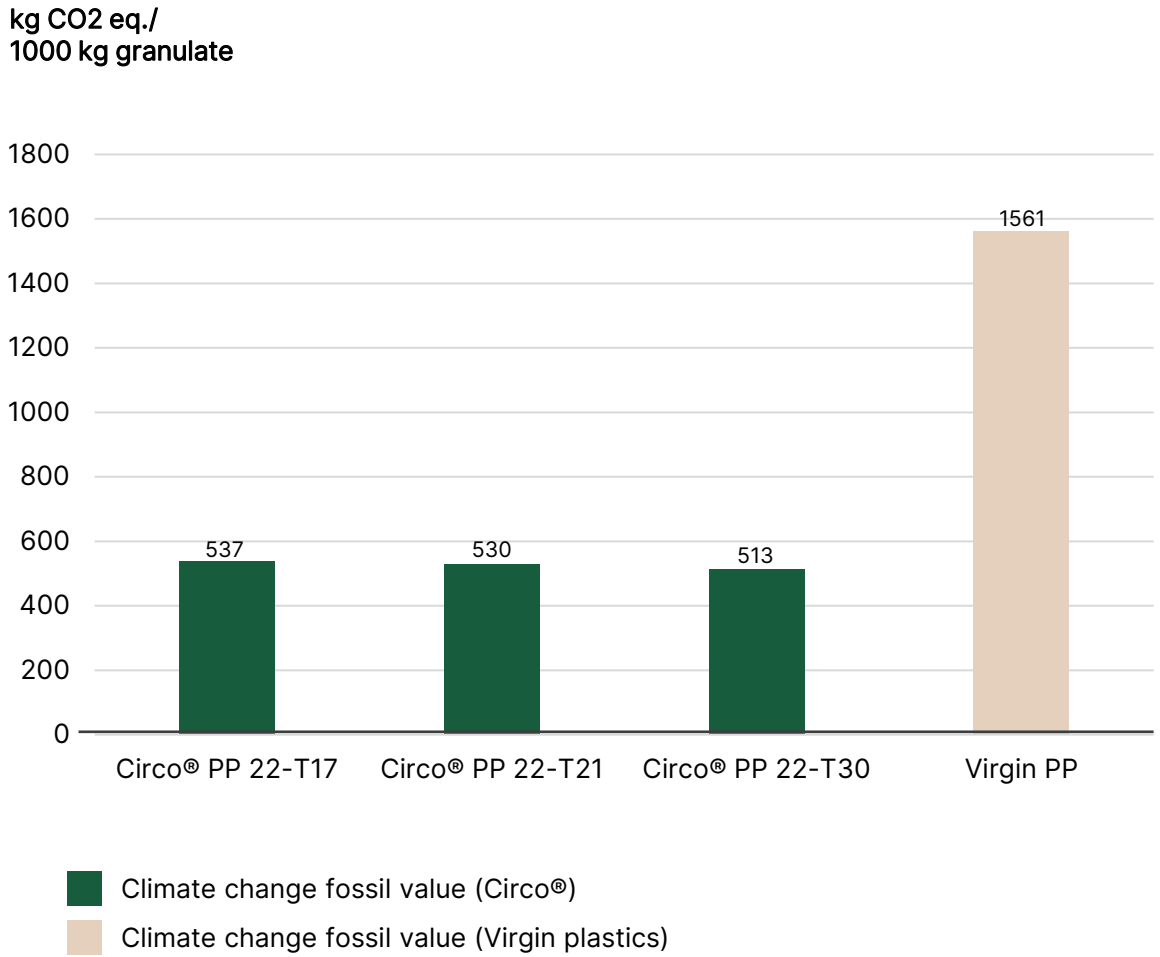


Circo® Life Cycle Assessment Study

Carbon footprint PP-T Series

The Circo® PP-T compound is made with the Circo PP basic grade and talcum. Thanks to the PP component, the PP-T compounds have a very low carbon footprint.

