

# Life Cycle Assessment of WoodSafe®

- the biobased medical waste bin

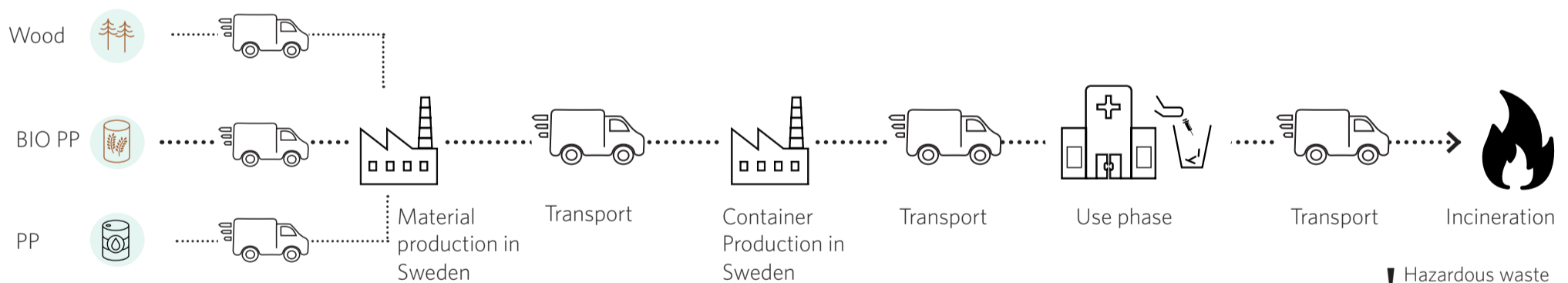
Independent Assessment Undertaken by Miljögiraff AB,  
May 2023

Medical waste bins in various sizes are currently a significant part of the plastic consumption within healthcare. After examination gloves and disposable aprons, medical waste containers are the largest product group, in terms of tons per year, that are incinerated. In this study we have looked at Woodsafe waste container's environmental impact and also compared Woodsafe material to the most common alternatives available in the market to obtain a fair assessment of the environmental impact and potential climate benefits that can be achieved.

## Woodsafe® life cycle

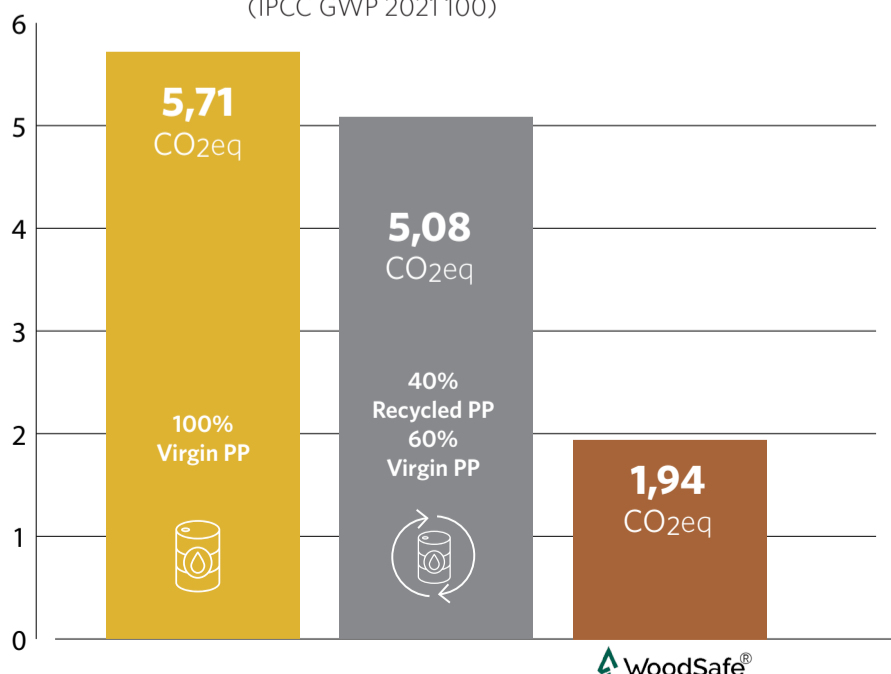
Woodsafe® is a medical waste bin based on biobased material. The bio propylene is made from pine oil and a smaller part virgin polypropylene. The hazardous waste container is then produced and distributed to hospitals. At the end of the container is sent to incineration.

WoodSafe fulfil all certifications regarding high safety standard.



! Hazardous waste containers are by default sent to incineration.

