

CONFERENCE REPORT:

Sustainability as a Strategic Priority



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cashesustainability.com

RECONNAISSANCE
**CASH
SUSTAINABILITY
FORUM™**

Introduction

Since the first Cash Sustainability Forum™ in November 2022, sustainability related activity and interest has increased and matured, although the Forum remains the only event dedicated to the topic as it relates to cash and payments. It feels as if a whole industry has sprung up around sustainability and regulators around the world have introduced increasingly prescriptive reporting requirements. The June 2024 Frankfurt Forum was, therefore, a good opportunity to pause, reflect and think about where the cash industry is.

The Forum started with an afternoon workshop considering how the cash cycle is changing around the world and the risks and opportunities for sustainability that this is bringing. Given how much of the environmental impact of cash lies in this area, it was good to hear from stakeholders such as Brinks Global AMS, Diebold Nixdorf, Oberthur Cash Protection, G+D and Cash InfraPro, as well as the South African Reserve Bank. A white paper on this subject will be published in September 2024 with input from central banks and a very wide range of cash stakeholders, followed by a webinar.

The format and nature of the Forum, and the sustainability topic, allows people time and the opportunity to compare notes and to discuss options. About a quarter of the speakers were from outside of the industry so that fresh thinking and different perspectives were shared. The mix of organisations who attended, made up of 22% central banks, 36% producers, 26% cash cycle and the balance external speakers from 24 countries, meant that the whole cash cycle was here, along with a wide range of views.

Challenges discussed included who should lead, what to measure and how to introduce that into tenders, the implications of new regulatory requirements and how to encourage, or require, cash cycle stakeholders to make changes, for example encouraging the buying of green energy, standardising packaging and electronic data interchanges, investing in cash handling equipment with a lower carbon footprint, organising cash handling to be more local etc.

Evidence that progress is being made can be illustrated by developments in recycling unfit cotton banknotes. After the 2022 event we published a white paper on recycling options ('What Goes Round Comes Round'). At this event the range of options has increased rapidly and significantly across substrate makers, printers, machine manufacturers and central banks.

Beyond just this example, there is strong evidence that organisations are doing a great deal to reduce their environmental impact. There were examples of actions taken and results achieved, both small and large scale, that all could consider for their own organisations. While some central banks are deep into change programmes, others are starting out. Again, there was something for everybody.

The Cash Sustainability Forum will return in June 2025 with a regional focus, when it will be co-located as a one-day event alongside the High Security Printing Conference in Rio de Janeiro, Brazil.



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Cash Cycle Sustainability Workshop

The European Central Bank's Product Environmental Footprint study found that 82% of the environmental impact of banknotes happened post-issue. In addition, all around the world cash usage is changing. In some countries cash remains dominant, but elsewhere change has started and in some countries cash transactions are so low that the traditional business models no longer work. Stakeholders are having to rethink how cash is organised.

The Cash Sustainability Forum started, therefore, with a half day workshop focused on possible steps to reduce the cash cycle impact.

After an initial presentation by Ryan Johnson from the South African Reserve Bank there was a discussion about challenges delegates faced. There were then five presentations from cash cycle stakeholders about the changes they are experiencing (Cash Infra Pro, Brinks Global AMS, Diebold Nixdorf, Giesecke+Devrient, Oberthur Cash Protection).

The session finished with reflections from the delegates about how they see the cash cycle changing.

Summary

The table discussions at the start of this session reflected the diversity and complexity of cash cycles around the world. While the presentations from Brinks, Diebold Nixdorf, G+D and Oberthur Cash Protection demonstrated how the private sector is racing to innovate and create new business models, creating real environmental (and efficiency) benefits, Cash Infra Pro and the table discussions at the start and finish described both challenges and an outline direction of travel for central banks.

The traditional objectives of central banks are changing, with sustainability and access to cash being added to the list and with the need for better monitoring and control of the cash cycle in a response to cost pressures and changing cash cycles. Whether it is moving to decentralised cash models or responding to the withdrawal of financial institutions from cash management, central banks need to develop new policies, regulations and practices.

This workshop did not have all the answers, but it did offer up clear themes and some practical information to consider.

Setting the scene: cash cycle challenges

The cash cycle workshop opened with table discussions about cash cycle challenges that people face. Although a snapshot, the results were varied and interesting. The range of issues included:

Creating and implementing policy

- » A central bank having responsibility but not influence
- » Cost of the ecosystem and the need for profit
- » Regulatory burdens
- » How to move from a centralised cash system to a decentralised cash system
- » Fitness test decks
- » How to collaborate, research more about CO2 and set incentives for efficiency, sustainability and resilience
- » Is the cash cycle complex, or not?

Challenges

- » Sweden: only one CIT company, the need for legislation to support cash use
- » Branch networks
- » Cost of cash.

Comparing cash cycles

- » The challenge of comparing experience when the ECB and Uganda, Pakistan and Brazil and a commercial bank are around the table
- » Increasing diversity of cash cycles even within the borders of one country (Indonesia)
- » The problem of living in a silo.

Recycling

- » Sustainability of ink
- » Separating components at the end of life for disposal
- » The recycling of machines is an unsolved problem.

Production

- » Philippines: meeting cash demand, the time lag between ordering notes and issuing them
- » Printers are full, and so lead times are long
- » Ensuring that the design of the banknote is appropriate for the required durability of the note
- » The challenge of managing machines when banknote designs are changing so fast.

Coins

- » Proving the fitness of coins.

Cash cycle sustainability: a practical view at the cash recirculation policy and its implementation

Cash Infrastructure Projects & Services (Cash Infra Pro): Jens Eberhardt

Three lifecycles co-exist in a cash cycle - those of banknotes, wholesale cash and branches. Cash flows between all three either directly or indirectly and the challenge of central banks is to ensure the cash cycle works well when its control of each element is not absolute.

Central banks today have four objectives:

- » Cash availability/demand
- » Cash authenticity
- » Cash quality/fitness classification
- » Cash cycle efficiency.

Its strategic levers are the design of banknotes and coins, and the design of the cash supply chain. But the world is changing, and new objectives are in sight:

- » Cash cycle monitoring and control
- » Cash sustainability
- » Cash accessibility.

Reaction to cost pressure

Cost pressures are leading central banks to focus on greater efficiency. The accountant's solution is to reduce cash services, cash centres and branches and opening hours and then to see if the central bank can outsource tasks such as cash processing (and there are varying levels of sophistication in how this is done).

More advanced options include introducing standardised cash services, optimising internal cash processes and transportation and removing friction in the system by optimising the interfaces where stakeholders interact – standardised packaging units and Electronic Data Interchange (EDI).

The development of cash recirculation policies is a key part of outsourcing cash management, particularly when it comes to cash recycling for ATMs and at the point of sale (POS). Central banks need to introduce procedures for reporting, testing and auditing. They need to build-up competencies in cash monitoring and control.

From theory to practice

While a theoretical policy model can be outlined, every country is unique and recommendations will need to be adapted for factors such as the population size and distribution, payment behaviour, utilisation of existing infrastructure (ATMs, branches, retail POS), financial literacy and how the professional cash handlers are organised and their level of technical readiness.

The professional cash handlers will have developed their services and cash networks based on the central banks, cash centre locations, cash services portfolios and regulations.

It is now a regular feature of decentralised cash cycles for deposits to be pooled, sorted and stored simultaneously, ie. cash is collected, processed and stored that belongs to a variety of owners and which is to be credited to a variety of different financial institutions. Regulations will need to determine how this is organised. Options are for licences for financial service providers or coverage through a bank cooperation.

Developing a policy

To develop a robust, effective cash recirculation policy tailor made for the specific circumstances of a country, central banks need to understand their cash cycles.

Central banks often conduct market surveys and talk to other central banks to understand their approach to cash recirculation, but there are other ways to build-up experience and knowledge. For example, developing relationships of banks, CITs and retailers, monitoring and reporting of cash activities by professional cash handlers, testing and certifying cash recirculation systems and auditing and documenting the cash infrastructure and the processes of professional cash handlers.

Three levels of policy and procedure

There are three elements to a recirculation policy – a clean note policy, a handling policy in the commercial market and monitoring and control procedures.

Clean note policy. The central bank needs to define a fitness classification standard and then communicate this to the population, commercial organisations and cash handling professionals. The classification needs to be based on what is out there, what machines can check for and the acceptable level of rejected notes.

Handling policies. For bulk cash handling, the central bank needs to give guidance on packaging standards, EDI communication standards and the cash service portfolio required.

Monitoring and control procedures. In terms of policy setting up a structure for the industry that details the infrastructure, required cash holdings and turnovers will define how the cash cycle will be organised. The central bank can use testing regimes for cash recycling systems based on technical and organisational processes and procedures to achieve policy goals. It will need to build up audit teams and to carry out regular audits for those testing regimes to made effective.

Reporting infrastructure, cash holdings and turnover

- A. What to report. Infrastructure data, cash point and cash centre data, and transaction data, cash-in/cash-out/storage volumes
- B. When to report. The required frequency of reporting, which must be sufficient to spot exceptional data likely to trigger contingency action.
- C. How to report. Cash Infra Pro recommends using GS1 EDI communication standards both for infrastructure and transaction data. The Bundesbank has also published guidance for its professional cash handlers in 2024.

The data will be used to set benchmarks and analyse performance to understand banknote and coin demand, cash holdings compared with storage requirements, cash return frequency and fit compared with unfit rates as a percentage of cash in circulation and withdrawal/deposit/recycling volumes per cash point in each region.

Building up an audit structure

In order to be able to audit, the central bank will need to develop test packs of new, fit, unfit and counterfeit banknotes to be used in sorting machines. Staff will need to be trained so that they are technically competent for testing across different types of sorting location (cash centre, CIT, ATM etc.). They will also need to be capable of inspecting processes and security. Consistency of testing and reporting will be key.

Sustainability in cash cycle logistics: the NotaTray[®] ecosystem

G+D: Marcus Ohnemus, Sustainability Management CTCS

With 35% of the environmental impact of the cash cycle lying with distribution, G+D's presentation focused on a solution to reduce it.

G+D presented two sustainability use cases to reduce the impact of cash centres. The first was to pack loose banknotes in standardised, reusable trays, which would reduce the need for the use of today's single-use packaging materials. Instead of having to put bands around notes and then shrink wrap them, notes can be put loose into trays (NotaTray).

This approach would also reduce the use of plastic safebags which are currently used with each batch of banknotes, again saving the need for plastic bags. Typically, 30,000 safebags are used over the life of a tray, and not needing safebags would save 135kg of CO2e.

G+D is now using bio-based and recycled materials to make savings on CO2 and using over 50% less virgin plastic than previous NotaTrays.

Implementing change faces opposition, and in the case of NotaTray there are initial costs that need to be paid. In addition, there will be initial technical integration, training requirements and, possibly, regulatory and compliance issues to be resolved. These need to be weighed against the efficiency and sustainability benefits outlined in the two use cases. NotaTray brings a range of other pure efficiency benefits which will help offset this cost and obstacles.

Some practical examples of the CO2 reduction initiatives in the cash cycle

Brinks Global AMS: Anne Richard Schaafsma, Business Development Director AMS (Europe)

Brinks provides cash and valuables management, digital retail solutions and ATM Managed Services for financial institutions, retailers and independent ATM deployers. Brinks operates in 52 countries and has over 100 countries with customers. It services 300,000 ATMs and operates 135,000 of its own. It has 16,400 of its own vehicles.

To do this for outsourced or in-house ATMs, it carries out cash management and forecasting, provides cash in transit (CIT) services, looks after ATMs offering monitoring, helpdesk support, delivering first and second line banknote equipment hardware maintenance, offering parts and lifecycle support, security and compliance.

Examples of CO2 emission reduction initiatives include:

ATM pooling / utility model

In the Netherlands Rabobank, ING and ABN Amro have pooled their ATMs under the Geldmaat brand and organisation. The number of ATMs has been reduced by 50% while ensuring that 99.76% of the population are within 5km of an ATM. This was achieved by removing duplicate machines. This has both reduced costs and the environmental impact of the ATM estate.

In Belgium KBC, BNPP, Belfius and ING have formed Batopin and Bancontact to create a similar 'utility' ATM model. Again 95% of Belgian's are within 5km of an ATM. Even though 970 new ATM locations had to be created to achieve the necessary coverage, the total number of ATMs was substantially reduced with similar benefits as Geldmaat.

Utility models allow the new providers to standardise the estate of equipment used. This brings benefits for simpler maintenance, spares and staff skills training.

Coin machine outsourcing by Geldmaat

When it came to coins, Geldmaat was, again, able to reduce the number of coin machines by 50%, but it also fully outsourced 750 devices to Brinks. Concentrating the management of the estate has allowed better operational performance – quality, uptime, fewer maintenance visits, reduced numbers of service calls and fewer coin shortages because of more stock capacity. Coin machines have also been located in places where coins are heavily used, such as the lobbies of DIY shops.

The result has been improved recirculation of coins in Dutch society, lower cost and reduced CO2 emissions.

Local cash recycling

ATMs that can recycle banknotes allow local recycling rather than the notes having to be returned to a cash centre. While some notes will be unfit and the denominational mix may not meet the needs of the ATM, local recycling can reduce the number of replenishment CIT stops by over 50%.

If ATM withdrawal and deposits and branch stops can be combined, this reduces CO2 emissions since more devices in one branch / site can be serviced at the same time.

Fuel and vehicles

Since 2023 Brinks has trialled using Hydrogenated Vegetable Oil (HVO) for its CIT trucks, significantly reducing their environmental impact. In one branch, the use of HVO reduced CO2 by over 896 tonnes, an 89% reduction in emissions.

It has also piloted electric vehicles. These use the IBNS protection system and so are not armoured, which allows them to be lighter and to have extended ranges. All office staff vehicles are electric.

CIT vehicles require constant power to maintain their protection systems. Brinks has installed solar panels on the roof of some of its vehicles as a pilot to help top up the power in the batteries. This has reduced CO2 emissions by over 3%.

To optimise route planning, stops are now geo-grouped. In city centres Brinks staff are now using scooters to get to ATMs to carry out maintenance tasks.

Building design

In the Netherlands, Brinks has redesigned its head office, introducing LED lighting, solar panels, reusable materials etc. These changes reduced CO2 usage by over 46 tonnes.

Brinks is also introducing solar panels on its buildings and branches. In addition, it is using green energy for all Dutch branches, reducing CO2 emissions by over 1.817 tonnes.

Customer experience, demands vs sustainability: can you strike a balance?

