

CONFERENCE REPORT:

# Putting the Environment Centre Stage



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# Introduction

The Cash & Payments Sustainability Forum™ in Edinburgh was an industry first. As such it was very much an experiment, a step into the unknown. Following on from the November 2021 white paper, 'Cash: A Roadmap to Sustainability', and a series of conference seminars throughout 2022, the goal was to take a systematic and in-depth look at sustainability for central banks, cash producers and the cash management sector.

The Forum was organised into an opening session focused on policy and reporting followed by an operational focus concentrating on manufacturing and cash management. There was also a seminar to share the approach and work of the UK's Cash Industry Environmental Charter group, an unusual voluntary co-operation between companies in the cash cycle.

The event was organised as a 'Forum' rather than as a conference with the intention of allowing great conversations and to encourage discussion. A 'round table format' helped this approach. A third of the speakers were not from the normal cash community to ensure new information, different approaches and fresh thinking.

Finally, Reconnaissance issued its new white paper on the re-purposing of unfit cotton banknotes, 'What goes around comes around', and Royal Dutch Kusters and Hunkeler both presented new papers in the same area.

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## POLICY

### The Case for Change

Dr Sarah Birrell Ivory, Director of the Centre for Business, Climate Change and Sustainability at Edinburgh University Business School, opened the conference with a tour de force of the environmental challenges faced by the world. The question is whether humankind is changing the globe's climate for the first time. The answer seems to be yes as we were asked to reframe our thinking to see this year as the coolest that will take place in the next 100 years.

She argued that the evidence that the change in the planet's climate is not driven by a change in the solar energy influx is overwhelming. However, while the loss of ice caps and glaciers does mean the Albedo effect is reducing, it is the increase in greenhouse gases that is the primary driver of change. We have doubled the amount of CO2 in the atmosphere since 1990.

Dr Ivory then made the case that the priority was to focus on mitigating or adaptive changes. She challenged the room to consider the opportunities to business from dealing with the impact of climate change and how business can contribute to addressing the impact of business on climate change.

She finished with two quotes, 'Just because you can't do everything, doesn't mean you shouldn't do anything' and 'The person who says it cannot be done, should not interrupt the person doing it.'



The person who says it cannot be done, should not interrupt the person doing it.



# Doing ESG Well

## ESG overview (Royal Mint)

Inga Doak from the Royal Mint (TRM) laid out how an organisation which is 1,100 years old can still be leading and progressive. She explained TRM's Environmental, Social and Governance (ESG) programme and gave an example of the significant work being done in its local energy centre to increase its own generation of renewable energy and to reduce its reliance on the national electricity grid.



## Metrics matter (MyCarbon, DNB)

The importance of measuring things was a constant theme during the Forum. The opening session heard from Dr Toby Green, MyCarbon, and Jan-Mark Geusebroek, Dutch National Bank (DNB), who spoke about Life Cycle Assessments (LCAs). While MyCarbon is an organisation that carries out LCAs for organisations, the DNB presented its recent work on cash. Dr Green laid out principles, processes, methodologies and reporting for the audience to consider when commissioning their own LCAs. Jan-Mark updated the DNB's 2015 work, revealing some significant amendments to the original work..

In 2015 DNB found that while there was a gap in carbon emissions per transactions between a debit card and a cash payment, the difference was not enormous. New work addressing some errors in the original study found that cash has a five times greater impact than debit cards.

### THE PROCESS



Despite this unwelcome news, the presentation also looked back to the reduction in the impact of cash since 1990 and discussed the many changes which have taken place since 2015. In 1990 the figure was 19.3 MKG, in 2015 it was 16.5 MKG and in 2019 7.5 MKG. DNB believes that it can see the way forward for cash to be reduced to the same level of cards.

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## Using procurement to drive change (Franz Seitz, NatWest)

While Dr Franz Seitz used data to demonstrate that sustainability is more than just environmental impact but also the societal impact of cash and the importance of resilience in its wider sense, NatWest Bank and the DNB talked about procurement.

Jo Saunders explained NatWest's work on sustainability and then focused on the use of ratings agencies, in their case EcoVadis, to measure the environmental impact of suppliers. NatWest asks suppliers to work with them and with EcoVadis. This is used as a partnership tool rather than for the selection of suppliers, so measurement takes place after award and NatWest works with the suppliers to improve their ratings.

NatWest is aware of the risk of such work imposing a burden on small suppliers and excluding innovative new organisations. It has developed slimmed down ratings tools to help avoid this.

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## Procurement the Dutch way (DNB)

Annemieke de Gooijer explained how sustainability has been used in the Joint European Tender (JET) for the procurement of euro banknotes for the nine banks who tender together. In 2015 the JET tender required suppliers to use a mix of organic, fairtrade or 'Better Cotton Initiative' (BCI) cotton. In the end 50% of the cotton used came from these sources. By 2019 all cotton came from these sources. Because of a shortage of organic and fairtrade cotton, BCI cotton made up 80% of the cotton used. The success of this programme has helped the ECB to require 100% of euro cotton to be from sustainable sources.



In the 2021 JET tender sustainability was one criterium used to award the business. The tender required proof of the percentage of energy from renewable sources used by the company and a calculation of the supplier's carbon footprint based on Green House Gas (GHG) protocols for emissions relating to the order. Points were awarded in line with the level of information provided. Scope 1, 2 and 3 information scored maximum points.

This approach is being refined with the aim of being able to compare supplier calculations in future tenders. More work is needed on the ratio of points awarded relative to the award criteria, how to include water and waste in the criteria and to understand the impact and implications to the current energy crisis.

# Getting to Net Zero Emissions

Three speakers took delegates on a journey from using less energy to the right and wrong way to buy renewable energy, ending up with how to carbon offset properly as and when organisations need to cover residual obligations. All speakers were from outside the banknote industry.

## An energy supplier perspective (npower)

Npower Business Solutions are the UK business of E.On, a European wide German energy company providing energy to business and consumers. A YouGov survey of 502 UK businesses found almost half aim to be carbon-neutral by 2030 but only 8% are already there. The net zero journey is, therefore, a major objective.

This is consistent with the Npower business customer tracker that found 55% said sustainability measures were their most important investment priority over the next 12 month. The tracker also found 58% saw energy efficiency as the best way to reduce energy risk, with the use of energy management tools (48%), an energy specialist (33%) and investing in self-generation (27%) as the best way to do this.

To avoid adding any incremental CO2 into the atmosphere, npower's recommendations are straightforward. Minimise the consumption of emissions generating materials, switch to low-emission fuels, processes and activities such as using heat pumps, use new technologies when they are ready, such as green hydrogen and carbon capture, and offset what you can't eliminate.

The challenges in achieving net zero include:

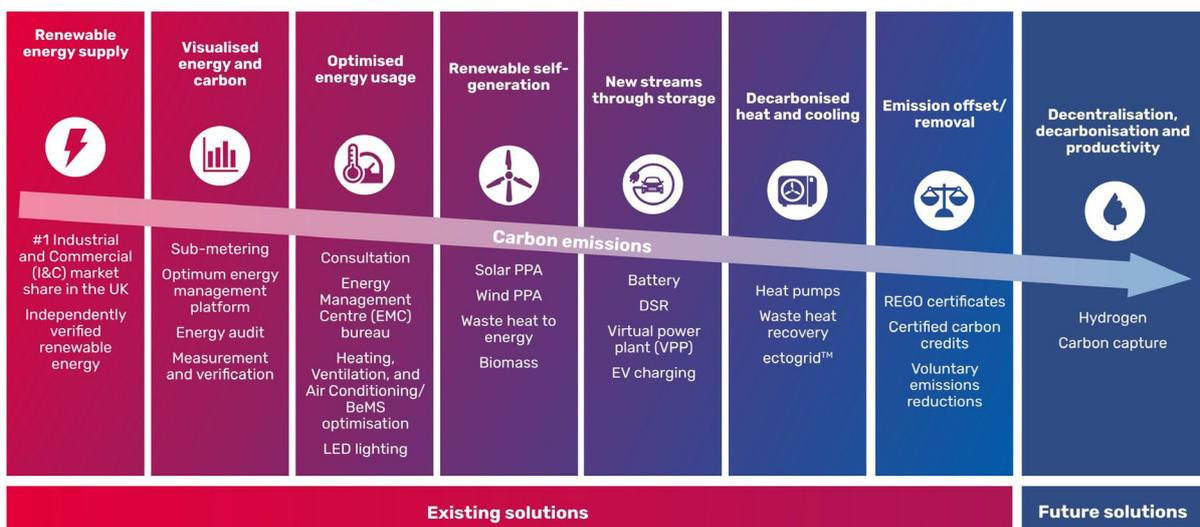
- » Understanding your GHG emissions across the three scopes
- » Knowing how to model your business to set realistic targets
- » Being clear on the business case for getting to net zero
- » What to do and what to prioritise to optimise the cost/benefit of investments to get to net zero
- » Getting the business case signed off
- » Proving that the work done has delivered cost/benefit analysis in line with the plan

**MANAGING SCOPE 2 TARGETS.** Scope 2 emissions are emissions you buy in produced by your consumption of electricity, heat, steam and cooling. The obvious first step is to minimise your demand. Npower's recommendations after that were to use decarbonisation technologies to reduce the emission load, to investigate the potential of on-site generation and storage and source renewable energy from Power Purchase Agreements (PPAs).

