Why Paper?

IMAGE CREDIT: IVAN GROMOV

Let us set the scene

We often get questioned about the impact of **paper vs plastic**

Specifically, about the **carbon footprint comparisons between the two materials.**

VS

FLEXI-HEX®

But we don’t think it’s as simple as good vs bad.

There are countless variables when it comes to choosing the best materials for protective packaging.

But one thing we are certain of; when designing a product, you have to consider far beyond just carbon emissions alone...

So what’s the problem?

Poor design is the real issue.

And single-use plastic for protective packaging is a poor design. Why? Because plastic is harmful to the environment long after its useful life.

Good design respects the world’s natural cyclical processes.

So why is Flexi-Hex made from paper?

We’re going to use something called Donut Economics to explain...

In short

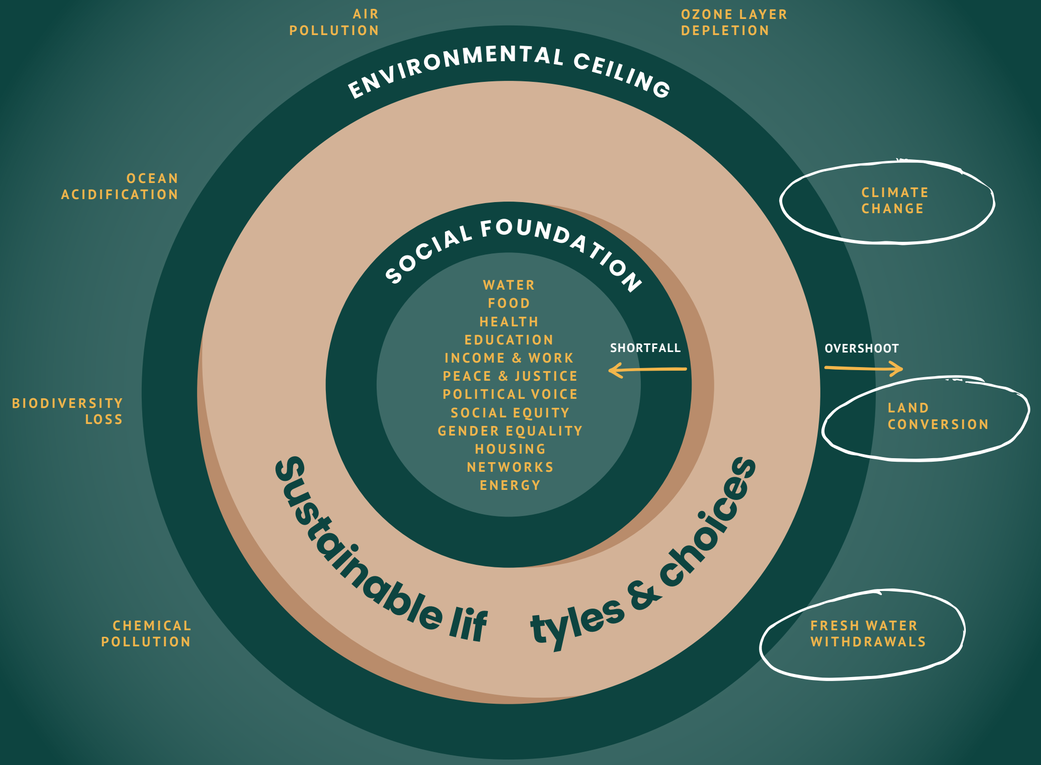
In Donut Economics, fundamental social needs like income, housing, and food are ensured, while consumption is regulated to safeguard the planet and its limited resources.

It illustrates a sweet spot for society to live sustainably. It pertains to avoiding excessiveness and maintaining balance.

READ MORE HERE

FLEXI-HEX®

Tell me more...