Diebold Nixdorf: Matt Phillips, Head of Banking, UK and Ireland

Diebold Nixdorf (DN) focuses on making, installing, maintaining and managing ATMs. It is number one for installed ATMs and total ATM application and monitoring software.

The key strategic priorities for financial institutions currently are efficiency, changing consumer needs and demands, increasing payment competition and environmental sustainability, including resilient cash systems, and financial inclusion.

One response is increased collaboration to provide efficient cash systems. There is increasing interest in ATM pooling, as in the Netherlands with Geldmaat, shared banking hubs where commercial banks use the same facility and outsourcing the delivery of cash services.

Banknote equipment is increasingly being used for a wide range of cash services, often with mobile apps working directly with them. Recycling machines can reduce CIT visits by 60%, and even more if there is also local replenishment. Modern ATMs can have as many as 150 sensors and the data feed from them allows effective predictive analytics, ensuring more up time and fewer unnecessary replenishment or maintenance visits.

ATMs now come with a wide range of measures such as LED lighting, power-down modes and more efficient components that mean they can use 58% less energy. They are also designed for future recycling. DN has also moved to decentralised manufacturing so that shipping distances are shorter.

Making the cash cycle work more efficiently and safely in a changing world with IBNS

Oberthur Cash Protection: Patrice Rullier, Managing Director

Cash handling brings familiar security challenges – theft and robbery, internal fraud, counterfeit currency, cash shortages and overages, inefficient cash handling processes.

Theft from ATMs and CITs decreases trust, limits access, increases fees and charges, accelerates the move to digital payments, has an impact on the vulnerable in society and can have economic impacts. Violent attacks have much more direct impact on staff and members of the public involved, as well as creating major infrastructure damage where it happens.

One tool to defend banknotes is Intelligent Banknote Neutralisation Systems (IBNS). These are systems that cover banknotes in permanent dye when criminals try and open the security boxes to get at the banknotes. If the public and commercial enterprises know that dyed banknotes are not valid currency, then the banknotes become effectively worthless.

A major environmental benefits of using IBNS systems is that banknotes do not need to be transported in armoured vehicles. Electronic systems and IBNS give the assurance to move the banknotes in light skinned vehicles which use less fuel or can even be electric. They also need less maintenance.

Delegate view of opportunities to improve the cash cycle

The feedback from the groups had a number of clear themes – standardisation, particularly around packaging, getting better data and the importance of working together.

Group 1

- » Standardised systems and working processes
- » Clear control and responsibilities
- » Trust is important
- » Working together. In the Netherlands the Dutch National Bank understood what the Geldmaat partnership aimed to do, and the financial institutions were on board.

Group 2

- » Standardisation, particularly of shipping specifications
- » Review of the note-coin boundary with the aim of having fewer denominations
- » Importance of leaders engaging with and driving change.

Group 3

- » Standardised packaging
- » Carefully crafted regulations and incentives.

Group 4

- » Managing and collecting data
- » Getting the different technologies to talk to each other to make data accessible.

Group 5

- » The importance of openness
- » Breaking down silos.

Group 6

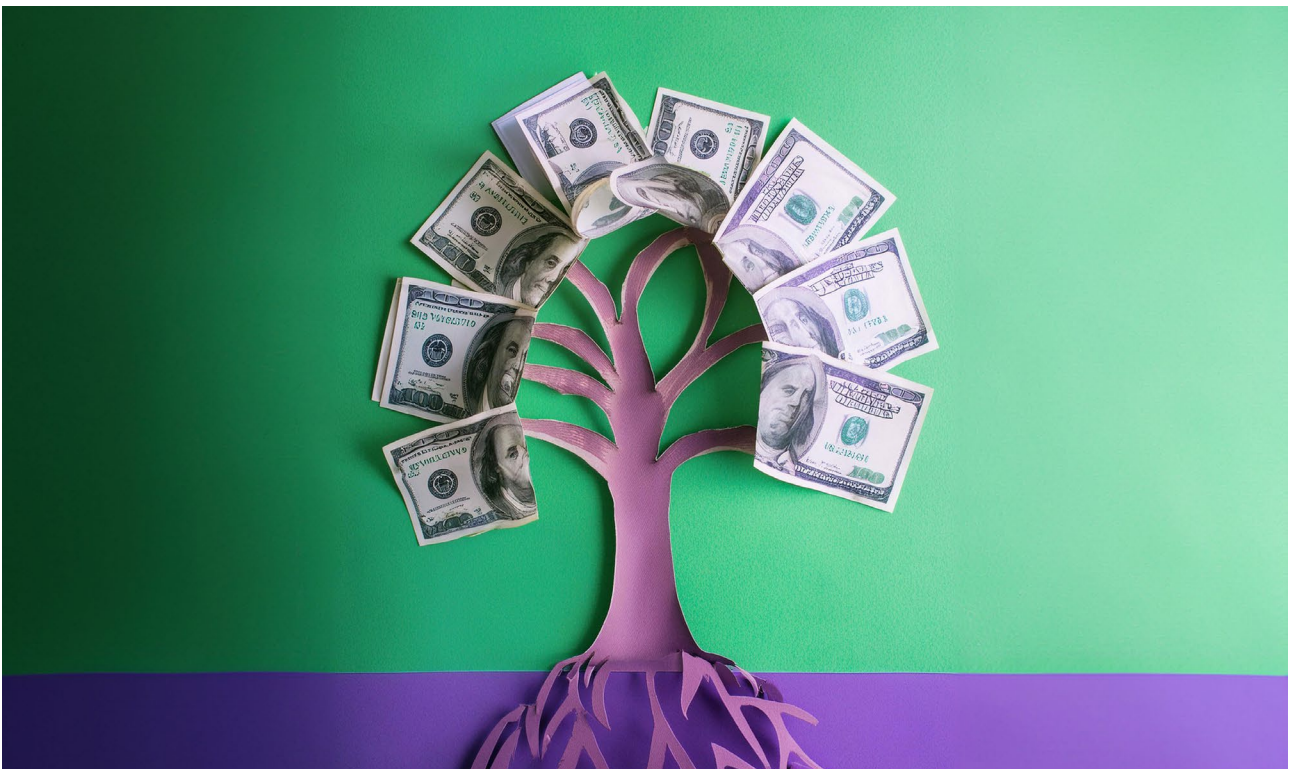
- » Learning to do more with less
- » No revolution needed but changes such as standardising packaging, recycling with new equipment
- » The importance of data – look at this first.

Group 7

- » Need for fitness standards
- » Working with financial institutions to measure velocity
- » Monitoring ATM/CIT data
- » Understanding recycling trends.

Group 8

- » Collaboration needs improvement. Cash cycle stakeholders are not integrated.
- » Standardisation would be a good step, for example IBNS.



Session One: Setting the Scene

While the Deutsche Bundesbank, European Central Bank and South African Reserve Bank opened the main agenda of the Cash Sustainability Forum, the last speaker in the session provided the overview of why sustainability is so important as a topic. Climate change is happening, and the goals set in 2015 of limiting the increase in temperature to 1.5°C is being missed.

Perhaps some of the lessons from this session include the need to make a start, to have a plan, to begin with areas you 'control', along with the benefits of focusing on what really matters. The importance of data both to inform what you do and to benchmark the progress being made. The need to look across the whole cash cycle and to collaborate.

Unlock a better future

Rewired Earth: Rupert Pearce, CEO and co-founder

Rewired Earth is a not-for-profit organisation dedicated to bringing together policy makers, financial institutions and society to collaborate to accelerate environmental change.

The opening slide outlined the scale of the problem. We are heading fast towards a 3°C increase in temperature with all the resulting issues that will bring. The currency system is ill-designed to bring the changes that are needed. In addition to insufficient policy clarity, coherence and commitment, the financial measures don't value risk properly and don't reward those doing the right things. If the system worked well there would be clear direction from governments, aligned delivery by business and informed deployment of capital.

It is easy to be overwhelmed by the challenges. The more you look, the worse things appear. The 'say-do' gap is a serious challenge because the apparent demand for green products and policies does not translate to support in the market and society. While the critical challenges are usually highly interconnected, often a one-dimensional approach is taken to addressing them.

For businesses, the need to make a profit is tangible and urgent, while the impact on the planet and the value of sustainability actions are secondary.

Finally, there is a major challenge around data, its quality, availability and connectivity. There is less and less trust in data, budgets are spent on measuring and reporting rather than on interventions and there is little decision grade data.

Rewired Earth is addressing these challenges by a series of initiatives:

- » Supply Chain Data Partnership. A new verification system for asset location that enables a wide variety of transparent monitoring, due diligence and finance to flow where it is most needed.
- » App based citizen survey tool suitable for use at large events or embedded in websites and apps. It uses UN SDGs as an interface to map the sustainability priorities and preferences of people and for these to be compared against a company's actual impact based on real data.



The tool is important because by giving citizens a voice, businesses have a reason to change, and governments and markets can reward transformation.

This 'say-do' gap is important because it applies just as much to how much people value banknotes as it does to sustainability generally.

Cash and climate – insights from the Deutsche Bundesbank

Bundesbank: Ralph Rotzler: Head of Department, Cash Payments & Cash Strategy

The Bundesbank (BBk) works as part of the Eurosystem and is part, therefore, of the work being done by the European Central Bank (ECB). Beyond that it is focusing on three areas to strengthen the environmental sustainability of the German cash cycle:

- » The internal provisions of its branches
- » Branch cash processing
- » The overall environmental footprint of Germany's cash cycle.

All within legal and security requirements.

While the BBk beyond the cash department is actively making changes to reduce the environmental footprint of its facilities and has a dedicated sustainability centre that reports to a Board Director, the cash department is working on both product and operational/business objectives.

For the banknote and coin products it is now conducting its own Product Environmental Footprint analysis which will drive further work. Its operational/business focus is on access to and acceptance of cash, resilience in the event of a crisis and economic efficiency.

In 2022 the BBk's greenhouse gas emissions came from heat consumption (70%), business traffic (15%), electricity (7%), waste (5%), cooling and extinguishing agents (2%) and water (1%).

Since 2014 the BBk has reduced its CO₂e emissions by 3% to 25,734 tonnes. It offsets its business traffic emissions retrospectively on an annual basis. Business traffic includes the movement of cash around the economy. Since 2017 all its electricity has come from green sources.

Examples of actions the cash department has taken include:

- » Testing greener packaging for banknotes and coins
- » Digitalising communications with cash business partners
- » Better energy management at BBk branches
- » Environmentally sustainable procurement of cash-related materials and products such as cardboard boxes.
- » Sustainable organisation of cash-related events
- » Building the new Dortmund branch with sustainable features.

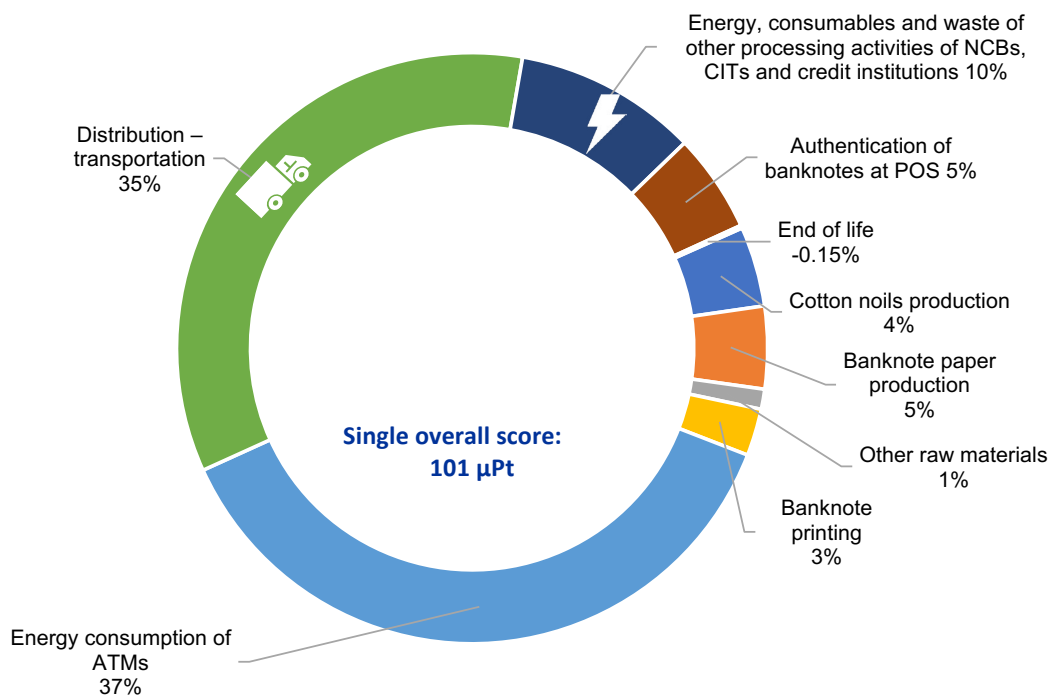
The BBk's National Cash Forum is a platform for cash stakeholders to exchange information and establishes working groups on cash-related topics. It is considering including sustainability as a working group in the future.



The Banknote Product Environmental Footprint and work of the ECB

European Central Bank: Bernadette O'Brien, Team Lead Banknote Production Expert

The ECB carried out a Product Environmental Footprint (PEF) analysis of banknotes identifying which elements of the cash cycle have the biggest environmental impact.



Sustainable cotton

The ECB requires Eurosystem members to use sustainable cotton for their banknotes because this reduces the impact of cotton noils by 58% (noil refers to the short fibres that are removed during the combing process in spinning). The ECB is now moving on to require organic cotton to be used since this will achieve a further 41% reduction compared with the baseline year 2014.

Disposal of unfit banknotes

The ECB has not allowed unfit banknotes to be sent to landfill since 2022. Almost all Eurosystem members now dispose of unfit banknotes through incineration where the energy is recovered. The result has been a 3.6% decrease in the total environmental impact of cash.

	2009	2019	2022
Landfill/combustion	57%	33%	0%
Incineration	41%	63%	98%
Recycling	2%	4%	2%

The next step is to move to recycling of the waste.

Energy consumption of ATMs

While the number of ATMs in the euro area has increased between 2004 and 2019, electricity consumption per ATM fell by 35% due to technical developments such as energy saving components, LCD screens, idle consumption and hibernation modes.

Organisations are increasingly looking to power their ATMs using green sources of electricity, although data is not available for this. The ECB sees opportunities for further reductions through optimisation based on pooling of ATMs, changing the user experience and environmental studies.