**MANAGING SCOPE 3 EMISSIONS.** Scope 3 emissions are those produced indirectly by your suppliers. The Carbon Disclosure Project (CDP) says that the average organisation's Scope 3 emissions are five-and-a-half times greater than those created by their direct operations.

The starting point is to work with your suppliers to measure your Scope 3 emissions and then to set targets with them to reduce those emissions. Where possible choose low emission products and design them differently to reduce emissions. For those that cannot be eliminated, offset the balance.

**POSSIBLE SOLUTIONS TO HELP ACHIEVE NET ZERO EMISSIONS.** Helpfully, npower provided a neat summary of possible technologies to assist with a reduction to zero emissions.



## How to buy renewable energy 'well' (University of Edinburgh)

Dr Matthew Brander from the Centre for Business, Climate Change and Sustainability at the University of Edinburgh Business School focused on Scope 2 emissions and how to source renewable energy.

He explained there are two ways of calculating grid electricity. The locational grid average, which works out the total emissions from all generation as a proportion of the total electricity generated, 0.19kg CO<sub>2</sub>/kWh in the UK, and the market-based method where organisations have a contractual arrangement based on Renewable Energy Certificates (REC), Guarantees of Origin or other contracts. For this method users can claim the attributes associated with renewable energy, ie. zero kg CO<sub>2</sub>/kWh.



About 2,000 companies use the market-based method to report CO<sub>2</sub> emissions to the CDP, for example Google, Unilever and the Royal Bank of Scotland.

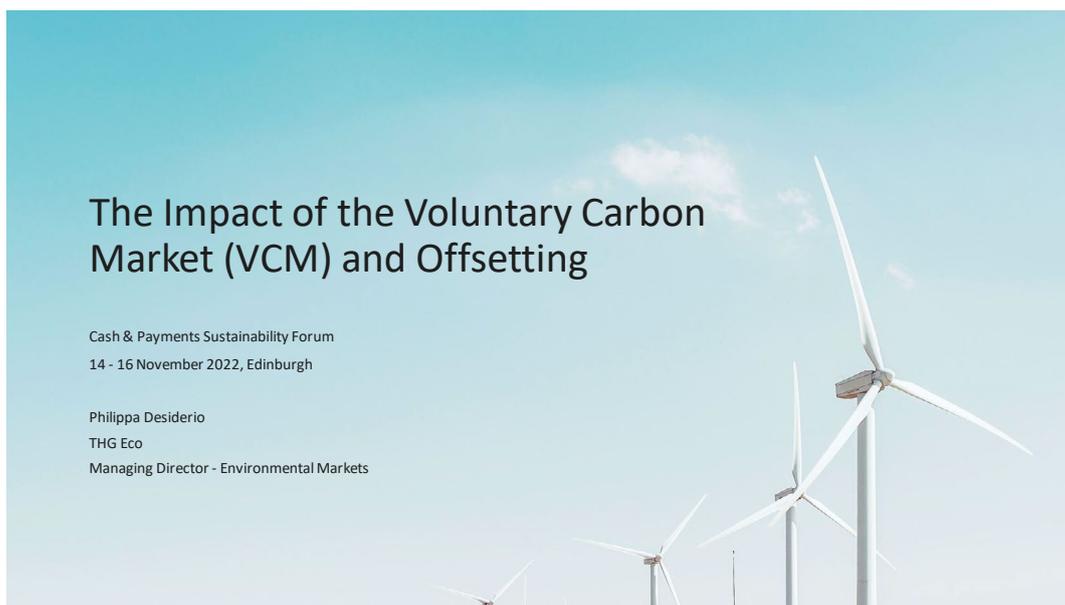
There are two, related, problems with the market-based method. First, additionality. If the renewable energy project existed without the company buying the REC, then the purchase has not added to the stock of renewables. The presentation then provided a long list of independent empirical studies that show no or limited additionality.

Second, GHG disclosures are not necessarily accurate. Even if a company reports zero emissions from electricity consumption, they are still drawing electricity from the grid, creating emissions. Unless there is proven additionality, they have not added to the stock of renewable energy. In addition, there is a risk of 'distraction', ie. the company does not feel any imperative to reduce consumptions and so takes no action.

The solution is either to use only the locational method while reporting the impact from contractual arrangements separately or to prove additionality alongside the market-based method. This is where the PPAs referred to by npower can be useful where they have led to the creation of additional renewable capacity. The GHG Protocol is aware of the problem and looking to revise their standards.

## Doing carbon offsetting 'well' (THG Eco)

THG Eco specialises in carbon offsetting and laid out how these work, and the pitfalls that need to be avoided.



**PROJECT VALIDATION AND VERIFICATION.** Projects need to be real, measurable, additional, independently verified and unique. The credit standard used needs to be high quality and THG Eco recommended three – Gold Standard (Verified Emissions Reduction), Verified Carbon Standard (VCS) and the Certified Emission Reductions (UN Framework Convention Climate Change CDM). The standards set global benchmarks for rigorous third-party monitoring, reporting and verification procedures. They provide the infrastructure needed to issue, trace, transfer and retire carbon credits. They show evidence of ownership to prevent double counting.

Each project needs to be sourced from a credit standard with a unique project number, the country of origin, the methodology that defines the product type, the year the offsets were generated, features (for example the SDGs it covers), the quantity in tonnes offset and the unit price of the credits.

**TYPES OF CREDIT.** There are two types of credit. Avoidance credits cover projects that allow people to avoid emitting carbon, eg. renewable energy projects. 90% of projects are avoidance projects. Removal credits are for projects that directly capture carbon from the atmosphere and store it within the system, for example blue carbon (mangroves), brown carbon (soil carbon, biochar) and direct air capture.

**PRICING.** The price of credits rises in line with the level of additionality of the project. Nature-based solutions, waste projects and chemicals being the most valuable while energy demand, energy generation and transportation are priced lowest. In 2020 the average carbon offset price was \$2.50 per tonne. Currently supply significantly exceeds demand and so prices are low relative to historic levels, and this is likely to continue for several years.

There are pros and cons for whether carbon credits are bought through a broker, over the counter (OTC) or in an exchange. While OTC is the lowest cost, it is also the longest and most complicated. Using a broker is the most expensive but provides the best project selection. An exchange is quick but allows no direct project engagement and limited project choice. As the saying goes, you pay your money and take your choice.

The recommendation was to measure, reduce and only then offset.

# From the Ground Up

The ESG agenda tends to be driven by executive teams down into the organisation. There are though, some great examples of organisations of change coming up from the 'shop floor'

## Vaultex's 'Green Path' staff initiative

Vaultex is a member of the Cash Industry Environmental Charter (CIEC) group. Parts of this summary were presented in the CIEC seminar.



Vaultex, who provide cash management services for two of the UK's largest banks, HSBC and Barclays, started its environmental journey conventionally by adopting some UN Sustainability Development Goals (SDGs) and pursuing them with dedicated resources. It invested in recycling improvements and infrastructure to reduce energy such as building energy management systems, occupancy lighting and 'PowerPerfactor' technology. It then found that the ideas for further improvements plateaued. At this point Vaultex decided to change tack and to concentrate on its staff. It wanted its people to take sustainability to heart and to drive change.

This represented a major change for the organisation and its culture. Communication was at the heart of the programme and people had to be confident that this was a real change. The question was reframed by asking what is impossible and what do we think is impossible?

The conversation was framed as a competition when people were asked for ideas and there was a systematic process of assessing suggestions. The ideas were rewarded to incentivise people for contributing, using gift vouchers and extra time off work.

The business was clear that it was prioritising avoiding landfill, reducing plastic use and reducing energy use in line with its selected UN SDG goals. It also took time to allow the scope of ideas to evolve and to manage the focus when required.

When suggestions were adopted, dedicated project teams were set up of senior managers and operators, with the idea originator involved running a pilot on their own site. Regular updates on all projects were provided across the whole business and the idea's originator was named.