The carbon footprint of Circo® PP-T recyclates is, on average, less than half of that of virgin granulates for all three types: circa 66%.



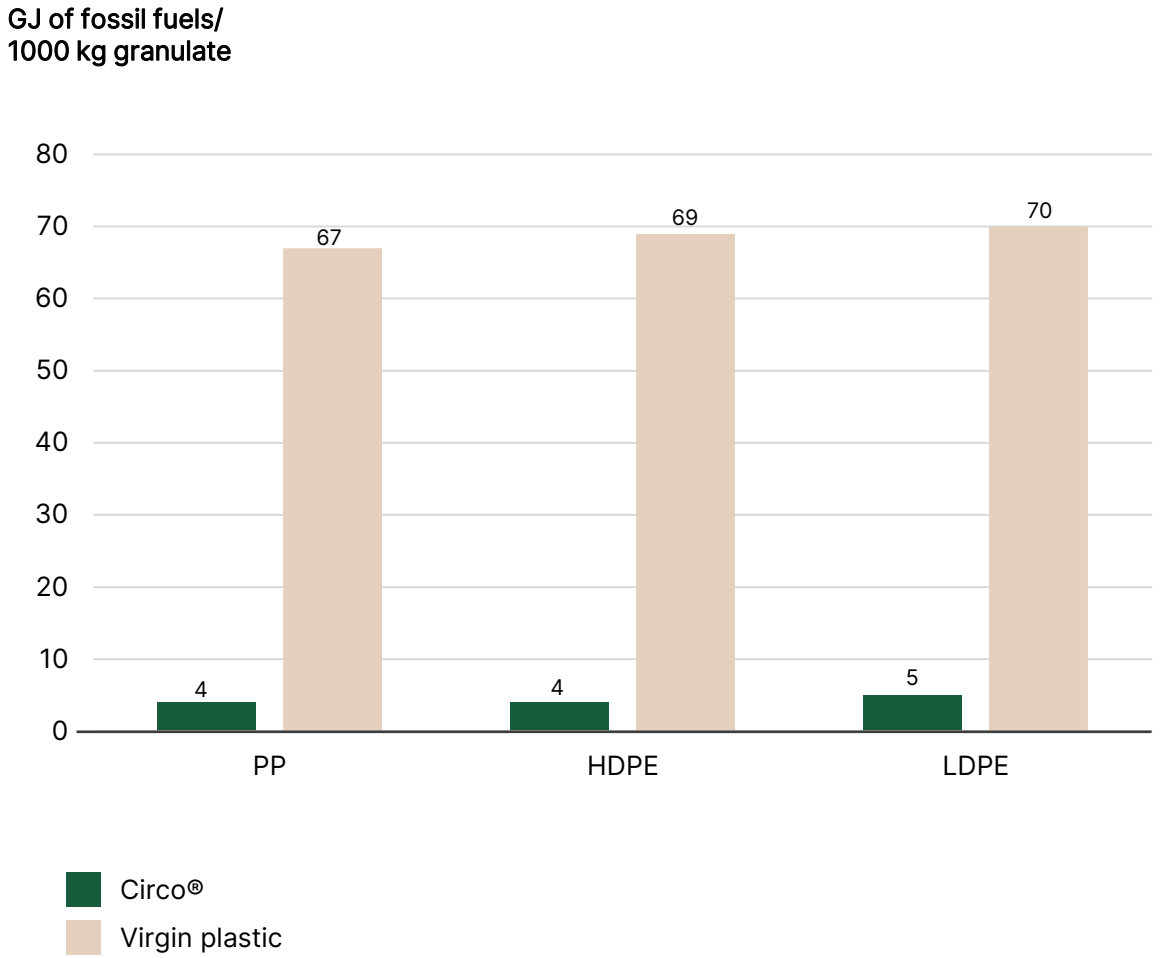
The carbon footprint i.e. climate change impact includes the generation of anthropogenic (i.e. caused by human) greenhouse gases that lead to large-scale shifts in weather patterns.

