



CURRENCY NEWS™

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End of Penny Production Confirmed – At Last

After years of debate about the future of the US one cent coin (penny), the US Treasury has now confirmed that its production will stop once stocks of blanks, the last order for which was placed this month, are used up.



The announcement follows President Trump's order to the Treasury Secretary in February to stop producing pennies as part of the drive to reduce waste and government costs.

The penny was one of the first coins made by the US Mint, entering circulation in 1793. But over the past 10 years the cost of producing it has risen from 1.3 cents to 3.69 cents, jumping up from 2.7 since 2022 alone. The Mint estimates that stopping production will result in an immediate annual saving of \$56 million in material costs.

What next?

Speculation now turns to whether the US will introduce some form of cash rounding, and drop the one cent from circulation altogether. Complete withdrawal will need to involve the US legislature as Congress determines currency specifications, including metal composition, denomination and sizing, and so any amendment to the currency structure will require its approval.

However, the US Mint produced 3.2 billion cents in 2024, roughly 10 coins per capita, and there are

approximately 114 billion cent coins in circulation, suggesting no shortage of pennies available.

Another topic of contention is the nickel, with production costs for the 5 cent coin also exceeding their face value, currently sitting at 13.78 cents (or more than double its value) to produce and distribute each coin.

There is a general lack of agreement over the issue of denominations, including in legislative circles, where recent attempts to either suspend the penny or amend its composition failed to advance. This includes the Coin Modernization, Oversight, and Continuity Act of 2010, which requires the Secretary of the Treasury to report biennially to Congress on production costs and potential alternative compositions. Despite extensive research and trials, nothing has changed.

So, whilst it would therefore be easy to think that the complete withdrawal of the penny (or even the nickel) is highly unlikely to happen, given the speed at which the current US administration has focused on the issue, and subsequently ordered the end of penny production this remains to be seen.

A Tale of Two Currencies – A Riddle, Wrapped in a Mystery, Inside an Enigma

The European Central Bank has published the production requirements for euro banknotes for 2026, which – at just under 1.95 billion – is nearly half that of 2025 (3.4 billion) and the second lowest figure since the euro was introduced in 2002 (the only year it was lower was in 2004). The value is €56 billion.

The lower production volumes run contrary to growth of cash in circulation – which in 2024 was up by 2.4% to 30.5 billion banknotes, worth €1.6 trillion. The two conflicting figures point to either the increased longevity of euro banknotes or (more likely) that a growing number are being held as a store of value, meaning that they don't get used for transactions and therefore don't wear out and need replacement.

The Federal Reserve, meanwhile, has recently updated its annual print volumes and values with confirmation of the total number of notes produced in 2024 – 5.8 billion. Its order for 2025 is in the 4.1 billion to 5.9 billion range, with a value of \$83.2 billion to \$113 billion.

As of the end of 2024, the total volume of US currency in circulation was 55.4 billion notes, and the value \$2.3 trillion.

An overlay of euro and dollar circulation data shows quite similar profiles.

Production volumes also have a similar profile. The early years of the euro were different and the response to the 2008-09 global financial crisis was clearly different. And again, in 2017, the euro diverged slightly from the dollar between 2017-18, but it is unclear why.

The year-on-year percentage changes for currency in circulation both also show very similar profiles.

However, the year-on-year percentage changes for production have very different profiles. And there is no apparent correlation in either percentage or absolute terms between production and circulation.

If you look at the year on year changes of euro circulation and euro production volumes, there is little obvious correlation. But then neither is there for the dollar.

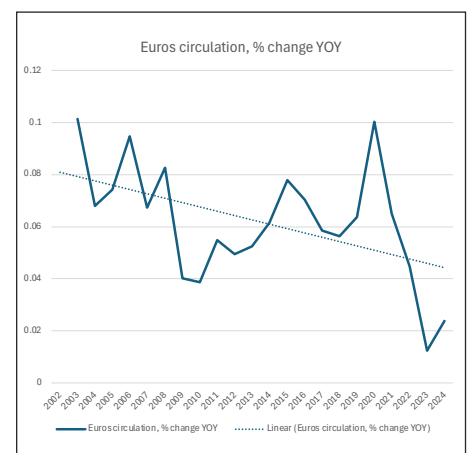
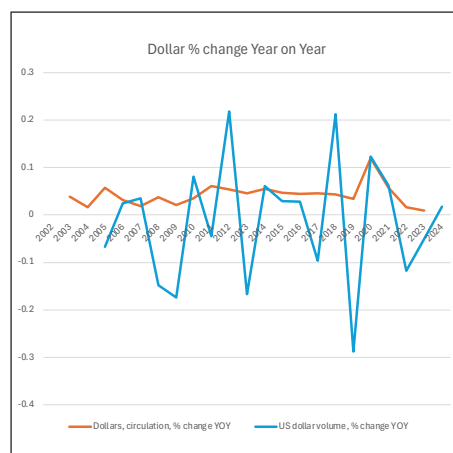
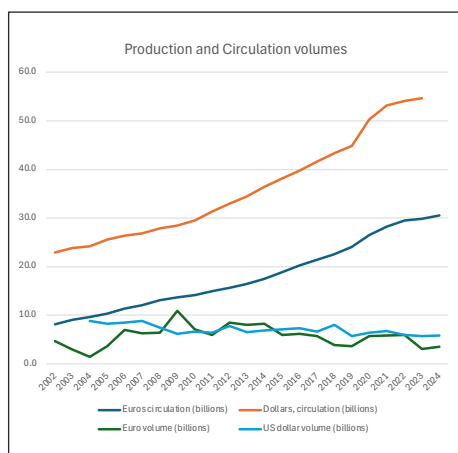
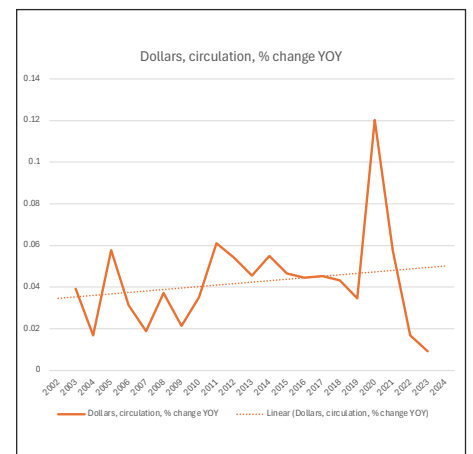
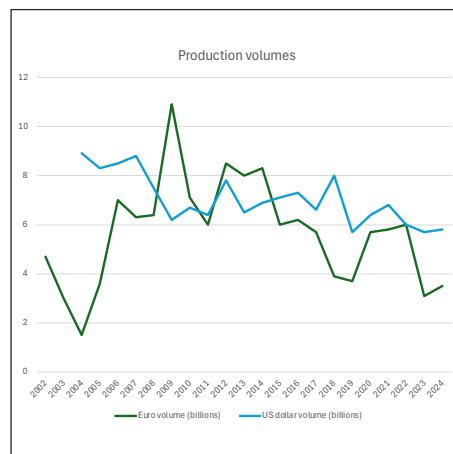
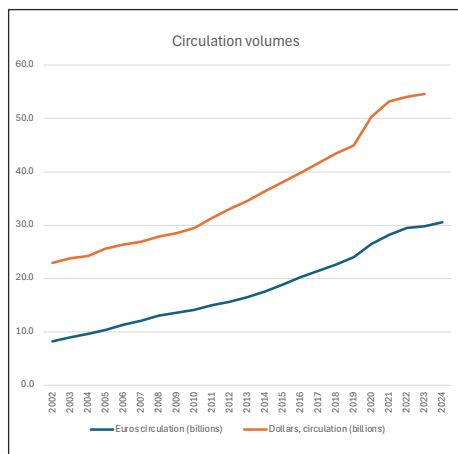
Why is production and circulation not aligned?

Central banks have an obligation to make sure that there are the right number of good quality banknotes in the right place at the right time. They know what is in their own vaults. Central banks such as the ECB and the Fed will know what is in the vaults of the commercial banks and, to some extent, the CIT companies. They will also have a sense of the flow of notes based on the changes in these stocks, demand on their own stocks, economic indicators and historical data (eg. holidays drive demand).

Does the answer lie in the demand for individual denominations? Is there evidence of shortages?

When you look at the circulation data by denomination for the dollar, the trend line for the \$100 it is strongly upwards, the \$20 is flat, the \$1s marginally up and for all other denominations it is slightly up. Despite that, the production order for the \$100 is down 38%, the \$50 65% and the \$20 85%. Orders for the lower denominations were all up.

Circulation for the euro has risen by 272% between its launch in 2002 and 2024. This has been driven by the €50, which has grown steadily from 2.4 billion pieces in 2002 to 15 billion today, an increase of 516%. The €20 and €100 are also driving growth, increasing by 150% and 506% respectively, although in terms of number of pieces they are only 4.9 and 4 billion



pieces respectively. The €10 has risen by 90% but the €200 has actually fallen by 15%. The €500 is no longer issued.

But production volumes for the €50 and €20 are down by 49% and 77% respectively compared with the year before. The €100 is up, but then it was not included in the 2025 order.

Conclusion

The euro and the dollar have broadly similar production and circulation volumes, although circulation is rising and production is either flat or falling.

The change in circulation year-on-year as a percentage is broadly similar for the euro and the dollar. However, the production volumes are not.

For both the euro and the dollar there is no apparent linkage between circulation and production. When this is analysed on a per denomination basis, this also holds true.

These disconnects appear to hold true across the 20 years of data looked at. More data is needed about stocks held by banks, CIT companies and central banks to understand the apparent disconnect in the data.

We assume that increased use of cash to store value is important. The euro is an international currency with a major 'hinterland' of near-Europe countries that use it to store value, although the use of the dollar internationally dwarfs the euro.

The US has not significantly changed its banknotes during this period. The ECB has added varnish to some notes. But this does not explain the disconnect between circulation and production.

Crises are a key part in circulation growth. Both economies have experienced the same global disruptions, albeit the Russian invasion of Ukraine is more specific to Europe. Production linkages to the crisis are visible, but there seem to be over corrections afterwards. Local effects presumably explain differences in the actual production level changes.

To paraphrase Sir Winston Churchill's phrase, 'currency is a riddle, wrapped in a mystery, inside an enigma'. Which is why this industry is so fascinating!

News in Brief

■ Hopes to Get African Monetary Union Back on Track

The East African Community (EAC) has re-established the region's Monetary Affairs Committee (MAC) following the appointment of new heads of central banks, bringing hope for new ideas to get the implementation of a single currency for the region back on track, after the initial deadline of 2024 was extended to 2031.

The EAC is an intergovernmental organisation with eight member states – Democratic Republic of the Congo, Somalia, Burundi, Kenya, Rwanda, South Sudan, Uganda, and Tanzania.

They signed the Protocol on the Establishment of the East African Community Monetary Union (EAMU) in 2013 in Kampala, aiming to establish the East African Monetary Institute and launch a single currency by 2024.

The target was revised after member states failed to meet a range of economic convergence criteria.

Another stumbling block has been the failure of the partners to agree on which country would host the East African Monetary Institute (EAMI), the precursor to central bank for the union and a crucial complement in establishing the single currency. The failure to reach agreement took place in 2022, since when six out of the eight central banks of member states have seen new governors appointed.

■ Philippines to Study Return of Abaca to Banknotes

Bangko Sentral ng Pilipinas (BSP) and the Philippine Fiber Industry Development Authority (PhilFIDA) are reported to have started discussions on the return of abaca to the country's banknotes, this time in polymer.

'We have talked to the Bangko Sentral ng Pilipinas and we are now working together to bring back abaca into our currency,' Ali Atienza, Executive Director of PhilFIDA, said in an interview with the government radio station.