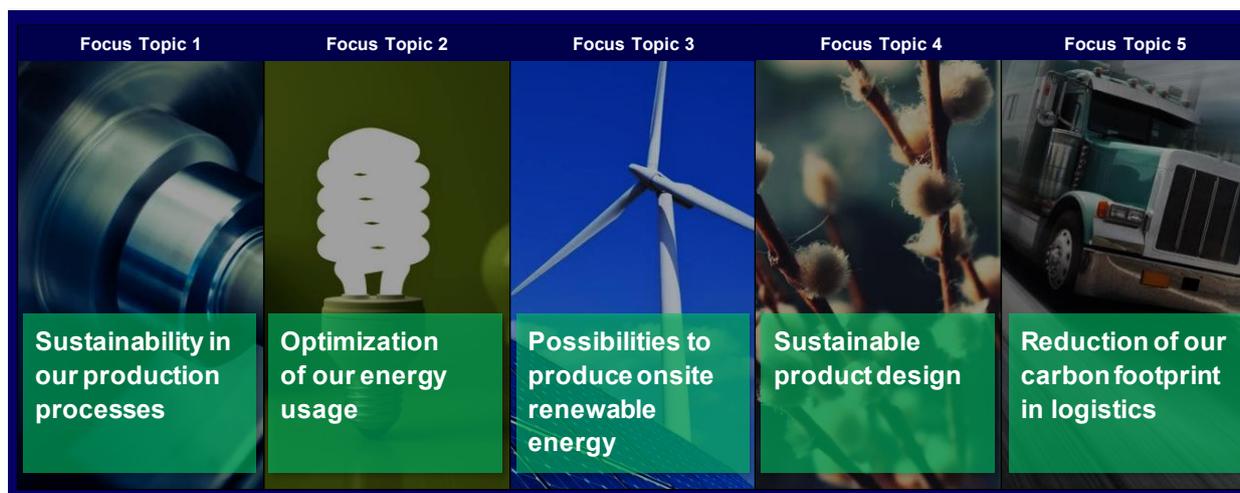
The communication of success generated more ideas and greater levels of involvement. The success and progress of small projects built up momentum, and value, leading to staff setting up site level Green Path groups.

Examples of change driven by the Green Path are a reduction in landfill by 13% by switching from recycling to repurposing. Vaultex has moved to reusable cloth coin bags instead of single use plastic bags, removed note wrappers from all orders, used padlocks for cashier workstations instead of seals and reduced the size of coin sachets within the business, which has now led to a change in the industry standard sizing. Energy use has dropped by 8.9% since 2019, purely from raised awareness and behaviour change. Paper usage has been reduced by removing unnecessary automatic print outs and the creation of a bespoke IT solution that moved document retention from being paper based to an online archive.

The result of all this has been that Green Path has moved from being an annual competition to a culture in the business. There is, still, an annual competition and this is refreshed to keep it vibrant. Vaultex has found that the scheme has improved employee engagement, with staff keen to learn new skills and engage with other departments. Employee engagement increased from 73% in 2019 to 84% in 2022. It has used the Cash Industry Environment Charter group to share knowledge and data across the UK cash industry since it sees this as the route to large scale improvements that will make the biggest difference.

## G+D's 'hackathon' and more

Giesecke+Devrient (G+D) has longstanding and ambitious sustainability goals. In this session, it gave two examples of how it is engaging with its staff to meet its goals.



In 2022 G+D ran an online 'hackathon' on its ESG goals. In the environmental category the title was 'paving our way to Net Zero' and staff were asked to consider sustainability in production processes, optimisation of energy usage, the possibility to produce onsite renewable energy, sustainable product design and the reduction of the carbon footprint in logistics. Across the five topics 1,000 people took part, generating 228 ideas from which 18 were shortlisted. These have now been evaluated, leading to real projects currently being worked on.

The second example was a challenge given to young managers where they were asked to develop a tool that the business could use to consider how project proposals in the business contributed to G+D's ESG goals. An Excel spreadsheet was created to be filled in as part of project bids that provided a numeric and visual representation of the how the project met each of the UN SDG goals within each of the categories of social, ecological and governance criteria. It also provided an overall total score. This approach has now been adopted and implemented for all projects within the Louisenthal business unit.

## Climate change education (NatWest)

Although working outside the banknote sector and on a rather different scale from those present, NatWest Bank is committed to making sustainability core to its business. It has a major educational programme for its staff, whatever their role, to help them put sustainability at the heart of what they do.

In this context NatWest is seeking to drive awareness of climate change amongst its staff, customers and communities, to equip its customer facing staff to help their customers meet regulatory requirements and to change their businesses and to be an influencer around climate change. To do this NatWest is looking to achieve a 'one bank approach', using its own resources and drawing on external research and expertise.

NatWest is working with the University of Edinburgh Business School to create climate change awareness modules, to provide toolkits for leaders to use with their teams and to create a sustainable futures employee-led network. It has created a NatWest Group Academy to provide leadership training, climate change transformation programmes and climate risk training.

Some staff, because of their customer facing roles, need specialist training and bespoke learning is provided for these people. Certain sectors – agriculture, commercial real estate, manufacturing, retail and leisure – have specific needs. Other staff are taking the Chartered Banker Institute green sustainable finance and climate risk qualifications. Finally, NatWest is offering support externally to customers, communities and for youth education.

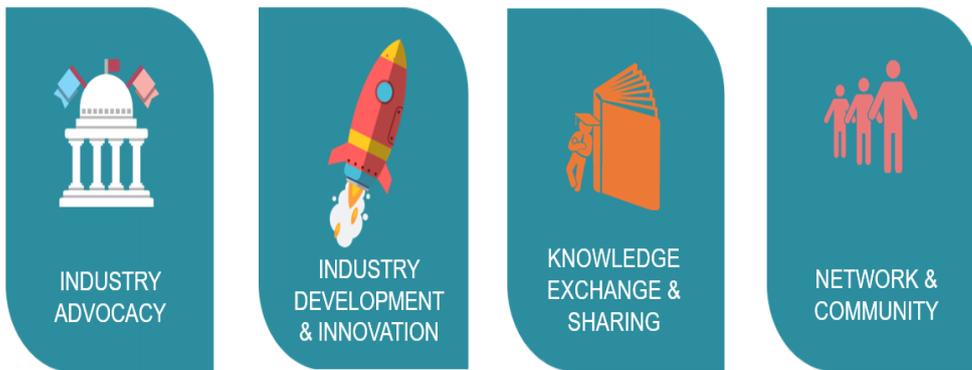
## The role of associations (ICA)

The Director General of the International Currency Association (ICA), Jutta Buyse, explained how the ICA is approaching sustainability. In 2020 the ICA agreed a sustainability charter and it is conducting its work through a committee following two 'pillars', the work of individual companies and the joint activity of members.

There are five actions relating to these pillars:

- » Members are encouraged to share their commitments and high-level sustainability initiatives. This includes collecting net zero targets
- » Monitor, collect and analyse relevant legislation on sustainability and environmental reporting
- » Collect, analyse and exchange relevant key performance indicators
- » Hold member-only events focused on key environmental and other ESG topics
- » Work with the Mint Director Working Group as part of a Cash Sustainability Task Force

## Our fields of activity



# OPERATIONS

## 'Eco-designing' (ECB)

Antonio Arrieta from the ECB explained how sustainability is being put at the heart of the design of a possible future new series of euro banknotes from the very start. There are currently no plans for the issue of a new series.

The Eurosystem consists of 19 National Central Banks (NCBs) with their unique cash cycles. The banknotes for them are made by 39 accredited manufacturers spread across 11 print works, six paper makers and 30 raw material suppliers.

Sustainability has developed over the years. In 2004, after the launch of Euro Series 1, the ECB carried out an LCA. For Euro Series 2 (ES2) in 2019 the ECB carried out a Product Environment Footprint (PEF). For a possible new series, the ECB is putting considerations of the eco-design of the banknotes at the start of the process to reduce its environmental footprint. Feature selection and feature design will require quantifying the environmental performance of new features and concepts relative to ES2.

The PEF is an LCA developed by the European Commission. There are 16 impact categories. For ES2 the contribution of these categories was:

- » Climate change.....22%
- » Particulate matter.....10%
- » Wastewater.....9%
- » Resource use.....8%
- » Land use.....8%
- » Ozone depletion.....7%

36% of the contribution was accounted for by the other 10 criteria. The ES2 PEF measured the actual environmental footprint of the notes using the production and circulation conditions for 2019.

For the possible new series, every change to the specification must result in a lower environmental impact across the whole cash cycle relative to ES2. To do this, the ECB needs to be able to estimate and compare the production and circulation conditions should a new series be produced, issued and circulate relative to standardised ES2 production and circulation conditions using the PEF methodology.