The common arguments used by plastic packaging advocates

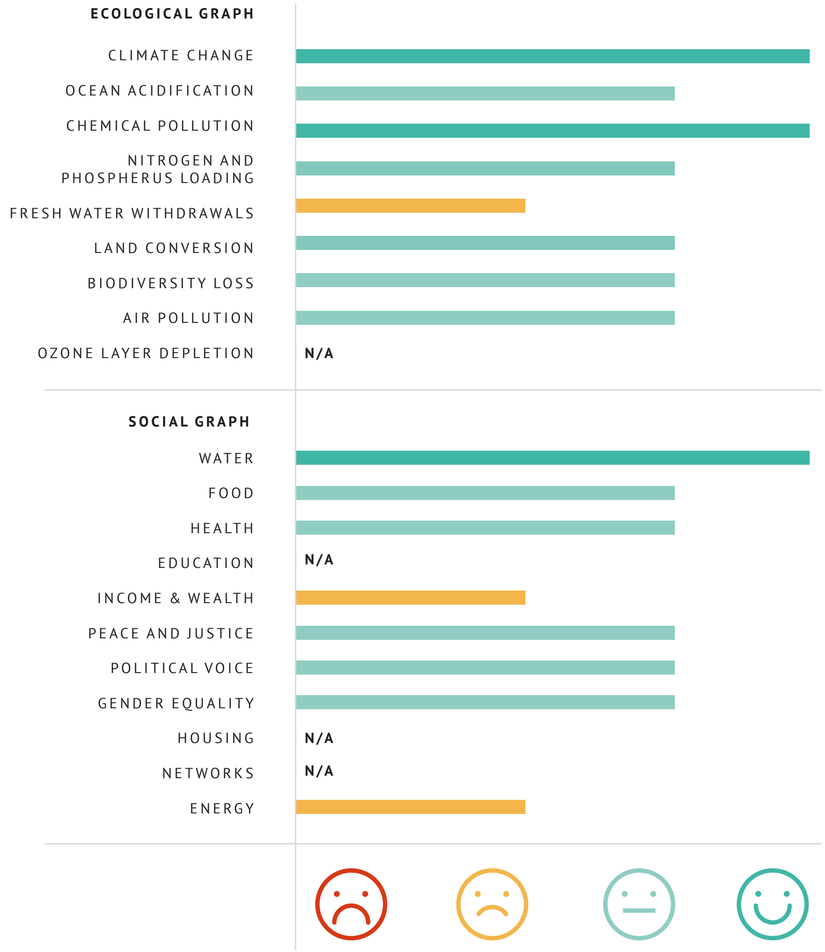
FLEXI-HEX®

Paper vs Plastic

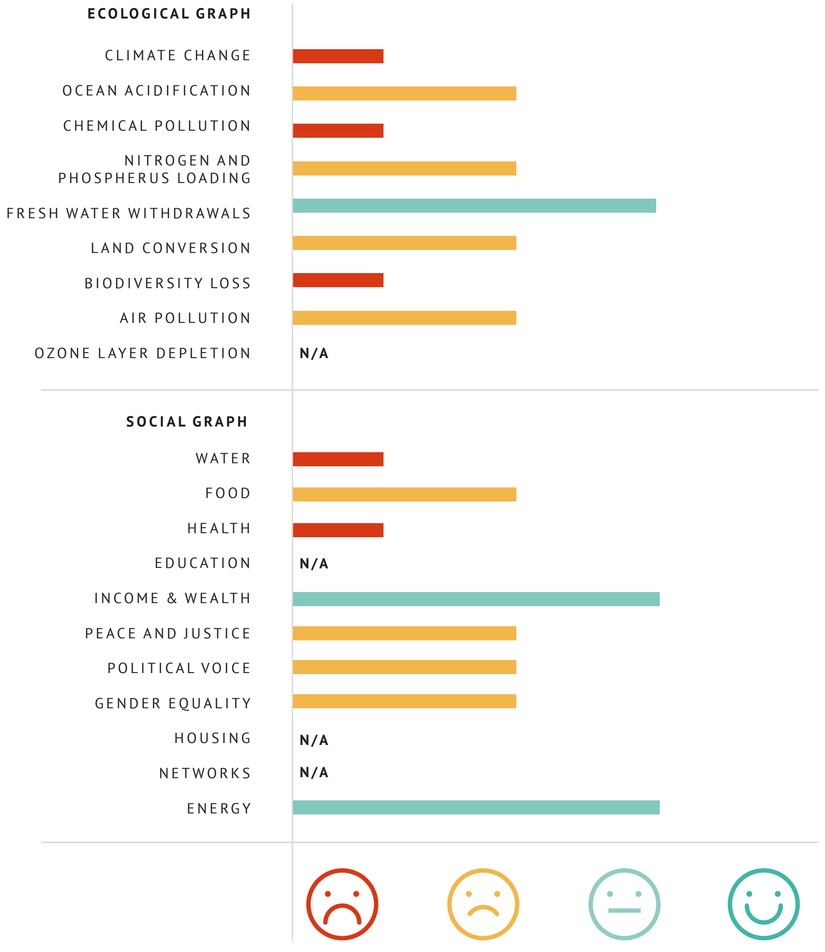
We assessed paper versus plastic as a material choice for packaging against the pillars of Donut Economics.