Abaca, also known as manila hemp, is used in marine cordage, textiles and specialised paper production, and is renowned for its strength and water resistance. It is indigenous to the Philippines, which accounted for 86% of global supply in 2023. Almost all locally produced abaca pulp is exported, but one of its domestic uses has traditionally been in Filipino banknotes, with a paper substrate ratio of 20% abaca to 80% cotton fibres.

That was, at any rate, until polymer came along. According to the Department of Agriculture, the end of the domestic market for abaca in the country's currency has

affected the livelihoods of millions of Filipinos who rely on the abaca industry for a living.

BSP introduced the first polymer note, the 1,000 piso, in 2022 alongside its paper equivalent. Last year, it introduced 500, 100 and 50 piso polymer banknotes. The 200 piso banknote is not being converted to polymer due to low usage, whilst the paper 20 piso is being withdrawn from circulation and replaced with a coin.

According to the reports, BSP has requested PhilFIDA's technical help to break down abaca so that it can be used as raw material in the future production of new polymer banknotes.

■ Swiss Bonanza from Old Banknotes

The Swiss government and cantons will receive over CHF 700 million (\$840 million) from the Swiss National Bank (SNB) because old banknotes worth almost CHF 1 billion from the sixth series (issued in 1976 and recalled in 2000), have never been exchanged.

The distribution of the money is governed by the Federal Act on Currency and Payment Instruments. It stipulates that 25 years after the recall of a banknote series, the equivalent value of the banknotes that have not been exchanged will be allocated according to a distribution formula. The SNB said the beneficiaries will be paid in May 2025.

Just over CHF 178 million will be paid to the Swiss Fund for Assistance in the Event of Uninsurable Natural Disaster Damage (fondssuisse). Two-thirds of the remaining money will go to the cantons (CHF 475 million) and one-third to the federal government (CHF237.5 million).

■ Lithuania Introduces Coin Rounding

Lithuania has become the eighth eurozone country to introduce cash rounding, effectively abolishing the use of one and two cent coins. As cash transactions will be rounded to the nearest 5 cents, the lowest denomination coins, although remaining legal tender, will essentially become obsolete as the practical need for them disappears.

The Baltic state is the latest such country to introduce a rounding rule; next in line could be Germany and Spain, both of which are reportedly considering such a move. Estonia has only just introduced the rule itself, seeing a sharp rise in the return of these lowest denomination coins.

According to the central bank, Lietuvos Bank, 69% of the public supports the removal of the lowest two coins (versus 61% for eurozone citizens as a whole), two thirds of which, once issued, never return.

Central Banks and Cash Round-Up

This month, the focus of our periodic series of articles covering cash information in central bank annual and other reports is split between Europe and Asia, with updates from Germany, Portugal, Spain, Hong Kong, Korea and Sri Lanka.

■ Deutsche Bundesbank

Banknotes in circulation: at the end of 2024, the Bundesbank held a 24.5% share of the total value of all euro banknotes in circulation. During the year, the total value of banknotes in circulation within the Eurosystem increased from €1,567.7 billion to €1,588.3 billion, a rise of 1.3%.

As per the allocation key, the value of euro banknotes in circulation at the Bundesbank was €389.1 billion at the end of the year, up from €377 billion the previous year, a rise of just under 4%.

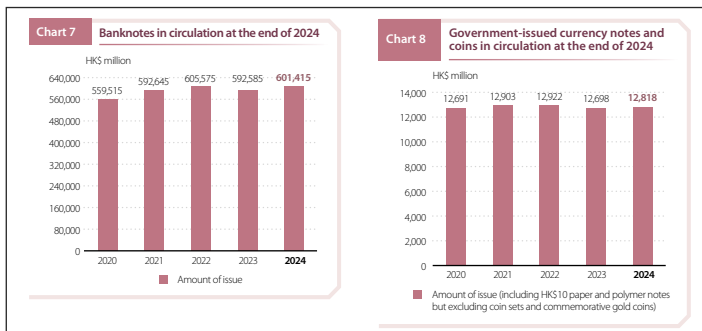
Counterfeiting: in 2024, the Bundesbank recorded approximately 72,400 counterfeit euro banknotes, with a total nominal value of €4.5 million – a 28% increase from the previous year.

Burkhard Balz, a member of the Bundesbank Executive Board responsible for cash management, stated that ‘while the number of detected counterfeits rose in 2024, the associated financial loss from counterfeiting decreased. This shift is due to more perpetrators reverting to introducing simpler counterfeits of low denominations into circulation. Consequently, the losses from counterfeiting in 2024 were 12% lower than the previous year.’

Meanwhile, approximately 141,300 counterfeit coins were identified in German payments, compared to around 115,900 in the previous year. Statistically, this equates to 17 counterfeit coins per 10,000 inhabitants in Germany. The increase can be attributed to several companies accumulating suspect coins over a period of years and then submitting them to the Bundesbank in 2024 as a batch. 96% of the counterfeits were €2 coins.

■ Hong Kong Monetary Authority (HKMA)

Cash in circulation: the total value of banknotes issued by Hong Kong’s three note issuing banks in 2024 reached HK\$601.4 billion, a 1.5% increase from 2023. The value of coins and government-issued notes stood at HK\$12.8 billion, up 0.9% from the end of 2023. Of this, the value of HK\$10 in circulation was HK\$4.6 billion. (Whilst the three commercial banks issue the HK\$20, HK\$50, HK\$10, HK\$500 and HK\$1,000 denominations, the government issues the HK\$10).



Public awareness: to promote public knowledge of Hong Kong’s banknotes, the HKMA held 14 seminars on design and security features. Over 2,600 participants – including bank tellers, retail cashiers and students – attended these sessions to improve their skills in detecting counterfeits.

Sustainability: the HKMA runs several sustainable programs, including the Coin Collection programme, recycling unfit coins and ‘good-as-new banknotes’.

The public continues to embrace the Coin Collection Programme. Two Coin Carts rotate across all 18 districts, offering free coin exchange services. People can swap coins for banknotes, add value to stored-value facilities like Octopus cards and e-wallets, or

donate to the Community Chest. This first-of-its-kind programme – first introduced in 2014 as a pilot and made permanent in 2018 – reduces the need to mint new coins. Over 1 billion coins worth more than HK\$1.6 billion have been collected since its inception and up to HK\$698 million saved by not having to mint similar quantities of new coins.

Under the programme, coins that are unfit and cannot be put back into circulation are sent to approved smelters or mints. In 2024, the HKMA recycled 62.4 million coins (about 250 tonnes), recovering HK\$14 million in scrap metal value, which was credited to the Exchange Fund.

The HKMA also encourages the public to use good-as-new banknotes (ie. used banknotes but in very good condition), especially for the festive lai see (namely, the red envelopes containing money that are traditionally given during Chinese New Year and other celebratory occasions as symbols of good luck and prosperity). This reduces demand for freshly printed notes, lowering the environmental impact.

■ Bank of Korea (BOK)

Cash in circulation: the BOK issued new currency worth KRW 28.18 trillion in 2024 while withdrawing KRW 16.12 trillion from circulation, resulting in KRW 193 trillion won of currency in circulation at year-end – 6.75% higher than 2023.

By denomination, the number of 50,000 and 1,000 won banknotes in circulation increased compared to the end of the previous year, while that of 10,000 and 5,000 won banknotes and coins showed a downward trend.

Table II- 10. Production of Banknotes and Coins¹⁾

	Number (million)		Value (hundred million won)	
	2023	2024	2023	2024
Banknotes ²⁾	530.0	345.0	126,750	63,750
	(-25.4)	(-34.9)	(-36.5)	(-49.7)
Coins ²⁾	101.1	40.8	11	5
	(22.2)	(-59.6)	(-18.8)	(-54.5)
Total	631.1	385.8	126,761	63,755
	(-20.4)	(-38.9)	(-36.5)	(-49.7)

Notes: 1) Figures in parentheses refer to percentage changes compared with the end of the previous year.

2) Excludes commemorative banknotes and coins.

Source: Bank of Korea.

Currency production: the volume of currency produced by KOMSCO and delivered to the BOK was 345 million banknotes and 40.8 million coins, which together represented a decrease of 38.9% compared to 2023. The number of banknotes, centred on the 50,000 and 10,000 won denominations, declined by 34.9%, while the number of coins dropped by 59.6%.

In terms of value, the manufactured currency amounted to KRW 6.3755 trillion, down 49.7% from the previous year.

Commemorative coins: in December 2024 the BOK issued two commemorative coins with the theme of ‘Korea’s Key Industries and Economic Development’ to promote Korea’s major industries that have contributed to the nation’s economic growth and to instil

a sense of national pride among the public. This commemorative coin series is scheduled to be issued through to 2026.

Counterfeiting: 143 counterfeit banknotes were detected, a decrease of 54 from the 197 counterfeits detected in 2023. This decline is attributed to the reduced use of cash in face-to-face transactions due to the increased use of non-cash payment methods, as well as improved public awareness of how to detect counterfeits.

The BOK also held the 11th 'Content Currency Protection Campaign Contest' with the themes of preserving the right to use cash, preventing the circulation of counterfeit currency, reusing coins, and using money with care.

■ Banco de Espana (BDE)

Banknotes: in 2024, BDE lodged 2.489 billion banknotes (2.521 billion in 2023) to credit institutions, with a total value of €75.78 billion (€76.78 billion in 2023) – a decrease of 1.3% compared to 2023 and 20.7% compared to 2019, the year before the pandemic and the corresponding change in payment habits.

In turn, BdE withdrew a 2.87 billion banknotes (2.9 billion in 2023), worth €88.03 billion (€90.1 billion in 2023) – 1% less than in the previous period and 16.6% less than in 2019.

The difference between banknotes lodged and withdrawn resulted in a negative net issuance of 382 million banknotes, equivalent to €12.25 billion, accentuating the negative trend observed historically, except for the period affected by COVID. This negative figure is due to the importance of the tourism sector in Spain, more specifically the cash in euros carried by tourists from their countries of origin.

In 2024, the BdE processed approximately 2.9 billion banknotes, 80% of were returned to circulation and the rest destroyed. It also undertook 508 control visits to the facilities of CIT companies and 199 to bank branches to review the correct operation of their 705 processing machines and compliance with regulations and procedures to check the authenticity and state of use of banknotes.

According to its capital key, the BdE produced 600.27 million banknotes through its new wholly-owned banknote printer Imprenta de Billetes (IMBISA).

Coins: in 2024, the BdE put into circulation 726.7 million coins (765.4 million in 2023), worth €183.9 million (€186.8 million in 2023), a decrease of 5.1% compared to 2023 and 30.3% compared to 2019. The €1 coin accounted for 14.5% of the total coins put into circulation. Those with the lowest face value (5, 2 and 1 euro cents) accounted for 60.2% of the total.

130.8 million coins, worth €107.6 million (€83.8 million in 2023), were withdrawn from circulation – an increase of 56.1% compared to 2023 and 118.1% compared to 2019. The coins withdrawn were mainly the €2 and €1, 90% of the total. Those with the lowest face value represented only 1%.

The difference between the coins delivered and those withdrawn by the Bank of Spain, ie. the resulting net issue, was 595.9 million pieces, equivalent to €86.5 million – a decrease of 12.6% in volume terms compared to 2023 and 39.4% compared to 2019.

Counterfeiting: the BdE the national authority responsible for protecting the euro against counterfeiting, and also acts as the National Analysis Centre (CNA) and the National Currency Analysis Centre (CNAM). It works in coordination with the Brigada de Investigación del Banco de España (BIBE), a police section that investigates and prosecutes crimes related to the counterfeiting of national and foreign currency – for example, through the dismantling of clandestine banknote printing presses and illegal coinage manufacturing workshops. The BdE also carries out inspection on the state of the machines that process banknotes and coins, in order to ensure their reliability in detecting counterfeits.

