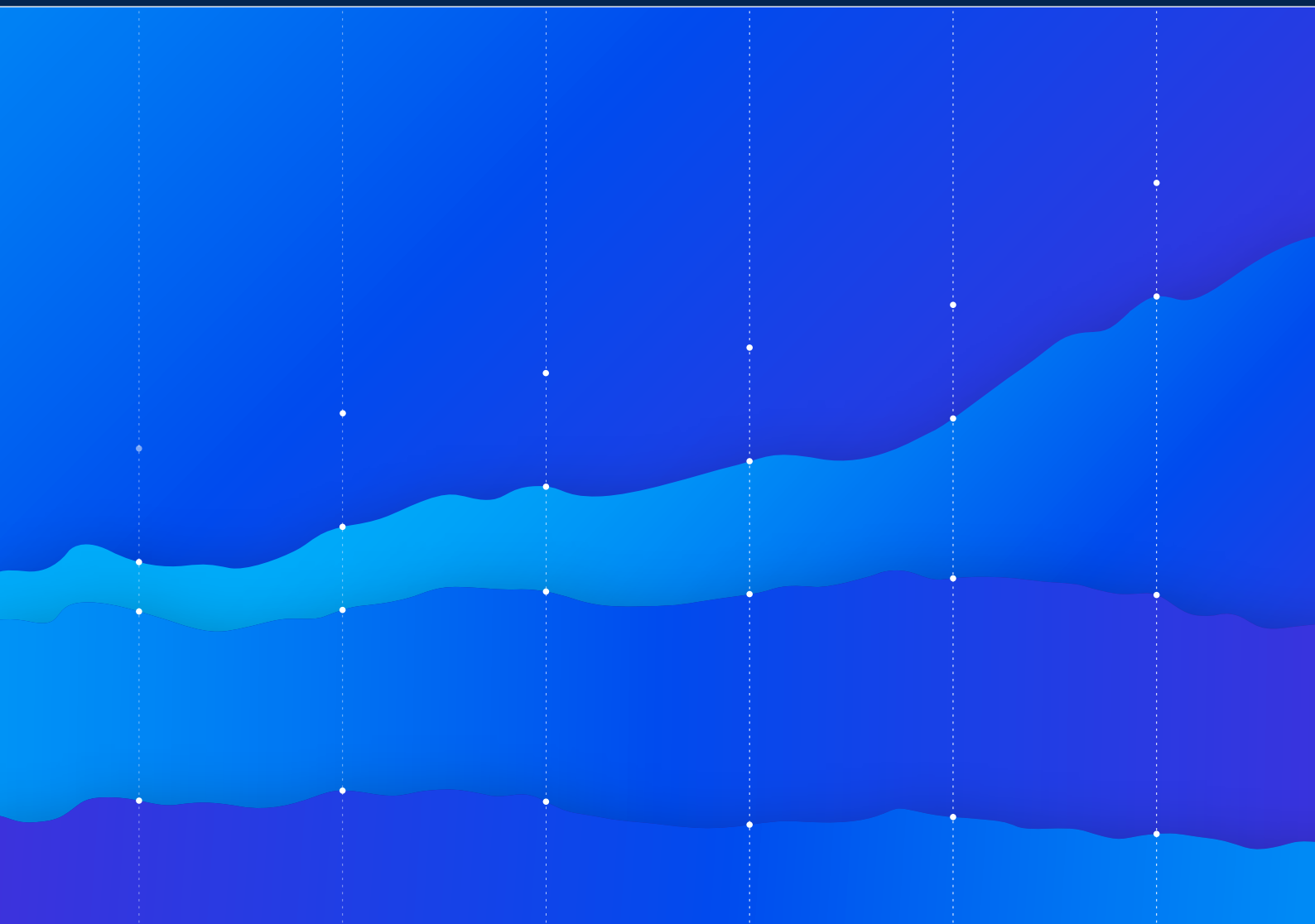
GOCARDLESS

Payments, plastics, people and the planet



Overview

At GoCardless we are committed to reducing our impact on the natural environment and seeking opportunities to create positive change, leaving a more sustainable world for future generations.

We recognise that we are interconnected with our environment and understand that the prosperity of our stakeholders — including our employees and our customers — is dependent on the services that our planet provides. Yet with humanity currently using the equivalent of 1.75 Earths for the provision of resources and absorption of waste – including greenhouse gases — it is crucial for businesses to take urgent action.