You can see our justifications and resources in the appendix of this document.

Paper



Plastic



FLEXI-HEX®

Lifecycle Analysis Reports (LCAs)

LCA report

A common tool used to measure the **impact** of a product.

"During a LCA, you evaluate the potential environmental impacts throughout the entire life cycle of a product (production, distribution, use and end-of-life phases). An LCA covers all relevant inputs from the environment (e.g.oil, water, land use) as well as emissions into air, water and soil (e.g., carbon dioxide)." Sphera

LCAs rely on globally available databases that undergo constant updates as new methodologies establish more accurate data.

This year, it was discovered that plastic emits carbon emissions **30% higher than initially estimated.*** Consequently, LCA reports must be revised to incorporate this updated data. *REF

!!

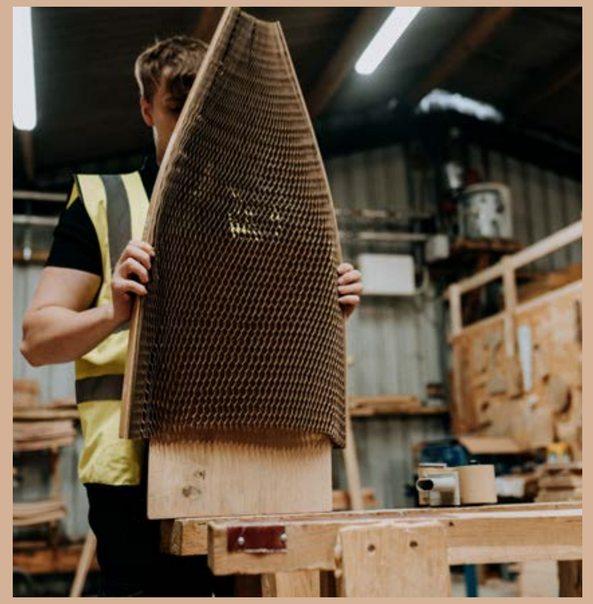
Our LCA Reports

At Flexi-Hex we have completed LCA reports on most of our products:

- **Flexi-Hex Air Range:** In comparison to bubble wrap, where 4 layers of the material was needed to offer equal protection, Flexi-Hex Air had a 15% lower carbon footprint. (LCA in partnership with Sourceful)

- **Flexi-Hex Mini Sleeve:** Plastic air sac (incinerated end of life) compared to Flexi-Hex (recycled end of life) showed that the Flexi-Hex Mini sleeve had a 19% higher carbon footprint. Since this 2021 report, we have reduced the amount of material in this sleeve, increased efficienices in shipping and databases have been updated. We will produce a new LCA for this sleeve asap.

- **Flexi-Hex Large Sleeves:** No LCA yet, it's on our list!