Pioneering sustainability in currency management

South African Reserve Bank: Tendamudzimu Nemusombori, Product Manager, Currency Management Department

The South African Reserve Bank (SARB) has set out a road map to establish its carbon footprint. Its baseline year was 2022/23 when it set clear targets for its carbon footprint. It then went on in 2023/24 to adopt a common strategy to get to net zero carbon emissions using existing projects. Over 2024-26 it will implement the plan, making sure that the results are measured and reported. From 2026 to 2035 it will assess its progress and take further measures to meet its targets. Consistent and transparent reporting throughout the process is key.

SARB has seven project areas:

- » Using recycled and environmentally friendly materials
- » Optimising production processes and pursuing waste reduction strategies
- » Designing banknotes and coins to last longer in circulation
- » Optimising the supply chain for the distribution and processing of banknotes and coins
- » Ensuring materials are reused, recycled, repurposed or disposed of in an environmentally friendly manner
- » Ensuring that policies support sustainable practices
- » Exploring new materials, processes and technologies.

Alternative methods of disposing of banknote waste

SARB's research has started with a survey of central banks to see what they are doing. Whatever solution it adopts, it has to work for the volume of waste South Africa produces. SARB is talking to the local paper industry and other local partners and is evaluating both short and long term solutions.

In its survey half of central banks now use energy recovery incineration, 12% cement co-processing and the remainder landfill and dumping. 88% were looking to switch to incineration with energy recovery.

Alternative substrates for low denomination banknotes

Again, SARB has carried out a central bank survey which found that 67% used the same substrate across all denominations. When considering converting the lower denominations to a different substrate, factors to consider are:

- » Adaptations that would be needed
- » Banknote processing and practices for co-circulation
- » Education and awareness programmes
- » The impact on IBNS
- » Cost.

Banknote retrieval initiative

In 2021 SARB ran a trial in a cash centre to see whether running it on lean principles could reduce waste, improve efficiency and recover more fit banknotes. It did and this trial has now been rolled out to all cash centres, increasing the recovery of fit banknotes from 224 million in 2021/22 to 345 million in 2022/23 and 282 million in 2023/24.

In addition to increased note life leading to having to order fewer new notes, less shredding was needed, and fewer notes were sent to landfill.

Quality alignment initiative for cash recycling machines

A project has been run in the KwaZulu Natal region to standardise banknote sorting quality standards across the central bank and the cash industry so that 75% of machines meet the standard for both fit and unfit banknotes.

To date, eight of the nine machines have met the standard and this is being rolled out across the whole region.

Metrics

SARB is carrying out a life cycle assessment of banknotes. It is also carrying out three net-zero carbon emission baseline assessments in collaboration with its subsidiaries, a carbon emission assessment, an Energy Performance Certificate evaluation and an Air Emissions Licence Evaluation.

Session Two: Metrics and Measurement

You can only change what you measure, which is why this session was the first topic after the scene was set.

It started at a high level looking at how organisations can be ready for the mass of reporting requirements that have been put into regulations. The answer being start early, be ambitious and treat it as an opportunity.

The session then moved to EcoVadis, who are widely used in the security printing industry, making the case for using ratings agencies to get comparable, relevant data with which to assess suppliers, before getting into the detail of measuring Scope 3 emissions with De La Rue.

The session ended with a thought provoking description of Intergraf's carbon measuring tool developed specifically for the commercial print market. Does the banknote industry need something similar?

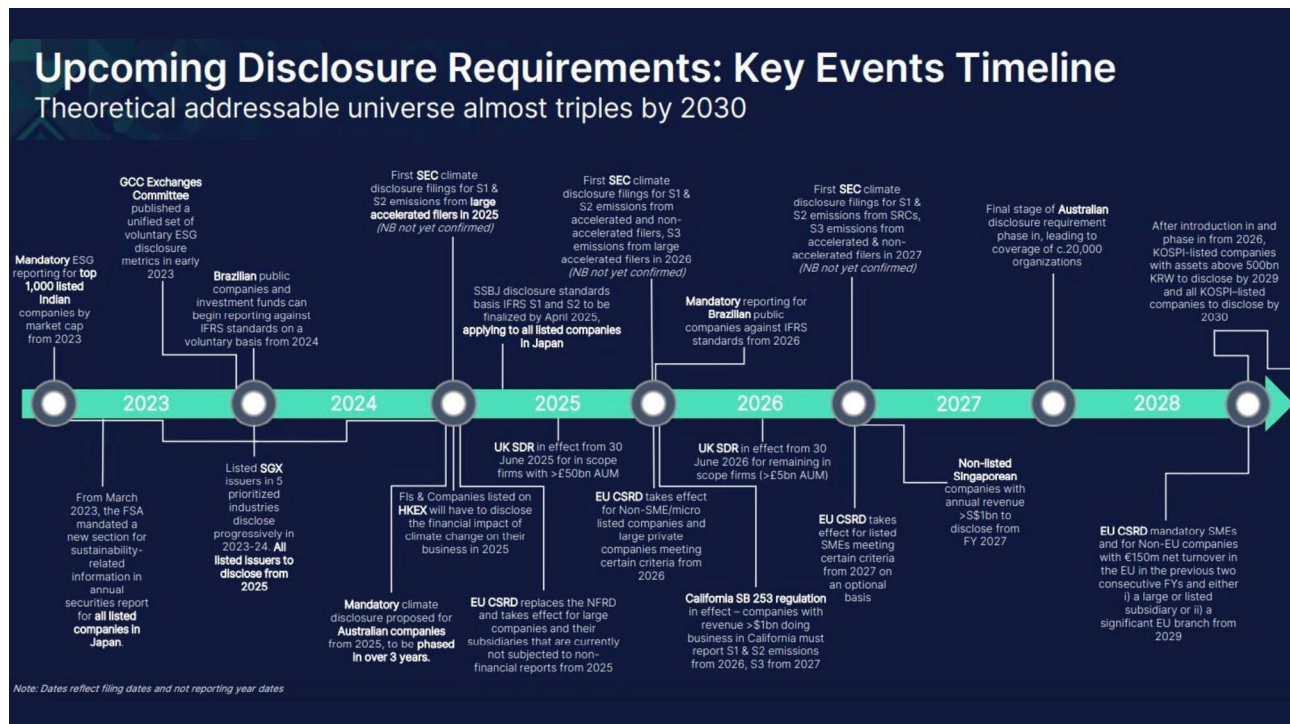
Navigating the evolving sustainability landscape: effective environmental target setting for Financial Institutions

MyCarbon: Dr Toby Green ,Co-founder and Director

Understanding emerging regulations

The number of regulations and standards facing organisations feels overwhelming – SFDR, CSRD, SDR, B3E, TPT, CCDB, ISSB, TCFD etc. And if businesses get it wrong, they face everything from reputational damage to legal and financial penalties. Complying with them represents operational challenges and significant costs.

The speaker put up a timeline of disclosure requirements and their implementation dates from 2023 to 2030. 21 deadlines for the Gulf Co-operation Council, Brazil, Japan, Australia, Hong Kong, US, UK, European Union and Singapore were listed. To complicate matters, not all authorities have yet issued their guidelines for standards which are imminent.



MyCarbon's advice was simple. If you calculate your emissions, set science based targets (SBTs) and have a strategy about how you are going to get to net-zero carbon emissions, you will be well placed to comply with whatever regulatory requirements come along. SBTs are a highly robust measure which are well respected and recognised.

Developing robust environmental targets

Targets can have multiple different options and be both short and long term. They can be combined across different Scopes or be individual. For example, it is common to have a combined Scope 1 and 2 target and a separate Scope 3 target. THG, a client of MyCarbon, has three SBTs:

- » Absolute Scope 1 and 2 Greenhouse Gas (GHG) emissions to be 42% lower by 2030 compared with 2020
- » 85% of suppliers by spend covering purchased goods and services to have SBTs by 2027
- » Absolute reduction of all emissions by at least 90% by 2040.

Setting Science Based Targets

Near term SBTs are a minimum of five years and a maximum of 10 years from the submission date. 95% of Scope 1 and 2 and 67% of Scope 3 emissions must be covered (if Scope 3 is more than 40% of the total).

Scope 1 and 2 targets must be aligned to the target of limiting temperature increase to 1.5°C. Scope 3 can be 1.5°C or aligned to well below 2°C. There are six different near-term target methods across Scope 1, 2 and 3. Some are sector specific; some are general.

Long-term SBTs cannot go beyond 2050 and 95% must include Scope 1, 2 and 3 emissions. Net-zero targets must either aim for an absolute contraction or physical intensity reduction. Targets must be aligned to reach net-zero with at least a 90% reduction in emissions.

The process for setting SBTs is straightforward. Write to the SBT initiative declaring your intention to set SBTs. Model emission reductions in line with SBTi criteria, present the targets to SBTi for validation and get the validated. Announce the validated targets, inform stakeholders and report annually on your emissions and progress towards your targets.

Easy to write, somewhat more involved to do.

Putting sustainability in a strategy

Integrating sustainability into a strategy starts with top-down buy-in and a willingness to be accountable. Internal engagement, industry collaboration, meeting evolving regulations, making sure you adopt and master available technology, engaging with regional infrastructure and meeting stakeholder expectations, particularly customers, are all streams of work to turn strategy into success.

Project management is project management and so there are no short cuts. Whatever the 'what' is that you are trying to achieve – GHG emissions, energy consumption, water, waste, resource efficiency, biodiversity, compliance etc. – you will still have to establish a baseline, set specific, measurable, achievable, realistic, time-based (SMART) goals which are regularly monitored and reported on, and which are benchmarked against peers, and have good data and analytics. The strategy will need to be part of your wider strategy and have engagement throughout the organisation.

The organisation, stakeholders and regulators will need to have confidence in the data and reporting against targets. Third-party assured data and the use of trusted metrics and methodologies are the starting point.

Final word

Organisations are likely to need to leverage external expertise and to use partnerships and collaboration to move at pace and to meet the expectations of stakeholders and regulators.

Which brings the presentation back to the opening advice - don't be overwhelmed, make a start. Calculate your emissions, set science based targets (SBTs) and have a strategy about how you are going to get to net-zero carbon emissions and you will be well placed to reduce your environmental impact and to comply with whatever regulatory requirements come along.

CSRD regulations – a burden or opportunity for carbon reduction? Practitioners' viewpoints

Verco: Thanos Patsos, Associate Director

Verco is a consultancy focused on sustainability and getting firms to net zero carbon emissions. It offers expert, independent advice, support services and implementation and data and reporting. It is part of the multinational consulting firm, Bip Group

As with MyCarbon, Verco pointed out just how much regulation there is around sustainability.

Acronyms abound – a practitioner's nightmare

- GRI: Global Reporting Initiative**, provides the world's most widely used sustainability reporting standards
- TCFD: Task Force on Climate Related Financial Disclosures**, established by G20
- IFRS: International Financial Reporting Standards**, the most-used set of financial standards globally
- ISSB: International Sustainability Standards Board**, develops and approves IFRS sustainability standards
- NFRD: Non-Financial Reporting Directive**. Adopted in 2014 in the EU
- CSRD: Corporate Sustainability Reporting Directive**, replaces the NFRD
- ESRS: European Sustainability Reporting Standards**. The 'what and how' detail of CSRD
- EFRAG: European Financial Reporting Advisory Group**. Produces the ESRS
- IROs: Impacts, risks and opportunities**

verco Confidential

But also, that we are moving from voluntary standards - GRI, SASB, UN SDGs, CDP, TCFD, GHG Protocol, UN Global Compact etc. - to mandatory standards, in Europe CSRD and ESRS, globally IFRS.

Corporate Sustainability Reporting Directive

The European Commissioner, who introduced the debate on the CSRD legislation in the European Parliament in November 2022, opened with the statement: 'For the first time... we are putting sustainability reporting on equal footing with financial reporting. The aim is to make non-financial data consistent, reliable and comparable'.

Who it applies to

In 2024 CSRD will apply to listed public interest enterprises. In 2025 it will apply to large private companies with two of having over 250 staff, revenues over €40 million or assets worth €20 million or more. In 2026 it will apply to small and medium size businesses, although they may defer until 2028. By 2028 it will apply to non-EU companies with revenues over €150 million. There are 11,700 countries currently who must comply with it but that will rise to 45,000 in due course.

What is included

CSRD covers more than just environmental measures, but employee diversity, equality and inclusion factors as well. There are up to 85 disclosures and 1,100 data points.

All information submitted must be assured. Impact materiality and financial materiality apply, known as double materiality.

Environmental requirements

There are five reporting areas:

- » Business model
- » Policies, including the due-diligence processes implemented
- » The outcome of these policies
- » Risks and risk management
- » Key performance indicators relevant to the business.

CSRD is not prescriptive in that it leaves it to the organisation to define what it includes, and why these are included. Organisations are required to consider whether climate change is material to what the organisation does, the possible impacts, risks and opportunities.

An assessment of risks, the financial effects of those risks, prevention/mitigation/remedial action throughout the supply chain, opportunities that arise from working with the supply chain what mitigation actions might cost, for example buying carbon credits, and climate change performance indicators.

Burden or opportunity?

The presentation listed many of the challenges of complying with CSRD, including ambiguity about what is expected, as well as the complexity of the task. In the Q&As at the end of the session, it was suggested that the cost of compliance for a large corporation would be material, perhaps as much as 1-1.5% of turnover.

In terms of opportunities, Verco looked at it through the lens of CSRD being a catalyst for an organisation to get serious about the environment, to put in place good structures and budgets, to understand the supply chain and to streamline data collection and reporting. There was a clear message that if CSRD applies to you and you aren't already preparing for implementation, now would be a very good time to start.

There was no discussion about whether CSRD gave organisations the opportunity to work with suppliers and customers to optimise the product, service and performance of what they do.

The role and contribution of rating agencies in sustainability

EcoVadis: Tanja Reilly, Senior Strategic Business Development Manager

EcoVadis is one of many global ratings agencies, but it is probably the best known and most used in the banknote industry.

An advantage of using a rating agency is that the reporting from suppliers can be inconsistent based on different metrics and methodologies. The data may not be validated and there may be a lack of detail about projects and practices. As a result, if a goal is to be able to compare different suppliers, or to compare an organisation over time, a ratings agency could be useful. If the regulations and reporting standards are changing fast, or the supplier needs to be known to be compliant to them, again a rating agency can help.

For the supplier, if buyers use the same ratings agency, the burden of complying with tender requirements can be reduced.

EcoVadis has employees in 13 countries and provides a worldwide service covering over 200 industries and countries. Its Environment, Social and Governance (ESG) methodology covers 21 ESG criteria and is aligned with international standards such as the UN Global Compact and SFDR. It offers an independent assessment and verification of organisations, including an assessment of whether sustainability initiatives are making progress.

