

The HKMA's e-HKD Journey — Making Steady Strides Forward

By the Fintech Facilitation Office

Under its “Fintech 2025” strategy, the Hong Kong Monetary Authority (HKMA) has been strengthening its work on Central Bank Digital Currency (CBDC) to future-proof Hong Kong in terms of CBDC readiness. One important focus is studying the prospect of issuing retail CBDC in Hong Kong, that is, the e-HKD. The HKMA has conducted considerable research into e-HKD and reached a number of milestones. This article explains what a CBDC is and summarises the work the HKMA has accomplished so far.

CBDC—a new form of central bank money

Central bank money is money issued or backed by the central bank. Traditionally, there are two forms of central bank money, namely notes and central bank reserves. Notes are physical money that can be used by the public, while central bank reserves are electronic money that can only be accessed by eligible financial institutions with clearing accounts at central banks.

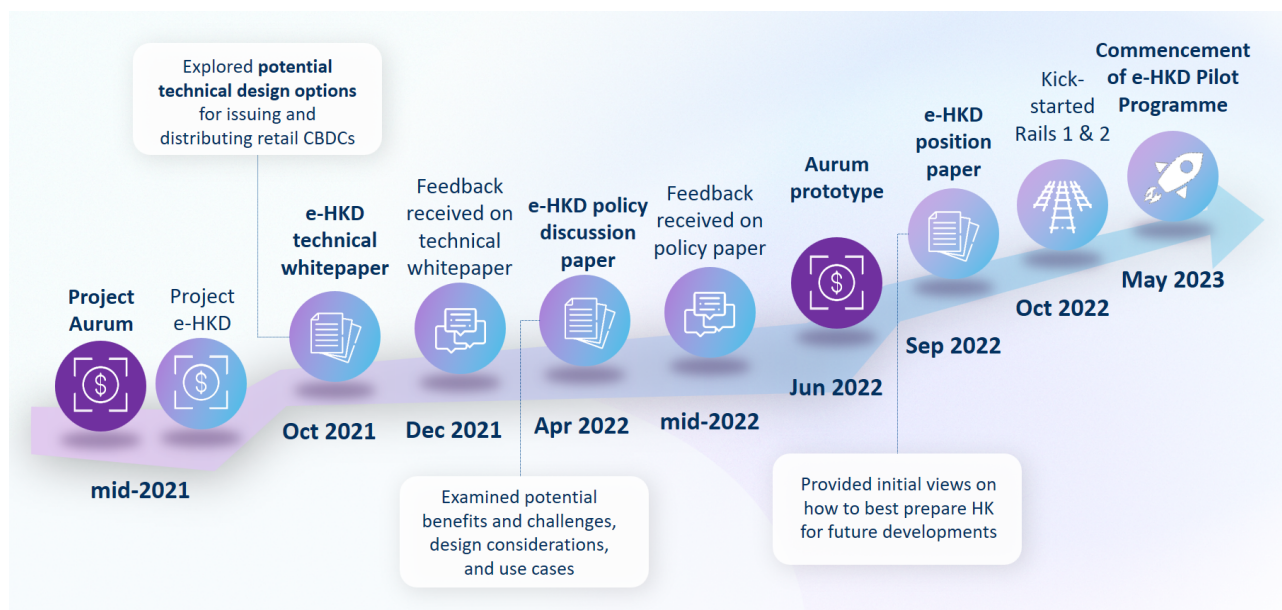
CBDC is a new form of central bank money. If the CBDC is intended for use by households and firms for everyday transactions, it is referred to as a “retail” or “general purpose” CBDC. Conversely, if the CBDC is meant for use for transactions between banks, central banks, and other financial institutions, it is called a “wholesale” CBDC.¹ In this article, we focus on the former. Not only is the retail CBDC electronic and accessible by the public, (i.e. an electronic version of coins and notes), it could also have potential new features and functions, for example, smart contracts and cryptography, depending on its design and technical feasibility.

Retail CBDC differs from commercial money

While commercial money, such as bank deposits, is also electronic money and can perform many functions that can potentially be offered by CBDC, the fundamental difference between CBDC and commercial money is that CBDC is money backed by the central bank, and represents a liability of the central bank and is therefore completely free of credit risk. By contrast, commercial money is a liability of the depository institution and has credit risk in case of closure of the depository institution (though the possibility is very low in Hong Kong).