73,605 counterfeit euro banknotes were detected in circulation in 2024, 24.4% more than in 2023 (59,196 units), with an increase in traditional counterfeit classes. In addition, the CNA recorded another 62,885 counterfeit banknotes (84,143 in 2023) seized by police before they went into circulation.

Spain ranked third in the Eurosystem in the detection of counterfeit euro banknotes and their withdrawal from circulation.

Regarding coins, 42,110 counterfeits were withdrawn from circulation during 2024 – a figure very similar to that prior to the pandemic, although 27% higher than in 2023 (32,969 pieces). In addition, in 2024, 14,537 counterfeit €2 coins were registered, which were seized before circulation as a result of an operation carried out by the BIBE.

■ Central Bank of Sri Lanka (CBSL)

The CBSL reported a 14.5% year-on-year growth in physical cash circulation during 2024. CIC reached a new post-pandemic high of Rs.1.36 trillion by the end of the fourth quarter, up from Rs.1.19 trillion in 2023. This, says the Bank, underscores the sustained public reliance on cash, despite the increasing adoption of digital payment systems.

Some 77.4% of currency was held by the public in 2024, and the rest by the banks.

According to the CBSL, despite the rise of digital payment platforms, physical cash remains deeply entrenched in Sri Lanka's economy. This is attributed to cultural preferences for cash, limited digital infrastructure in rural areas, security concerns and the informal sector's reliance on tangible currency.

■ Banco de Portugal (BdP)

In 2024, the Portuguese printer – Valora – produced 165.5 million €20 banknotes, per the share of banknotes allocated to the BdP under the terms of its pooled euro production agreement with the central banks of Austria and Belgium.

Banknote net issuance decreased, with €9.74 billion in banknote inflows and €5.64 billion in outflows. The change in rules for treasury operations encouraged banknote exchanges between credit institutions and CIT companies, but the impact of this measure on the flow of banknotes into the BdP was mitigated by growth in tourism, which continued to lead to the accumulation of banknotes in the central bank, especially those of higher value.

Net issuance of coins increased. €66.5 million in coins were issued by the central bank, and €38.9 million returned. The 1 and 2 euro cent coins accounted for more than half of the coins put into circulation by the BdP. It conducted two coin exchange operations with the Belgian Treasury and the Central Bank of Slovakia.

The BdP checked the authenticity and fitness of 405 million banknotes and 90 million coins and identified 104 million banknotes and 485,000 coins unfit for recirculation. The bank also manually assessed 588,000 damaged banknotes and 277,000 coins, returning €12.5 million to the respective holders. Credit institutions and cash-in-transit companies processed nine times more banknotes and 22 times more coins than the Banco de Portugal.

Unfit banknotes were destroyed, producing 88 tonnes of shreds which were used to produce energy. The Bank performed several tests with Portuguese companies and launched a competition to find more sustainable alternatives to incineration.

The BdP detected 11,039 counterfeit banknotes and 2,601 counterfeit coins, 0.004% and 0.0001% respectively of the number of genuine banknotes and coins in circulation.

Finally, the BdP organised 487 training courses on euro banknotes and coins, with over 12,000 participants, and trained more than 12,000 professional cash handlers. The Bank's remote learning platform was redesigned to be used by retailers.

Crane Currency – People, Purpose, and Paper Money

It's an exciting time for Crane NXT. Crane NXT ('CXT' – NYSE) just completed the acquisition of De La Rue's Authentication business, and combined it with its existing portfolio, the Smart Packaging assets of TruTag and brand protection specialist OpSec (acquired in 2024) to form a new company – Crane Authentication. Together with Crane Currency, these form the newly-created business unit Security & Authentication Technologies (SAT), which sits alongside Crane Payment Innovations.

It was just over two years ago that Crane NXT, then comprised of Crane Payment Innovations (CPI) and Crane Currency, was spun out of the engineered industrial materials company, Crane Co. At the close of 2023, Crane NXT reported a currency business backlog of \$105MM. Earlier this month, Crane NXT reported a backlog of over \$400MM, and while that figure includes its recent acquisitions, the currency component's 'record-high backlog, and book-to-bill ratio of 2.4', suggests that the currency industry's innovator of such renowned security features as MOTION® and RAPID® is enjoying robust growth.



Currency News caught up with Crane Currency's new President Dr Aleta Richards to find out her early impressions of the company and the industry, and how she sees both developing in the future.

Q: *First of all, can you provide a little background about yourself before you joined Crane?*

A: Thank you. I joined Crane Currency in October 2024 from Covestro, a leading supplier of high-quality polymer technologies. As Executive Vice President, I led the global specialty films business, and this acquainted me with high-security technology solutions for passports, medical and other applications. Prior to that, I led Sales and Marketing for Covestro's CAS North American business, focused on coatings and adhesive technologies. Before its separation from Bayer, I served as head of HR Services for Bayer U.S., supporting 14,000 employees.

Q: *What attracted you about the opportunity to join Crane?*

A: A couple of things, firstly I was impressed by its technology, foremost its micro-optics technology which appeared to be shaping the industry in some interesting ways. I was also attracted to its culture and where the company was in its journey, that before 2018, was a family-owned business as old as the US to today, a publicly traded tech-savvy company with the feeling of a start-up. Alongside this was a history of philanthropic practices that protected and enriched its associates and the communities in which they live and work.

Q: *Coming from outside the industry, or at least the currency industry, what are your first impressions?*

A: Before sitting in this role, I did not appreciate the full responsibility of a central bank to its country and fellow citizens. It's clear that central banks remain very focused on providing a secure monetary system that maintains confidence in physical currency. I am also appreciative of how great today are the forces of change acting on the currency industry. I'm seeing the next years as having a greater potential for change and innovation than at any other time.

Q: *And how, as a company, do you see this influencing current opportunities?*

A: We see it throughout our customer base, especially at a time when the global currency industry is under pressure to do more with less, and faster. The industry is going through a period of significant consolidation and transformation, and we have felt the impact with a growing number of requests and a higher demand for speed.

Central banks are coming back – and when we say we deliver, we deliver. But being a good partner isn't just about execution. It's about foresight.

We need to be ready not just for where we are now, but for where the industry is going. That means expanding our portfolio, investing in innovation, and forging deeper relationships with other suppliers and security tech providers.

A new initiative is 'Blue Sky Collaboration' – a series of co-design sessions with central bankers, industry suppliers, and adjacent sectors. We want to bring people together

to think ahead – five to seven years out – and ask what security threats are coming? What will banknotes look like? Where are the current gaps in our industry, and how can we start solving them now? These discussions will be agnostic to current product offerings and a real focus on what the industry needs in the future.

The response so far has been enthusiastic. The first Blue Sky session is planned for Latin America, and this is just the beginning.

Q: *Talking of that portfolio, although most of our readers will be familiar with Crane Currency, could you just summarise your key products and activities.*

A: Our activities center around the voice of customer, and voice of the industry. Design thinking and co-creation aren't buzzwords for me – they are central to what Crane does well, i.e., customising banknote solutions for central banks. These often involve Crane's micro-optic security feature technologies. This is not only due to the security of these features, but how Crane's banknote designers influence the evolution of them, and how these very complex but imminently customizable features influence our banknote designers. Ultimately what I see us doing exceptionally well is based on this unique and symbiotic relationship of traditional banknote design, feature integration and micro-optic feature optimization. I'm more than happy to share the virtues of Crane's famous features like MOTION SURFACE®, RAPID® HD and MOTION® Switch, but central banks don't buy standalone features, they specify and need security solutions.

In terms of activities, my time with Covestro and Bayer enabled me to see firsthand how operational excellence and innovation go hand in hand. So, one of the things I am championing is the Crane Business System (CBS) as a foundation for profitable growth. This is being applied not just in operations, but across supply chain, procurement, customer service, even marketing. It creates consistency and responsiveness. As these are things our customers value deeply, CBS promotes a virtuous circle.

Q: *How many central banks today use Crane's solutions?*

A: Cumulatively, I believe the number of central banks that have specified Crane's micro-optic security features is 58, and in total this equates to over 120 billion banknotes protected against counterfeiting. I recognize that 120 billion is such a big number it's difficult to comprehend, so what I tell central banks is to think less about the number of banknotes using Crane's features, and more about our expertise required to produce them. That's what matters to them, i.e., effective features delivered in banknotes when needed, to quality and quantity on-time.

Q: *The development of micro-optics was a gamechanger, not just for Crane but for banknote security overall. Other companies are now bringing out their own versions. What do you see as potentially being the next 'big thing' in banknote security?*

A: Okay, I'll answer by describing what Crane is doing today which I see as having a very good chance of being 'the next big thing.' I invite you to have a look at our recently issued 'Beauty of Life' house notes. I don't believe you'll have seen anything like it. Its security is so bold and clear it can feel like you are looking at a concept design, but in fact it's a fully developed commercial product. The note's principal feature is a wide MOTION SURFACE® micro-optic stripe that is a pioneering step in narrative-based security. Just a glance tells a story, securely. That's it. There is no need for instruction or explanation. The imagery, movement, and animation effects are bold and defy simulation, and the feature fits within an overall banknote design. That's our concept of the modern banknote, and we feel it will have an impact on the industry as large as MOTION® security thread did 20 years ago.

Q: *There is much talk at moment the about digitisation, not just in production and processes but also in digital currencies as well as so-called phygital features. Do you have anything in your portfolio or in the pipeline that addresses this?*

A: I appreciate the question. In this regard, I see many industry solutions being proposed; however, as we listen to our customers their interest in our physical security solutions continue to dominate our exchanges. This comes while many of these same central banks are conducting some form of digital currency research.

Q: *Looking a little more broadly at Crane NXT in general, and Security and Authentication Technologies in particular, what are the objectives?*

A: Our goal is to become a \$3 billion revenue technology company by the end of 2028. We aim to achieve this by focusing on three priorities: growth across our existing businesses, investing in innovation through internal startups and external partnerships, and using free cash flow to acquire businesses in fast-growing markets. These could be related to currency or authentication or both.

Q: *So we can expect more acquisitions in the near future?*

A: Absolutely. We'll see which part of Crane NXT the next acquisition supports, but M&A is certainly a key part of our path to meeting our goals.

Q: *The investment made on the authentication side is obviously an exciting time for SAT, and some interesting new technologies have been acquired a result.*



Examples of the new Beauty of Life house notes.

As a single technology company (ie. micro-optics), are you planning to leverage the new technologies to broaden your currency portfolio? And if so, what and how?

A: Our micro-optic technology has broad potential and can be very interesting for other secure applications adjacent to currency for example ID cards, passports, even health credentials. These also exploit our competencies in operations, security, design, etc. No other company is offering the proven solutions of the type we do. There are some features under development which, while not achieving the movement and high-contrast of our features, have effect origination techniques that are interesting. These may be future discussion topics with our customers.

Q: *Crane has a strong presence at the governmental level. Will Crane Currency, in turn, be leveraging this network to help benefit Crane Authentication?*

A: One could certainly see central bank awareness of Crane Currency as a plus. Additionally, De La Rue Authentication adds strength to Crane Authentication with its strong government network (tax stamps, passports, etc). We view this as an opportunity for both businesses to benefit from closer collaboration, as we share our technical expertise of security features across a broader governmental network.

Q: *In a previous article you stressed the importance of the people at Crane. Can you elaborate on this?*

A: At the heart of Crane Currency's next chapter is a simple but powerful belief: people matter. That's non-negotiable, and it was that value that attracted me to the company.

Our mission is not only to attract and onboard the skills and expertise needed to drive our growth ambitions, but also to retain our people by investing in their professional development.