The ECB is prioritising changes that improve the environmental performance of the substrate, increase life in circulation and improve the environmental footprint of the end-of-life treatment of the notes.



## Reducing the impact of the banknote (G+D)

G+D launched its Green Banknote Initiative in 2022. G+D has re-worked the specification of a banknote to understand how it can reduce its environmental impact. Increasing note life makes a significant difference and so G+D selected its Hybrid™ banknote substrate. It went further though by changing the substrate mix to be 50% sustainably sourced cotton and 50% European FSC® certified wood pulp. This mix has 63% less CO2 compared with conventional cotton fibres.

The security thread and foils in the paper and on the note were made using recycled polyester (rPET), the thickness of the plastic layer applied to the back and front of the paper was reduced from 6 to 4 microns, reducing the quantity of plastic by 30% and the weight of the note by 5%, and mineral oil free lithographic ink was used. G+D has calculated that these changes mean that their Green Banknote generates 23% less CO2 than an equivalent standard Hybrid banknote.



## Reducing emissions in manufacturing (CCL Secure UK)

CCL Secure's Wigton site sent its Engineering and Sustainability Manager, Gary Frizell, to describe the site's work on sustainability. CCL has worked with Verco to measure its CO2 emissions using the Green House Gas (GHG) Protocol and BSI PAS2050, used for assessing product life cycle GHG emissions. It has also benefited from audits from the UK's Energy Savings and Opportunities Scheme. This work identified Wigton's Scope 1, 2 and 3 emissions.

**MANAGING SCOPE 1 AND 2 EMISSIONS.** The approach adopted was straightforward in its simplicity making it simple for staff to grasp and use:

- » If it's not needed, TURN IT OFF
- » If it doesn't need to be that hot, TURN IT DOWN
- » If it's only needed for a short while, SCHEDULE IT
- » If there is a better piece of equipment, EVALUATE IT

**MANAGING SCOPE 3 EMISSIONS.** The approach used started with reducing waste, product spoilage, raw material waste and offcuts. Regular communications with suppliers including using local suppliers where possible, establishing the carbon intensity of incoming goods, setting targets and plans and sticking to them.

The result has been between 2018 and 2021 a 22% reduction in raw material emissions per kilogramme of good product, a 90% reduction in incoming transport emissions and a cradle to gate product carbon intensity kgCO2e/kg reduction of 26%.

In addition, a 31% reduction in energy and a 40% reduction in water consumption has been achieved. The Wigton site won the UK's Energy Institute 2022 Energy Management Award.

## A structured approach to get to net zero (Verco)

Verco is a long-established consultancy dedicated to helping manufacturing industry get to net zero emissions. The presentation focused on three areas: the importance of the efficient use of energy, how to prioritise improvements and successful process optimisation.

**ENERGY EFFICIENCY.** It appears organisations are not always rigorous about establishing whether they are truly efficient. Benchmarking against other industry players is a start. While it is easy to do, it seldom leads to significant change. Developing internal normalised standards provides greater contextualised information and better comparisons but needs a greater understanding of energy users and drivers.

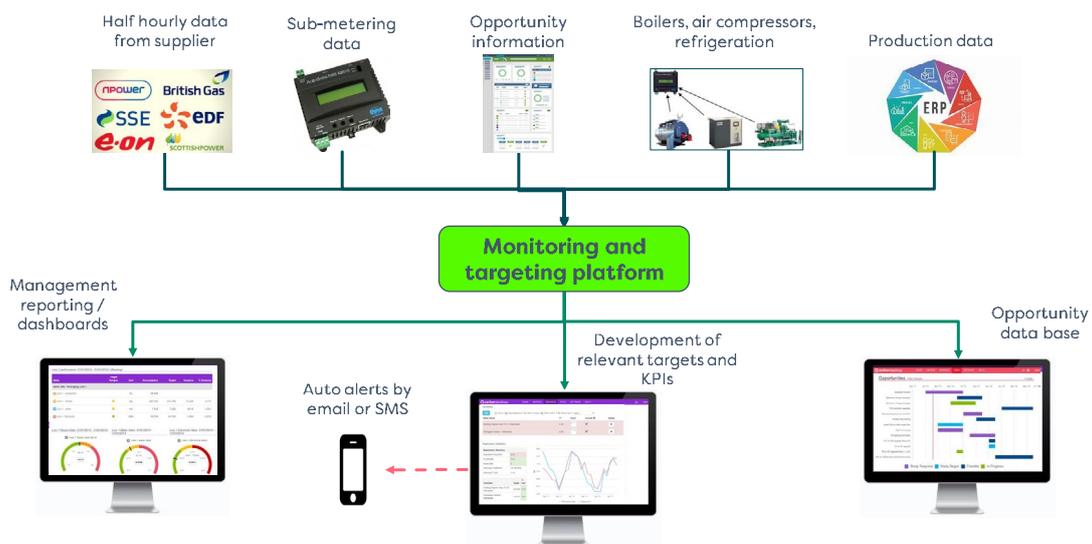
Better yet is to develop a clear understanding of what best in class looks like for the organisation to establish a stretching target. The top of the pyramid is to develop a bottom-up theoretical consumption and to identify the efficiency gap.

**PRIORITISING IMPROVEMENTS.** Since you can't improve what you can't measure, the starting point is ensuring you have high quality timely data. To create a net zero road map, you need to combine the data with bottom-up technical assessments.

**PROCESS OPTIMISATION.** This starts with understanding where value comes from. Verco listed large complex capital projects, standard technical solutions (which usually have a short payback), process optimisation, monitoring and targeting people and behaviour, before suggesting that process optimisation tends to be overlooked and can, in fact, be a source of quick wins.

Process optimisation is often side-lined because of the lack of data and the need for upfront technical assessments. There are, of course, a range of other barriers including technical constraints, the lack of clarity on technical standards, resistance to change, siloed mentalities and a lack of skills and resources.

## You can't reduce what you can't measure



Several case studies were presented to illustrate these approaches.

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## Good manufacture and the environment go hand in hand (Komori)

Komori started work on sustainability many years ago. ISO 14001 is about a systematic approach and target setting and the first Komori site was accredited in 2001 and all sites by 2003. By 2006 all Komori sites achieved zero emissions. Its factories have wind and solar power and oil recycling.

Recycling is key whether of paper, waste solvents, metal machine parts, broken pallets, empty chemical drums and glass. Komori's Tsukuba plant has 20 different categories of waste. In 2008 Tsukuba used 1,832 tonnes of paper for testing machines. 30 tonnes were recycled to be used in the offices.

Carbon footprinting is the calculation of the organisations total carbon footprint, but it is also important to know what this is by product. The calculation needs to be externally verified and then the footprint needs to be actively managed. In 2005 all Komori facilities produced in total 16,482 tonnes of CO<sub>2</sub>. This was taken as the base. Changes such as moving all air conditioning to being gas based helped achieve a 5.7% reduction by 2008 to 15,385 tonnes and a 15.3% reduction by 2009 to just under 14,000 tonnes.

Just-in-time manufacturing reduces environmental impact because it avoids overstocking of parts, saving manufacturing, storage and money. For this to work each part must fit correctly. Machines are built to order. High quality parts and proper design enables higher productivity and less waste.

Kaizen, namely the principle of continuous improvement, ensures achieving savings in energy and materials and waste reduction and is a way of life for the business. Cross functional teams focus on key areas in swift sprints to make change.

Green purchasing addresses Scope 3 emissions. Environmentally Preferable Purchasing (EPP) helps reduce pollution, conserve resources, develop environmentally friendly products, stimulate new markets and jobs and save manufacturing costs. The Mobius Loop, European Ecolabel, Forest Stewardship Council and EPA Energy Star are part of this scheme.

Bill Gates said, 'The first rule of any technology used in business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency.' When applied to print, this means focusing on usage assessments, make-ready times, paper waste, toxic compounds and noise emissions.

Examples were given illustrating these points throughout the talk, highlighting the long-term approach and commitment of Komori to sustainability and manufacturing excellence.

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## Energy, carbon, water and waste programmes at Oberthur Fiduciaire

Oberthur Fiduciaire has led on sustainability ever since it adopted its Earth 365 approach following the Paris climate summit (COP 21) in 2015. In May 2022 it issued its first sustainability report. As a signatory to the UN Global Compact, it has set targets for 12 of the 17 UN Sustainable Development Goals and has 33 targets as an organisation. It aims to use only renewable energy by 2025 and by 2030 to reduce its greenhouse gas emissions by 90% for Scope 1 and 2 emissions and 50% for Scope 3. It has carried out carbon footprint studies and LCAs to set these goals.