¹ <https://www.bis.org/publ/bppdf/bispap136.pdf>

Embarking on the retail CBDC journey



The HKMA began its CBDC journey in 2017. At the time, in light of the well-developed and diversified retail payment landscape of Hong Kong, we gave priority to studying wholesale CBDC and exploring its application.² In parallel, we conducted, and have continued to conduct, horizon scanning to monitor international developments in the retail CBDC sphere as well as deepen our understanding of the subject.

The HKMA officially began researching retail CBDC in 2021 amid the central banking community's heightened attention to the topic. To begin with, the HKMA partnered with the Bank for International Settlements Innovation Hub (BISIH) Hong Kong Centre to conduct Project Aurum. As the BISIH's first retail CBDC project, Aurum studied the high-level technical design of retail CBDC.³ The successful outcomes of Aurum are twofold. Not only did Aurum lay a solid foundation for the HKMA's

subsequent retail CBDC projects (e.g. Project Sela⁴, another joint project with the BISIH), it also helped shed light on the CBDC journey for other central banks through making the source codes and technical manuals accessible to all central banks—a manifestation of the HKMA's commitment to developing public goods to serve the needs of the wider central banking community.

In view of the accelerated pace of market digitalisation and rapid proliferation of crypto-market activities in recent years, the HKMA saw the need to take one step further to deep dive into whether, and how, retail CBDC can play a role in supporting and rationalising the relevant market developments. Against this background, in June 2021, the HKMA embarked on Project e-HKD under its "Fintech 2025" strategy to study the prospect of issuing retail CBDC in Hong Kong.

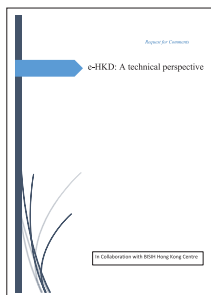
² An overview of the HKMA's wholesale CBDC projects is available on the HKMA website: <https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/research-and-applications/central-bank-digital-currency/>

³ More information about Project Aurum is available on the BIS website: <https://www.bis.org/about/bisih/topics/cbdc/rcbdc.htm>

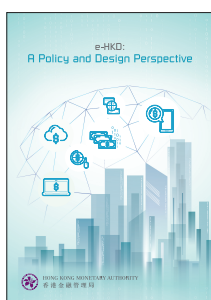
⁴ Project Sela explores the cyber security and technical feasibility of a two-tier retail CBDC architecture that allows intermediaries (e.g. commercial banks, payment service providers, and fintech firms) to provide CBDC services without any related financial exposure. The project report is available on the BIS website: <https://www.bis.org/about/bisih/topics/cbdc/sela.htm>

Project e-HKD—a comprehensive study with the public's participation

Project e-HKD is a multifaceted study covering not only the technical, but also policy and legal aspects:

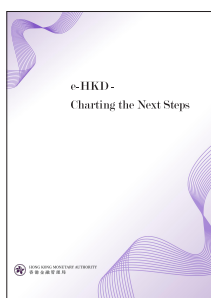


On the technical front, in October 2021, the HKMA published a whitepaper titled *e-HKD: A technical perspective*⁵, which explored the potential architecture and design options for issuing and distributing e-HKD. It also identified a number of issues, summarised in seven problem statements, for further exploration. The whitepaper was the first among similar papers published by central banks to unveil a technical architecture that includes a groundbreaking privacy preservation arrangement that allows transaction traceability in a privacy-amicable manner.



On the policy front, in April 2022, the HKMA published a discussion paper titled *e-HKD: A Policy and Design Perspective*⁶, which examined the key policy and design issues in introducing e-HKD, including the potential benefits and challenges, issuance mechanism, interoperability (i.e. connectivity) with other payment systems, privacy and data protection and legal considerations, as well as potential use cases. The issues were highlighted in the form of 12 discussion questions for comment.

Two rounds of market consultation, one on high-level technical design and one on key policy and design issues, were conducted alongside the study to keep relevant stakeholders (including the industry and the public) informed and to ensure that their views and comments were duly considered. Overall, the feedback received indicated that respondents are supportive of the e-HKD initiative and believe that retail CBDC has the potential to make payments more efficient while supporting the digital economy. This positive sentiment was observed across various sectors.



Subsequent to the technical whitepaper and policy discussion paper, as well as the two rounds of market consultation, the HKMA released a position paper in September 2022 titled *e-HKD - Charting the Next Steps*⁷ to announce the findings of the study, set out our policy stance, and outline the next steps.