Circo® Life Cycle Assessment Study

Fossil resource depletion

Keeping plastic in circulation with Circo® will save a significant amount of valuable non-renewable resources and contribute to the UN's Responsible Consumption and Production SDG.

The fossil resource depletion impact of Circo® recyclates is remarkably lower than that of virgin granulates in case of all three studied plastic types: 94% lower for PP and HDPE, and 93% for LDPE.



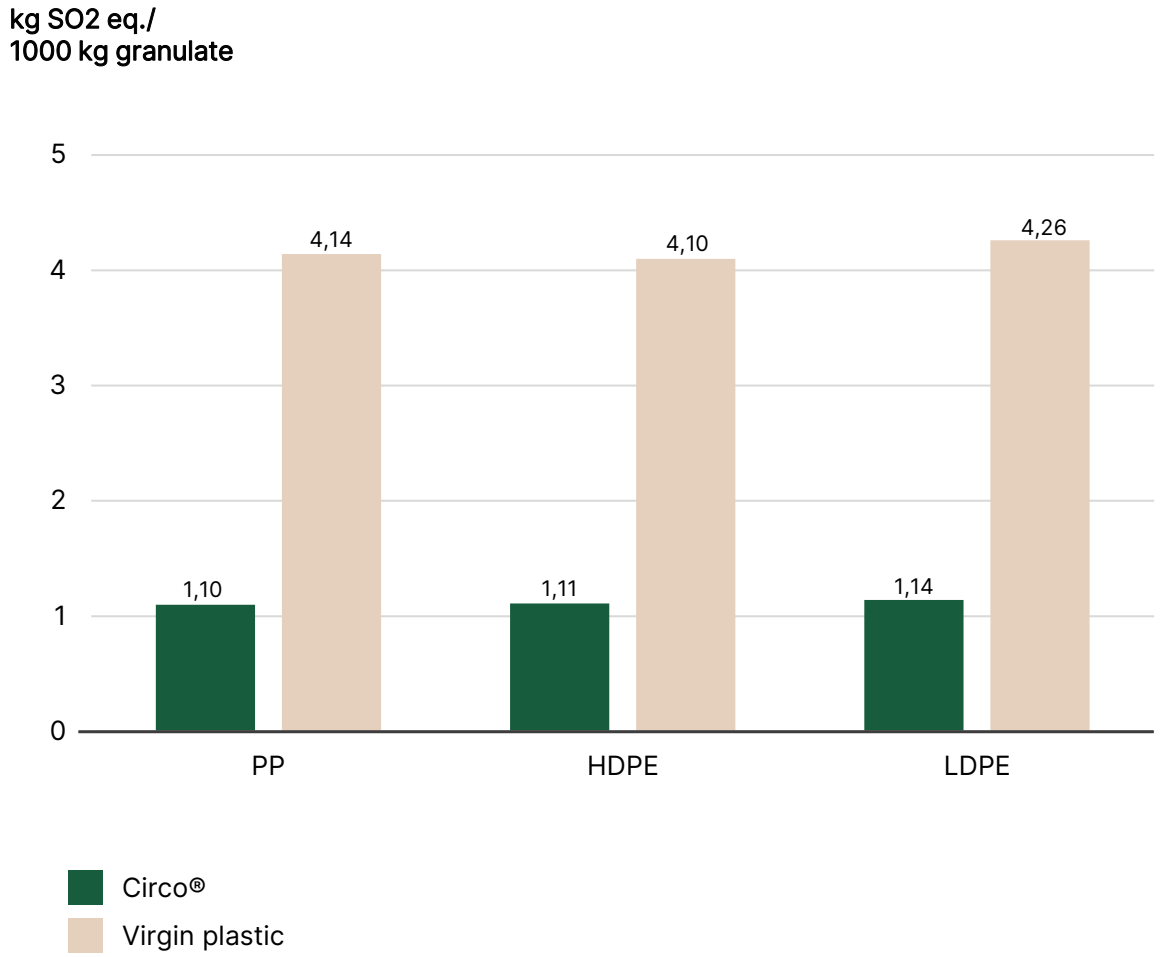
Fossil resource depletion describes the consumption of non-renewable, fossil resources that cannot be renewed by natural means.