The rating process involves questionnaires customised to the industry, data inputs and then assessments with evidence-backed validations by the in-house analysts. The output is a scorecard rating ESG themes, benchmarks, strengths and improvement areas.

25% of the assessment looks at policies and external endorsements of initiatives, for example SBTi. 40% is about what has been done – measures, certifications and the level of deployment of measurement and actions. 35% looks at the results achieved based on reporting of key performance indicators and looking at general news, reporting and information about the company.

The rating is reported in the form of 18 actionable dashboards. While an overall rating is created, and how the company compares to other similar organisations, there are individual scores for the environment, sustainable procurement, ethics, labour and human rights etc. along with strengths and improvement areas.

The reporting also looks at how the organisation has performed against different standards – SFDR, UN Global compact, TCFD etc. Given that so many organisations sign up to such standards, perhaps this offers a useful indicator of their commitment to them.

Final word

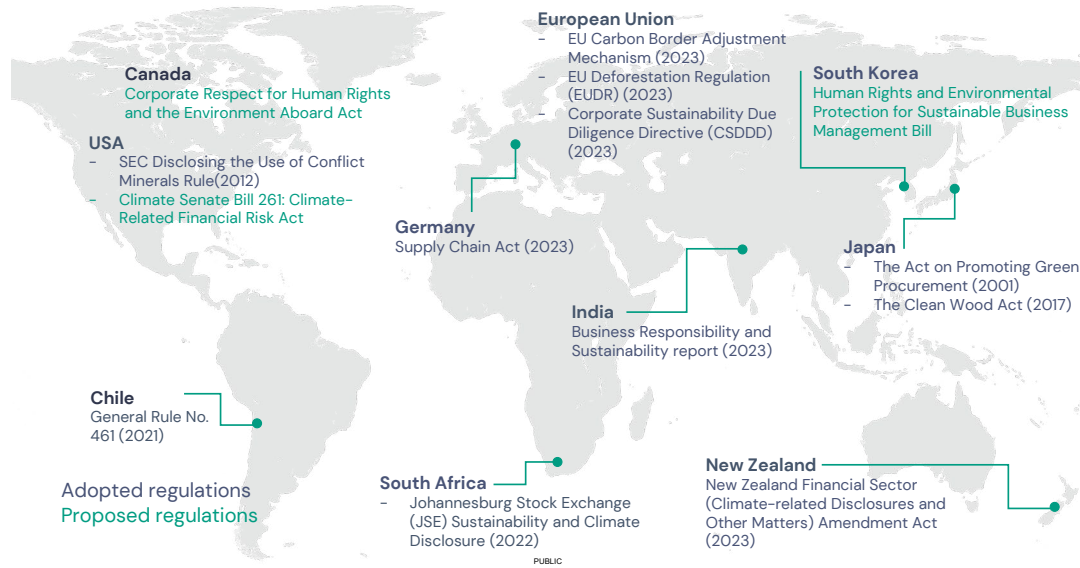
Clearly there is a cost to such ratings, and it will be interesting to see if CSRD, and its equivalents around the world, offer an alternative way of comparing organisations. Users need to have transparency about how the scores have been derived if there is to be confidence in them. But overall using a ratings agency may offer a useful tool to be confident in supplier performance.

Measuring and assessing impacts in the supply chain

De La Rue: Harsha Mary Thomas, Environmental Sustainability Co-ordinator

De La Rue focused on its Scope 3 emissions, up and downstream indirect emissions from suppliers and what happens to the product after it leaves De La Rue. There is now increased scrutiny on supply chain due diligence, partly driven by new regulatory frameworks and legislation around the world and partly because they are so much larger than operational emissions. According to the CDP Global Supply Chain Report 2020, on average supply chain emissions are 11.4 times greater than operational emissions. For every 100 tonne CO₂e that De La Rue produces, 64% comes from its supply chain.

A useful slide was shown which recorded new environmental legislation in South Korea, India and China, South Africa and New Zealand, as well as Canada, the US, Germany, the European Union and Japan.



Calculating Scope 3 emissions

Scope 3 emissions can be hard to calculate. The easiest way to calculate them is on a spend-basis, ie. record what you have spent on different items with different suppliers and estimate their emissions. A slightly more accurate approach is an average-based method which estimates emissions from mass or other relevant units. A hybrid approach uses available specific data and then fills in the gaps with secondary data. Finally, the best approach is where the supplier is able to provide specific data for what they have supplied.

Historically De La Rue used the spend-based method. When it uses hybrid data the emissions dropped 93%, demonstrating the real need to get to supplier specific information.

When asking for data from suppliers, the hierarchy based on the methodology described in the GHG Protocol for Scope 3, Category 1 Emissions is:

Priority	Supplier data provided	Minimum	Improving	Good	Outstanding
HIGH					
<i>EcoVadis Assessment</i>		Yes	Yes	Yes	Yes
<i>Allocation method</i>		X	Yes	Yes	Yes
<i>Scope 1 & 2 emissions</i>		X	Yes	Yes	Yes
<i>Activity data</i>		X	X	Yes	Yes
<i>Waste data</i>		X	X	Yes	Yes
<i>Scope 3 emissions</i>		X	X	X	Yes
<i>Product lifecycle assessment</i>		X	X	X	Yes
LOW					

A key lesson is the importance of working with suppliers to build credible low carbon strategies.

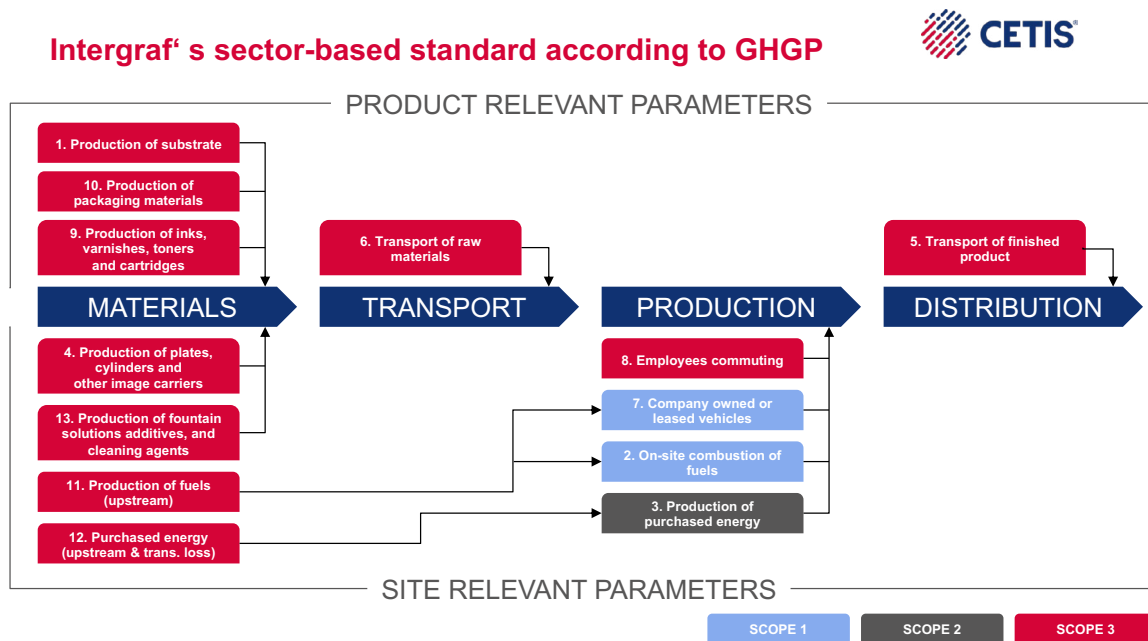
Getting to know your emissions: a practical approach

Cetis: Boštjan Kolar, Security and Compliance Officer

Cetis produces complete solutions for security identity management. Based in Slovenia, it has customers in four continents. Why were they at a banknote event?

Cetis is a member of Intergraf, an international federation for the printing and digital communication industry which provides industry best practices and facilitates sharing of information among members. As part of this work, Intergraf has produced a sector base standard in line with the Greenhouse Gas Protocol for the (commercial) print industry. Does the banknote industry need an equivalent or an adapted version?

What is included in the calculator?



The calculation tool, ClimateCalc, uses company and supplier specific data and draws from internationally recognised databases. Its calculations are in line with the GHG Protocol, ISO 16759 and ISO 14064-1, and 13 parameters defined by Intergraf as normally responsible for most CO₂ emissions associated with printing activities on site, or in relation with the production of printed produces. Intergraf estimates that these 13 parameters identify 95% of the total CO₂ emissions within the defined scope.

This tool does not set out to capture everything; for example, business travel by employees and visitors, transport of raw materials other than the substrate, transport and treatment of production waste and wastewater, the production of other materials such as plate developing agents, blankets etc. and emissions from Volatile Organic Compounds are excluded.

Cetis has used ClimateCalc and has found getting data, whether from suppliers or in-house, can be challenging. While major transport companies generally have the necessary data, minor transport companies do not. Getting substrate data can be difficult and there is no data about waste processing.

For in-house data they have had problems with bad data from SAP, missing data for some materials and problems with getting accurate data for fields such as the weight of holograms.

For this to work, this has to be a management priority, not just a quality department project. A long term commitment is needed to keep improving it.

For a commercial printer, which does not have complex banknote substrates and the five or six different printing processes involved in creating a banknote, the top five parameters were:

1. Production of the substrate (Scope 3)
2. Production of purchased energy (Scope 2)
3. On-site combustion of fuels (Scope 1)
4. Transport of raw materials (Scope 3)
5. Production of inks and varnishes (Scope 3).

Session Three: How Do You Introduce Sustainability Measures into Tenders Fairly and Effectively?

Lachlan McDonald (Technical Services Manager at CCL Secure), Tanja Reilley (Senior Strategic Business Development Manager at EcoVadis), and Shoukry Karim (Director Quality Management and Strategic Projects at Orell Füssli) formed a panel on tenders.

The buying process is a moment of power because the buyer has the opportunity to reward suppliers who meet their criteria. However, including sustainability criteria needs thought.

A distinction was made between different types of tenders: those for a repeat order or those where a new design is being created, those for a finished banknote or those for a substrate. Orell Füssli and CCL Secure suggested that for new designs suppliers should be making proposals about the total life of their design from issue to destruction.

Buyers need to be clear on what their environmental priorities are. Focus is more likely to bring results than including multiple goals. In a question about how to balance off a supplier who does little on the environment but happens to have access to green power, for example hydroelectricity, and a supplier who can only buy power generated by fossil fuels but who is striving to reduce their environmental impact, one panellist took an absolutist view that if the focus is on net zero carbon emissions, then it is only the number that matters.

The weighting of sustainability criteria in tenders relative to other factors – price, lead times etc. - was discussed. While the Bank of England in its substrate tender had a weighting of 30% for sustainability criteria, the Dutch National Bank in its finished banknote tender used 5%. Certainly 30% was enough to drive supplier behaviour but 5% was much less effective. It depends, of course, on just how competitive the tender is and the spread of bids that are received.

Asked whether central banks are prepared to pay more for more sustainable products or to use more sustainable suppliers, there was scepticism about whether this was true. Certainly a few central banks are, but it was clear the panellists were not confident that this was widespread.

One panellist recommended that central banks do a Life Cycle Analysis (LCA) so that they have a baseline to measure from and clarity on where to focus. Given that banknote LCAs from around the world give highly consistent results, perhaps an LCA is a nice to have rather than a must have. It depends on resources, expertise, time and priorities.

EcoVadis is widely used in the banknote sector. CCL Secure, De La Rue, Kurz and Cetis, for example, have all used EcoVadis. Using a rating agency does create a level playing field across suppliers, allows supplier comparisons and provides detailed information on the metrics, plans and performance of companies that has been verified. This does add direct costs to suppliers and requires them to devote considerable time to following the rating agency processes, so the buyer needs to think carefully about how the information will be used to adjudicate the tender.

Orell Füssli offered the figure of 40% of tenders over the last four or five years including sustainability criteria. However, most central banks include general questions rather than requiring hard data and specific answers, with weighting allocated in the adjudication process. It is much more common for sustainability to be a 'hygiene' factor as part of the pre-assessment to be included in the tender. This is reflected in survey results as well, but there is evidence that this is changing. Perhaps what is missing is agreement on how to do it well.



Session Four: Manufacturing Excellence

The European Central Bank (ECB) is moving from a reactive analysis of work done to exploring future options for a possible future new euro series.

CCL Secure updated its environmental work and made the case for the environmental credentials of polymer notes.

Oberthur Fiduciaire gave a fairly detailed summary of its Environment Social Governance (ESG) agenda, although with the majority of the focus on what a highly engaged manufacturer is doing.

Security Fibres gave an example of innovating to address a specific manufacturing problem, the sort of continuous improvement that, when added together with lots of other small projects, ends up making a big difference.

Npower Business Solutions gave a timely reminder about both day to day changes and big project opportunities to get to net zero for power.

Finally, THG Eco explained what to do about those emissions which you either cannot eliminate or cannot eliminate at this time. Carbon offsetting perhaps seems complex, or even inappropriate, but if it is done well, it does offer a legitimate and effective way of reducing global CO2 emissions.

Eco-design of future euro banknotes

ECB: Antonio Arrieta, Senior Lead Banknote R&D Expert

The ECB carried out a Life Cycle Assessment of the ES1 banknote series after it was launched, in 2004. Again, the 2019 Product Environmental Footprint assessment of ES2 banknotes has taken place post-launch. For a possible ES3 series the ECB is looking to reduce the environmental impact of the series by using an eco-design process which quantifies the environmental impact of a range of design variations using the ES2 series for comparison.

The eco-design approach has three parts:

- » Designing for durability based on new or alternative raw materials, or extending the use of existing raw materials
- » Designing for recycling by developing new upcycling treatments and adapting existing treatments
- » Looking at changing the design of the life cycle based on new methodologies to calculate the environmental impact of all design variations.

The time horizon being used is a launch in 2030. The inputs into the ECB's eco-design model is 2019 production and circulation data, which is used to create a forecast based on extrapolation and standardisation.

The second input is an evaluation of the environmental impact of design variations, referred to as DEVA. DEVA is the environmental footprint of euro banknotes calculated for the conditions expected for design variation 'DEVA' in 2030 divided by the environmental footprint of ES2 banknotes calculated for the standard conditions expected in 2030.

If the output is less than 100%, then the DEVA has a lower environmental impact than the 2030 standard. The impact on each cash cycle stage, the impact category and the denomination is assessed.