**ENERGY.** It is working to reduce energy consumption by 10% compared with 2021 and to that end is signing up for ISO 50001. It is precisely mapping the consumption of its air pressure system, insulating pumps and roof and introducing energy recovery. Between March and October, it is using no gas, only electricity. Lighting used to use 5% of its electricity but this has now been reduced to 2%.

Between 2017 and 2021 it reduced its energy use by 12.22%, between 2021 and 2022 by a further 11%. Oberthur has invested €2 million in cooling systems and introduced new technology for compressed air. It wants to reduce its consumption of 'background energy' by 12% from 42% to 30% this year. The first result in this effort is a reduction of 11.36%.

These efforts are being achieved by following a five-stage process:

- » Data collection, historisation and analysis
- » Understand the behaviour of installations and the creation of digital twins
- » Monitoring, analysis and preventative maintenance
- » Intelligent real-time equipment automation and control
- » Learning and continuous improvement

**STAFF ENGAGEMENT.** In June 2021 Oberthur started a programme it calls Sustainable Lean®, with the aim of increasing staff awareness across all environmental areas, including reducing energy usage. A first programme standardised the way equipment is closed down, with an energy saving result of 2.5%.

**WATER REDUCTION.** An 18% reduction in water usage has been achieved against a target of 25% by optimising reduction. Again, Sustainable Lean was used to engage staff. Water consumption was reduced by 50% for intaglio and 2% for other printing processes, 45% for toilets, showers and fountains and 2% for the restaurant.

Wastewater treatment has been optimised and wastewater and rainwater has been used to produce demineralised water. Reuse of industrial wastewater for processes has been reduced by 75% against a target of 90% and, since 2014 the carbon footprint of wastewater has been reduced by 95%.

**WASTE.** 82% of waste is now recycled and 65 waste treatment processes have been put in place. 4,800 tonnes of waste are produced each year.

Oberthur has tested 12 solutions that use shredded cotton banknotes. Two of the solutions have been qualified. The goal has been to use the waste in a circular way and to find a low technology solution.

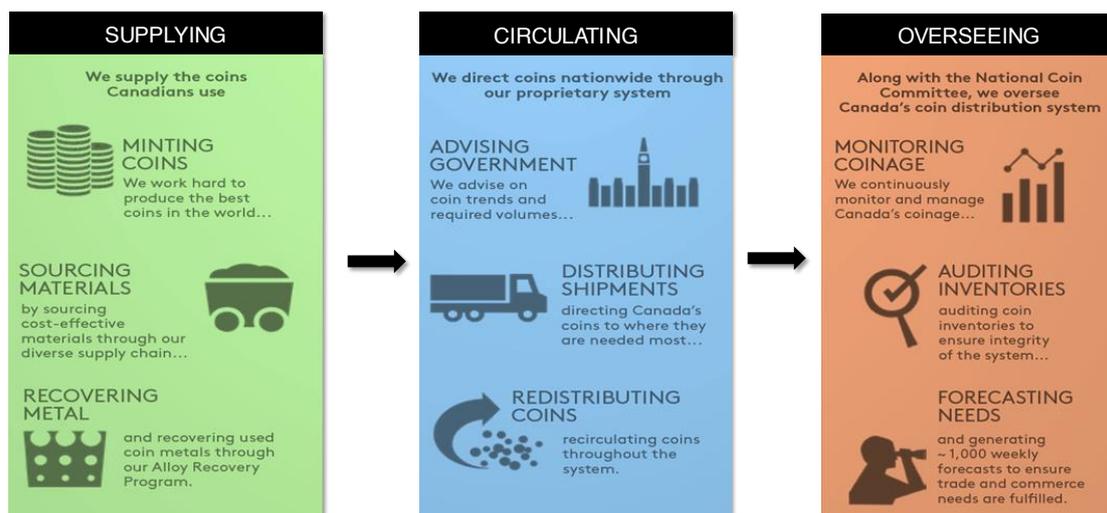
One solution is an acoustic panel that is both decorative and has sound-insulation properties. It is produced using a natural glue that is dried and pressed with the cotton shreds to create the panel. The second is a lightweight concrete block used as an internal partition wall. The shredded notes replace other materials and are mixed with the concrete.

**CONCLUSION.** Between 2014 and 2021 Oberthur reduced its carbon footprint per 1000 sheets produced by 60%.

## Royal Canadian Mint's programme of ESG work

The Royal Canadian Mint (RCM) has a full ESG programme. For the environment, the main priorities are to lower the carbon footprint and to reduce water use and waste, along with other environmental impacts. The goal is to be carbon neutral for circulation coins by 2030.

The presentation gave details of the RCMs energy goals, coin life cycle management, Alloy Recovery Programme, charitable medal programme, social and governance programmes.



# Unfit Banknotes

## 'What Goes Around Comes Around' (Reconnaissance)

The Forum saw the launch of a white paper on how to dispose of unfit cotton banknotes at the end of life, 'What Goes Around Comes Around.' Given that over 90% of the world's banknotes are cotton based, the paper sets out to give the science, practical examples and an outline approach to moving up the hierarchy of waste disposal options.

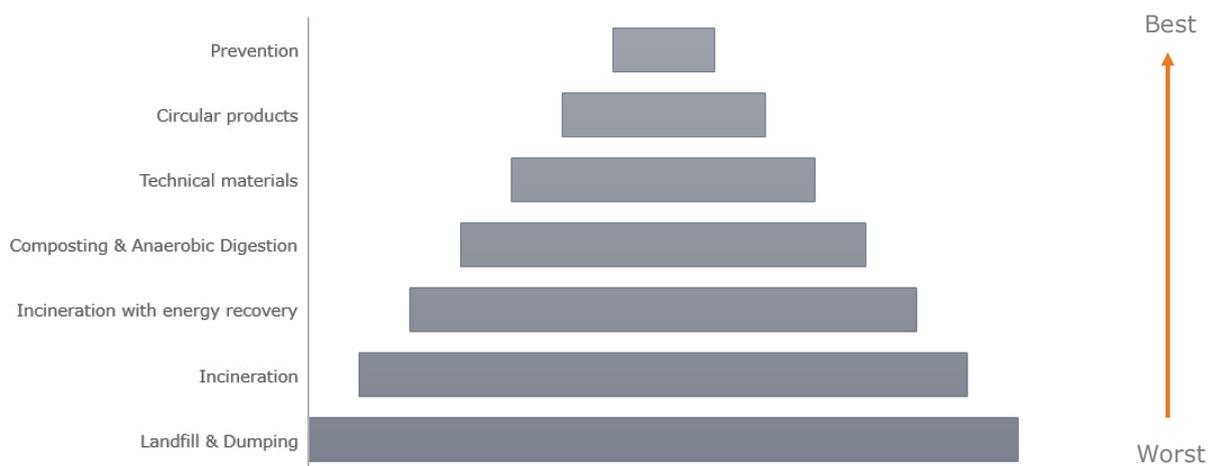
The key conclusion from the paper is that there are a wide range of options beyond putting unfit notes in landfill. The calorific value of cotton means that it has real value for a range of applications. Composting is a realistic option for most central banks whatever the infrastructure, but the number of options is wider than one might have thought.

The white paper can be found here: <https://cashandpaymentsustainabilityforum.com/wp-content/uploads/2022/11/Re-purposing-banknotes.pdf>

## Understanding who is doing what (Kusters)

Royal Dutch Kusters Engineering presented a new survey of 82 central banks about how they are disposing of unfit banknotes, whether they are using paper, composite or polymer substrates. Although 38% of respondents were in Europe, the mix across the rest of the world was good.

The percentage of countries who reported a mix of polymer, composite and cotton substrates was 26%, with 7% being polymer only and 4% composite only.



For cotton only banknotes, landfill (29 countries) and burning for energy (21 countries) were the main disposal methods. When one considers the hierarchy of disposal presented by Kusters, and used in the Reconnaissance report, landfill and incineration was used by 40 countries, suggesting an opportunity to find different methods of disposal. Other uses were being used as fuel for industrial processes, composting and use in other industrial processes.

For countries with polymer denominations, 11 recycled them, 2 burnt them for energy, 4 incinerated them and 2 used landfill. Although promoters of polymer make the case for recycling, it appears that the reality is slightly different.

For both cotton and polymer, the availability of local infrastructure was the most important driver of how unfit notes were disposed of. 37% of respondents were looking to change the way they dispose of their banknotes. When it comes to disposal of unfit notes, 72% of central banks wanted to outsource this to a third-party organisation.

**SUSTAINABILITY POLICY.** Almost half of central banks had a sustainability policy, but only 32% had a sustainability report and 11% made it public. A quarter of central banks said they had carried out some sort of life cycle assessment (LCA).