In 2021 we became co-founders of the Tech Zero coalition — a UN Race To Zero Partner — and signatories of the Business Ambition for 1.5°C Campaign, committing to reach Net-Zero emissions as outlined by the Science Based Target initiative Net-Zero Standard.

Reducing our emissions in-line with climate science is not only an environmental necessity, but also a societal one. Limiting global temperature rise to 1.5°C is a crucial target for many communities around the world, with a large proportion of the people most at risk from the effects of climate change being the least responsible for causing it.

Plastics, People and Planet

Over recent years awareness of the impact of plastic pollution has increased dramatically, driven by coverage such as Sir David Attenborough's' Blue Planet and A Plastic Ocean. However, across the world nearly 400 million tonnes of plastic continue to be produced each year — with 40% of this being single-use plastic — contributing to the twin crises of the ecological and climate emergency.

Across the planet, natural ecosystems are at increasing threat from the wave of plastic waste that enters our waterways and oceans, with NGO Plastic Oceans estimating that **8 million tonnes** of plastic enter the ocean every year, and without action scientists predict this amount could increase tenfold by 2025. The Guardian reported that plastic waste is responsible for the deaths of more than 1,000,000 birds and 100,000 sea mammals and turtles every year.

According to the Marine Conservation Society, "Pollution has been reported to be one of the five main drivers of the current biodiversity crisis, threatening 40% of marine mammals with extinction." However, this impact is also apparent much closer to home, with a WWF report showing how humans consume on average the equivalent of a credit cards' amount of plastic each week.

Globally, we are also becoming increasingly aware of the impact of climate change, with the recent IPCC 2022 Climate Change report stating "Climate change is a threat to human well-being and planetary health. Any further delay will miss a brief and rapidly closing window of opportunity to secure a liveable and sustainable future for all."

However, greenhouse gas emissions continue to increase, and - although often seen as parallel crises — climate change and plastic pollution are more interlinked than we may think. An IPCC report showed that in 2019, plastic production and disposal produced 850 million tonnes of greenhouse gas emissions in 2019 — equivalent to 220 Coal Fired Power Stations - and this may rise to 2.8 billion tonnes by 2050.

This is due to the fact that plastics are derived from fossil fuels, meaning the process of extracting and transporting these fuels, the manufacturing process, and the end-of-life treatment releases GHGs into the atmosphere. According to the WWF, 4% of global petroleum production is for plastic production alone.

Plastic waste also highlights wider societal inequalities, with a recent UN Environment Programme Report showing how vulnerable communities are disproportionately impacted by plastic pollution — in the same way that communities least responsible for climate change are those most at risk from its impact.

Waste entering waterways may cause flooding, while plastics and microplastics can pollute seafood which communities depend on for food. Additionally, communities living in the vicinity of extraction, refining and production facilities can be exposed to associated pollution and toxins. In fact, many Global North countries often export their waste to less developed, Global South Countries, where end-of-life practices (if there are any at all) such as incineration have a direct impact on the wellbeing of communities.

Response

In response to this crisis, Governments, businesses, and consumers are taking action. In July 2021, The EU banned the sale of single-use plates, cutlery, straws, and cotton buds in EU Member States. The UK Government announced the intention to follow suit after already implementing a plastic bag charge, banning plastic microbeads in 2018, and single use straws and stirrers in 2020. And recently, 200 countries have agreed to create a legally binding plastics-treaty to tackle the "plastic crisis" — akin to the Paris Agreement for Climate Change.

Large scale projects such as the Ocean Cleanup, which aims to remove 90% of plastics in the oceans, and UK based Ocean Saviour — which will collect up to 5 ocean tonnes of plastic per day — are both developing innovative technology to tackle the problem.

However, when designed for long-term use and circularity, plastics can potentially help to reduce emissions through reduced weight in packaging (for example when compared to glass), or by helping to reduce food waste — which is also crucial with 1 in 3 mouthfuls of food going to waste globally, producing 8 – 10% of global greenhouse gas emissions. Sometimes, a plastic product may be better for re-use and recycling than alternatives. James Piper — author of The Rubbish Book — points out that moving away from plastic packaging is not always the most sustainable choice. HDPE milk bottles for example are collected and likely to be recycled, whereas cardboard cartons with plastic liners are less likely to get recycled.