Acidification

Using Circo® can significantly reduce the acidification of the environment, helping to protect biodiversity and contributing to the UN's Life Below Water SDG.

The acidification impact of Circo® recyclates is lower than that of virgin granulates for all three studied plastic types: 73 % lower for PP and HDPE, and 74% for LDPE.

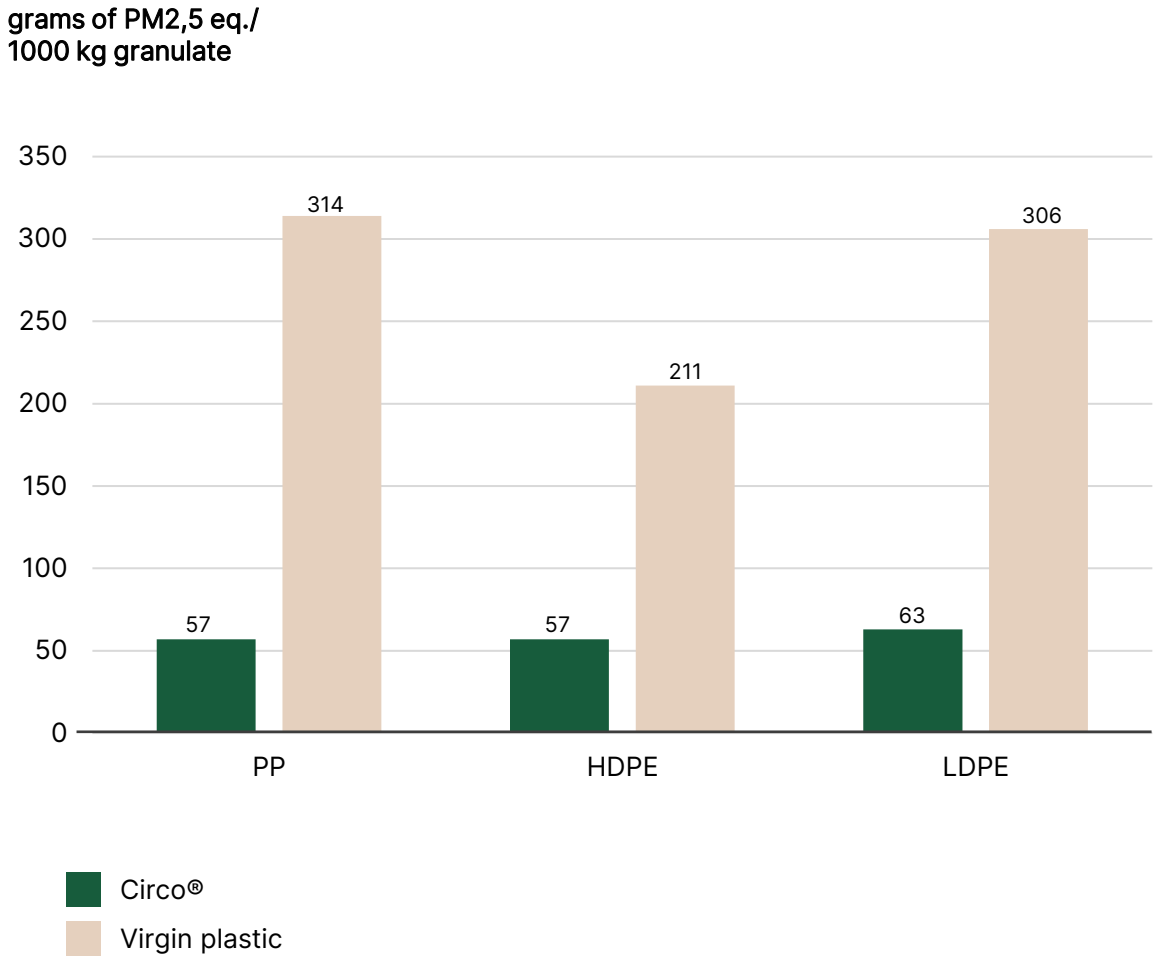
The acidification impact describes the generation of emissions that contribute to acidification of soil and water by decreasing the pH of the natural environment.