**SNB LCA CASE STUDY.** The Swiss National Bank (SNB) published an LCA which compared the 8<sup>th</sup> series of banknotes with the new 9<sup>th</sup> series of banknotes produced on Landqart's Durasafe® composite substrate. The overall environmental impact points (EIPs) for disposal were 2% of the total 2.2 billion EIPs of the series. The Green House Gas emissions came to 1,900 tonnes CO<sub>2</sub>e and disposal was responsible for 5% of this. The move to the Durasafe increased the annual environmental impact of the 9<sup>th</sup> series for disposal from 17 to 51 EIPs, an increase of 300%. To give this context, the total EIPs were 2,241.

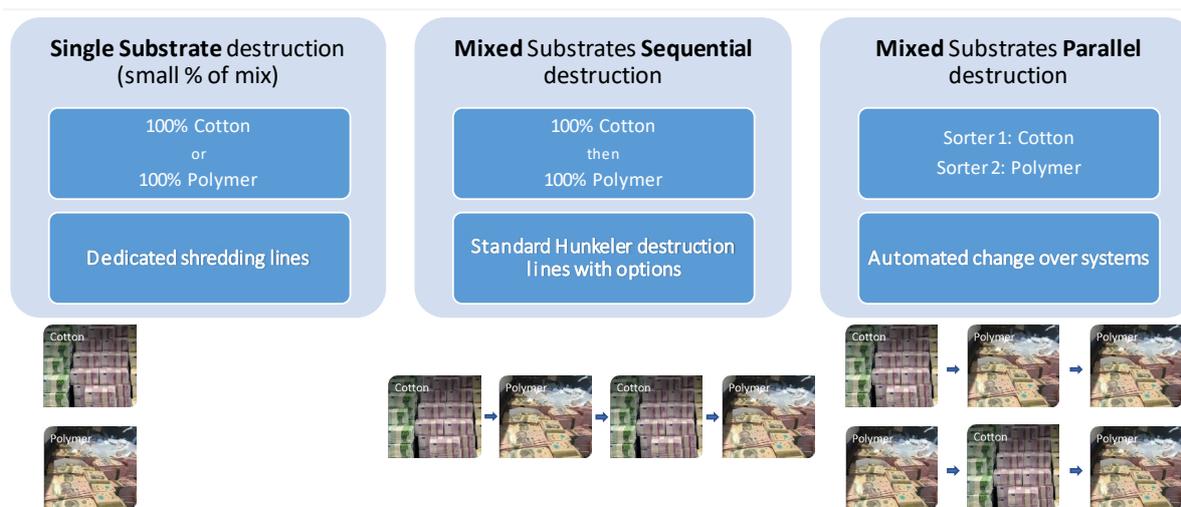
**NEW SOLUTIONS.** The presentation finished with a few new options for disposing of unfit notes. For cotton notes Kusters has worked with a local company on creating board panels which are a mixture of 100% recycled and upcycled raw cellulose waste including paper-based fibres, cardboard and agricultural waste such as rice straw, tomato stems, cocoa husks etc.

For polymer notes Kusters is looking to create furniture, upcycling rather than downcycling. The presentation showed some examples of what has been produced to date – plant pots, room dividers and pouffes.

## Sustainability and destruction technology report (Hunkeler)

Hunkeler presented its paper issued at the start of November in conjunction with Banknote Industry News, which focused on organising shredded waste ready for disposal. Respondents to a survey for this report found 60% of notes on cotton only, 10% polymer or composites only and 30% having a mix of substrates.

60% of central banks surveyed are working on a sustainability policy. 24% of respondents have a recycling process in place and 30% are working on changing their recycling process.



Hunkeler made the point that as central banks introduce a mix of substrates, they need to make changes to their destruction systems to be able to handle them. A key element of this is the separation of substrates for the shredding process. While single substrate users have a dedicated shredding unit, when it is mixed, they need to choose between mixed sequential destruction or parallel destruction. It is possible to have equipment with automated change over systems.

There was a question whether the default shred size needs reviewing, given the difference in energy used between shred sizes.

Polymer banknotes cannot be briquetted, which means the waste is bulkier than for cotton notes, an important consideration when evaluating transportation options. When considering what to do with polymer notes at the end of life, a calculation is needed to understand whether the environmental cost of transportation for recycling is more or less than incineration for energy recovery locally.

The presentation finished with information about the US, where 98% of shredded notes do not go to landfill, 42% being composted, about Australia, where 100% of polymer notes are, and have been, recycled for over 20 years, and about South Korea, where their cotton notes are used in construction materials and automotive parts.

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## Pakistan's composting experience (PSPC)

Although delivered remotely, Syed Faizan Haider Shah of the Pakistan Security Printing Corporation presented its work on composting unfit banknotes. This detailed piece of work demonstrated that composting is a viable option available to almost all central banks, and it is covered in detail in the Reconnaissance white paper.

Although the Bank of England had used its cotton waste as a soil enhancer, PSPC started its research from scratch. The first question was whether it was compostable given the inks and materials used in banknotes. It used Pakistan's National Research Institute to assess the notes, and the compost once produced, and found that it was fit for use.

**WHICH COMPOSTING METHOD TO USE.** Aerobic and anaerobic composting was investigated. Aerobic composting takes place in an oxygenated atmosphere and produces less methane than anaerobic composting. The temperature increase is higher than for anaerobic composting and it is sufficient to kill pathogens. The final product is humus, rather than mud, and the composting rate is 42% compared with 33% for anaerobic composting.

**AEROBIC COMPOSTING.** Three methods of aerobic composting were assessed, composting in a passive stack, in a ventilated static stack or windrow and in a transitional stack. The last of these options was used. For the trial, stacks 2 metres high and 2.5 metres wide were used. Each stack weighted about 700kg. This approach could be used for volumes of 5,000 tonnes per year. PSPC believes this could be done for a medium investment, although it would be relatively labour intensive and require a large area. It would be possible to tailor stacks to suit different specification denominations.

**CONDITIONS AND MIX.** The optimum conditions would be a temperature range of 30-70 degrees centigrade, a pH of 6.5-7.5 and humidity of 45% - 60%. Currently PSPC is producing 1-1.5 tonnes per day. It experimented with three different ratios of shredded notes to cow manure and found a 50/50 mix worked best. Any green waste could be substituted for cow manure. A laboratory test from M/S SGC showed 39.84% carbon.

**RESULTS.** The results from the trials showed a high-quality compost with total nitrogen of 15.98 g/kg and 20.15% organic matter, 11.83 g/kg and 47.14 g/kg of phosphorus and potassium, respectively. Heavy metals were within permissible limits as per international standards. Faecal Coliform and Salmonella values were far below the permissible limits, ie. 550 Most Probable Number (MPN)/g and 1.68 MPN/4g.

The Department of Botany at the University of Karachi grew sunflowers from seed with a control and two additions of compost. The results showed that an addition of 1% of compost increased plant height, number of leaves and root length significantly.

The composting process generated 0.59 tonnes less CO<sub>2</sub> per tonne of banknote wastepaper compared with burning it.

**CAN SLUDGE BE COMPOSTED?** Experiments were carried out on 12 different mixes of ETP sludge, decanter waste sludge and intaglio waste ink. Physicochemical analysis showed these could not be composted aerobically.

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## De La Rue and the environment

De La Rue described its environmental journey that started in 2002 when it first reported its Scope 1 and 2 carbon emissions followed, in 2003 with its UK operations becoming accredited to ISO 14001. In 2010 it started reporting annually to the Carbon Disclosure Project, in 2011 all sites became ISO14001 certified, in 2016 it signed up to the UN Global Company Compact, in 2020 all UK sites used 100% renewable energy and in 2021 De La Rue committed to Science Based Targets Initiatives, and this has now been approved.

The presentation listed several achievements, although some without a timescale. De La Rue has reduced its energy consumption in Malta by 2.5 million KWh per annum, it achieved its 2021/22 target of reducing energy per tonne of good output by 7.5%, water use has been reduced by 16% over the last four years and it has reduced SAFEGUARD® waste by 2.3%.

De La Rue's customer survey found 65% of cotton notes went to landfill with 20% being incinerated. 5% went to compost, 5% were locally 'recycled' and 5% were 'subcontracted'. For polymer notes 18% went to landfill and 82% were locally recycled. Mixed composite notes were either incinerated (33%) or sent to landfill.