Yet according to the Waitrose Food and Drink report in 2019, 88% of viewers who watched "Blue Planet 2" and witnessed the impact of plastic waste on wildlife have since changed their consumption habits. According to a survey conducted by Oceana, 87% of consumers believe major retailers need to reduce the amount of plastic they use, whilst research by Accenture shows 72% of consumers are buying more sustainable products than they were 5 years previously.

Plastic Finance

Credit and Debit cards — often referred to simply as "Plastic" — are still in the most part made from plastic, specifically polyvinyl chloride acetate (PVC). According to Global Data (Payment Cards Analytics), in 2021 there were 17.2 billion credit, debit and charge cards in circulation, yet — according to Forbes — the average lifespan of a card is only 3 years.

With an average plastic card weighing-in at 0.005 Kg, this is 86,000 Tonnes of PVC in pockets around the globe.

In the extraction of materials and production process alone the greenhouse gas emissions from producing these cards in 2021 was **293,525 tCO2e**.

[17.2 billion cards x 0.005 Kg x 3.41308 KgCO2 e/Kg = 293,524,880 KgCO2 e = 293,525 tCO2e]

[3.41308 KgCO2e/Kg is the DEFRA Emission Factor 2021 for PVC Primary Material Production]

For context, this is equivalent to the emissions driving an average diesel car around the Earth ~43,000 times would create (driving 1.1 billion miles).

With 20.5 billion cards forecasted to be in circulation by 2025 (according to Global Data), this could rise to **349,841 tCO2e**.

However, the impact is not only in the manufacturing process. PVC is not biodegradable, taking up to 400 years to break down. Due to its material make-up (and low economic value) it is often difficult to recycle. In fact, of the 8,300 million tonnes of plastic produced worldwide between 1950 and 2015, only <2% has been recycled with the rest sent to landfill, disposed of in the natural environment, or incinerated; contributing further towards the ecological emergency and the climate crisis.

If all 17.2 billion cards in 2021 were sent to landfill, this would produce **766 tCO2e** of greenhouse gas emissions. But, if they were incinerated, this increases to **1,831 tCO2e**.

[17.2 billion cards x 0.005 Kg x 0.008902 KgCO2 e/Kg = 765,572,000 KgCO2 e = 766 tCO2e]

[17.2 billion cards x 0.005 Kg x 0.021294 KgCO2 e/Kg = 1,831,284 KgCO2 e = 1,831 tCO2e]

[0.008902 KgCO2e/Kg is the DEFRA Emission Factor 2021 for PVC disposal in landfill

0.021294 KgCO2e/Kg is the DEFRA Emission Factor 2021 for PVC Disposal via Combustion]

What is being done?

There are developments in the material design of cards, such as the Thales eco-friendly card made from Polylactic acid, a plant-based plastic substitute, whilst other cards are now made from wood and metal.

However, metal cards can weigh up to 0.027 Kg, and with metal production itself creating — on average — 3.97582 kg CO2e per kg, if all the 17.2 billion cards in 2021 were Metal cards, this would have produced **1.9 Million tCO2e** in production, and **9,889 tCO2e** if incinerated at the end of life.

An Alternative?

Just as the first step in the "waste hierarchy" is to **Prevent Waste**, removing the need to use a plastic card in the first place could help consumers who wish to reduce their impact on the natural world.

At **GoCardless**, our technology not only creates a positive impact on our customers' businesses, but our payment process removes the need for our customers to use cards in the first place.

Of course, we are the same as any other business in that we still have a wider impact (which we measure and report annually here) but this is why we are committed to measuring and reducing our own environmental impact in line with climate science, whilst looking for opportunities to create positive change.

Payment Efficiency = Energy Efficiency

We often think that emissions only come from sources we can see, such as cars and planes. However, the energy used in digital services — such as in processing a payment — also has an impact.

When we process a payment and move our customers' money this requires energy, and therefore creates emissions. However, when using an Account-to-Account payment method such as GoCardless, the steps (the process of moving data between parties) involved are simplified:

Consumer > GoCardless > GC Customer

However, a typical credit or debit card transaction involves many more steps:

Consumer > Merchant > Processor > Card Network > Issuer > Processor > Card Network > Processor > Merchant

The simplified two-step process produces approximately **0.13 grams of CO2e** per transaction, yet the additional steps in a traditional card payment increase associated energy and emissions to **0.53 grams CO2e**, assuming all other factors remain constant.