Dummy data was used to show how data was modelled through the cash cycle and an example output shown.

Environmental impact of all denominations	Banknote production, 15.4% weighting	Banknote circulation, 85% weighting	Banknote disposal, -0.4% weighting	Whole cash cycle
Design variation 'S', use of natural fibres other than cotton	95%	100%	114%	98%
Technology 'T' for sustainable disposal of unfit banknotes	100%	100%	19%	96%

(Incineration for energy recovery provides a net benefit, hence the result here).

Final word

This was presentation followed on from the tender panel which talked about assessing designs for their total life impact. It is a useful example of what will, no doubt, become a common practice when designing new series.

Do nothing, a little bit or something that makes a difference

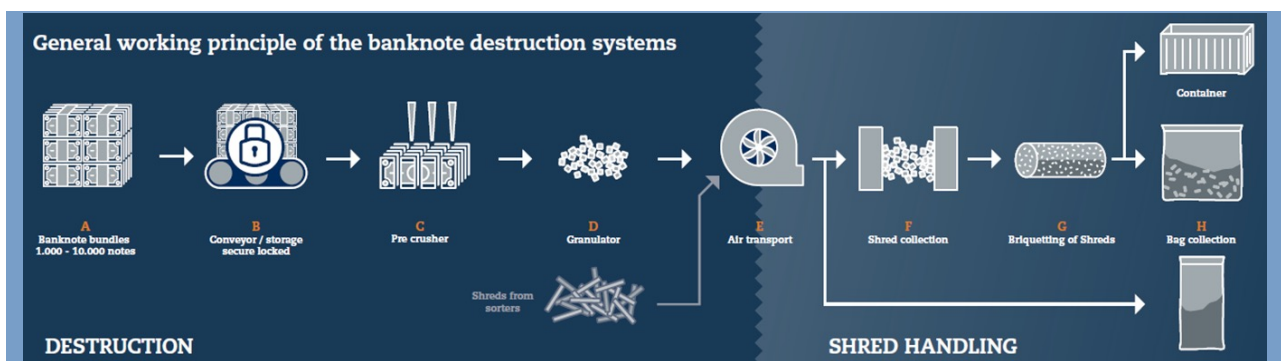
CCL Secure: Lachlan McDonald, Technical Services Manager

CCL Secure has kept its environmental journey focused on the goals of reducing, reusing and recycling in all that it does. It achieved the EcoVadis Silver sustainability rating in May 2024, which only the top 15% of companies achieve. It has been working with Verco on its journey to net zero. Its EcoVadis verified results from its UK plant show real progress:

- » 26% reduction in its carbon footprint across all three greenhouse gas scopes
- » 31% reduction in energy use
- » 40% reduction in water consumption
- » 90% reduction in incoming transport emissions
- » Zero landfill.

CCL Secure suggests that a transition to polymer notes will lead to an 80% reduction of emissions in banknote production, 50% less emission resulting from transportation and cash processing and the opportunity to recycle all banknote waste at end of life.

With 82% of the environmental impact of banknotes coming from the cash cycle, the 50% reduction in transportation and cash processing is key and CCL claims that changing to polymer adds up to a 70% reduction in carbon emissions overall.



If polymer waste is properly separated from other waste at the point of destruction, it is possible to convert the shredded or granulated waste back into polypropylene pellets that can then be used to produce new polymer products. These range from construction and building materials to outdoor furniture, composite timber, reusable shipping pallets, structural pylons, water tanks etc.

Over the last seven years the percentage of central banks fully recycling unfit Guardian polymer notes by volume has reached 80%. In 2023 the number of central banks fully recycling unfit Guardian polymer notes was 70%. A further 6% were testing recycling solutions, 18% were exploring recycling and the remaining 6% had such small volumes that they were either storing it until they had sufficient volume or were finding alternative disposal methods.

Final word

CCL Secure has clearly done considerable work and achieved great success in reducing the environmental impact of its own operations. The extended durability of the substrate in circulation provides a very significant environmental benefit. At end of life, when operations and systems are in place, recycling is a proven option.

The core challenge of our business industry – be the change we want to see in the world

Oberthur Fiduciaire: Benoît Renault, QHSE – CSR - Continuous Improvement Director

Oberthur Fiduciaire is a pioneer and leader in environmental work in the banknote industry. This presentation spoke about its wider Corporate Social Responsibility (CSR) work, but the bulk of the presentation looked at how Oberthur has approached change and what it has done.

Corporate Social Responsibility

Corporate Social Responsibility (CSR) is covered by ISO 26000 and for Oberthur it is integrated in to how it does business:

- » Security: ISO14298, ISO 27001
- » Human Rights, Labour practices: ISO 45001
- » Environmental impact: ISO 14001, ISO 50001
- » Competitiveness: ISO9001, EPV
- » Consumer issues, fair business practices: ISO 37001.

Oberthur has also signed up to the UN Global Compact.

Its Earth 365 programme has 12 ESG objectives, five relating to the environment, four to social and three to governance.

Environment

Water, energy, sustainable resources, waste and circular economy, CO2 emissions, green products and technologies.

Social

Social includes health and safety, working life conditions, learning and talent development, committed company / diversity and equality.

Governance

Governance includes sustainable investments, digital responsibility including data privacy, compliance and integrity, sustainable integration and community involvement.

Lean environmental sustainability

Oberthur has led on sustainability for many years in the banknote industry. It has pursued its Earth 365 agenda part of which is introducing a sustainable lean culture built on four principles:

- » Customer first, driving demand
- » Humans, the core value of the company
- » Gemba, where it all happens
- » Continuous improvement, transformation step by step.

The goal of lean sustainability is how to do with more with less, frugal innovation while delivery perfection for customers based on people and economics.

Performance is managed by monitoring progress every day based on 'short interval animation' rituals, a five minute quick 'traffic light' assessment on the shop floor, a 15 minute supervisory team animation looking at trends and a 30 minute management animation. Lean defines 10 levels at which a problem can be addressed, or not, starting with level one where the problem is ignored. The hierarchy rises to deny, accuse, 'justify myself', accept, compensate and analyse (level 7). The lean mind-set operates from level 8 upwards – fix, imagine and improve.

Oberthur's carbon footprint

In 2023 Oberthur's carbon footprint came from:

- » 40.3% substrate
- » 26.05% downstream freight
- » 14.26% purchased goods and services
- » 10.16% upstream freight
- » 4.14% waste generated
- » 1.93% capital goods
- » 1.6% employees commuting
- » 1.12% business travel
- » 0.42% emissions related to fuels and energy not included in Scope 1 and 2
- » 0.02% other indirect emissions.

98.38% of Oberthur's CO₂e emissions have direct or indirect links with requirements of tenders.

INITIATIVES TO REDUCE THE ENVIRONMENTAL IMPACT

» Water

The basic tenets are to limit the usage of water and to recycle it. If 150 billion banknotes are produced each year around the world, about 11,900,000 cubic meters of water are used in paper mills, and 262,000 in print works, the equivalent of the water used by 20,200 people.

» Energy

Estimated worldwide energy consumption is 162,400 TWH/year. Energy used in the production of banknotes is estimated to be 1 TWH/year with an energy carbon footprint of 591,216 tonnes of CO₂. Changes such as cool roofs on buildings, widespread installation of solar panels and the use of electric vehicles for transportation would help reduce cash related energy demand. If paper mills and printing works could use carbon free energy, those emissions could fall by 70,512 tonnes.

Dynamic multi-parametric process control can reduce energy use by 10-30% /1,000 banknotes. Investment in technology could combine information on energy tariffs, the weather and carbon footprints with machine/equipment/building data to allow automated controls to manage energy use.

» Sustainable resources

If reams of paper delivered to the print works are without plastic wrapping around the pallets, 375 tonnes of plastic can be saved, reducing CO₂e from 2,041 tonnes to 695 tonnes. If eco-friendly packaging replaces the plastic and cardboard banknote packaging used today, 30,390 tonnes CO₂e could be saved.

» Waste and the circular economy

Oberthur gave four examples of using waste to make new products. Mixing shredded banknotes with a strong binder to create decorative and insulation bricks and sound proofing panels, integrating shredded banknotes in the paste used to manufacture packaging boxes, creating organic fertilizer by the pyrolysis of shredded banknotes and bacteria, and mixing shredded banknotes with a strong binder to create technical tissues.

Oberthur's use of waste in insulation materials has saved 615,000 tonnes of CO₂e.

Green banknote concept

The key elements of a green banknote are well known:

- » Make them as durable as possible but do not use plastics in the banknote
- » Use eco-friendly fibres
- » Use bio based materials to help with easy recycling
- » Reduce the contribution of fossil inputs.

Life cycle analysis shows that if wooden boxes can be replaced with cardboard packaging for finished banknotes delivered to customers, their single score in µPt can drop by about a half. If recycled PET plastic is used, 29% of CO₂e can be saved.

Final word

The key themes that came across for suppliers were to adopt a lean sustainability ethos and the benefits of energy management. Adopting a green banknote design approach and agreeing to green packaging solutions with customers also offers significant environmental benefits.

Finally, there are now a wide range of options at the end of life for a banknote to add value to new products. All of this has been achieved in a highly structured approach to the whole CSR agenda.

Evolution of a more secure fibre

Security Fibres: Gary Spinks, Managing Director

Security Fibres manufactures traditional synthetic security fibres for use in banknotes. It has always been a leader in innovation, for example creating the world's first multi-coloured fibres and paper-based fibres. Paper fibres are much more environmentally friendly, of course, than their synthetic counterparts.

While security fibres represent only 0.01% of a tonne of paper, they can present a challenge to paper makers if they are looking to reuse the broke (the waste from trims and offcuts) within the paper making process, ie. at a very early stage when it is relatively easy to reintroduce it into the process. If the security fibres have a UV coating, this can contaminate the paper it is being put into.

As a result, Security Fibres has invented a way to allow the paper maker to 'remove' its security fibres from the broke, allowing the paper pulp to be re-used. Security Fibres has patented a process where a primer layer is applied to the surface of the paper fibre. This special layer reacts with a water-soluble agent to remove the printed fluorescent colours from the fibre, allowing the pulp to be reused for a new production.

This process does not use harmful chemicals. It allows chopped/cut fibres to be removed from the edge broke and to be reused without compromising the quality of the paper. This saves materials and production costs.

Although an apparently simple development of a minor part of the production process, it is innovations such as this that can make a real difference.

An energy supplier's perspective on saving the planet

Npower Business Solutions: Gareth Metcalf, Strategic Sales Manager

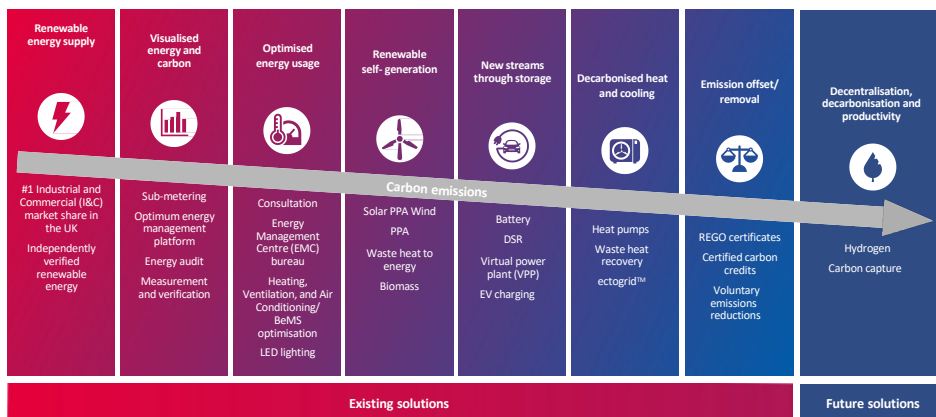
Energy usage is at the heart of getting to net zero throughout the cash cycle. Npower is part of the E.ON group operating throughout Europe. It is playing a central role in Europe's transition to green energy, operating the largest energy distribution grid in Europe, providing infrastructure solutions to industries and cities seeking to decarbonise and working with businesses and private households to achieve their net-zero goals. In Germany it has 25% market share of the customer/electricity market, 24% in the Netherlands and 18% in the UK. As such npower was well placed to talk to the Forum about all things energy.

Npower itself is working to be carbon neutral for Scope 1 and 2 emissions by 2040 and for Scope 3 by 2050. 15% of all renewable assets in Europe are connected to the E.ON grid. It is working on new technologies to provide low-carbon energy solutions, for example its ectogrid™ heat sharing solution that reduces energy consumption by up to 80%.

Being net zero means that you are not adding any incremental greenhouse gas emissions to the atmosphere. To do this you need to:

- » Minimise consumption of power and gas
- » Switch to low-emission fuels, processes and use heat pumps and electric vehicles
- » Seek to generate your own energy by onsite renewable generation or using heat and energy sharing networks
- » Offset any emissions that you cannot eliminate.

Npower showed a useful slide capturing change that any organisation can make to reduce their energy use.



While it may only apply to larger organisations, the presentation went on to review a number of projects npower has delivered for organisations:

- » A district heating scheme using geothermal power for the city of Malmö in Sweden
- » 63,000 solar panels in the Port of Liverpool in the UK
- » A district heating scheme in the centre of London at Citigen
- » A site in Blackburn Meadows in the UK turning recycled waste wood into heat and power
- » A 15 year partnership with the city of Coventry to decarbonise the city, adding solar panels and EV charging points.

Final word

Npower's sensible advice was to start with the basics, ie. minimise what you use, and to be willing to look to community projects to decarbonise heat and power.

Navigating carbon offsetting: methods, legal frameworks, supply chain collaboration

THG Eco: Adam Lowe, Head of Sustainability and Jason Petrou-Brown, Head of Business Development

Not all emissions can be eliminated. It is a legitimate and widely used practice to invest in projects that save CO2 to balance off against those emissions. While organisations can do their own projects, most do so by 'carbon credits' associated with projects being done by others. Those projects, of course, need to exist, be properly measured, be new projects and to be unique to the buyer of the credit. Independent verification is needed to be sure, and assured, that those criteria have been met.

To address the need for independent verification, a number of recognised standards exist to guarantee the credibility and effectiveness of carbon offset projects, for example VCS, Gold Standard and VDM.

Types of project

There are three types of project:

- » Project-based credits generated from specific projects that reduce, avoid or sequester carbon emissions. Generally, these are renewable energy or forestry and land use projects
- » Nature-based projects leverage natural processes to reduce or sequester carbon emissions. Generally, these are afforestation/reforestation projects or avoided deforestation
- » Technology based solutions using technology to reduce carbon emissions, for example carbon capture and storage and direct air capture.