# CASH CYCLE

## CIEC seminar – Bringing an industry together (NatWest)

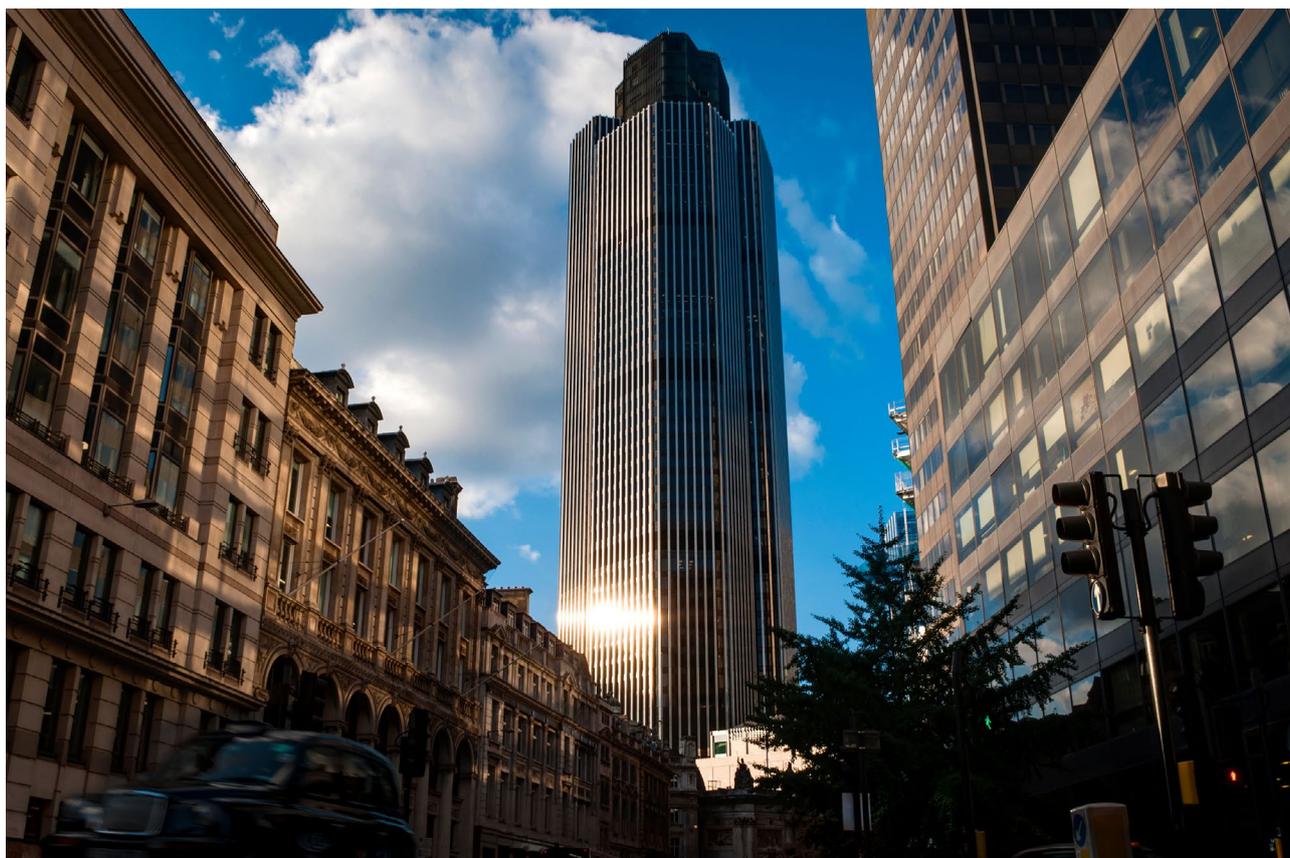
NatWest is one of the UK's four largest commercial banks. It is a member of the Bank of England's Note Circulation Scheme and, through the Royal Bank of Scotland, designs, issues and circulates banknotes in Scotland. NatWest is active on a wide range of sustainability activities and in September 2020 it invited 36 organisations<sup>1</sup> to join an online call to discuss the UK's cash cycle and collaboration to reduce its environmental impact.

The Cash Industry Environmental Charter (CIEC) Group, as it became known, became a formal grouping on 21 January 2021 when nine organisations signing the charter committing them to achieving four targets. 30 of the 36 organisations continue to meet regularly and to work together (see the UK Finance report below).

The CIEC has three areas of focus, energy, carbon and plastic and four targets:

- » Achieve Net Zero for 'Own Operations & Business Travel' by 2030
- » Eliminate single-use non-recyclable plastic in note centres by 2030 (3 years 25%, 5 years 50%, 10 years, 100%)
- » Reduce single-use non-recyclable plastic in coin centres to below 45% of plastic waste (by weight) by 2030, (2023 < 70%, 2025 < 50%, 2030 < 45%)
- » 100% renewable electricity – own operations by 2022

This co-operation made sense because the Bank of England sets what is known as 'Standard 21' which all parties in the cash industry abide to. Working together to organise cash within that regulation, and to lobby for change where appropriate, as an industry is an opportunity to be more efficient and with less environmental impact.



<sup>1</sup> The 'owners' of the UK's cash (the Bank of England and the Treasury), banknote and coin production (De La Rue and the Royal Mint), commercial banks (13 organisations), retailers (two organisations), machine suppliers (five organisations), ATMs (Link and CMS Analytics), Cash in Transit (two organisations), other suppliers (four organisations), associations (UK Finance and British Retail Consortium (BRC), press (Reconnaissance and Chartered Banker).

## CIEC seminar – making a good idea work (UK Finance)

UK Finance is the collective voice for the banking and finance industry. It represents around 300 firms across the industry, acting to enhance competitiveness, support customers and facilitate innovation. Within UK Finance, Cash Services acts as the secretariat for the CIEC.

Once the CIEC was up and running, responsibility for the Charter was passed to UK Finance. A Chair was selected from amongst the participants. Originally this was somebody from G4S, but this has recently passed to Vaultex. Membership of the group was open to all, not just Charter signatories.

Terms of reference were established:

- » The group meets on a bi-monthly basis, originally monthly, and usually online.
- » The group exists for collaborative, non-commercial discussions in line with the Cash Industry Environmental Charter to:
  - o Share operational best practice (transport, packaging etc.) allowing members to reduce the environmental impact of cash
  - o Update the UK Finance Cash Policy Committee and seniors within member organisations on environmental matters relating to the cash supply chain in the UK

The objective is to provide an impartial, non-competitive forum where strategic discussions can be held to identify operational changes that will enable the industry to work towards the Charter targets and generally improve efficiencies in the cash cycle.

Membership is open to any organisation with an interest in the cash supply chain in the UK, together with The Royal Mint and Bank of England.

Wherever possible, consensus is to be reached on all substantive matters considered. If consensus cannot be achieved, members are entitled to develop their own solution either individually or bilaterally.



Data is shared for each charter objective. UK Finance collects and maintains data presenting updates to each meeting. While the data itself is confidential, UK Finance shared an example of the layout of the plastic inventory:

- » Item of plastic
- » Material used
- » Use
- » Recycled, recyclable, biodegradable, reusable? How do you deal with this waste?
- » Possible alternatives? What do you use instead? What controls are in place?
- » Any blockers to change? Is there anything the group can do to help?
- » Any other activity/pilot scheme or trials underway?
- » If you need help or information on a particular area, please indicate below

**PLASTICS.** In January 2020 Cash Services convened a meeting to review current packaging and to consider ways to reduce, reuse and recycle plastic. It sought to share best practice within the industry.

Achievements to date include:

- » The Royal Mint is packing some denominations in standard, reusable metal cages which should mean 200 single use box/pallet combinations are not used in 2022
- » CIEC members have found an alternative to the use of multiple plastic seals on each note cage, which contain no metal and can be easily recycled. These new seals will be trialled with the intention that they will be adopted in 2023 (see also Vaultex's presentation)

**CHALLENGES.** No change process is without challenges. Examples given were:

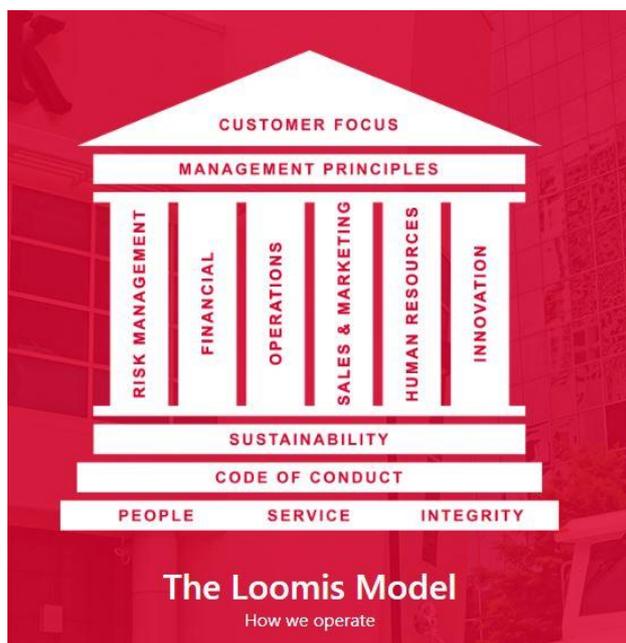
- » Increasing the number of coins in a sachet (eg. £2) is seen as being too disruptive to retailers and branches
- » Adopting bulk coin bags that identify the contents with clear, with simple printing was seen as creating a risk that orders could get mixed up
- » Some audit takings using were based on the number of bags used to deposit cash. Reducing the number of plastic bags was not preferred

## Tackling the cash management challenge (Loomis)

Loomis is a member of the Cash Industry Environmental Charter (CIEC) group. Parts of this summary were presented in the CIEC seminar.