If all the 787 billion card transactions in 2021 followed this 8-stage process — the resulting emissions (still assuming all above assumptions remain the same) would be **416,742 tCO2e**. However, if all these transactions used a similar approach to the GoCardless A2A model, this would be **104,222 tCO2e** — a 75% reduction.

In real-terms this is dependent upon the energy that the payment provider uses to process these transactions. The calculation is based on a global emissions factor, but if the provider used 100% renewable energy (whether for a card or A2A payment), the market-based emissions would both be zero.

How is this measured?

For an equal comparison, we have used the same data for each calculation, based on our own measurements in our verified Climate Impact Report 2019 – 21.

- Payment Steps: The amount of steps in a payment process. For GoCardless, this is taken as 2.007 as a small number of payments have to go via an additional step. For simplicity, both card and A2A payments assess the high-level steps between intermediaries on the payment chain, rather than bespoke/complex processes.
- Average size of a data packet: Until we can measure this more accurately, we have based the amount of data that is moved as equal to an average email; 75 KB
- Average energy needed to move 1 GB: This is taken from "Global Electricity Usage of Communication Technology" and is 1.8 Watts.
- Global emissions factor: As this is a global comparison, the amount of CO2e produced per KWH uses a global emissions factor.

[787.5 billion payments x payment steps (2.007) x ave size of data packet (0.000075 GB) x Avg. energy needed to move 1 GB (1.8w) x ave global emission factor (0.49 kg/kwh] = 104,222 tCO2e]

[787.5 billion payments x payment steps (8) x ave size of data packet (0.000075 GB) x Avg. energy needed to move 1 GB (1.8w) x ave global emission factor (0.49 kg/kwh] = 416,742 tCO2e]

With the number of card payments projected to reach 1.3 trillion in 2025, moving from an elongated process to an efficient A2A could save ~500,000 tCO2e.

By reducing the steps in the payment process — not only does it save time for customers — it can also reduce the energy consumption and associated greenhouse gas emissions. However, this is dependent upon the energy source used in the process, whilst it is also vital the payment provider is also taking action on reducing emissions across the rest of their business.

Crucially, just as how the payment is made has an impact, what the payment is for is also important, with wider consumer behavioural change a key component of climate action.

A Net-zero emissions service?

Not only does the simplified payment process itself increase efficiency, in 2022 our service to our customers will become a net-zero emissions service.

WHAT DOES THIS MEAN IN REALITY?

Well, this certainly doesn't mean we have reached our ambitious 2035 Science-Based Net-Zero target ahead of schedule, where we need to reduce our emissions per-employee by 97% across scope 1, 2 and 3. But what it does mean is that for our direct emissions in providing our service (the emissions that are passed on to our customers):

1. We will have reduced our direct emissions (Scope 1 & 2) by at least 90% from our baseline

2. We will have permanently removed any residual emissions from the atmosphere

HOW HAVE WE DONE THIS?

In 2019, our scope 1 and 2 emissions were **31.68 tCO2e**.

Then in 2021, this was reduced by 90.4% to **3.04 tCO2e** by measures such as changing our main energy providers to 100% renewable sources, backed by the Carbon Trust.

In 2022, our scope 1 and 2 emissions are estimated to be between **0.19-0.4 tCO2e**; a 99% reduction from 2019. We are now working with partners to ensure our residual emissions will be permanently removed, meaning our total market-based scope 1 and scope 2 emissions passed to our customers when they use our service will be classed as net-zero.

We have gone even further by partnering with renewable energy generators to match the energy used in transactions and by our customers with 100% renewable energy. This is of course not as good as our customers moving to 100% renewable energy, but in the meantime, this is a step in the right direction.

However, we still have a long way to go to get to net-zero emissions across our whole value chain (Scope 1, 2 and 3) - with our Science Based Net-Zero Target for 2035 requiring a 97% reduction in emissions per employee - but getting to net-zero emissions for our direct impact is a great first step.

Find out more about our targets and plans in our Sustainability Strategy & Net-Zero Action Plan.

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