**Total kg CO<sub>2</sub> eq per 1 kg material**  
(IPCC GWP 2021100)



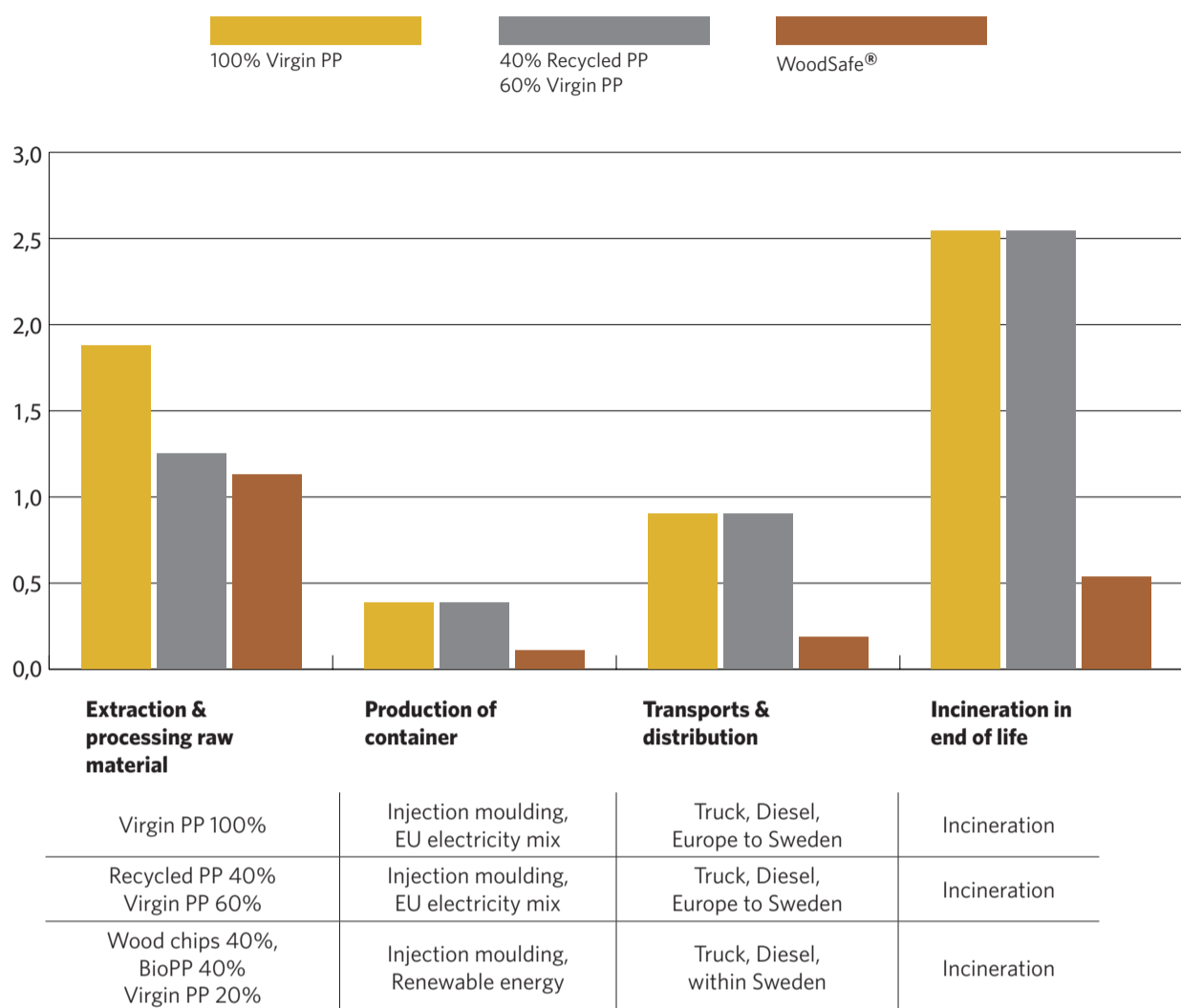
## Woodsafe® material could cut CO<sub>2</sub> emissions with 2/3

By using Woodsafe® there is a possibility to lower the CO<sub>2</sub> emissions 66% compared to 100% virgin PP. Here we have compared 1 kg material Woodsafe with 1 kg virgin PP and 1kg material with 40% recycled PP. The result also shows that by replacing 100% virgin PP with part recycled could lower the emissions by only 11%.