I've mentioned the Crane Business System (CBS) and how it is shaping not only operational excellence but also the company's culture. This drive toward continuous improvement is also reflected in the company's talent development

program. I am currently participating in this year's President's Kaizen Event at our Tumba, Sweden site and invigorated by the passion that my fellow associates have in improving how we run our company. CBS, and this event specifically, also provide an opportunity for associates up and down the organization to recognize and leverage their expertise and enhance their own skills in the process.

Crane's culture of 'Doing the Right Thing, Always Improving, and Putting People First' really resonates with me. A fun fact, and one that I and many other associates enjoy sharing with others, is that Crane's largest shareholder is the Crane Fund. This trust is mandated to channel millions of dollars into community projects annually. Every site receives funds and volunteer time for local causes. The recipients of these funds are nominated directly every year by Crane associates. We know how good it feels to give to worthy causes. The Crane Fund allows dozens of Crane associates to provide substantial monetary awards to nominated organizations. It's a fantastic initiative, rooted in our core values and ties our business to our communities.

Q: *And finally, the core business for Crane Currency remains, well, currency. Do you see that changing any time soon?*

A: Simply, no. Physical currency still matters, and our mission will remain for some time to design and produce the world's most secure, beautiful and durable banknotes. That said, we're not naïve. The benefits of digital payments are compelling and as an industry we have much work to do to counter the false narrative that these alternative payments are modern and cash is obsolete. Encouragingly, in the face of increasing digitalization, there is growing recognition of cash's importance. Just this month the central banks of Sweden and England issued statements to this effect, and let's not overlook that cash as a percentage of GDP is in many countries still growing. It's with this in mind that Crane Currency is committed to being the supplier of choice of central banks worldwide.

Does the Number of Banknotes in Circulation Already Exceed 900 Billion?

■ **By Antti Heinonen, External advisor, Bank of Finland, and former Director, Banknotes of the ECB**

If every central bank and monetary authority were to consistently publish the number of banknotes in circulation, this article wouldn't be necessary. However, that isn't the case, and the question is raised every now then in discussions. Various estimates, some around 550 billion, are cited in industry reports and presentations, which prompted me to dig deeper as the numbers seemed low. This article highlights some of the challenges involved when considering the question and provides an estimate for further discussion.



Banknotes are a liability on the balance sheet of the issuing central bank and the first question is evidently which part of this liability is really 'in circulation'. It is normal that some notes have been lost, burnt or taken abroad by tourists and seldom return. These amounts differ by denomination, low denominations having a higher share. Other than that, these notes are impossible to count.

More importantly, there might be banknotes which are no longer legal tender, but have not yet been demonetised and can still be redeemed by the respective central bank, even if they haven't been issued for decades. Some central banks separate these banknotes on their balance sheet, and typically in the course of time there are only very minor changes in the annual figures. These notes that are mostly found in death estates or similar are in principle no longer in circulation and hence I have tried to exclude them in the following study.

The treatment of such denominations has a significant impact on calculations. To illustrate the impact let us look at the situation of the two most populated nations of the world, India and China. These countries have the highest number of banknotes in circulation and are in this respect in their own category.

India and China

India had the well-known demonetisation of ₹500 and ₹1,000 banknotes in November 2016. A new redesigned series was thereafter issued, which included the ₹500 but not a ₹1,000 note. The ₹2 and ₹5 notes, which were excluded already from the earlier new designs and upgrades in 1996 and 2011 respectively, weren't included either.

The ₹1,000 denomination is an example of the impact of the withdrawal and demonetisation of a high denomination. After demonetisation only around 1% of the ₹1,000 notes were not redeemed, which is quite a typical percentage for a high denomination.

The Reserve Bank of India (RBI) issued a new high denomination, a ₹2,000 note in November 2016, primarily to meet the currency requirements after the withdrawal of the legal tender status of ₹500 and ₹1,000 banknotes. In May 2023 the RBI decided to withdraw the ₹2,000 note, which continues to be a legal tender. Recently, circa 31 million notes were still in circulation, which meant that 98.2% have been withdrawn since the announcement of the withdrawal decision.

The ₹2 and ₹5 are examples of low denominations which are still included in the RBI liability, even if they are not

part of the current rupee series. At the end of 2024 the amount of these two denominations still in circulation was in total 11 billion pieces. The remaining amount of ₹2 notes was slightly less than 4.3 billion pieces and has been stable since 2015. The number of ₹5 notes in circulation is currently decreasing annually, with some 20 million pieces. Depending on whether only those denominations are included which belong to the current series, or also the ₹5, or both the ₹2 and ₹5, the number of Indian rupee banknotes in circulation at the end of 2024 would be 149.4 or 145.2 or 138.4 billion notes respectively. In the current study, the ₹5 note is included in the calculations but not the ₹2.

For China the impact of the assumption as to which denominations are included in the calculations is even more significant. The balance sheet of the People's Bank of China (PBoC) gives an interesting illustration in this respect. In the current Chinese note series the lowest denomination is the 1 yuan. The yuan is divided into 10 jiaos and 100 fens, which are currently coin denominations, but the liability of the PBoC still includes the notes denominated in jiaos and fens.

The notes denominated in fens were withdrawn from circulation in 2007, and their value in circulation hasn't changed since 2012, which is the earliest year from which denominational data is available on the PBoC website. However, the jiao denominated notes are not withdrawn from circulation and the value of 5 jiao notes in circulation even increased in 2023.

Depending on whether only current denominations are included or also jiao-denominated or both jiao- and fen-denominated notes, very different figures will be reached. According to the 2023 Annual Report of the PBoC, the amount in the first case would be 257 billion notes, in the second 369 billion and in the third 410 billion. In the current study it has been considered appropriate to include the jiao-denominated notes in the calculations, but not the fen-denominated notes.

Hence, according to the assumptions used, the two most populated nations have together more than 500 billion notes in circulation.

The impact of the assumptions regarding the other currencies is not of the same order. However, particularly those issuing authorities which do not publish their figures regularly or not at all create certain challenges.

Other currencies

Even if China and India are in their own category, a few nations or currency areas have tens of billions of notes in circulation. The amount of US dollar notes is more than 55 billion (2024), euro notes exceed 30 billion (2024) and Indonesian rupiah

The average value of a note in the size order of the denominations (130 currencies)

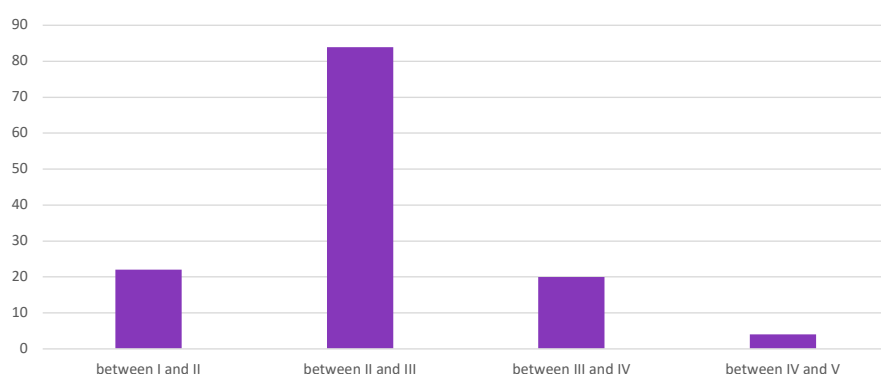


Fig 1: The average value of a note within the size order of denominations

notes 29 billion (2024). That means another 100-plus billion pieces.

The US dollar note statistics include not only the Federal Reserve notes, but also US notes issued by the US Treasury from 1862 to 1971 and other types of notes which haven't been issued during recent decades, but which remain legal tender. The figures therefore include, for example, the higher denomination \$500 to \$10,000 notes, which haven't been issued since 1969. However, their inclusion in the calculations isn't visible in the numbers used.

That said, considering that the number of US dollar notes has almost tripled during the last quarter of a century, the error margin by including published figures in the calculations is not significant. The history of euro notes is shorter and even if the €500 note isn't issued any more, it is still circulating and changing hands.

The circulation of several other currencies also exceeds 10 billion notes and even more currencies 1 billion notes, down to the currencies for which the volume is counted in millions. Because some issuers don't publish data, the amounts should be estimated and a method for the estimation established. To proceed I started off with the data I have.

There are 234 countries and dependent territories. From these, only 154 had to be addressed because the rest use common currencies or currencies issued by another entity. From these 154 currencies a good 100 publish regularly information on the number of banknotes in circulation. In addition, several central bank colleagues have kindly provided me regularly with data for another ten currencies. Furthermore, by way of an occasional statement in a report, an interview, a press release or conference presentation, the amount could be raised to 130 currencies. As a result, I was able to get a figure, for example, for the currencies

of the 50 most populated countries in the world, except in three cases.

The next step was to update some of the figures and to find an estimate for the remaining 24 currencies. For that purpose I classified the 130 currencies from which I had at least some data, based on the average value of a note in circulation within the size order of denominations (whether the average value was between the highest and second highest or second highest and third highest denomination etc). The result is depicted in Figure 1.

According to Fig 1, the average value of a note was between the second and third highest denomination for a great majority of currencies (84/130). However, two other categories also had a certain incidence, and are therefore worth analysing.

The currencies which have an average value of the note between the highest and second highest denomination are typically currencies which haven't changed the denominational structure for quite a while. Because of gradual inflation, the popularity of the highest and second highest denomination has grown continuously and the average value of a note rises up the hierarchy. Examples are the Australian dollar (denominational structure unchanged since 1984), the Japanese yen (also mostly as from 1984) and the Moroccan dirham (since 1996).

Another group of currencies belonging to this group are currencies with recent high inflation like the Lebanese pound (denominational structure unchanged since 2004) or the Turkish lira (since 2009).

Correspondingly, currencies which have the average value of a note between the third highest and fourth highest denomination are typically currencies which have recently issued a new highest denomination and have a diverse denominational structure. Examples are the Brazilian real (seven denominations

and a new highest denomination has been issued in 2020) or the Uzbek som (seven denominations and a new highest denomination issued in 2022).

Another group of currencies belonging to this group are those which have a very popular lowest denomination, eg. The Bahamas or Cayman Islands dollar (63% and 68% of the volume respectively).

Based on this analysis I classified the currencies from which I missed recent data or any data at all to one of the above-mentioned classes. However, to reach a conservative estimate for the total number of notes in circulation, I used the value of the second highest denomination for the average value (ie dividing the notes in circulation by the value of the second highest denomination), in case the denominational structure indicated that the average value would be between the second and third highest denomination and similarly with the other classes.

Furthermore, there were a few currencies for which I couldn't use this estimation method because no data was available on the value of notes in circulation. Most of them were minor currencies and I could make a rough estimate based on the volume of notes printed during the last ten years or so based on the serial numbers. Accordingly, at the very least a rough estimate on the number of notes in circulation was available for all 154 currencies, except the North Korean won.

The most recent data was used for the calculation (mostly end-2023 or -2024 figures). A relevant figure was tried for each currency focusing on notes 'in circulation'. To take the Venezuelan bolivar as an extreme example, according to the published statistics there were 6.4 billion bolivar notes in circulation at the end of 2024. However, 5.84 billion notes were introduced before the redenomination (1,000,000:1) in October 2021, and their number had been stable since August 2022. Hence, 561 million pieces was used for Venezuelan bolivar.

The result...

So, what was the result of this exercise? The estimate put together resulted in 921 billion banknotes. In view that conservative estimates have been used, it can be concluded that the number of banknotes in circulation is significantly more than 900 billion pieces.

Even if the number of notes in circulation of some currencies is decreasing, it might be only a question of time when the amount of 1 trillion notes in circulation will be exceeded. Of course, much depends on developments in China and India, not underestimating the efforts of other central banks in taking care of the access to and acceptance of cash by all stakeholders.