The Solution

We need to switch from a linear to a circular economy

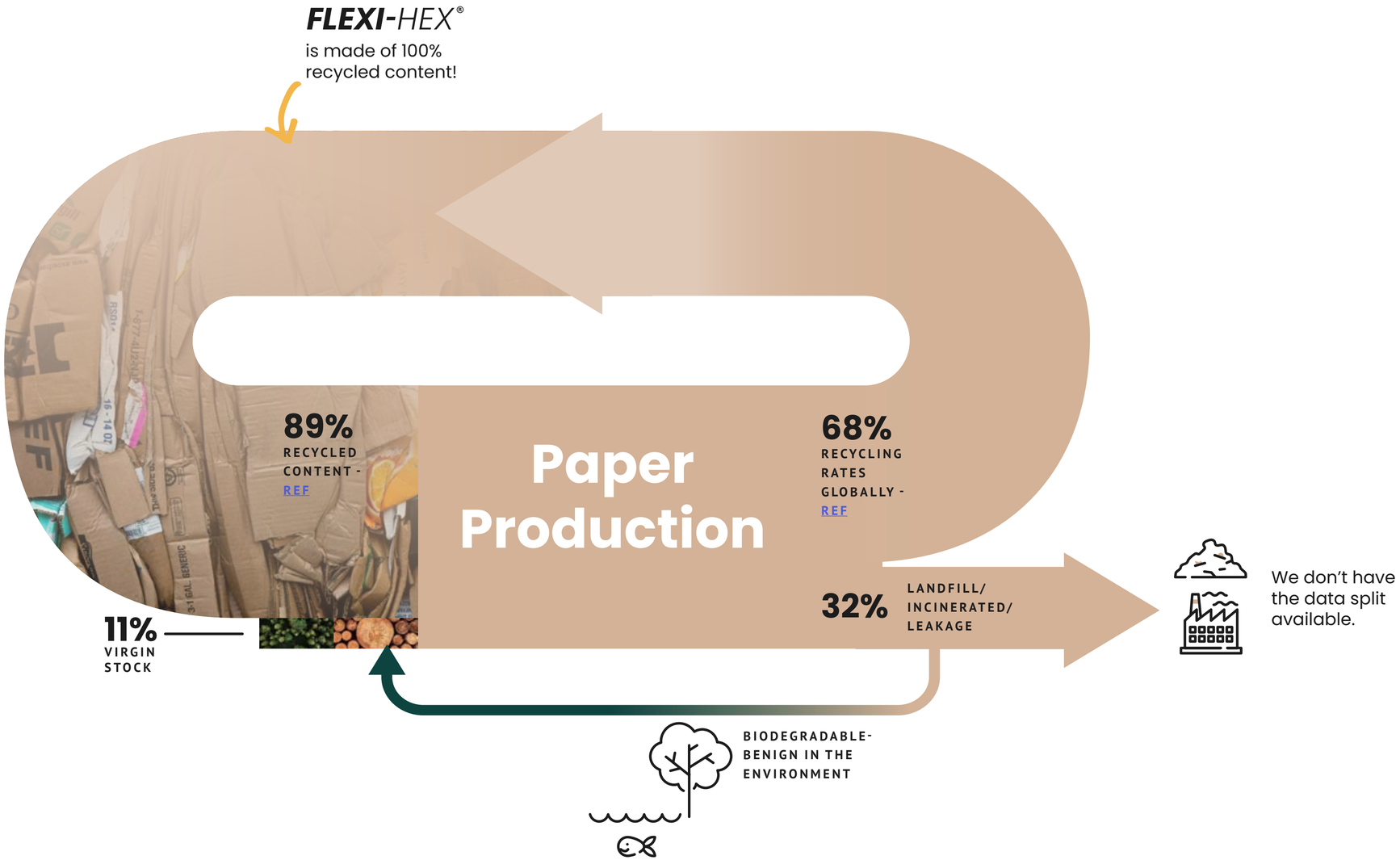
Linear economy

Circular economy

Paper lifecycle

Today's paper lifecycle is mostly **circular.**

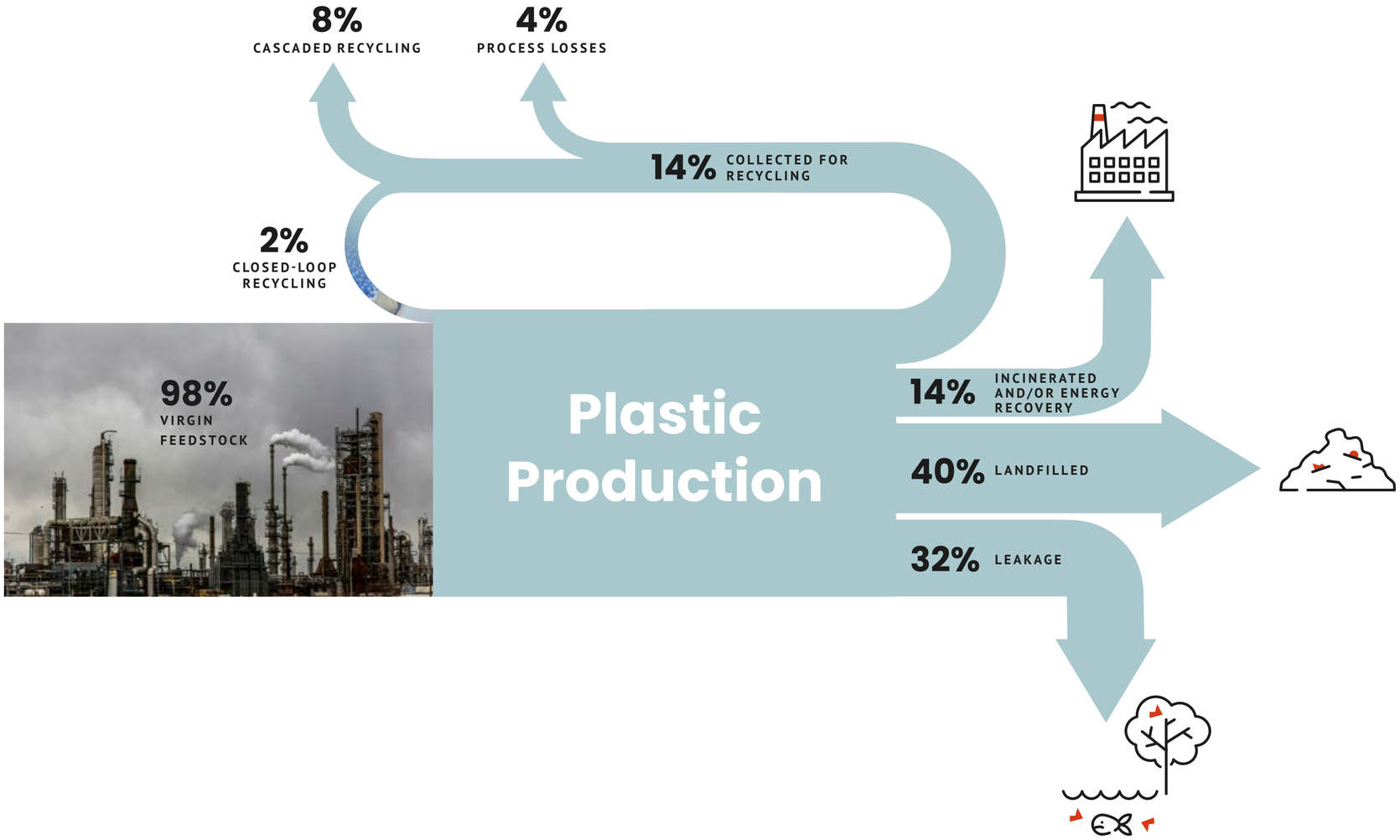
The % of recycled paper in manufacturing varies across the industry however it's clear that paper is recycled efficiently.



Plastic lifecycle

Today's plastic lifecycle is largely **linear.**

Recycling plastic is hugely complex and therefore the industry is reliant on virgin feedstock.



SOURCE HERE

ELLEN MACARTHUR FOUNDATION

FLEXI-HEX®

Summary

At Flexi-Hex, we recognize the indispensable role plastic plays in our society. Its unparalleled strength and durability often make it essential in products we use every single day.

However, the evidence is crystal clear: **nearly 98-99% of global plastics originate from fossil fuels**, which in turn contribute to 75% of greenhouse gas emissions and 90% of carbon emissions. So, it's no surprise that the carbon crisis and plastic issue go hand in hand. Plus, our Donut Economics analysis points out even more reasons to be concerned about plastic, both socially and environmentally.