**- 66%**  
CO<sub>2</sub>eq  
compared to  
100% Virgin PP

**- 11%**  
CO<sub>2</sub>eq  
If 100% virgin PP is  
replaced with 40%  
recycled PP

### Kg CO<sub>2</sub> eq per life cycle step (1 kg material)

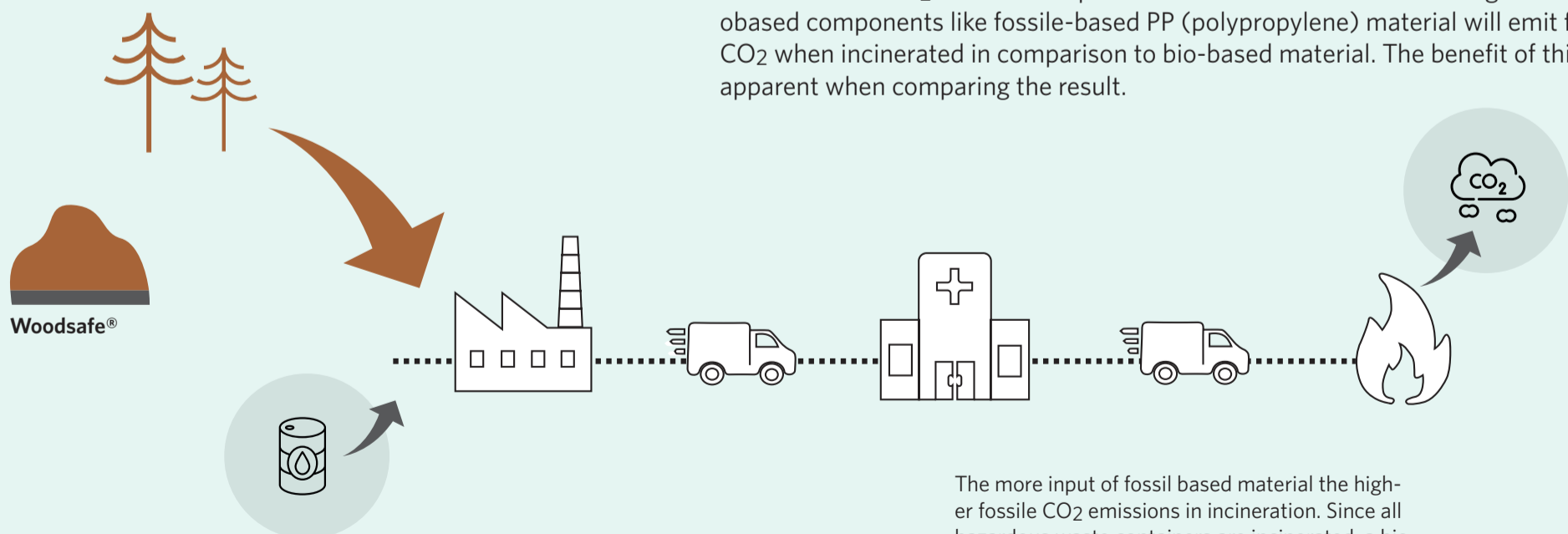


### Comparing CO<sub>2</sub> Emissions in life cycle stages

Virgin PP has the highest CO<sub>2</sub> emissions in all life cycle steps. The material with part recycled PP has a lower CO<sub>2</sub> emission than virgin since the material for the recycled PP is produced in a previous life cycle. Woodsafe® has the lowest CO<sub>2</sub> emission in production due to its bio-material and processing in Sweden. In production the virgin PP and material with part recycled PP is higher than Woodsafe® due mainly to higher GWP of electricity in Europe compared to Sweden where Woodsafe® is produced. PP is often produced in southern Europe and an European electricity mix is used when calculating the result. Regarding transportation and distribution, the study considers a scenario where end consumer is in Sweden. Woodsafe® has a lower CO<sub>2</sub> since it is produced closer to market. Incineration at end of life contributes the most to the oil-based material's CO<sub>2</sub> emission.

### Bio-based Materials: Decreasing CO<sub>2</sub> Emissions at End-of-Life

Using bio-based materials instead of fossil-based materials helps to lower the Global warming potential (GWP) in the end-of-life phase. The environmental impact assessment method IPCC GWP 2021 100, excludes biogenic CO<sub>2</sub> emissions and the uptake of CO<sub>2</sub>. The method calculates fossil CO<sub>2</sub> emissions, e.g the emissions that add additional CO<sub>2</sub> to the atmosphere and contribute to climate change. Non-bio-based components like fossil-based PP (polypropylene) material will emit fossil CO<sub>2</sub> when incinerated in comparison to bio-based material. The benefit of this is apparent when comparing the result.