Projects that prevent emissions generally cost £0.80 to £100 per tonne, or more, and are immediately available. Projects that actively remove CO2 from the atmosphere are more expensive, £20 to £500 per tonne, or more. There are fewer of these projects available.

THG Eco and the supply chain

The Hut Group (THG) is a major UK ecommerce business linking 600 brands to consumers and providing a range of services. Sustainability is a core part of its business and THG Eco was set up to support suppliers, customers and those seeking help with climate related actions.

It helps organisations with their Scope 3 emissions with supplier assessments and evaluations, including identifying sustainability risks, compliance status and monitoring and scoring supplier performance. They also monitor regulations and standards and help with sustainability reporting providing detailed, data-driven insights for decision making.

Session Five: Cash Cycle

Cash InfraPro talked about ways to optimise the cash cycle, NatWest Group described both how an industry can come together to reduce carbon, energy and plastic usage and the current focus of the group and G+D started to explore cash centre measurement, actions and end of life solutions.

The Reserve Bank of New Zealand described its community cash services trial, an innovative exploration at scale of how to provide cash services in remote areas where the banks have completely withdrawn.

Optimising the cash cycle: standards in the supply chain

Cash InfraPro: Jens Eberhardt, Managing Director

Cash InfraPro presented on the challenges and opportunities of making the cash supply chain work well. The starting point is standardisation combined with a flow of transparent data end-to-end. Standardised units, labelling and reporting brings efficiency and visibility to stakeholders. It offers the opportunity to do things differently and can change the relationship between stakeholders, allowing mutual benefit.

The presentation also looks at what central banks can change to optimise the cash cycle, including reflecting on the how the private sector will have to adjust should a central bank introduce changes.

1. Standards and cash supply chain

Uniform engineering/technical criteria, methods, processes and practices which are agreed and widely followed offer opportunities for increased efficiency. If they are shared and harmonised across producers, IT (as open standards) and suppliers and they flow down to individual processes and systems within an industry, then alignment is possible.

If you consider a supply chain from factory to the user, it involves many stakeholders. Products and service levels are seldom standard within an industry, creating potentially massive variations and complexity. The starting point for creating a standardised, efficient systems are benchmarks and guidelines for service availability, cost and quality.

Basic information across the end-to-end process flow is:

- » The point of origin of the product
- » In transit visibility from factory to shipping point/warehouse
- » Stock visibility at the shipping point/warehouse
- » In transit visibility to the end user
- » Stock visibility at the end user.

Technology and systems are needed to know and track the individual products, how they have been aggregated between point of origin and end-user and how they are disaggregated by the end-user. The data needs to be captured and monitored to maintain control, and this requires interoperable electronic data interfaces (EDI) between all the stakeholders involved.

2. Challenges within supply chain management (of commercial cash cycle)

The organisation of a cash network with multi-vendor layers across different regions and a mix of ATMs, Cash Recycler Systems (CRS) and Cash Deposit Systems (CDS), for example, will involve a flow of data and decision making:

- » A data platform will be needed to take device data across the system
- » Order planning will involve cash order management based on knowing the cash inventory and a forecast of demand and order management based on a technical event analysis of the devices
- » Order planning will flow down to order fulfilment which organises cash transport cash centres and claim management as well as the deployment of field technicians with the right spare parts and knowledge. Performance management against contracts or service levels will feed into this as well.
- » Finally, decision support based on reporting, benchmarking and audits will manage risk and performance.

Optimising this is more straightforward if those involved are co-operating rather than competing or having an adversarial approach. The data flow needs the process to be well structured with systems properly configured and mapped. Inventory, planning, performance and quality need to be managed with standardised, assured information visible along the supply chain.

For cash monitoring and forecasting to work, device hubs and data platforms must connect to all the devices, with cash event and incident monitoring and cash inventory monitoring and forecasting in place.

While Cash InfraPro recommends the GS1 standards, there are others. Whatever is used, the software must comply with the standard if CIT and cash cycle performance is to be managed and optimised.

The order management elements are route planning and scheduling, warehouse and cash centre management, order monitoring and control, authorisation control at ATMs and ATM reconciliation of accounts. Contract management and decision support tools can also be part of the software settings.

End-to-end inventory optimisation

End-to-end inventory optimisation balances the tension between the cost per item rising as the number of ATM replenishments increasing and the interest costs being lower if ATMs hold less cash, ie. they are replenished more often.

While the number of ATM replenishments per 1,000 transactions, cash return rates and cash demand are variables, operators can control variables such as transactions per ATM, the number of denominations in an ATM, the value or volume of notes in each cassette, service hours, the number of notes per cassette or location, CIT frequency and performance (fixed or dynamic route schedules, performance rates) and whether cash is on stock and within what limits.

ATM clustering models

The principle of the cost optimisation model is balancing off the number of replenishments as cash in circulation increases.

The behaviour of customers can be managed by varying factors such as the number of transactions per ATM, using different CIT pricing structures for different areas, eg. urban or rural areas, and setting interest rate/limit for cash in circulation.

CIT partnership model

Within the list of implementation tools for optimising ATM and branch cash points is CIT contract management. Contracts can be written to allow quantity flexibility, revenue-sharing and with business contingency rules.

Challenges – bullwhip effect

A bullwhip effect is when there is a non-periodical oscillation of cash order volumes within a wholesale cycle even when cash demand/deposits are stable. This is a well-known phenomenon first recognised by Proctor & Gamble for nappy (diaper) production.

Factors that can lead to such unexpected variations include:

- » Analytics of cash demand are wrong
- » The grouping of cash orders is due to logistic requirements or economics and cash centres are not aware that this is what is driving orders
- » Bottlenecks in logistics. Perhaps a carrier changes or minimises customer supply, causing the customer to react with unpredicted order increases
- » Orders exceed the predicted volume/price increases. If a customer orders more stock than the current optimum requirement in order to save future costs, for example because of negative interest rates.

Good EDI infrastructure and planning tools can help minimise the impact of these variations.

Optimisation of ATM cash services

Cash InfraPro believes lean cash management can reduce cash cycle costs by 25-40%. Actions involved in lean cash management are process optimisation in branches, cash centres and transportation, adopting standardised logistic units for transport and storage and alignment of software interfaces.

Savings from adjusting branch and ATM networks are hard to quantify since the variables are too great. ATM providers need to benchmark transaction costs, ATM costs per machine, ATM maintenance and cash services and back-end IT systems and services.

Savings from moving to a stronger partnership model, or even shared utilities, offers savings of up to 35% based on regional co-operation to optimise ATM distribution and shared IT/CIT/cash centre services. These savings can only be realised if processes have been standardised.

3. Standardisation initiatives of central banks – compelling event for commercial players

There are a number of elements which central banks can put in place to help optimise cash cycles. These start with a review of whether they have the right number of cash centres in the right places. Have their cash processes and the supporting logistic requirements been automated? Standardisation of transport units for trays and containers and the adoption of auto ID and EDI communications in line with GS1 standards will streamline cash handling, movement and storage, but they will need modern IT systems.

As cash usage changes and interest rates become more volatile, central banks should evaluate whether they should have balance sheet relief schemes for cash stakeholders or check that their current system is delivering the right benefits. Central banks need to monitor the commercial cash cycle and provide guidelines for stakeholders.

New guidelines from central banks will require a response from the commercial sector. If they respond, which may require investment, they should be able to achieve efficiency and cost benefits.

New guidelines from central banks	Challenges for commercial players
Recirculation framework with fitness sorting	Automation of cash processing
Note Held to Order schemes allow pooling of cash inventories	'Real-time' inventory reporting to the central bank
Cross-docking allows new distribution concepts	Cash forecasting and planning
EDI communication for cash order/deposit	IT systems for cash order management/tracking and tracing

Final word

Central banks can lead and drive change. They can also shape the commercial landscape which the private sector operates in. Change always brings challenges and central banks need to think through what to change and how they will flow through the cash cycle.

UK cash cycle: environmental impact

NatWest Group: Leeann Shanks, Sustainability Lead, Cash & Self-Service

The UK's NatWest Group consists of NatWest, the Royal Bank of Scotland, Ulster Bank, Coutts, RBS International and Holt's Military Banking. It serves 19 million people, families and businesses and processes one in four UK payments. It is a member of the Bank of England's Note Circulation Scheme and issues banknotes in Scotland and Northern Ireland.

In the UK cash is the second most common payment type, accounting for 14% of the 6.4 billion transactions made each year. 94% of cash users are also digitally active. 95% have a debit card and 91% are contactless enabled.

NatWest cash centres process about 30% of all cash in the UK. In 2023 it facilitated £100 billion of cash movements, including £1.1 billion worth of coins. It operates 5,600 ATMs and provides the UK with £25.5 billion of cash each year.

Cash Industry Environment Charter

NatWest initiated the UK's Cash Industry Environment Charter (CIEC). This brought together 36 financial institutions representing the entire UK cash cycle:

- » The 'owners' of cash – 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 (CIT) – two organisations
- » Other suppliers – four organisations
- » Associations – UK Finance and the British Retail Consortium
- » Press – Reconnaissance International and Chartered Bankers

UK Finance provides a co-ordinating and secretariat role and the Chair of the CIEC group rotates. Currently Vaultex is providing the Chair.

The CIEC group appears to be a unique example of the commercial sector taking the lead to address environmental cash cycle issues. It started work in January 2021, focusing on three areas - carbon, energy and plastic reduction. Commitments and targets were agreed with the aim of decarbonising at pace. Collaboration was seen as necessary to build a resilient future.

Currently the focus is on CIT, which is facing fewer vehicle movements, reducing plastic usage by standardising cash bags and reviewing single use Bank of England cage seals and addressing challenges created by fewer bronze coins (the one and two pence coins) being used, which has created an excess of coins (for example, 200 million excess 2p coins).

The group is looking to industry collaboration to reduce reliance on plastic, at how to tackle the challenge of surplus coins and transportation issues created by fewer coins being recycled locally, radical reform to address a shortage of cage liners created by excess coins and for innovative solutions to create a circular economy and to reduce the carbon impact of cash processing.

Sustainability in the cash cycle

G+D: Marcus Ohenmus, Sustainability Manager

G+D's green banknote and green cash cycle concepts provide a conceptual framework for reducing the end-to-end environmental impact of cash. This presentation considered three areas relating to the cash cycle:

- » Product carbon footprint
- » Green factory
- » Banknote Fibre Extraction technology

The presentation demonstrated the capability and approach of G+D rather than a detailed explanation of each area.

Product carbon footprint

While G+D has calculated the CO₂ emissions of every stage of the life cycle of all its products, this presentation focused on its BPS® M7 high speed sorting machines. The results were:

- » Raw materials, 9%. This broke down as aluminium 47%, steel 37% and virgin plastic 7%.
- » Energy and waste used and created in production, 3%
- » Distribution and packaging, 1%
- » Energy and spare parts used in operations, 87%. Inevitably this is an area where G+D is focusing its work.
- » End of life, less than 1%, although this was almost entirely derived from disposal of the virgin plastic and G+D is looking at options in this area.

G+D has developed an Excel tool for establishing the carbon footprint and works with customers with this tool, for example in the development of Egypt's new cash centre.

Green factory

The data used came from analysis of the Central Bank of Hungary's cash centre. 59% of emissions came from cooling the cash centre, 15% from heating it, 21% from electricity for IT, security, lighting etc. and 4% from waste.

Typically cash centres are taking steps such as installing solar panels, eco-friendly air condition, forced ventilation modules and process optimisation to reduce these figures.

Banknote Fibre Extraction (BFE) technology

This is a new technology developed by G+D that decomposes banknotes so that they can be repurposed into new products. G+D's engineers have created a machine which, without the addition of chemicals or water, breaks down the cotton fibres in shredded banknotes without damaging them. The fibres are sheared rather than cut so they are not damaged and retain valuable properties needed in creating new products.

While the process does not allow the fibres to be used for making banknote paper, and so a true circular economy is not possible, the fibres can be used for cardboard, paper, moulded papers, insulation materials and other high value items.

The equipment is not yet ready to be fitted to the end of high speed sorters, but that is a development in the pipeline.

RBNZ Community Cash Services trial

Reserve Bank of New Zealand (RBNZ): Ian Woolford, Head of Money and Cash

New Zealand is a big country with a small population, meaning that delivering cash services is a challenge. If laid over Europe, it would stretch from Copenhagen to Marseille but with a population of only 5.1 million people.

Cash usage has been in decline for some time. As a proportion of household payments, cash payments have fallen from about 32% in 2007 to 7% in 2023. Despite that, when surveyed the population overwhelmingly supports cash. A 'say-do' gap clearly exists. 6% of the population is entirely reliant on cash. A key point, that isn't properly appreciated, is that people become vulnerable at different time in their lives.

Supply problem

While the decline in the number of bank branches started a long time ago, it has accelerated sharply since 2015.

BANK BRANCHES	2000	2015	2022	2000-2022
Upper North Island	693	645	456	-34%
Lower North Island	273	210	150	-45%
South Island	279	264	189	-32%

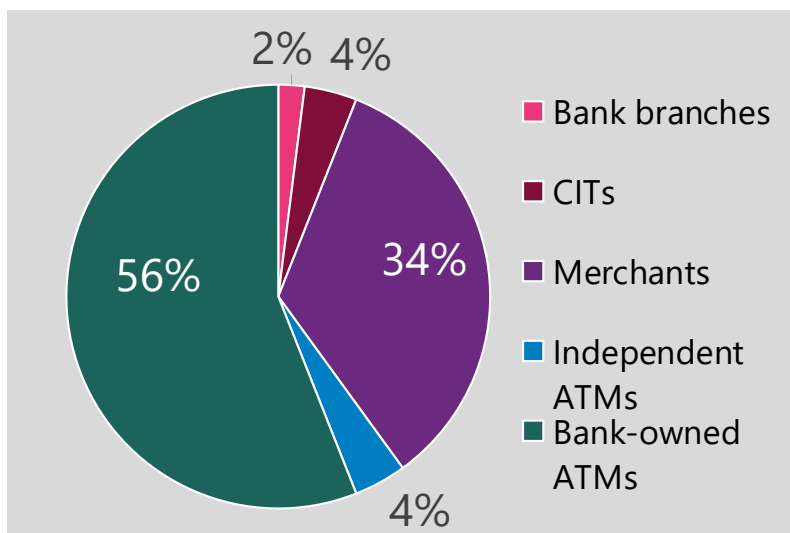
These reductions don't capture reduced branch opening hours.