Particulate matter

Using Circo® can help people live healthier lives in urban areas and contribute to the UN's Good Health and Well-being SDG.

The particulate matter impact of Circo® recyclates is much lower than that of virgin granulates for all three studied plastic types: 82% lower for PP, 73% for HDPE and 79% for LDPE.

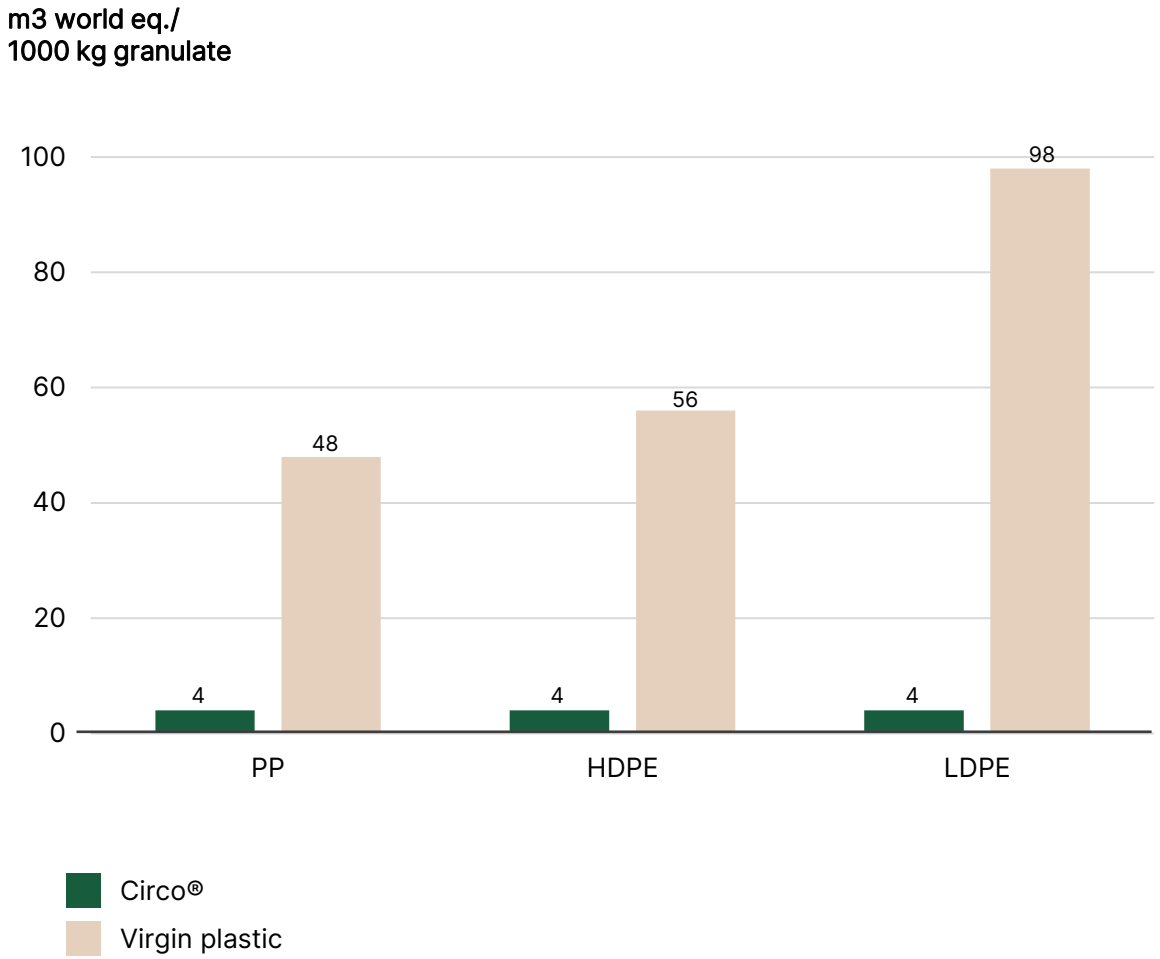


Particulate matter (PM) is a mixture of extremely small particles and liquid droplets. Particles less than 2.5 micrometers pose a threat to human health as they can get deep into the lungs or even into the bloodstream.