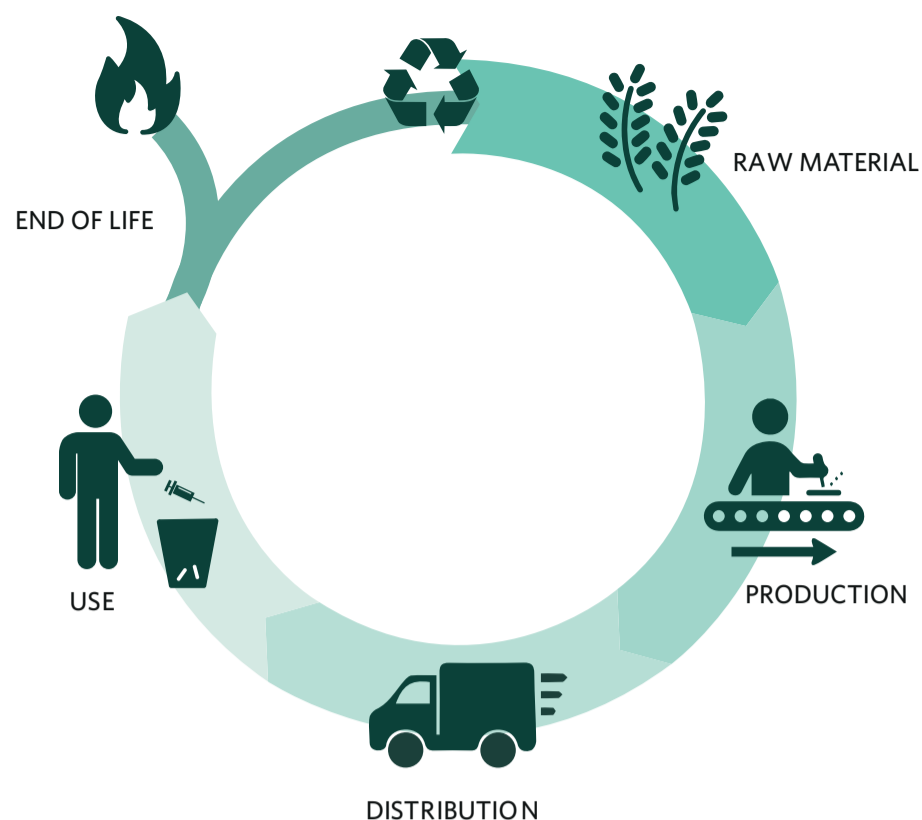


The more input of fossil based material the higher fossil CO<sub>2</sub> emissions in incineration. Since all hazardous waste containers are incinerated, a bio-based material is beneficial to lower climate impact.

## Understanding the full picture with a cradle to grave perspective in LCA

When assessing a product's life cycle, it is essential to consider all stages, starting from the extraction of raw materials (cradle) to the end of its useful life and disposal (grave). By examining the complete life cycle, LCA captures the environmental impacts associated with each stage.

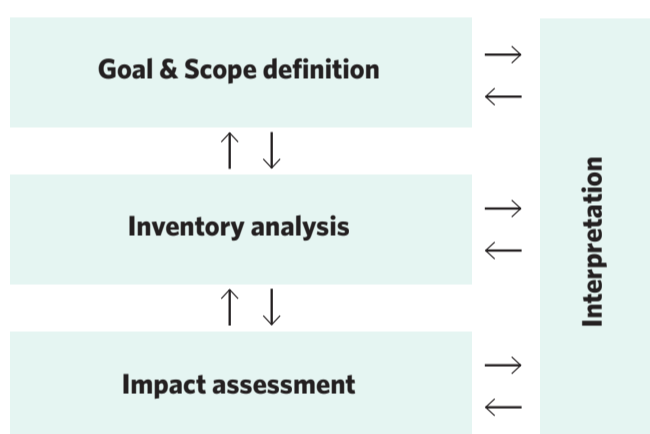
**Focusing solely on a specific life cycle stage or ignoring certain stages can lead to incomplete or misleading assessments.** By taking a cradle-to-grave perspective, LCA ensures that the assessment encompasses the total environmental impacts across all life cycle stages.



### LCA framework

ISO 14040/14044

LCA is an iterative process where the standards provide frameworks and guidelines.



## LCA according to ISO 14040/14044

ISO 14040 and ISO 14044 are international standards that provide guidelines for conducting comprehensive life cycle assessments (LCAs) of products and systems. ISO 14040 sets the principles and framework for LCAs, while ISO 14044 provides detailed guidance on conducting the assessments. These standards ensure consistent and scientifically rigorous assessments of environmental impacts, aiding decision-making and identifying opportunities for improvement.

## Want to know more about the full LCA?

**Name of full LCA report:** Life cycle assessment by Frost Pharma

**Contact person WoodSafe:** Henrik Alfredsson, Frost Pharma

**LCA practitioner:** Pär Lindman, Miljögiraff

**Standard used:** ISO14040/44

**Method used:** EF 3.1

**LCA calculation software:** SimaPro 9.5

**Database used:** Ecoinvent 3.9

**Reference year:** 2022

## About Miljögiraff

**- Two decades of life cycle assessments and EPD's**

Established in 2003, Miljögiraff is a pioneering company in the field of Life Cycle Assessment (LCA). With extensive experience, they have conducted a large number of LCAs and Environmental Declarations (EPDs), assisting over 200 clients in enhancing their environmental strategies. Miljögiraff serves as both LCA experts and the authorized agency for the renowned LCA software, SimaPro, which has been the industry-leading tool for conducting LCA studies since 1990.

**Miljögiraff** **SimaPro**