The number of ATMs supplied by banks has also fallen. In 2011 there were about 2,500 bank ATMs, and this number persisted at that level until 2017, declined slightly to 2,019 and today is just over 2,100. Pay-to-use ATMs provided by independent suppliers has largely filled the gap.

New Zealand's banks have conducted an aggressive anti-cash campaign in recent years and have done this quite openly. The branch and ATM closures are part of this strategy.

Who pays the costs of cash?

The public still get access to cash through bank-owned ATMs, but 34% of cash is now accessed through merchants.



The problem is that the retail cash sector - merchants, independent ATM operators and consumers - is carrying 68% of the costs (and risks) of cash – providing cash, change, running the independent ATMs and the costs of storing and managing cash outside of banks. The commercial banks supply the cities but have left the retailer cash sector to do the rest.

Cash system redesign 2021

The community cash services trial is being carried out in the context of RBNZ's 2021 cash system redesign.

In 2021, RBNZ set out to ensure that consumer access to and use of cash is supported, and merchant acceptance of cash is supported. It has run consumer awareness campaigns, mandated merchant acceptance and put in place remuneration of merchants for cash out services. The key is frequent, affordable cash delivery and collection for merchants.

RBNZ is working to find solutions for:

- » Recycling capabilities at the point-of-sale
- » Consolidating functions (eg. utility entities, joint ventures)
- » Solutions for coins
- » Broadening access to wholesale cash, including low denomination banknotes and coins
- » Directing banks to provide affordable cash services to support consumer access to cash.

No single intervention will work, and a range of interventions will be needed.

Community Cash Services trial

RBNZ has identified 91 communities with a population of between 1,000-10,000 people that don't have a branch or only have very limited opening hours. 8-10 of these have been chosen for a trial starting in September 2024, and running through to February 2026, which make cash available through retailers on a new basis.

The cash flow will be from cities to rural depots and from those rural depots to rural shops which will then provide cash, with or without purchases, to consumers with no fee. Retailers will be paid a fee for cash issued by them.

In these communities there will be one of:

- » Multi-bank smart ATMs with coin deposit facilities
- » Smart safes that provide a cash drop off and/or pick-up point
- » Store visits by individual security van services under multi-retailer deals.

The costs of this equipment are being paid by the trial.

The ATM industry says recycling ATMs reduce CIT visits by 40%.

The trial will test whether this new access to cash changes behaviour, the economics of local distribution, recycling within communities and banknote quality impacts, service needs and use rates.

Next steps

Beyond the trial there is a need to explore legal gaps, including other parts of the cash system redesign 'policy bundle' described above, the implications and practicalities of widespread remuneration if the trial is successful and how to manage crisis using this approach.

The results and lessons from this trial will be watched closely because it is a rare example of a focused attempt to address the withdrawal of cash services in rural areas. The rest of the 2021 redesign are also of great industry to the wider cash community.



Session Six: Cash Management

The Royal Canadian Mint (RCM) has been on a determined journey to reduce its environmental impact, as well as its other 'S' and 'G' commitments for a number of years. The RCM presentation demonstrated the progress that can be made when a clear plan is in place.

Like the RCM, the Royal Mint (TRM) is a member of the Mint Director's Association, and TRM both introduced the work of the MDA's sub-committee on sustainability and its own work celebrating Diversity, Equality and Inclusion.

Continuing the coin theme, Leftover Currency gave a glimpse of a public service, the bulk repatriation of coins and banknotes that have ended up abroad. True recirculation.

Sorting machines are the driving force of a cash centre, and so it was interesting to hear CPS make the case for using two small machines rather than one large machine on the basis of both the one-off environmental cost of such machines and their lifetime operating impact.

In some countries the centre of gravity for cash is moving from the banks to the retailer, as the Reserve Bank of New Zealand community cash trial demonstrates, so it was also interesting to hear a supplier of retail cash handling equipment, Tellermate, talk about what retailers are buying and using today.

Minting with Care: the Royal Canadian Mint's ESG commitment

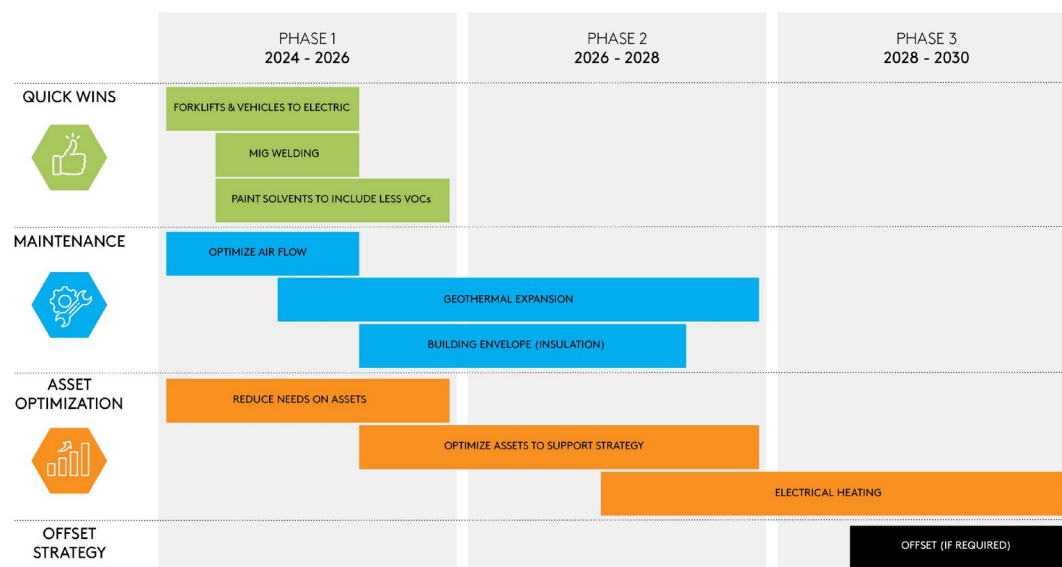
Royal Canadian Mint: Mike Grove, Senior Program Adviser, Sustainability & International Mint Liaison

RCM's Environment Social Governance (ESG) strategy is focused in three areas:

- » Climate action
- » Responsible sourcing and manufacturing processes
- » Diversity, Equality and Inclusion

The RCM laid out its ESG commitment, with the majority of the presentation focused on its environmental actions. It has a clear path to carbon neutrality and is taking actions to reduce, reuse and recycle, demonstrating how innovation, investment and how good cash management can help achieve its goals.

PATH TO CARBON NEUTRALITY



Material innovation

RCM has focused its innovation on using steel core plated with microns-thin copper and nickel layers. This significantly reduces the amount of alloy to be mined which helps manage price stability in volatile markets. It also enhances coin durability as well as adding to security in vending machines.

Circular economy – recycling steel

The traditional model has been based on steel manufactured largely from iron ore with a small percentage of scrap used and, usually with coal (which has higher Greenhouse Gas emissions) as the energy source. The mini mill model uses steel manufactured predominantly from scrap metal (~up to 70% more scrap) using electricity and natural gas and minimal coal usage, thereby creating a circular economy.

Sustainable coin management: prioritising recirculation

Recycling by redistributing existing coins reduces the need for new production by extending the lifespan of coins. RCM's priority is, therefore, to maximise circulating coins and minimising new coin issue.

This is achieved by constant monitoring of coin supply to allow accurate forecasting. When coins are needed, the inventories of financial institution previously circulated coin are always prioritised.

Decarbonising road map: carbon emissions and climate change

RCM's goal is for its circulation business to be carbon-neutral by 2030. It has had an independent assessment of Scope 1 and 2 emissions and developed a decarbonisation roadmap outlining its timelines and investments requirements to eliminate natural gas used in building infrastructure and manufacturing processes. Over 99% of the Winnipeg facility's electricity is currently from renewable hydro-electric sources.

Geothermal technology

At its Winnipeg facility, where circulating coins are produced, in 2023 RCM invested in geothermal technology to provide certain heating and cooling processes.

871m of underground pipe and five wells were dug to bring water from underground to cool machinery. The water is then circulated to help heat parts of the building before returning underground. This technology is currently being used for certain heating and cooling processes, reducing the need for carbon-emitting fuels, and there is the potential for the technology to be expanded for use in other areas.

Impact report

RCM issues an annual ESG report detailing action taken and future plans relating them to UN Sustainable Development Goals, key areas, priorities and on-going initiatives.

Putting the S into ESG

The Royal Mint: Andrew Mills, Managing Director Currency

The Royal Mint (TRM) spoke of the celebration of Diversity, Equality and Inclusion as expressed through its programme of issuing collector coins and bullion pieces. These included celebrating fifty years of 'Pride UK' with a 50p coin, 75 years of HMT Empire Windrush 50p coin, Diwali gold bullion bars, Lakshmi gold bullion bars and Kaaba gold bullion bars.

TRM explained how these were designed with subject matter experts, the collaboration with people from those communities and how this is helping both celebrate diversity and widen the appeal of coins.

Mint Director's Association

TRM is also a member of a sub-committee of the Mint Director's Association which consists of six mints – TRM, the Royal Australian Mint, RCM, the South African Mint, the US Mint and Monnaie de Paris.

The committee has agreed a charter, surveyed members to help create a roadmap to focus on key topics, issued five case studies, three articles and spoken at four industry conferences.

It has run two webinars, one on ESG reporting and one on Artificial Intelligence. A webinar on sustainability packing will take place late September.

Recirculation of potted up money and cash stuck abroad

Leftover Currency: Mario van Poppel, Founder & Director

Leftover Currency is part of a network of non-bank companies who repatriate bulk shipments of foreign and withdrawn banknotes and coins to their countries of origin.

To give a sense of scale, in the year to May 2024 from four terminals at London's Heathrow Airport 28 tonnes of coins and banknotes were received by Leftover Currency from collection boxes, two airlines and two charities who receive donated currency. Leftover Currency has a specialist sorting machine to handle the currency.

The £2.3 million in face value over 161 currencies was split 28.7% UK cash (12.4% notes, 16.3% coins and a further 1.2% of old coins), 29.3% foreign currency (29.3% notes, 23.3% coins) and 42% 'other'. Other includes exotic currency (£60,000 of Indian currency), obsolete currency (£61,000 Croatian kuna), unfit and withdrawn currency.

The currency is repatriated either via partner organisations or directly to banks.

Where does the currency come from

Leftover Currency collects currency directly from the public via their website, from high profile business-to-business and charity collectors and a tight knit global network working with equivalent organisations in Canada, Australia and Germany. People donate or send money for a variety of reasons – to do good, to declutter or to cash-in what they hold. Leftover Currency also collects coins from cruise ships, military bases and collectors and hobbyists.

Obstacles: Chief challenges include access to banking. Being unknown and unloved, the lack of a level playing field where Know Your Customer regulations can be an impediment, as are no procedures or dedicated channels for non-bank bulk shipments.

Risks: Salvaged coins, if the world goes cashless, less cash makes the business unviable.

Opportunities: Strategic partnerships, national charity appeals.

Final word

Leftover Currency, and the tight knit community it operates within provide a useful service that wouldn't otherwise be viable. The coins they repatriate can, of course, go back into circulation so that new coins don't have to be minted. One of the appeals to central banks from this presentation is for some of the regulatory barriers to be removed since they block the flow of currency.

Sustainable cash processing

CPS: David Hawkins, Head of Engineering

In early 2023 CPS (Cash Processing Solutions) was restructured and stopped supplying large high-speed banknote sorting machines and instead focuses on small and medium size banknote sorting machines, software and service. In the process of rethinking its business it collected data on sustainability and drew some interesting conclusions.

Manufacturing materials for large, high speed sorters involves some energy intensive processes, including the use of steel and aluminium. Manufacturing a tonne of steel emits 1.85 tonnes of CO₂, while a tonne of aluminium emits 11.5 tonnes. If replacing an existing machine, the first question is whether you can extend the lifespan of existing equipment through upgrades. If not, what is the most environmentally machine to use?

CPS recommends:

- » Extending the life of the large high-speed sorters
- » Considering buying lower cost compact size sorters, which have lower CO₂ emissions during material manufacture and whose lifetime operational power consumption will also be lower. Use two of these to do the work of one large sorter
- » Harness data to enhance cash centre and banknote processing operations so that machine, operator and cash centre operations use every gram of CO₂ emissions effectively
- » Commit to disposing of the machine at the end of its life. CPS takes back its equipment at the end of its life and disposes of it.

Machine	One CPS7000 high speed sorter based on a configuration of 4 strappers and a shredder	Two CPS V-series compact sorters based on a configuration of 4 strappers and a shredder
Throughput	Up to 120,000 notes per hour	Up to 144,000 notes per hour
Yearly power consumption, 2,000 hours of operation	18,400 kWh \$12.79/million notes	6,600 kWh \$3.82/million notes
CO2 to manufacture, estimated	12,075 kg	4,600 kg
CO2 to manufacture & operate over 15 years	205,275 kg	73,900 kg
Environment & operating cost	8,500 trees	3,000 trees

Final word

This is an interesting way of thinking worth exploring at the start of any change cycle, whether for a new machine or the replacement of an existing machine.

Cash automation: How innovation is serving retailers' quest to a greener tomorrow

Tellermate: Marie Carmen Hughes, Sales Director, Europe

It is unusual to hear the voice of the retailer at currency events. Tellermate is a provider of cash management solutions to the retail, grocery, hospitality and financial industries. As a result, it is well placed to talk about retail trends.

Retailers focus on improving the customer experience, ensuring staff well-being and, increasingly, on taking a sustainable approach. Innovations that are currently being made in the retail sector are:

- » Back-office float recyclers
- » Back-office safes
- » Closed loop point-of-sale devices
- » Intelligent drawers, which give full visibility of how much money is in the draw at any one time. They highlight discrepancies between the point-of-sale and the draw and eliminate the need for counting when cashing up
- » Attended lane smart safes
- » Self-checkout.

(NB: smart safes don't need plastic bags for cashing up, reducing the need for plastic).

Back office float recyclers and smart safes both include sensors that check notes for authenticity and fitness. These devices allow retailers to recycle notes into their tills and to customers with confidence, reducing the need for cash in transit (CIT) cash drop offs or visits to banks to get cash.

Smart safes, if an appropriate agreement has been made with a CIT company, allow retailers to have fewer CIT pick-ups. Similarly, if self-checkout equipment accepts cash, the same applies.

Final word

It appears that retailers are willing to invest in cash and the power of data allows smarter operations.

Session Seven: Repurposing & Recycling Unfit Banknotes

Four presentations captured just how much progress has been made with creating options for central banks to avoid landfill and even move beyond incinerating unfit banknotes with energy recapture. Print works and papermills from Brazil, Pakistan, Landqart and G+D all added to the story.