From Money Trees to Honey Bees – Cash that Buzzes

The United Nations and its agencies hold international observance days (and in some cases weeks or even years) to promote global issues. There are 218 overall – many on familiar topics such as women, family, oceans, the environment. But there are some unexpected ones too – toilets, potatoes, tea, tuna, bicycles, seagrass.

And since 2017, bees too, with World Bee Day celebrated on 20 May to shine a spotlight on the importance of importance of pollinators, the threats they face, and their contribution to biodiversity and food security.

Bees are renowned as symbols of diligence and hard work. But, crucially, they are also responsible for pollinating around 75% of the world's leading crops, ensuring the production of fruits, vegetables, and nuts. Without them, global agriculture would suffer immensely. However, bees are under threat due to habitat loss, climate change, pesticide use, and disease. Their declining populations could have devastating consequences for ecosystems and food supply chains.

World Bee Day encourages governments, environmental organisations, and individuals to take action including, for example, planting bee-friendly flowers, reducing pesticide use, and supporting sustainable farming.

There are few better ways in societies of celebrating achievements and raising awareness than the images on our banknotes and coins. In the March issue of Currency News™, we looked at images of women on banknotes to celebrate International Women's Day that month. This month, to mark World Bee Day, we asked around for examples of banknotes (including house notes) and coins that feature these saviours of our ecosystems. Interestingly, there are several examples of bees on coins, but no current banknotes. This could be simply that we didn't look hard enough, so please contact us with details of omissions – we are happy to stand corrected!

Bees are, however, particularly popular on specimen, or house, notes.

For example, in 2013, Poland's state printing works, PWPW, produced a polymer test banknote on CCL Secure's GUARDIAN™ substrate featuring a detailed illustration of a honey bee, including in the two windows.



Another, more recent, house note from PWPW issued last year – Meadows – features a number of different insects, bees among them.

In 2022, KURZ produced a specimen note to demonstrate its KINEGRAM DYNAMIC® feature, with the stripe featuring bees and honeycombs.



Also in 2022, Giesecke+Devrient introduced the Green Banknote. The main security feature is a varifeye® ColorChange Patch from Louisenthal depicting a golden bee with an Animate-effect, creating a stunning 3D effect that gives the wings the appearance of motion. When the banknote is held against the light, the colour transitions from gold to blue.



That same year, Crane Currency launched its Bug note to promote its RAPID® Detect machine-readable micro-optics thread. The note is an entomologist's dream, replete with all sorts of six legged insects. They include, on the reverse, a bee.



Compared with banknotes, bees feature on a number of coins, both circulating and commemorative.

Bank al Maghrib issued a new series of Moroccan coins in 2011, the lowest denomination of which – the 10 cents – features a bee against a saffron flower.



In 2023, the South African Reserve Bank introduced a new coin series with a 'deep ecology' theme. The updated 10 cent coin features a detailed depiction of a Cape honey bee.



In the UK, the first £1 coins featuring the effigy of HM King Charles III's entered circulation last year. The coins depict British bees, and are one of eight new designs that will appear on the nation's coins, inspired by the flora and fauna of the British Isles.



The A\$2 Honey Bee coin was issued in 2022 as a joint collaboration between the Royal Australian Mint and the Honey Bee Industry Council to mark the 200th anniversary of the establishment of the bee industry in Australia. This industry is now estimated to contribute \$4-6 billion to the Australian economy, with around 20,000 registered beekeepers operating more than 640,000 hives, producing up to 30,000 tonnes of honey each year.

The reverse of the Honey Bee coin, which won the MDC Best Circulating Coin Award in 2023, has a central circle printed in a honey-coloured ink, which is protected by an intricate sculptured honeycomb. Surrounding the circle are engravings of two bees at work, along with examples of the plants they pollinate.



Flanders, in Belgium, has taken World Bee Day a step further with Bee Week, and in 2024 a €25 brass coin featuring a bee was issued by the Royal Belgian Mint and produced by the Royal Dutch Mint as part of the 'Mow May' campaign to encourage people to plant more pollen-producing flowers than grass in their gardens.



The reverse of the coin depicts a bee and stylised cherry blossoms, against a honeycomb map of Belgium in the background.

Malta also celebrated the bee last year, this time with a circulating commemorative €2 featuring its native Maltese honey bee. The reverse of the coin depicts an aerial view of the bee in the centre, with half a flower and partial honeycomb above and below, respectively.



In 2023, the German Bundesbank issued a commemorative €5 coin featuring a rusty-red mason bee as part of its 'Wonderful World of Insects' series. The same year, Austria issued a €5 coin featuring the 'Bee Dance' (apparently bees 'dance' to signal to their colleagues in the hive where pollen and nectar are plentiful).

Our thanks to those who responded to our call for examples of notes and coins to support this article. You are the 'bees knees' (for non-native English speakers, that's slang for an excellent person).

Be Smart with BeeSmart

In keeping with our apiology theme (ie. the study of bees), one company that is using the stripey stingers to support a major financial literacy initiative is Koenig & Bauer Banknote Solutions, who presented the BeeSmart educational platform at the recent HSP EMEA conference in Basel.

In a nutshell, BeeSmart uses banknotes as a tool to improve financial literacy among communities where digital banknote is in the minority.

Financial literacy involves understanding how to use banknotes as a payment tool, store of value, unit of account, and assignment of value. It includes skills like counting, budgeting, saving, borrowing, repaying, understanding prices, using financial services, and avoiding scams and financial abuse.

Despite its importance, financial literacy is in short supply. Over 50% of the world's population lacks basic financial literacy, affecting both developing and developed nations, according to the Global Financial Literacy Excellence Center. Meanwhile, an OECD study in 2020 put the percentage of financial illiterate people in the EU at 50%. Moreover, the situation isn't improving, with only a 0.5% improvement since 1985.

This deficit leads to significant consequences like poverty, unemployment, inequality, debt, crime, and social cohesion issues. It negatively impacts quality of life improvement for the individual, and limits socioeconomic development for the nation.

Koenig & Bauer became involved due to what it terms a social duty to help. To explore how banknotes can be used for financial education,

the company partnered with AFLATOUN International, a Dutch-based NGO focused on financial literacy and life skill development whose programs have been implemented in 102 countries, reaching more than 50 million children and young people (see CN August 2023). The collaboration, called iLearn, resulted in a digital tool – BeeSmart – which was presented at the Global Social and Financial Skills Conference that year.

BeeSmart leverages the public's trust in and affinity with banknotes, using an AI-driven phygital architecture to create a personalised and engaging learning journey.

The ecosystem includes a gamified app and physical BeeCash notes, which can be downloaded and printed at home. Each BeeCash note is unique and unlocks a user-specific digital learning environment. There are five 'denominations' (Earn, Save, Protect, Spend, Borrow), each of which can be scanned into the app. A dashboard tracks and measures financial literacy in real time, and users earn Pollen for rewards in the form of small prizes, promoting financial literacy through real-world transactions.

According to Koenig & Bauer, banknotes will transition from being just money to tools for learning about money, enhancing financial literacy globally.



Cash Awards Showcase Environmental Change

This year a Cash Sustainability workshop is being run alongside the High Security Printing (HSP) conference in Latin America. It makes sense, therefore, that a new Environmental Award is being announced at the conference, even though the award is open to any organisation anywhere.

Eight submissions have been received, and they have been namely, environmental impact, implement and scalability, innovation and creativity, leadership and vision, and broader influence and engagement.

Half of the projects submitted involved work on creating a circular economy, one was on management of the cash cycle, one was about reducing energy requirements and two were to do with the design and production of banknotes. In fact, the impact of all projects were multi-faceted, reaching more broadly across different areas of environmental impact.

The winner will be announced at the conference dinner on 10 May, which takes place on top of Rio de Janeiro's iconic Sugarloaf Mountain. In the meantime, a snapshot of each entry follows.

■ Royal Canadian Mint

The Royal Canadian Mint (RCM) has a three-phase project through to 2030 to decarbonise its business. An important element is the investment of C\$4.8 million in a geoexchange energy system at its Winnipeg facility. The project is a first in the industry but offers a solution that other mints could adopt.

The geoexchange technology provides cooling, and heating, for machinery, and buildings which account for 75% of total energy use. It has allowed a 300kW chiller load to be replaced with various circulation pumps and heat exchangers that require less than 100kW of emergency power capacity on the hottest summer day.

■ Orell Füssli

Orell Füssli (OFS) has created a software package to allow the environmental impact of banknote designs to be evaluated quickly and easily. It allows the early assessment of design choices and options.

Using data from Switzerland's banknote Life Cycle Analysis and OFS's own deep experience, the software assesses 17 variables across substrate types, varnishes, note sizes, security features etc. against environmental criteria such as global warming, energy, acidification, human toxicity, Ecotox etc.

The software creates an environmental score based on Swiss Ecopoints and the European Footprint method. This allows the impact to be assessed, but it

also allows designs to be compared with others. This is useful for tender processes.

■ Oberthur Fiduciaire, Casa da Moeda do Brasil, BlendPaper Security, SICPA

Bringing together four organisations to submit a bid is not easy, but it reflects how important these companies see the environment, as well as recording their work.

In addition to a design dedicated to Rio's environmental leadership, the team highlighted four key initiatives:

- 15% (organic) sisal fibre used in the paper. Sisal is widely grown around the world, it is fast growing, drought resistant and needs less fertiliser and no pesticides to grow.
- 15% recycled banknote fibre, reducing the need for new cotton input (see project Tran\$forma below).
- HighLink™ – a plastic free substrate reinforcement innovation that is completely free of fossil-based components. It is designed to increase fibre cohesion to increase note life.
- Mineral oil free inks. SICPA's offset 3VF ink incorporates 60% bio-renewable material as well as being mineral oil free. Its intaglio IR transparent ink and SICPATALK® intaglio infrared absorbing ink is also mineral oil free. Both contain a proportion of bio-renewable material.

■ Casa da Moeda do Brasil and BlendPaper

BlendPaper has developed a process to recover cotton fibres from banknote production waste. Working with the Casa da Moeda do Brasil, it has already processed 760 tonnes and put it into commercial papers. It can produce either fourdrinier or cylinder mould paper within a range of 50-330gsm.



It achieves this by a high oxidation chemical treatment followed by a cleaning system to remove plastics and other contaminants.

It has now developed this to the point where the fibre can be used in security papers (see above). Its approach has been tested by Oberthur Fiduciaire and the Banco de Portugal.

■ Louisenthal

Cotton has a high calorific value and is, therefore, a valuable and useful waste material capable of being used in a range of ways. Challenges of traditional treatments include making the cotton fibres shorter and the water and chemicals needed in the processes. Louisenthal has solved both of these problems by inventing an entirely new way of handling banknote waste, whether at the paper mill or in cash centres. The process creates usable recyclable cotton and cellulose fibre for use in cardboard, boxes, paper, envelopes, bags etc.

The BFE process uses mechanical force rather than water and chemicals to transform unfit banknotes into material useable and useful for recycling and reworking. The fibres retain their length and so can go back into paper making. For example, Louisenthal now has an agreement with a local paper mill which uses the fibres in their commercial papers.

The BFE equipment can be connected directly with high speed sorting machines and the output can be briquetted in the same way as traditional shreds.

■ CCL Secure

The advantage of banknotes is that people tend to return them to the bank rather than throwing them away. This creates the opportunity for creating a genuine circular economy. One of the requirements for high value polymer reuse is to have the same grade of polymer and not to mix different polymer types. Again, the opportunity to segregate banknote polymer exists more readily than for other plastics.