⁵ *e-HKD: A technical perspective* is available on the HKMA website:
https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/e-HKD_A_technical_perspective.pdf

⁷ *e-HKD - Charting the Next Steps* is available on the HKMA website:
<https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2022/20220920e4a1.pdf>

⁶ *e-HKD: A Policy and Design Perspective* is available on the HKMA website:
https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/e-HKD_A_Policy_and_Design_Perspective.pdf

Policy stance — a need to prepare for possible implementation of e-HKD

In the position paper, the HKMA explained that it had not yet made a decision on whether and when to introduce e-HKD, and would remain open-minded in considering the issues carefully. That said, the HKMA believed it was necessary to start paving the way for possible e-HKD implementation for the following three reasons:

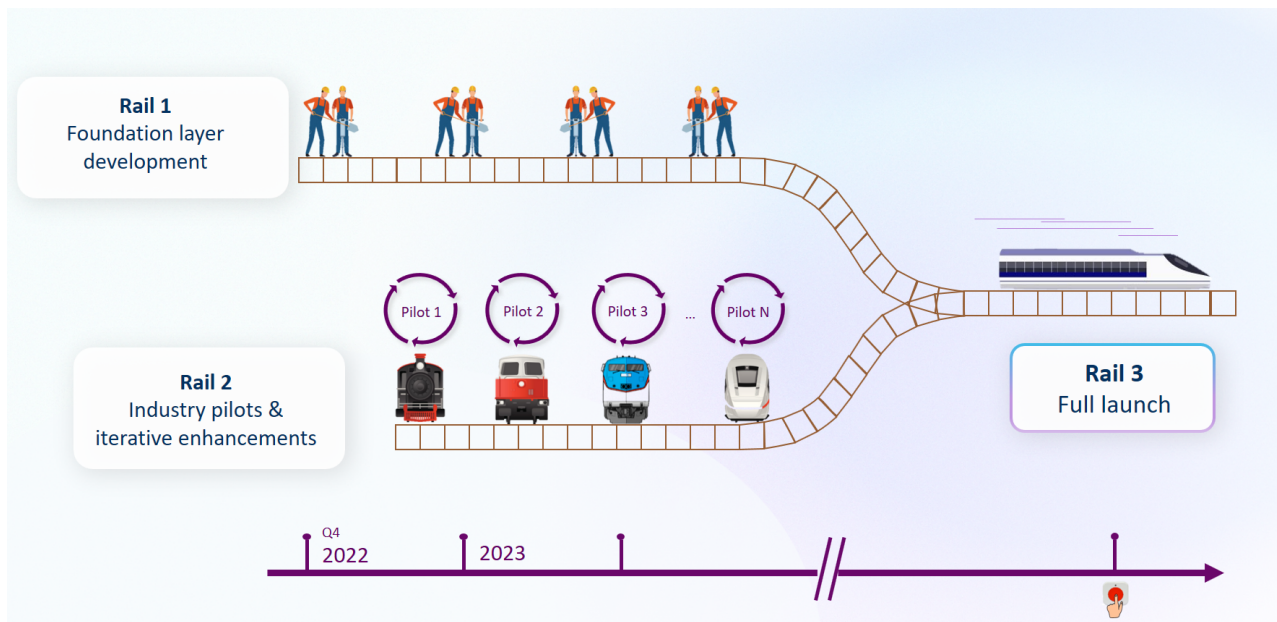
1. The two rounds of market consultation had registered widespread support for the e-HKD initiative.
2. Internationally, all major jurisdictions were studying or developing retail CBDC⁸, and keeping Hong Kong at the forefront of the CBDC arena was crucial to preserving our competitiveness as an international financial centre.

3. Although e-HKD might not have an imminent role to play in Hong Kong's existing advanced and well-diversified retail payment market, possible use cases for it might emerge quickly out of the rapidly evolving digital economy.

When paving the way for a possible launch, the HKMA will proceed prudently. As similarly noted by the wider international central banking community, introducing a new, digital form of currency would entail far-reaching implications for a wide range of issues, including legal, regulatory, policy, financial stability, privacy, cybersecurity, and interaction with existing payment options.

It is worth mentioning that the objective of introducing a potential e-HKD is to provide consumers with an additional payment option that may address certain limitations with the existing payment options, instead of removing or becoming a substitute for these options.