We believe the issue lies with plastic being overused and over-engineered, especially in stuff like protective packaging. We know we can reduce plastic's negative impacts by rethinking how we design things, making circularity the priority. That's why recycled paper is the best protective packaging in today’s landscape.

“If you are not designing for planet, what planet are you on?”

KATE RAWORTH,
DONUT ECONOMICS

Appendix

Environmental

Element	Paper	Plastic	Future
CLIMATE CHANGE	The paper industry is responsible for 2% of all emissions from industry - REF	Plastic are responsible for 4.5% of global greenhouse gas emissions - REF Fossil fuels account for over 75% of greenhouse gasses and 90% of carbon emissions. 99% of plastic is made from fossil fuels - REF	Natural fibre production is increasingly being run on renewable energy with 60% of EU production now run on renewables - CEPI Decarbonising plastics is far more complex as emissions are released in more stages of its process. Fundamentally, we need to keep fossil fuels in the ground to beat climate change.
OCEAN ACIDIFICATION	Ocean acidification is also accelerated by land use change (reducing the ability of the land to absorb carbon) - Flexi-Hex is 100% recycled content, so has minimal effect on land use change that is generally associated with virgin material.	Plastic leaching could produce a seawater pH decrease up to 0.5 units - REF	EU forests are increasing in size by 1.5m football pitches a year, forestries are carbon sequestrants - REF The use of alternative natural fibres (eg. seaweed) can help absorb carbon when grown, combined with increasingly higher recycled content helps drive down carbon emissions.
CHEMICAL POLLUTION	Chlorine based pollutants released in the manufacturing process are a concern for natural fibres. Flexi-Hex is unbleached, using water based glues and made from recycled content. So pollutants are limited further.	There is evidence that >16,000 chemicals are potentially used or present in plastic materials and products. A mere 6% of these chemicals are currently subject to international regulation. More than 4,200 plastic chemicals are of concern because they are persistent, bioaccumulative, mobile, and/or toxic (PBMT). Over 1,300 chemicals of concern are known to be marketed for use in plastics and 29–66% of the chemicals used or found in well-studied plastic types are of concern. This means that chemicals of concern can be present in all plastics types. - REF	Natural fibre production is increasingly limiting chemical use and the release of. This is far more complex to achieve with plastic, being a chemically based material.
NITROGEN AND PHOSPHERUS LOADING	Loading in production; although not non-existent has been proven to be low - REF	Microplastics affect nitrogen cycling in the freshwater sediment-water system - REF	The natural fibre industry is actively working to reduce loading and standards are improving all the time. Efforts to limit plastic pollution is not meeting the scale of the challenge.

Environmental

Element	Paper	Plastic	Future
FRESH WATER WITHDRAWALS	Flexi-Hex is made from 100% recycled content and recycling one tonne of paper saves 7,000 gallons of water compared to producing virgin paper - REF	Plastic uses around 4 times less water in manufacturing than paper and pulp production, however this doesn't account for the extraction process of fossil fuels - REF	The paper and pulp industry is working on water reuse systems which will drastically reduce water use - REF
LAND CONVERSION	Natural fibres account for 13–15% of total wood consumption from forestries - REF Recycled paper has little effect on land conversion compared with virgin material.	Terrestrial microplastic pollution is much higher than marine microplastic pollution - an estimate of four to 23 times more, depending on the environment - REF	EU forests are increasing in size by 1.5m football pitches a year, forestries are carbon sequestrants - REF The use of alternative natural fibres, such as seaweed, can assist in rejevanting depleted biodiverse areas.
BIODIVERSITY LOSS	The loss of intact forest landscapes is down by 7.2% since the year 2000, with the rate of loss tripling between 2003 and 2016. The leading driver (responsible for 37% of the loss) being timber harvesting, including for papermaking - REF Recycled paper has minimal effect on biodiversity loss.	Marine plastic pollution effects 453 animal species. 40% of marine mammals and 44% of seabirds have ingested plastic - REF	The use of alternative natural fibres, such as seaweed for paper, can assist in rejevanting depleted biodiverse areas. For example, only 0.066% of the total ocean space is required to replace all single-use plastic with a seaweed alternative - REF
AIR POLLUTION	PRODUCTION - Air pollution from paper mills is mainly caused by the production of various volatile sulfur compounds (from sulfite pulping process), odour emissions (from reduced sulfur), SO2, and nitrogen oxides (NOx) - REF Whilst this is a concern, these are generally limited to the vicinity of the mill location rather than multi ecosystems. Recycled content has a reduced effect on air pollution compared with virgin options.	EXTRACTION - Oil and gas drilling can release toxic air contaminants including benzene, carbon monoxide, ethylbenzene, hydrogen sulphide, ozone, particulate matter, sulphur dioxide, toluene, volatile organic compounds and xylene. PRODUCTION - During the process of refining plastic, toxic resins and additives such as benzene and vinyl hydrochloride are released. IN USE AND END OF LIFE - Contribution of microplastic in the sea, land, air and rain at a daily rate of 365 microplastic particles per square metre - REF	Air pollution from natural fibres predominantly arises from production, which is easier to limit. Plastic air pollution occurs more frequently in comparison, throughout its lifecycle. Which is more complex to limit.