Loomis has 23,000 staff in 20 countries. It consumes 54 million litres of fuel each year driving 263 million km each year. As such it creates 259,554 tonnes of CO<sub>2</sub> and uses 1,267 tonnes of plastics.

Loomis is focusing on reducing emissions and single use plastics, using green energy and collaborating with others in the industry to allow further changes. Loomis has issued a sustainability linked bond committing it to reducing its sustainable targets by 20% compared to 2019.



**SCOPE 1 EMISSION REDUCTIONS.** To reduce CO<sub>2</sub>e by 15% by 2024 relative to a 2019 base year, Loomis is exploring three alternative fuels and a range of other initiatives. In addition to hybrid vehicles, electric vehicles have been introduced. Their utility is limited because the range/payload limitation of electric vehicles means only 17% of routes in the UK are suitable for their use. Charging infrastructure is a major issue, both the ability of the electricity grid to meet demand and the availability of charging points. Today battery life and emissions have an impact. The background technology is changing and advancing fast. With a vehicle life of eight years, nobody wants to buy a vehicle that is likely to be obsolete within that period. In the medium to long term Loomis sees hydrogen FCVE vehicles as the likely solution.

Biofuels are limited to 10% in the UK because vehicle warranties are voided if more is used.

Loomis has introduced solar panels on the roof of vehicles to charge the non-vehicle batteries used for other systems, which means the engines don't have to be run to charge them. The move to smaller 3.5 tonne vehicles has led to a 22% increase in fuel efficiency. Telematics have led drivers to increase their fuel efficiency by 6.1% overall, although some drivers achieve 10% increases. Loomis has an optimisation tool that has allowed the fleet to be reduced by 12% while, at the same time, services have increased by 14%. The optimisation tool looks at vehicle utilisation, stem mileage and route efficiencies.

Loomis is also looking to transition to renewable sources of energy. All countries in Europe have been evaluated for the installation of solar panels. In 2023 the UK plans to produce 57% of its own electricity.

**PLASTICS.** To reduce its use of plastic by 30% by 2025 Loomis is working to increase the use of recycled materials so that bags contain at least 30% of recycled materials. It wants closed loop recycling in all cash centres, reusable internal cash bag transfers, smaller cash bags (which would reduce plastic procurement by 10%), to introduce reusable seals (reducing plastic procurement by 80%) and to work with the Cash Industry Environmental Charter group on packaging and industry standards.

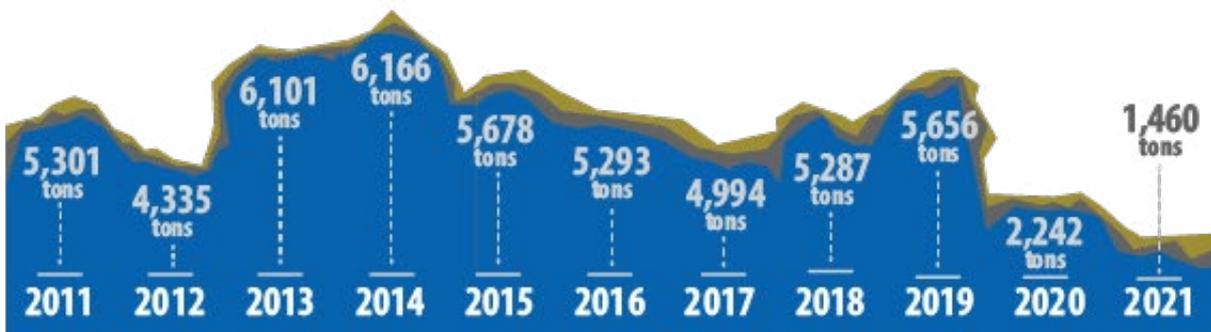
Loomis Europe is carbon offsetting all production and associated transportation of plastic bags. In 2020 over 600,000 kg of CO2e was offset through three projects, one in the Philippines, one in Brazil and one in India.

### US sustainability initiatives (FedCash® Services)

FedCash Services described its environmental work including what it is doing with disposing of shredded banknote waste and its E-manifest service, which replaces paper-based systems with electronic manifests. It has also started a project to look at what to do with its plastic waste.

FedCash uses process changes, partnerships and technology to increase the sustainability of the cash cycle. The goal is to increase sufficiency, resilience and sustainability of the cash cycle recognising that cash usage is changing. Currently the focus is on disposing of shredded unfit banknotes well, supplies, paper and transportation.

**SHREDDED NOTES.** The volume of shredded notes is significant and the relatively low volumes in 2020 and 2021 are unlikely to continue.



Only two of the 28 cash offices send unfit notes to landfill, and this is because they don't currently have locally available alternatives. Burning with energy recovery and composting are the most common ways to dispose of unfit notes, both being used for 42% of notes. A further 15% is disposed of through a variety of routes including being used in road surfaces (cement curing) and spray insulation.

**CASH CYCLE.** In addition to its introduction of its E-Manifest system, which is based on the GS1 standard, FedCash has now started work on reducing plastic usage in the cash cycle.

This year it is doing work to understand the challenges and options, with the intent in 2023 to develop and run a pilot which will allow the recovery of plastics for use as composite lumber or biofuel or for local partners to recycle the plastics for their own use.

## The importance of data (Koenig & Bauer Banknote Solutions)

Koenig and Bauer Banknote Solutions (KBBNS) presented on the use of data in the cash cycle. It made the case that in the changing environment we face, data can reduce some of the friction that is making cash expensive, inconvenient and with a larger environmental impact.



The presentation suggested that it is not cash, the product, which is challenged, but the banknote 'service system.'

The presentation suggested three different cash cycles:

- » High-velocity cash cycle where there are more than 300 transactions per banknote per year
- » Mid-velocity cash cycle where there are more than 200 transactions per banknote per year
- » Low-velocity cash cycle where there are less than 200 transactions per banknote per year

As the number of transactions reduces, the cash infrastructure, number of cash management intermediaries and priorities change. While access to cash is the priority for a high-velocity cash cycle, cash efficiency is the priority for the mid-velocity and cash sustainability for the low-velocity scenarios. The costs of circulation rise steadily across the scenarios. This is an interesting way to think about the challenge.

KBBNS suggests that the friction, which drives the cost of the cash cycle, comes from a range of historic sources that are not changing to reflect the new reality. Amongst these are a lack of shared data networks, a fragmented industry, central bank clean note policies and recycling regulations, centralised cash centres etc.

The answer put forward is to use change enabling technology, largely around the use of data, and cash community collaboration to deliver the needed sustainability.

## Green Cash Cycle Initiative (G+D)

Cash is facing a range of pressure points currently, the cash paradox, rising costs and climate change.

G+D presented its Green Banknote Initiative earlier in the Forum but in this session introduced its Green Cash Cycle initiative which works with it.

The big levers to reduce the impact of the cash cycle are:

- » To reduce waste and single use plastic
- » To focus on cash design (less emissions in production, less plastic and a green product)
- » To focus on cash processing
  - Less power consumption through automation in cash management, higher machine throughput rates, and using Notatracc™
  - Less waste by using NotaTray to reduce bundling and packaging waste
  - Less service travel through knowledge transfer delivered remotely through training platforms, remote servicing using Eco-Remote and Visual Support and Smart Maintenance derived from machine data delivering condition-based and predictive maintenance
- » To focus on cash distribution
  - Less transport emissions enabled by using network forecasting to right-size and correctly locate the sorting infrastructure along with multi-bank cash centres.
  - Standardised packaging and transport)

G+D suggests that these two initiatives offer a sustainable banknote future.



G+D – UN Sustainable Development Goals

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Reconnaissance



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Reconnaissance

**Reconnaissance International Ltd**

1B The Beacon

Beaufront Park

Anick Road

Hexham

Northumberland

NE46 4TU

United Kingdom

Tel: +44 (0) 1932 785 680

Email: [publications@recon-intl.com](mailto:publications@recon-intl.com)

[www.reconnaissance.net](http://www.reconnaissance.net)

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