Three-rail approach to maximising readiness for e-HKD



⁸ According to a paper published by the BIS in July 2023, 93% of the surveyed central banks were engaged in some form of CBDC work. In addition, there could be 15 retail CBDCs publicly circulating in 2030. More information is available on the BIS website: <https://www.bis.org/publ/bppdf/bispap136.pdf>

To maximise Hong Kong's readiness for e-HKD in a prudent manner, the HKMA is adopting a three-rail approach to implement various work items:

Rail 1 serves to lay the technology and legal foundations for supporting the potential implementation of e-HKD in the future. First, on the technology front, although the ultimate design of the e-HKD system may be significantly affected by a wide range of factors, some of which are yet to be fully articulated and studied; the HKMA aims to develop a technical foundation that can suit different design choices for the system with relatively little modification further down the road.

Secondly, on the legal front, the HKMA's focus will be on enabling the issuance of a digital form of fiat currency with legal tender status. Legal tender status is important as it will help ensure alignment in status between the digital form and the physical form of the local currency. More importantly, an unambiguous legal foundation for issuance is crucial to foster public confidence in e-HKD and, in turn, achieve network effect.

Rail 2 runs in parallel with Rail 1 and comprises deep dives into use cases, implementation and design issues relating to e-HKD. In particular, the HKMA will conduct a series of pilots with various stakeholders, including banks and the industry, to gain actual experience. Through this iterative process, the HKMA could gather new, innovative ideas from the private sector. In addition, the outcomes and insights gained from each pilot should help enrich the HKMA's perspective, enable us to make better informed decisions on the design choices for the e-HKD system, refine our approach to the implementation of e-HKD, and ultimately contribute to the public good through a fair balance between innovation and stability.

Rail 3 is concerned with launching of e-HKD. It will consolidate the outcomes of Rails 1 and 2 for more thorough implementation and planning, and will set the timeline for launching e-HKD. The timeline will depend on factors such as the actual progress of Rails 1 and 2, and the pace of relevant market development, both local and international. It is

expected that our work under the first two rails will enable the HKMA to set Rail 3 in motion in an expeditious time frame.

This prudent three-rail approach should put Hong Kong at the forefront of CBDC development internationally while providing the space to articulate and examine the complex issues from different dimensions, as well as learn from the experience of other jurisdictions.

Pilot Programme to explore innovative use cases with industry and gain hands-on experience

As part of an effort to deepen application research and pilots under Rail 2, the HKMA launched the e-HKD Pilot Programme in November 2022 and invited applications from the industry. More specifically, we encouraged the industry to submit potential use cases that would offer customers unique benefits currently not available through existing digital payment means.

The applications received were then assessed against the following five criteria:

1. **Hong Kong-centric** – the proposed solution should aim to maximise the potential use of e-HKD
2. **Forefront of innovation** – the proposed solution should showcase innovative elements that differ significantly from existing market offerings. It could be a new business model, a new market, or a new version of an existing product
3. **Customer-centric** – the proposed solution should aim to enhance customer experience or solve their existing pain points
4. **Readily testable** – the proposed solution should be ready to be tested in the market by selected group(s) of customers; relevant risks have been identified with appropriate mitigants in place; and sufficient resources including capital and manpower have been committed
5. **Regulation-compliant** – the proposed solution should be compliant with existing licensing requirements

After a rigorous selection process, the Pilot Programme officially commenced in May 2023, with 16 firms having been selected to take part in the first round of the pilots. At the time of writing, these firms are in the process of conducting 14 pilots covering six categories of potential use cases, namely full-fledged payments, programmable payments, offline payments, tokenised deposits, settlement of Web3 transactions, and settlement of tokenised assets.

Some of these firms are also leveraging the e-HKD sandbox, a technical platform provided by the HKMA in partnership with the Hong Kong Applied Science and Technology Research Institute, to trial their innovative use cases with a limited number of participants, with the goal of identifying and addressing potential design challenges, as well as gaining practical experience.

The key takeaways of this first round of 14 pilots will be shared with the public later this year. In the near future, it is expected that more rounds of pilots will be conducted with the industry.

Continuing the e-HKD journey with an open mind

The HKMA embarked on the challenging and hugely complex e-HKD journey two years ago. We have reached some important milestones, kept pace with the latest international developments, and continued to press on into uncharted territory. Similar to other central banks that are also studying retail CBDC, the HKMA is still exploring, experimenting, and learning. As we pursue our e-HKD journey in the coming years, we will continue to work closely with the industry and academia, while adopting a welcoming attitude to innovative ideas with the aim of achieving solutions that benefit the public good worldwide.