Water scarcity footprint

Using Circo® will reduce waste, help save precious water resources and contribute to the UN's Clean Water and Sanitation SDG.

The water scarcity footprint impact of Circo® recyclates is only a fraction of virgin granulates' impact for all three studied plastic types: 92% lower for PP, 93% for HDPE and 96% for LDPE.



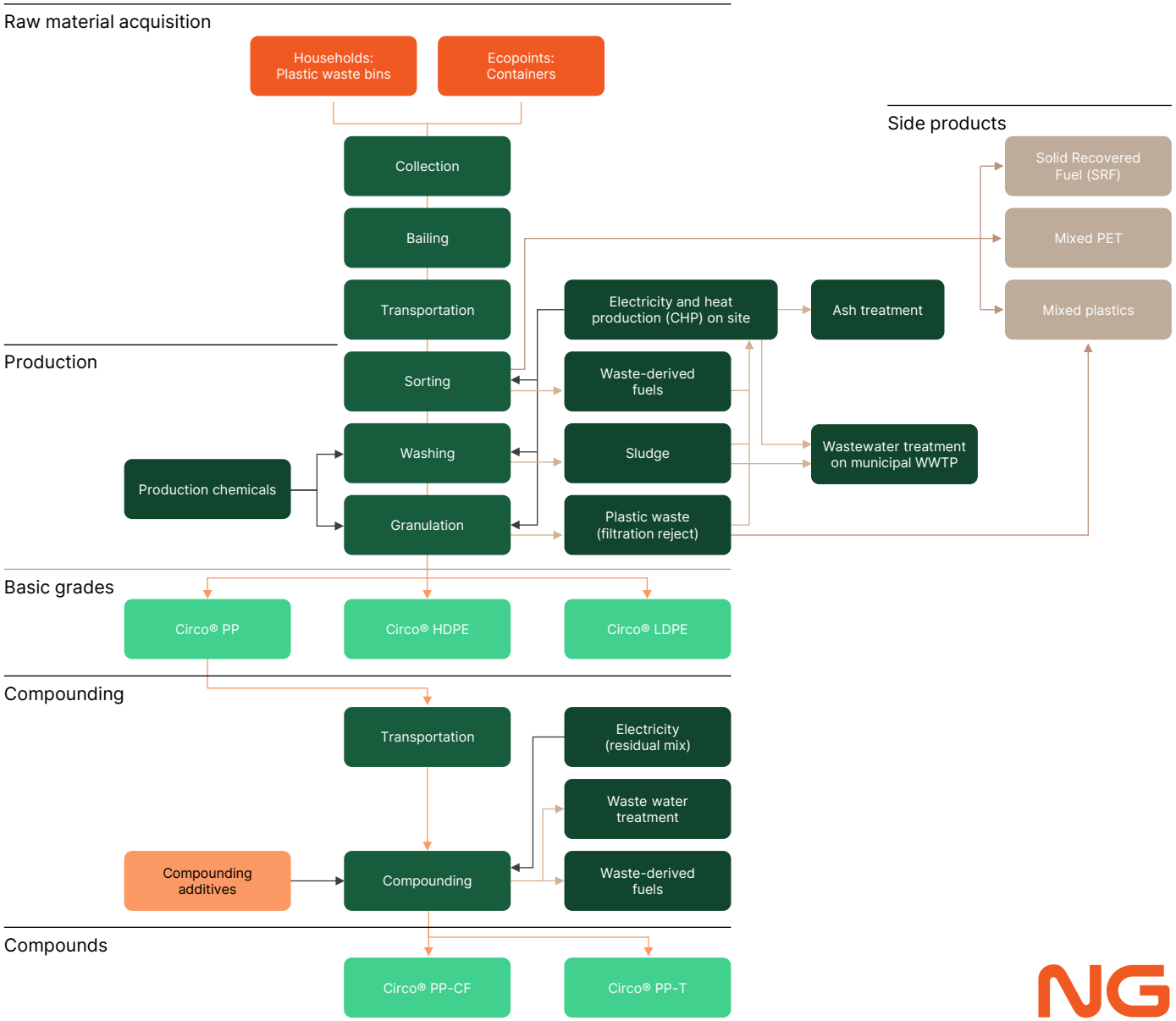
Water scarcity footprint is based on the consumption of water resources in relation to regional water availability.