Circular economy in cotton banknotes: new possibilities, expanding life cycles

Casa da Moeda do Brasil: Nathália Salles R. Barros, Environmental Manager and BP Security: Alexandre Gilberti, Chief Operation Officer

The Casa da Moeda do Brasil (CdM) has already made considerable strides in sustainability. 50% of its water is recycled from its water treatment plant and 80% of its waste is recycled. It composts organic waste with local farms. Beyond those achievements it has now addressed what to do with unfit banknote waste, whether from its printing processes or when withdrawn from circulation.

A strategic partnership with BP Security and the Equipa Group has allowed it to create Tran\$forma, a way to put unfit banknote waste back into circulation rather than sending it to landfill or for incineration. A true circular economy is being achieved because some of the waste, working with Equipa, is being used to make furniture and decorative items, and some, working with BP Security, is going into making commercial and security paper.

BP Security makes 29,000 tonnes of paper each year and is a major supplier of banknote paper both to Brazil and around the world. It is now able to take its own waste, and waste from printing works, and turn it back into paper using a patented process.

The waste used is given an identity according to its origin and it is tracked through production. Initially the waste is either put through high density or high pressure equipment before going through washers, cleaners and a dry press. It is then ready to be used as a raw material in paper making. A banknote house note has been created with 25%, 50% and 100% waste content for demonstration purposes and the material has now been used to make passport paper.

BP Security has also installed a biomass process to create energy for the mill. Each month using this equipment is saving 2,884 tonnes of CO₂.

Composting Unfit Cotton Banknotes

Pakistan Security Printing Corporation (PSPC): Sayed Faizan Haider

PSPC now composts significant volumes of unfit banknote waste each year. This relatively low technology solution produces a valuable product for the agricultural sector.

Composting is a natural process of decay that changes organic wastes into a valuable humus-like material. A mixture of organic material containing carbon (browns) and nitrogen (greens) is required.

Aerobic composting is when decomposition takes place in an oxygenated atmosphere which accelerates the decomposition, causing the temperature to increase. Humus is found in the final product and the composting rate is 42%.

Anaerobic composting is when the biodegradation takes place in the absence of oxygen, resulting in a slower process and bringing lower temperature increases. The final product is in the form of mud. This is a less efficient process with a composting rate of 33%.

PSPC uses the aerobic processes. A mixture of brown and green material is mixed in what, for composting, are seen as small windrows which are 2m high and 2.5m wide. For large scale composting, 1 acre (43,560 sq ft) of land may be used to produce 15-20 batches in 60 days.

This approach is appropriate to treat solid waste up to 5,000-6,000 tonnes per year. The windrows are carefully organised so that there is a gap between the general environment and the compost. Each pile can be managed individually.

This is a medium cost process, although relatively labour intensive and needing a relatively high surface area.

Optimal conditions

The optimal conditions for rapid composting are a temperature range of 30-70°C, an oxygen content that delivers that range, a pH value between 6.5 and 7.4 and a humidity level of 45-60%.

PSPC produces about 1-1.5 tonnes of shredded paper per day. Laboratory tests show a mix of 39.84% carbon, which is mixed with nitrogen-rich cow manure. PSPC trialled a range of mixtures and found this mix gave the best results.

Benefits of compost

Composting reduces greenhouse gas effects by mitigating the production of gases like methane, as well as creating less CO₂ compared with burning. It improves tilth and friability of soil, loosens heavy clay soils, avoiding compaction, suppresses some soil microbes that can attack plant roots and contains nutrients that are essential to plant growth.

Hyperspeed composting of banknotes: turning waste notes into a raw material

Landqart: Richard Perera, Director of Marketing Services

Landqart makes banknote paper for the Swiss National Bank and other central banks around the world. One of its products, Durasafe®, is a composite note where paper sandwiches a polymer layer to create the note. This presentation gave a general overview of some of Landqart's sustainability activities and, in particular, its work on creating a circular product using Durasafe.

Switzerland has extremely high and rigorously enforced environmental standards, which Landqart has long worked with. While it re-uses broke wherever possible, any other waste is sent for incineration in the local community facility where heat is harvested (as steam) and returned to Landqart to run the dryers on the paper machine. The same applies to used Swiss franc banknotes.

Durasafe

Landqart came across Hughes Energy, an American company, that uses the Wilson System® to dispose of waste which has combined fibre/polymer components, such as a coffee cup from a shop. The Wilson process is a variation of anaerobic composting which uses an autoclave to process material at 180°C for 90 minutes.

Autoclaving uses steam and pressure to create a homogeneous, sterile, biogenic material. Shredded notes go in, cellulose fibre comes out. The process separates plastic from fibre, creating Wilson Fibre®. The fibre can be dried, milled and pelletised.

The US Department of Agriculture has produced an opinion on the Hughes Energy process. It found that the material produced is ideal for use in the cardboard packaging industry because of its high quality and strength. The autoclaved banknote fibre is cleaner and greener than any recycled cardboard.

The Wilson System is deployable at an industrial scale. As such it does mean that Durasafe can be turned into a material suitable to use to create new products. Landqart is investigating how to proceed with this.

Green cash: exploring the sustainability of banknotes

G+D: Astrid Drexler, Product Manager, Louisenthal

Security value of cotton paper

G+D made the environmental case for banknotes being made from cotton, starting with its security value, its ability to have security in (threads, security fibres, M feature etc.), on (inks, applied features etc.) and through (windows, watermarks) the substrate. The unique feel of intaglio printed paper is part of this story.

Environmental value of cotton paper

Cotton is, of course, a renewable raw material. It is widely grown around the world. Photosynthesis captures CO₂ whilst generating oxygen. It can also be repurposed.

The durability of the substrate plays an important role in determining the environmental impact. If the paper is coated or the printed note is varnished, or if a composite note is used, then the longer life has a major impact.

When calculating the carbon footprint of a banknote in production, it is important to remember factors such as the note size, number of notes per sheet, security feature equipment, whether it has intaglio on one or two sides of the paper, the substrate type etc.

The methodology used in most life cycle assessments doesn't allow for the fact that banknote cotton comes from the combing of the cotton which is then spun for use in clothing. Of the worldwide demand for raw cotton fibre, 11% is combings and annual banknote demand uses 0.5%.

If the cotton is from sustainable sources, and ideally organic cotton, then the carbon content and environmental impact is even lower.

Louisenthal's binders used in its Longlife™ product are now based on renewable materials. Its threads and foils use 70% recycled polyester, reducing carbon emissions by 45% compared with standard materials, security fibres are now made using wood pulp rather than plastic, and litho inks are now mineral oil free. All of these changes have increased the biobased content of banknotes. Louisenthal and G+D's Green Longlife™ concept note bring all of these ideas together.

G+D's latest innovation, its Banknote Fibre Extraction process (see page 23), makes the transition of shredded banknotes into material suitable for repurposing more straightforward increasing their value and the chances of recirculation.



Session Eight: This House Believes that Central Banks Need to Lead on Cash Cycle Sustainability

The Cash Sustainability Forum finished with a panel discussion exploring who should lead and drive environmental change in the cash area. The panel consisted of:

- » Antonio J Arrieta, Senior Lead Banknote R&D Expert, European Central Bank (ECB)
- » Tendamudzimu Nemusombori, Product Manager, Currency Management Department, South African Reserve Bank (SARB)
- » Ian Woolford, Director of Money and Cash, Reserve Bank of New Zealand (RBNZ)
- » Alexandra Peppmeier, Sustainability Engineer, G+D

The discussion explored the levers for change controlled directly by central banks, primarily setting the specification of their banknotes, items that they buy and how they dispose of unfit banknotes at the end of life. It also discussed what happens to cash once it is issued and the extent to which central banks can control this.

One thing was swiftly apparent, every country is different.

Utility models: Interestingly, wider resilience and inclusion requirements were referred to at the same time and there is a strong linkage between these topics and sustainability. Perhaps because the utility model, as seen by Geldmaat in the Netherlands and Batopin in Belgium, and New Zealand's community cash trial, are delivering a lower environmental impact and increased resilience.

Cash cycle levers of control: When it was suggested that central banks have the ability to control what commercial banks do, eyebrows were raised. While that may be true in terms of regulating payments, there was a distinct sense that around cash this is less straightforward. At least central banks and commercial banks are used to talking to each other.

This was in the context of to what extent central banks can get other cash players - cash in transit (CIT) companies and cash management companies - to change their practices. Where the authorities licence CITs, there is some direct control. Otherwise, tools such as reporting regulations, security standards and accreditations and guidance on insurance limits may be possible.

Implementing a GS1 type standard, which brings significant efficiency (and, therefore, sustainability) benefits requires a central bank to co-ordinate and push for change and implementation. How this is done depends on the position of the central bank. It took the Federal Reserve to make this happen in the US and the ECB throughout the Eurosystem.

An example of how relatively narrow a central banks remit is, is that requiring ATM companies to buy renewable energy for their networks is something a central bank can recommend, but not require. Perhaps another part of national government can reach into this space, but not the central bank.

Legislation: At the moment, environmental legislation has not had an impact, regulations such as Europe's Corporate Sustainability Reporting Directive. However, sustainability is now firmly on the agenda of many central banks and the impact has flowed down to cash departments.

Use of policy: Issuing, implementing and enforcing clean note, cash handling and cash management policies depend on the regulatory environment and take considerable work and resources to do. The ECB's work in this area is an example of how to do this.

Changing cash cycles: In some countries the centre of gravity for cash is starting to move away from commercial banks to retailers, CITs and cash management companies, New Zealand being an example but also the example given by Brinks of what is happening with hyper-local recycling with the retail sector and ATM network linking up locally. Again, such changes bring new challenges to how environmental change can be optimised.

Coins: The status of coins depends on each country's rules. In the UK the Bank of England manages banknotes, the Treasury manages coins. In Canada the Royal Canadian Mint manages the production and distribution of coins. In the US the Federal Reserve manages the distribution of coins, but not their production. In South Africa, SARB does it all. This panel did not, therefore, discuss coins.

Associations and central bank groupings: The cash stakeholder community has many associations representing different elements of the cash cycle. From retailers to commercial banks to CITs to ATMs all the way through to the manufacturers of banknotes and coins there are regional and global associations. Central banks themselves have regular meetings.

The question was asked about how important these were for driving change and as routes for central banks to influence change. In the same conversation was the question whether the ECB, with its role across the 20 members of the Eurosystem, or the Five Nations group (Australia, Canada, Mexico, UK, US) could set standards for how to procure banknotes with sustainability criteria or cash management which other central banks could then adopt, or not.

Associations do play an important role. They create awareness, put sustainability on the agenda, create forums for information exchange and policy development and allow difficult areas to be discussed. As we saw with Intergraf (see page 12), some have gone a long way to making sustainability core to their membership by creating a practical tool. In highly competitive commercial markets it can, though, be hard to drive change.

The ECB is already fulfilling the role of providing an example of best practice which others can adopt, amend or not. The Five Nations group has formed a working group on sustainability which may lead to future action and information sharing.

Final word

While the UK may have its Cash Industry Environmental Charter group, driven by the private sector, this is currently an anomaly and there was a clear sense that this panel saw central banks as having a leadership role.

For some central banks sustainability is a standalone reportable topic, but it appears to be part of the mix now even for countries and cash cycle organisations where that is not the case.

In terms of reporting, the private sector appears to be ahead of central banks, but few seem to be ignoring it completely. Certainly, there are very different levels of knowledge, engagement and plans, but for virtually all sustainability is now a 'thing', a topic or even an action agenda item.

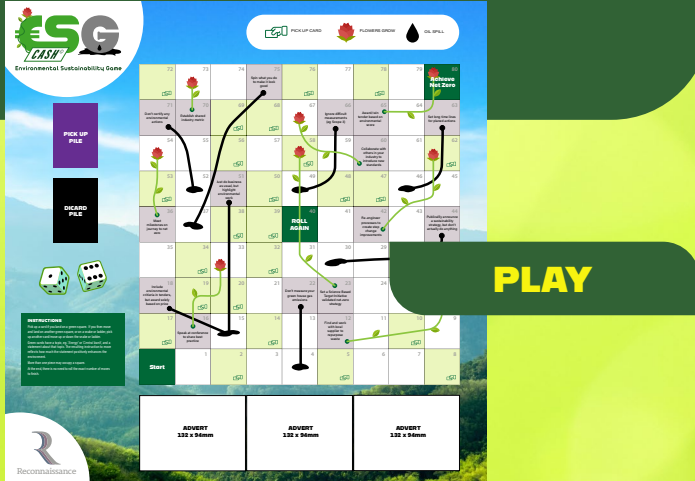
Or is that just the view from a sustainability forum?



ESG Game

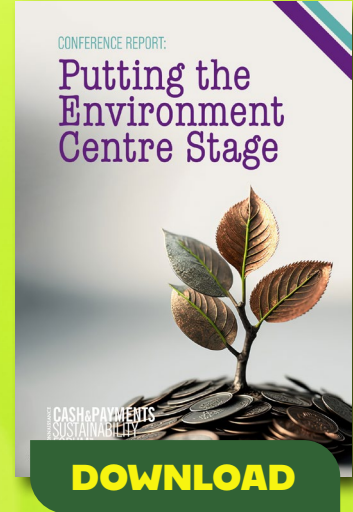
This game was invented by Reconnaissance International as part of its work to help the cash industry reduce its end to end environmental impact.

The aim is to introduce players to language and terms associated with sustainability and to the impact of a range of environmental actions that organisations choose to take so that you can consider what your organisation is doing.

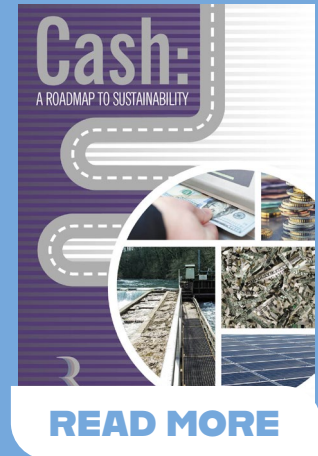


The first Cash Sustainability Forum was in November 2022, and this built on the white paper 'Cash: a Roadmap to Sustainability'. In 2023 we published a white paper on repurposing unfit cotton banknotes, 'What Goes Round Comes Round', and we ran three webinars on cotton and polymer destruction. We also supported an IACA webinar on putting sustainability into tenders.

In September 2024 we will publish a white paper on best practice in managing recirculation of cash outside of central banks.



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