However, to recycle polymer banknotes, you still need to be organised and have access to an appropriate recycler. CCL Secure in Latin America has followed an extended producer responsibility route to address this.

By working actively with central banks, all those in Latin America who use CCL's Guardian® substrate now recycle their waste. Some 2.5 billion banknotes have been recycled, saving 3,750 tonnes of CO2.

CCL's submission includes a case study from Nicaragua, details of their structured approach to helping central banks recycle and it explains the local, national and international options that have been developed to allow central banks to recycle their Guardian substrate.

Patches are Making a Splash

Banknote security is an undisputable must. But what are the developing trends in banknote security, and how are industry suppliers meeting these challenges?

In the 1990s, when surface-applied optically variable features (primarily holographic) were appearing on banknotes, the vast majority were patches. Over the years, they have been supplanted by stripes (along with windowed threads). Today, of the 245 current denominations with an applied stripe or patch with optically variable effects, 70% are the former, and 30% the latter. But of the 13 new banknotes issued in 2024 with a stripe or patch, it was more evenly split with seven featuring a stripe, and six a patch.

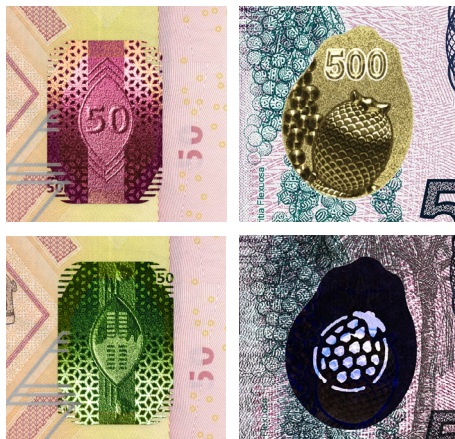
So is the pendulum beginning to swing back again? We had a chat with Clemens Berger, Chairman of the Management Board of Louisenthal, to get an insight on these trends.

He told us 'there is a strong and growing demand toward intuitive and attractive banknote security. We know that technological solutions at third and second level help protect banknotes from sophisticated counterfeiters. But for the public, to authenticate and stop counterfeits at first pass, Louisenthal believes security with inbuilt attraction is a must'.

He positions this into the company's long term perspectives: 'we see continually growing demand for innovation from our customers – we witness the evolution in security demand for micromirror technology with ColourShift. We also notice that, based on the trend for stripes, micromirror patches are becoming more prominent'.

These micromirror patches with ColourShift are unique to Louisenthal. 'With the

RollingStar® (RS) Patch, secure design and dynamics work hand-in-hand. Micromirrors beat the limitations of old-fashioned holographic patches or printed optical features. From a technological viewpoint, micromirrors plus ColourShift cannot be imitated'.



Left: Eswatini have RS patches. Right: Suriname varifeye® CC Patches.

The micromirror platform creates sophisticated security which combines with ColourShift, providing attractive and memorable results. Inherent in this, Louisenthal patches are a powerful package for design integration.

'We nicknamed this 'storytelling' on banknotes, as it enables central banks to project attractive and memorable features on banknotes, which encourage the public to check their banknotes'.

This storytelling was suitably expressed in Louisenthal's recent RS Patch housenote, exhibiting bright and attractive wishing stars from a German fairy tale, 'Star-Money'. Clemens indicated how the dynamic features provide intuitive recognition and authentication. He also pointed out that these are visible even in low light conditions. He further noted that issuers are attracted to such dynamics, and Kazakhstan and Eswatini have RS patches, whilst other issuers – including Suriname, Oman and Guatemala – have varifeye® CC Patches with secure windows behind the patch and ColourChange (CC) effects in reflection and transmission.'

This technology requires specialist methodology and properties, and Louisenthal has optimised production for Patches.

'You need application know-how for roll/roll and sheet application. Currency resilience starts with a reliable and proven manufacturing platform. Our patches are more attractive and more secure than others in the market, many of which are principally based on holography (and not so secure) or the colours don't switch'.

'Our patches are available in different sizes, shapes, with integrated windows (varifeye® CC patch) or without (RS Patch) and with or without demetallisation of the patch shape. The result is a secure patch which is very good to integrate in every banknote design and with the best potential for storytelling. In addition, patches also have a sustainable element to them, as the plastic carrier can have a 70% recycled plastic content'.

'Micromirror patches integrate perfectly into banknote design and have proven to emphatically support holistic banknote security', he concluded.

... Cash Awards Showcase Environmental Change

■ Biobanknote

Biobanknote has developed a process to take shredded unfit banknotes and turn it into a composted ring designed to be placed around newly planted trees.

The rings aids tree growth by improving soil stability, increasing organic matter content in the soil and increasing the ability to retain moisture by approximately 250%. They also increase microbial life and introduce microorganisms and mycorrhizae.

The composting of unfit banknotes requires little infrastructure and is a direct benefit whether used for crops or, as with BiobankMulch, growing trees. Biobanknote offers a service to evaluate banknotes to make sure that they are suitable within the environmental regulations of the country.

■ Banco de Portugal

The Banco de Portugal (BdP) was the only central bank submission. BdP has been working closely with the Banque de France and Casa da Moeda do Brasil on sustainability. Its submission provides details of how it is turning its commitment to achieving carbon neutrality by 2050 into action.

Energy. Since 2020 all its electricity comes from renewable energy and its Carregado site installed a photovoltaic powerplant in 2024, avoiding 510te of CO2.

Circular economy. BdP started a project in 2023 to find more sustainable alternatives for the reuse/recycling of unfit shredded notes. It is working directly with companies and academia and ran a competition for students to give a second life to banknotes, along with a dedicated conference earlier this year.

Eurosystem coin swaps. BdP pioneered the establishment of coin swap agreements between National Central Banks in the Eurosystem, reducing the need to produce new coins and reducing unnecessary coin destruction.

Less cash movement. It introduced a regulation to optimise the withdrawal and deposits of euro banknotes. The changes made reduced sorting volumes between 2022 and 2023 by 20%. In 2024 commercial institutions and CIT companies processed nine times more banknotes and 22 times more coins than BdP.

All bids showcase leadership, vision and commitment to the environment. There is much to be learnt from what has been done. Whoever wins, the quality of all of the submissions is first rate.

Koenig & Bauer Banknote Solutions Champions Sustainability in Currency Production

Koenig & Bauer Banknote Solutions (KBBS) has published its Banconota Spring/Summer edition dedicated to one subject, sustainability. The focus of the piece is how KBBS is helping its customers reduce the environmental impact of what they do.

While the European Central Bank's (ECB) 2019 Product Environmental Product (PEF) analysis demonstrated that the annual environmental impact of cash payments for one person for a year is the equivalent of somebody driving a standard car for 8km, the conversion of materials and substrate into a finished banknote via the printing process only accounts for 3% of the total PEF of banknotes in the eurozone. But that doesn't mean we shouldn't be striving to reduce it even further.



Ironically just as the wider cash service system is becoming less sustainable because of falling volumes, banknote production has become more sustainable. Even in this context, the cash service sector is working hard to reduce energy, transportation and plastics. Banknote production operations are using greener materials such as sustainable cotton, increasing note life by coating and varnishing substrates, using less and/or more renewable energy and managing waste to produce less of it, to recirculate it and to dispose of it better.

Efficiency and sustainability

Increasing efficiency goes hand in hand with sustainability. KBBS has led in

increasing sheet sizes, printing speeds, process controls, rapid make-readies, smart design for manufacturing, reducing energy consumption through LED curing, PowerSave, water material recycling, changing processes such as plate making to remove toxic compounds, energy monitoring, selective inking, digital workflows, integrating different printing processes etc.

The innovations across the last 40 years have resulted in dramatic reductions in materials, energy and waste along with better quality, faster throughputs and better material handling.

Costs and sustainability

Changing processes can involve upfront investment and costs for longer term financial and ecological returns. Sometimes regulatory regimes force change, but other changes require business cases to work.

A good example of how sustainability can a solid ROI (Return on Investment) is selective inking, which offers a simple, precise and perfectly controlled means of transferring ink. This drastically improves the efficiency of this process, creating a virtuous circle: a simpler, better-controlled process implicitly generates less scrap, and therefore lower non-quality costs. A process where waste production can be halved is far more profitable.

Of course, some investments will require organisations to put a financial value on the environmental benefits from making a change.

Making music with KBBS

Being a creative organisation, KBBS uses an interesting analogy to describe its role in reducing the environmental impact of banknote production. It suggests that we should see the creation, use and management of a banknote as being akin to a musical performance. Done right and the music delivers to the audience an experience that is a thing of beauty, a joy to hear, easy to consume and something that works in its own way for the complex and diverse range of audience members.

For society, the hard work and attention to detail should be invisible. From this perspective, KBBS has a key role, it makes the musical instruments.

Banconota gives details of where KBBS equipment helps print works reduce their global greenhouse gas emissions and reduce their energy usage, use fewer chemicals and reduce chemical waste, use less water and less wastewater and reduce the resources required to make a banknote – using less ink, less foil, simplifying production by combining processes, creating less waste and increasing control through good data.

Customer support

KBBS believes it can help central banks and printers with sustainability – whether at a strategic or an operational level – because not only has it been on a sustainability journey, but has done this within the full breadth of the extensive European and Swiss sustainability legislative landscape.

KBBS also suggests that as the 'instrument maker', closely connected to the central bank (composer/conductor) and intimately connected to the printer (the orchestra), it knows banknotes in a unique way and to a unique depth like few others. Its understanding of banknotes goes beyond production through its design and digital work with security features (eg. ValiCash™) and financial inclusion work (eg. BeeSmart® – see page 11). It understands, therefore, the cash cycle and the role of cash in society.

Based on this, KBBS is developing a new dedicated service called GreenCheck. This service starts with an assessment of current sustainability practices and initiatives. These are compared with best practice to establish highlights and opportunities to do sustainability differently.

The review will cover a high level overview and an operational analysis from design to energy usage, to thermal efficiency to process flows, individual process reviews, material reviews, logistics, and Scope 1, 2 and 3 reviews. The outcome will be recommendations of possible changes comparing impact, time and cost.

A sustainable future

This sustainability spotlight edition of Banconota demonstrates that environmental progress has been a long term part of the production story. Usually driven by the needs to increase efficiency and to reduce costs, sometimes driven by regulatory requirements, but always part of the drum beat of innovation.

The focus on helping the customer to reduce their environmental impact is pragmatic and in tune with the need to make changes, particularly as the cash cycle comes under pressure.

GemVision™ – the Industry's First CDI2 Fitness Solution

Sensor and feature specialist Authentix has announced the launch of the banknote industry's first CDI2 fitness solution – the GemVision™ Camera System, designed to help central banks lower currency management costs, combat counterfeiting, and improve the quality of circulating banknotes.

Powered by Vision Inspector software from Boulder Imaging, GemVision offers real-time processing on commercially available Windows-based servers. According to Authentix, it features high-speed, high-resolution imaging sensors and an Image Evaluation Unit that supports the Common Detector Interface (CDI2) specification, agreed upon by the US Federal Reserve Bank and the European Central Bank (see sidebar), which allows for easy integration of third-party sensors into banknote processing systems.

Authentix and Boulder Imaging collaborated with the ECB and FRB specification groups, providing feedback on the standards. They implemented note image capturing techniques and image processing algorithms that assess the fitness of overt features (important for public confidence in banknote authenticity and fitness). High-resolution images confirm the presence and activity of these features, while the detection of crumples and creasing provides valuable fitness information.

Key features

One of the primary functions of GemVision is the detection of denomination, series, and orientation of notes. This ensures that each banknote is accurately identified and processed.

The Camera Sensor and Fitness Solution focus on note presentation, specifying a 'belt-free view' for higher fitness evaluation accuracy. Accurate fitness determination leads to better visibility regarding the quality of notes in circulation, whilst the highly accurate reading of serial numbers and series year information supports note fitness monitoring programs.