Studied system

Cradle-to-gate is the assessment of the product life cycle from resource extraction (cradle) to the refinery gate.

The assessment forms the basis for the environmental product declarations (EDP) of a plastic product, which contains Circo® recycled plastics.

The illustration is a simplified version of the studied system.



NG Nordic

Background of the study

Goal

This is a carbon footprint (CFP, cradle to gate) study of Circo® plastic granulates. This study examined multiple products manufactured by NG Nordic. The studied granulates are manufactured from recycled plastics consisting both of post-consumer plastic packages and separately collected plastics from industry. In compounds, also additive materials are used.

The objectives of the study are:

1. Provide reliable, comprehensive information about the carbon footprint of Circo® granulates
2. Provide results which can be utilised also in EPD creation of customers of Circo.

Conduction

The study has been conducted in line with life cycle assessment (LCA) standards ISO 14040 (2006) and ISO 14044 (2006) and carbon footprint standard ISO 14067 (2018).

Additionally, EPD International (2022) Product category rules (PCR) – Plastics in primary forms. Version 3.02 is applied whenever appropriate.

To ensure the quality of the study and that the requirements of ISO 14040, 14044 and 14067 are followed, critical review is conducted at the end of the study. The critical review was performed by VTT Technical Research Center of Finland.

HDPE, LDPE and PP granulates made of virgin material have been modelled based on the secondary data of Plastics Europe Ecoprofiles and the LCI data of these granulates.

Interpretation of Results

The declared unit is 1,000 kg of packaged (or bulk) Circo granulates or compounds at the gate ready to be transported to customers.

The partial CFP is the net sum of fossil, biogenic and direct land use change emissions and removals, the effect of which is known as global warming potential (over 100 years) (GWP 100). Mass-based allocation is applied by recommendation of both applied ISO-standards and applicable PCR.

The term "CFP" is used to refer to the partial CFP (cradle to gate) in which use and end of life (EoL) stages are not considered. It should be noted that when only partial carbon footprint is assessed, the biogenic emissions formed in the EoL stage are not considered. This may be notable in case of partly biobased products.

NG Nordic

Sustainable alternative for virgin plastics

Circo® is a plastic recyclate produced from post-consumer plastic waste by NG Nordic. With consistent and high quality, versatility and solid availability, Circo recycled plastic can be used in a variety of products and also customized into compounds to meet the specific needs and requirements. Circo is made with no compromises: it is a safe and reliable solution for sustainable plastics production.

circoplastics.com

NG Nordic – pioneering circularity

NG Nordic is a leading provider of circular solutions and environmental services, tackling the urgent challenges of climate change and resource scarcity. Through reuse, collection, recycling, and depollution NG Nordic transforms waste into valuable resources and removes hazardous substances from circulation – scaling access to circular raw materials, decarbonize society and help protect natural ecosystems.

With strong presence across the Nordics, and in Poland and the UK, NG Nordic is a vital part of the Nordic industrial infrastructure handling 4.4 million of waste annually through 90 facilities and sites. With 3,400 employees, generating EUR 1,3 billion in revenue and provide tailored customer solutions across the entire value chain.

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