Social

Element	Paper	Plastic	Future
WATER	While the paper and pulp industry is one of the largest water consumers in the US & EU, there is little evidence of paper production polluting drinking water. Additionally, recycling one tonne of paper saves 7,000 gallons of water - REF	A global survey of tap water from six regions on five continents found that of 159 samples analyzed, 83% contained plastic particles - REF	Efforts to close the water loop within the paper and pulp industry will drastically reduce water consumption in the future - REF The efforts to limit microplastics in water isn't meeting the scale of the problem.
FOOD	The effects of the paper and pulp industry on food is generally limited to the local of paper mills. Flexi-Hex is unbleached, uses water-based glues and recycled content, so pollutants are limited further.	Plastic is now found in the food chain - REF	Natural fibre production is increasingly limiting chemical use and the release of. This is far more complex to achieve with plastic being a chemically based material that leaks at multiple stages of the lifecycle.
HEALTH	The effects of the paper and pulp industry on health is generally limited to the local of paper mills - REF Flexi-Hex is unbleached, uses water-based glues and recycled content, so pollutants are limited further.	There are serious concerns for health at every stage of plastic's lifecycle - REF	Natural fibre production is increasingly limiting chemical use and the release of. This is far more complex to achieve with plastic being a chemically based material that leaks at multiple stages of the lifecycle.
INCOME & WEALTH	Flexi-Hex is a B-Corp which raises the standards of employees and suppliers working conditions.	The plastics industry employs twice as many people than the paper industry in the UK - REF	

Social

Element	Paper	Plastic	Future
PEACE AND JUSTICE	All Flexi Hex products are FSC Certified which recognises community rights, including the rights of indigenous peoples - REF Flexi-Hex is a B-Corp which raises the standards of social governance.	Fossil fuels have been at the centre of many large global conflicts - REF	Demand for high standards and certifications will increase.
POLITICAL VOICE	The paper and pulp industry are powerful in some areas and may well limit some communities access to water – REF Using recycled content mitigates involvement in bad practices that are focused on virgin material production.	The world's five big oil and gas majors and their lobbyists have spent at least €251 million lobbying the EU since 2010 - REF	
GENDER EQUALITY	A researcher of the paper and pulp industry found the gender distribution was almost the same - REF Flexi-Hex is B-Corp which encourages organisation to close the gender gap.	Women's role within the plastics value chain means they suffer greater economic and health impacts than men - REF	Both industries will be looking to redress the balance in gender equality.
ENERGY	Paper and pulp use 8 exajoules per year - REF Average paper packaging distance traveled from production to retailer - 1,200 km - REF	Petrochemicals use 9 exajoules per year - REF Plastics packaging distance traveled from production to retailer - 22,460 km - REF	Although energy efficiency plays a fundamental role in reaching Net Zero, as the world decarbonises there is less environmental concern with energy use