Another capability of GemVision is reported to be its high accuracy in determining serial numbers and smaller printed characters on banknotes. This feature is particularly important for tracking and monitoring the circulation of currency, as well as for identifying and removing counterfeit notes.

Additionally, the system employs multi-angle illumination and full-colour analysis, which allows for a human-like fitness evaluation of the banknotes. This means that the system can assess the quality and authenticity of the notes in a manner similar to how a human would, but with greater precision and consistency – ensuring that only fit banknotes remain in circulation.

Furthermore, as GemVision is CDI2 compliant, it can stream image and data for use by other sensors and store combined data for research, analysis, and system enhancements.

GemVision uses sensor fusion capabilities through an Image Data Bus (IDB) and a Data Machine Bus (DMB) to share images and results. This allows downstream sensors to receive information without generating independent results.

An aggregator module supports sensor fusion, enabling central banks to pool and weight multiple results from various sensors for sorting decisions. The CDI2 standard disaggregates the sensor from the sorting machine, allowing entities to focus on specific aspects of banknote inspection and analysis.

Benefits for central banks

According to Authentix, GemVision offers numerous benefits for central banks.

For a start, the system provides unprecedented access to banknote data and images acquired during high-speed processing. This enhanced visibility helps reduce the number of notes taken out of circulation prematurely, thereby increasing the efficiency of banknote processing and extending the life of notes in circulation.

In particular, GemVision's sensor fusion capabilities allow central banks to assess the quality, wear, and authenticity of banknotes with greater accuracy and precision, more informed decisions regarding the circulation and withdrawal of currency, optimising cash management strategies and maintaining the integrity of the currency supply can be achieved.

And by optimising the processing of banknotes and reducing the rate of erroneous shredding of otherwise fit banknotes, central banks can reduce the cost of cash management, ensure that only high-quality notes remain in circulation, and minimise the carbon footprint associated with currency production and destruction.

The CDI2 standard, meanwhile, gives central banks the flexibility to select detectors from multiple suppliers, enhancing fitness sorting and potentially lowering the overall cost of managing cash.

Additionally, the standard provides improved access to sorting decisions and the data behind these decisions, enabling central banks to make more

informed choices about the circulation and withdrawal of currency.

With nearly 20 years of high-speed sensor development experience, Authentix is a trusted partner for central banks, understanding the complexity of the cash industry. Boulder Imaging, meanwhile, offers a growing suite of integrated systems and software that leverage machine vision technologies to support the precision printing of banknotes.

Their combined expertise, they say has made GemVision and its unique fitness measurement capabilities a commercial reality.

In 2013, the Eurosystem and the main suppliers of high-speed banknote sorting machines (BSMs) developed specifications for integrating detectors for banknote security features into BSMs. The specifications provided for a common interface between banknote detectors and sorting machines for standardized data exchange to authenticate banknotes based on their features, and were published under the name of the Common Detector Interface (CDI).

Two years later, the US Federal Reserve System (FRS) and the Eurosystem began work to develop a second generation of the common detector interface (CDI2), together with BSM suppliers. A key difference is that CDI2 allows for the integration of third-party camera systems – with optional fitness detectors – into sorters – so that any given sensor can be integrated into any given banknote-processing machine (versus the past, where cameras and sensors were specific to each model, with the limits on interoperability and data exchange that are involved).

In 2020, the FRS and ECB finalised the CDI2 standards, with the help of members of the central banks of the Netherlands and Austria, the Austrian Institute of Technology (AIT), and the US-based Lawrence Livermore National Laboratories.

Having appointed Giesecke+Devrient in 2020 to supply its next generation high speed banknote processing system, a condition of which is that they are CDI2-compliant (see CN August 2020), the FRS is the first to apply the new standards. They are being implemented alongside its broader Cash Visibility Project, a multi-year, multi-phase joint industry initiative aimed at bringing greater transparency, resiliency and efficiency to US cash supply chain logistics.

IACA Excellence in Currency Awards 2025

The Currency Conference gala dinner on 28 May hosted the presentation of the latest International Association of Currency Affairs (IACA) 2025 Technical Excellence in Currency Awards.

There were four categories, with three finalists in each.

■ Best New Banknote or Banknote Series

The finalists were:

- **Bangko Sentral ng Pilipinas (BSP)** – the First Philippines Polymer Banknote Series
- **National Bank of Kazakhstan & The Banknote Factory** – the Saka Style banknote series
- **Bank of Jamaica** – the new all-polymer banknote series.

The winner was BSP for its new polymer series, and specifically the new 50, 100 and 500 piso banknotes issued in 2024 (the first in the series, the 1,000 piso, was issued in 2022).



BSP partnered with Note Printing Australia for the production of the new notes, the designs of which incorporated features carefully selected to represent qualities and values that Filipinos identify with and are known for.

Moreover, each security element, from the clear windows to dynamic colour shifting effects, enable simple, rapid verification by the public.

■ Best New Coin or Coin Series

The finalists were:

- **Centrale Bank van Curaçao en Sint Maarten (CBCS)** – for the new Caribbean guilder coins, produced by Royal Canadian Mint, which have replaced the coins of the Netherlands Antilles guilder

- **South African Reserve Bank** – for the 4th Decimal Coin series
- **Monnaie de Paris** – for the Paris Olympics 2024 €2 circulation coin.

The winner was the Monnaie de Paris in what was a joint project with the French Ministry for Education, the first time such an initiative has taken place between the two institutions, involving the distribution of the Olympic coin to millions of children.



■ Best New Currency Public Engagement Program

The three finalists were:

- **Bank of Jamaica** – the communication campaign the new banknote series
- **South African Reserve Bank** – the campaign to promote the upgraded Nelson Mandela series and the 4th Decimal Coin series
- **National Bank of Kazakhstan** – public engagement programme for the new Saka style banknote series.

The winner was the South African Reserve Bank (SARB) who, in 2023, launched the upgraded Nelson Mandela banknote series and the Fourth Decimal Coin Series.



Creativity defined the launch campaign, themed 'Our Money, Our Pride.' The project's success was underpinned by a robust stakeholder engagement strategy, ensuring seamless integration into the cash-handling ecosystem across South Africa

■ Best Cash Visibility & Collaboration Program or Initiative

The three finalists were:

- **FedCash® E-Manifest Service:** laying the path for Cash Visibility in the United States
- **Glory:** Serial Number Reading (SNR) series of projects, providing cash visibility for more efficiency
- **Giesecke+Devrient:** Compass Banknote Intelligence a cloud-based platform designed to transform how stakeholders manage banknotes.

The winner was Glory, whose project leverages SNR technology to enhance cash visibility and efficiency across the cash cycle. The project has involved collaboration with key stakeholders from various sectors, including central banks, retail, banks, CIT, and cash centres and has achieved comprehensive visibility into banknote conditions and locations, enabling detailed lifecycle analysis and management. This, in turn has facilitated better decision-making and operational efficiency.

Currency Hall of Fame

In addition to the Excellence in Currency Awards, which were first held in 2007, IACA held an induction ceremony at the Currency Conference for two new members of the Currency Hall of Fame (CHOF). This provides a permanent public record and memorial of the outstanding achievements of individuals who have made a significant impact in the currency industry, and that year saw the induction of four distinguished contributors to the currency industry. Since then, 14 more inductees have been celebrated.

This year, they were joined by two titans of the industry – Antti Heinonen (formerly of the Bank of Finland, European Central Bank and the Banknote Ethics Initiative) and Richard (Rick) Haycock, whose long career in the sector began with cash processing systems before founding a number of conferences, industry associations and publications to strengthen the currency industry through community and information sharing.

Full details of the IACA award winners and finalists, along with the two new inductees to the Currency Hall of Fame, can be found at www.currencyaffairs.org.

Fusing Tradition with Modern Minting at MDC 2025

The 32nd Mint Directors Conference (MDC) was held from 27–29 April 2025 in Cape Town, South Africa, co-hosted by the South African Mint. The event focused on merging traditional minting with modern technology via keynotes, workshops, and panel sessions. An awards ceremony recognised achievements in coin design and packaging (see CN April 2025).

South African Reserve Bank Executive Director Pradeep Maharaj welcomed delegates, noting the conference was long overdue due to its postponement from April 2020. He emphasised the evolving role of coins in society and their importance in telling lasting stories.

Mint Directors Association (MDA) Chair Marie Lemay recapped the six-decade history of the conference, which now attracts over 230 delegates from 93 organisations in 31 countries, providing a global platform for collaboration.

The importance of cash

In the session on the modern minting industry, MDA Executive Director Mark Cartwright addressed the challenge of adapting to fast-evolving global payment systems.

Michelle Richardson from the Royal Canadian Mint reported that 85% of Canadians still use cash and with 74% have no intention of going fully cashless, citing its privacy and accessibility.

Nicolas Dumont from Monnaie de Paris discussed cash's symbolic value and its role in trust and identity, and provided insights into using cash surveys as a strategic communication asset.

Pearl Kgalegi of the South African Reserve Bank emphasised that coins are essential in South Africa, where they represent economic lifelines and heritage. 86.3% of businesses and 75.3% of households use cash for payments, with the majority surveyed saying it is used frequently or all of the time.

Focus on sustainability

Further sessions addressed the minting industry's role in sustainability. Anne Jessopp of The Royal Mint outlined a strategy covering all emission scopes, stressing immediate action and collaboration.

Tom Froggatt from the Royal Canadian Mint detailed a supplier engagement approach in its partnership with Agnico Eagle, which is recognised for its adherence to global sustainability standards, such as the Responsible Gold Mining Principles and the International Cyanide Management Code. He also covered the Mint's Impact Report, which sets a goal of carbon-neutral operations by 2030.

Julie Grandjean of Monnaie de Paris shared a four-pillar sustainability strategy targeting a

50% reduction in greenhouse gas emissions by 2030, 80% less non-recycled waste by 2027, and a zero plastic packaging policy. The Mint is also enhancing energy efficiency, targeting a 30% reduction in consumption by 2027.

Technical innovations and AI

The International Mint Directors (IMD) Technical Committee held a series of presentations on innovations such as automated coin and blank inspection, tri-component coins (tri-material, hybrid, smart coded), laser roughing and finishing, sensor sensitivity for plated materials, benchmarking in the minting industry, coin blank burnishing, quality assurance for circulation coins, and security and anti-counterfeiting measures.

Artificial Intelligence had a session all of its own.

Robert Newman from Carveco demonstrated AI's applications in coin design, including converting photographs into tactile 3D representations for the visually impaired.

Cameron Barnsley from Giesecke+Devrient spoke on AI's ability to unlock new capabilities across the company's portfolio – with a new assistant 'Genie' aiding in increased accessibility to its data analytics platform. AI provides the ability to handle large data sets, detecting seasonality and trends, and continually learning from this incoming data to enable greater accuracy in predicting cash trends.

Marie Lemay of the Royal Canadian Mint described how the organisation is embedding AI across operations, encouraging employees to see it as a tool for augmentation, not replacement.

The session concluded with the takeaway that AI should amplify human creativity rather than replace it.

Future outlook

The closing panel highlighted key insights and takeaways – protecting cash's role in society, adopting emerging technologies like AI, staying agile and innovative, and using data and collaboration to drive strategic decisions.

The conference concluded with the handover to Spain, which will host the next MDC in Madrid in April 2027.

(A more detailed review of MDC 2025 can be found in this month's Coin & Mint News™).

G+D: Anchoring Trust in a Digital Era

Giesecke+Devrient will hold its customer event – the G+D Currency Technology Symposium 2025 – from July 7-10 at its Munich headquarters. Themed 'Currency Fast Forward,' this event will examine the pivotal role of public currency as a foundation of trust in the rapidly evolving digital landscape, highlighting the indispensable role of cash as critical infrastructure, a public asset, and a key element of national security.

The symposium will also address the integration of Central Bank Digital Currencies (CBDCs) with traditional cash systems within a tokenised financial system. The symposium aims to display G+D's dedication to nurturing a resilient payment ecosystem where cash and CBDCs can seamlessly coexist, offering flexibility and choice across various financial contexts. Discussions will emphasise the protection of cash as a significant public good and instrument for maintaining economic sovereignty and public confidence. A major focus will be on the latest innovations in currency technology, with G+D showcasing advancements in banknote security architecture, the enhanced durability of banknotes, and solutions designed to future-proof cash cycles and support the introduction of digital tokenised cash (CBDC).

G+D is committed to highlighting the strong value propositions of its solutions, affirming its role as a leader in developing secure, efficient, and user-centred currency systems. This invitation-only symposium is attentively organized to foster meaningful dialogue and spur innovation among top-tier central banks, financial and technological thought leaders. For additional information or to request an invitation, please contact the symposium's organisation team at symposium2025@gi-de.com.

New Currency Focuses on the World Under the Seas

As described in last month's Currency News™, the new Caribbean guilder has now been issued. It's been a long time coming, but well worth the wait.



The Netherlands (or Dutch) Antilles was a collection of Caribbean islands forming part of the Kingdom of the Netherlands which, along with Curaçao and Sint Maarten, also comprised St Bonaire, Saba and St Eustatius. It was dissolved in 2010, with the latter three adopting the US dollar. Curaçao and Sint Maarten are autonomous countries within the Dutch kingdom (as is the neighbouring Caribbean island of Aruba), but formed a currency union in 2010, the same year the dissolution. The Centrale Bank van Curaçao en Sint Maarten (CBCS) was formed the same year, replacing the Central Bank of the Netherlands Antilles.

The issue of a new currency – the Caribbean gilder – was agreed at the time, but its introduction was postponed for a number of reasons, including the economic situation at the time and, subsequently, the pandemic. The improvement of the public finances, together with stocks of the old banknotes (dating back to the late 1990s) running low, resulted in the Ministry of Finance announcing in 2022 that the new currency would finally go ahead.

But the Caribbean guilder is not just a new series – it's a new currency. Launching a new currency does not happen often; apart from the euro and South Sudan, few have been created and launched since the 1990s. Therefore the CBCS gave careful thought not only to the design and security features of their new currency, but also on how it would engage and educate the public. The series was first unveiled last year in a so-called 'Grand Reveal' (see CN August 2024) and went

into circulation at the end of March, backed up by a comprehensive public education campaign.

The notes are mostly in the same denominations as their predecessors – the Cg 10, 20, 50, 100 and 200, with the Cg 20 replacing the former 25 and the Cg 200 replacing the former 250 Netherlands Antillean guilders. The coins are in denominations of 1, 5, 10, 25, and 50 cents, and Cg 1 and 5 – the same as before.

Both islands, with a combined population of c. 220,000 people, are known for their marine life and coral reefs, and are popular destination for eco-tourists and scuba divers. Fittingly, therefore, the main theme of the new Caribbean guilder is the ocean, with 'The World Under the Sea' as its title, where fish swim freely with no borders

(serving as a metaphor for the unity shared between the two countries).

The front of the banknotes, which were designed and printed by Crane Currency, depicts the vibrant marine life native to Curaçao and Sint Maarten, while the reverse showcases significant historical and cultural landmarks of both countries. The fronts are in a vertical orientation and the backs are horizontal. Whilst the security features are common throughout, each of the notes has a distinct colour. They all measure 147 x 66mm.

The yellow-coloured Cg 10 shows the Gray Angelfish and the Queen Conch on the front and the historic lighthouse on the island of Klein Curaçao on the back.

The predominantly blue Cg 20 shows the Spotted Eagle Ray and the Yellow Cowry on the front and the ecologically unique Simpson Bay Lagoon on Sint Maarten on the back.

The green Cg 50 shows the Green Sea Turtle and the Favored Tellin shell on the front and the pristine Playa Kenepa Grandi Beach on Curaçao on the back.

The red Cg 100 shows the Spotlight Parrot Fish and the Common Music Volute on the front and the remarkable Courthouse of Sint Maarten on the back.

The new purple Cg 200 shows the Longsnout Seahorse and the Giant Tun Shell on the front and the iconic Queen Emma Bridge, a pontoon bridge in Curaçao's capital, Willemstad, on the back.

On the front of each note is a MOTION SURFACE® stripe, the colours matching the denomination and each with an image of XCG (the currency symbol) inside a sun, a shell and water droplets. The back of each has a 3mm wide RAPID® HD Detect micro-optic thread depicting waves; again, the colour matches the denomination.

The currency symbol is represented in the watermark as an electrotype beneath a multi-tonal compass. It also features in the see through feature, with the patterns on



the front and back making up XCG when viewed in transmission.

The other main overt feature is SPARK® Flow in the form of shells unique for each denomination, which change from blue-to-green when tilted.

Finally, the visually impaired have been catered for, not only with the distinct individual colours and the large numeral on the front and back, but also with raised intaglio lines along the short edge of the notes, the number of which corresponds to the denomination.

The coins have been produced by the Royal Canadian Mint. There are similar but distinct designs for Curaçao and Sint Maarten, with both sets circulating interchangeably on both islands. The themes of the six denominations also centre on marine life, including turtles, seashells and waves.

The Curaçao versions of the 1, 5, 10, 25 and 50 cents all feature orange blossoms on the front, and Favored Tellin shells, pearls and the denomination numeral on the reverse. The bimetallic Cg 1 coin features the effigy of King Willem Alexander on the front and the island of Curaçao, along with green turtles, on the reverse. The same effigies feature on the trimetallic Cg 5.

The same designs appear on the St Maarten version of the lower denomination coins. The Cg 1 and Cg 5 coins feature the island's coat of arms on the reverse.

The coins are made from multi-ply nickel plated steel utilising cyanide free bronze plating. Each coin has a unique edge finish to allow easy distinction between denominations for the visually impaired.

This is not just a new series, but a new currency and, as noted, the CBCS has undertaken a comprehensive public engagement programme, supported by a dedicated website (www.caribbean-guilder.com) and an app ('My CaribbeanGuilder'), which highlights the security features of the currency and offers detailed information about the theme. The CBCS has also undertaken training sessions for commercial bank and retail personnel.

The new currency, which is pegged to the US dollar, will co-circulate alongside the Netherlands Antillean guilder until 1 July, after which the latter can be exchanged at commercial banks until 1 April 2026 and until 31 March 2055 at the CBCS.

(Nancy van der Wal of the CBCS will be giving a presentation on the new series and the important role its public education campaign played in its success at the upcoming HSP Latin America conference in Rio de Janeiro, 9-11 June).

Note and Coin News

■ The National Bank of Kazakhstan has issued a commemorative 1,000 tenge note celebrating the 80th anniversary of the Great Victory and the end of World War II in Europe.



The (vertical) front of the predominantly brown and beige note features the Memorial of Glory, honouring those who lost their lives, along with cranes in flight and the national emblem. The reverse features a map of Kazakhstan with fragments of historical archive photographs, and the Order of the Patriotic War.

The note also features a red MOTION SURFACE® micro-optics stripe depicting the movement of an eternal flame and flying cranes.

5 million of the notes, which are legal tender, have been printed.

■ The Bank of Thailand has issued a commemorative 100 baht banknote marking the 150th anniversary of the country's Ministry of Finance. It is part of a special package which includes a commemorative coin.

It is the same as the circulating 100 baht, but includes the legend '150th year of the Ministry of Finance, April 14, 2025' on the front.

■ The Central Bank of the Republic of Guinea has recently issued new versions of the 10,000 and 20,000 francs. The designs are similar to the 2018 versions respectively, but are produced on a more durable substrate. In place of the previous threads, they also feature Pulsar™ colour-shifting micro-optics threads, and SPARK® Live in the form of a dove. Upgraded versions of the lower denomination notes are also due to be introduced.

Shortly after the issue of the 20,000 franc in April, the central bank reported that a massive robbery had taken place near the border with Sierra

Leone, with over 1 million notes valued at 21 billion Guinean francs (US\$2.4 million) stolen. Several people have been detained, but as yet the notes have not been recovered, albeit that the serial numbers have been recorded, and the public have been warned to take care if offered the notes.



■ Bangladesh Bank is reported to be releasing banknotes with new designs in July, ahead of Eid-ul-Azha, in response to mounting public pressure over scarcity of notes.

The notes will feature both graffiti art commemorating the July Uprising of last year, which ousted the incumbent prime minister, and motifs of Bangladesh's cultural heritage. The portrait of Sheikh Mujibur Rahman, viewed as the founder of modern Bangladesh and which appears on all notes in the current series, is being dropped.

Nine denominations of redesigned notes have been printed, but only selected ones will be released initially most likely the 20, 100, 500 and 1,000 taka notes. The rest (the 2, 5, 10, 50 and 200 taka notes) will be phased in subsequently over time based on demand and logistical capacity.

■ The Central Bank of Syria has dampened speculation that it will drop its existing printer, Goznak (who has been producing its banknotes since 2018), and choose one in Europe or the UAE instead for a redesigned currency. In a statement, it says that Goznak is continuing to print Syrian banknotes as previously contracted, emphasising that the process has adhered to 'official standards and technical safeguards'.

It is also weighing up whether to introduce new banknotes or carry out a broader overhaul of its currency, stating that any proposals remain under review. The currency has all but collapsed since the start of the civil war in 2011, with two new high denominations issued since then – the 2,000 and 5,000 Syrian pounds. The first of these features a portrait of the former president, Bashar al-Assad, who was ousted last year.

New Round Up of New Notes and Coins

Currency News™ is publishing a round-up of all new banknotes and coins issued in 2024. This annual summary will be issued each year from now on, covering the previous year's new issues.



Entitled, somewhat prosaically, Banknote and Coin Update 2024, this round-up is the result of the new DataVault™ searchable database of banknotes and coins. This resource, which is now available to the industry, enables all the

world's banknotes and circulating coins to be searched and sorted via various parameters relating to size, orientation, date of issue, theme, size, substrate and features – with a powerful search engine saving hours if not days of time-consuming research.

24 countries issued new notes or coins in 2024, of which 21 issued one or more new banknotes – 57 in total.

Of those banknotes, 25 were in new series from eight central banks. In most cases, they were part of new series which are being issued progressively.

12 were upgrades by five issuers and four were on new substrates, switching from paper to polymer (on top of the two countries where the new series also involved a substrate switch – ie. the Philippines and Mozambique).

Of the other new notes issued, five from three issuers were new high denominations, seven from four issuers were redesigns and three were commemorative.

On the coin side, three countries issued new coins – new designs in the case of France (three) and the UK (one) and part of a new series in one (Zimbabwe).

The information on each new note and coin in the report is an abbreviation on the information provided in DataVault itself, more information on which can be found at www.datavault.reconnaissance.net.

Events

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Rio de Janeiro, Brazil
hsp-latinamerica.com

9–11 SEPTEMBER 2025
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www.cbdc-conference.com

15–17 SEPTEMBER 2025
OPTICAL & DIGITAL
DOCUMENT SECURITY
Warsaw, Poland
opticaldigitalsecurity.com

3–5 NOVEMBER 2025
THE FUTURE OF CASH
Warsaw, Poland
thefutureofcash.com

1–3 DECEMBER 2025
HIGH SECURITY PRINTING ASIA
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hsp-asia.com

2–4 MARCH 2026
HIGH SECURITY PRINTING EMEA
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