



Australian CBDC Pilot for Digital Finance Innovation

White Paper

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Table of Contents

Introduction	3
Reserve Bank of Australia	3
Digital Finance CRC	3
Context	4
Research Project	5
Research Questions	5
Research Data Gathering	5
Indicative Project Timelines	6
Outputs & Outcomes	6
Scope Exclusions & Constraints	6
Project Ecosystem	7
Pilot CBDC: eAUD	8
eAUD Platform Technology	8
eAUD Use Case Platforms	8
Business Functions	9
eAUD Holding Structures	10
Privacy	11
eAUD Distribution & Redemption	11
Industry Participation	12
Why Participate?	12
Use Case Providers & Engagement	12
CBDC Capabilities in Use Cases	12
Use Case Design Workshops	12
Compliance Assessment	13
Pilot Engagement & Contracts	14
Costs	14
Use Case Submissions/Expressions of Interest	14
Resources	14



Introduction

This document has been prepared by the Digital Finance Cooperative Research Centre (DFCRC) in conjunction with the Reserve Bank of Australia (RBA). It describes a joint research project to explore use cases for a central bank digital currency (CBDC) and invites engagement by interested industry participants. The project is overseen by a Steering Committee consisting of senior representatives of the RBA, DFCRC and the Australian Treasury.

The paper describes relevant aspects of the project as currently proposed by the Steering Committee. However these may be subject to further consideration and change over the course of the project.

Reserve Bank of Australia

The RBA is Australia's central bank. Its duty is to contribute to the stability of the currency, full employment and the prosperity and welfare of the Australian people. It does this by conducting monetary policy to meet an agreed inflation target, works to maintain a stable financial system, acts as banker to the Australian Government, regulates the payments system and issues the nation's currency.

Over the past few years, the RBA has been exploring whether there is a role for a CBDC in Australia in the context of the RBA's responsibilities for issuing the currency and overseeing the development of the payments system.¹ The RBA is an industry partner of the DFCRC, and is using its involvement to support its research on CBDC.

Digital Finance CRC

The DFCRC is a 10-year, \$180 million research program funded by industry partners, universities and the Australian Government, through the Cooperative Research Centres Program. The DFCRC's mission is to bring together stakeholders in the finance industry, academia and regulatory sectors to develop and harness the opportunities arising from the next transformation of financial markets – the digitisation of assets that can be traded and exchanged directly and in real-time on digital platforms.

1. See: <https://www.rba.gov.au/payments-and-infrastructure/central-bank-digital-currency/>



Context

Activity and innovation in digital finance suggests new business models might emerge in a tokenised ecosystem. Central banks are working to understand the role of value transfer in these emerging digital economies, because of their role in the issuance of money, maintaining the stability of the financial system, and supporting the development of the payments system.

In this context, central banks globally are actively exploring the potential role, benefits, risks, and other implications of CBDC. This has involved the publication of discussion papers, public consultations, and the development of proofs of concept and CBDC pilots involving real financial transactions. A small number of jurisdictions have issued or are planning to issue CBDC.

An issue that has received less research attention to date, particularly for countries with modern and well-functioning payments infrastructure like Australia, is the rationale for CBDC, specifically the potential economic benefits of introducing one.

Prior work by the RBA suggested there was not yet a compelling case for issuance of a ‘retail’ CBDC in Australia.² However, a proof of concept of a CBDC developed as part of Project Atom

demonstrated the potential for a ‘wholesale’ CBDC and asset tokenisation to improve efficiency, risk management and innovation in wholesale financial market transactions.³ The RBA was also involved in Project Dunbar with the BIS Innovation Hub and a number of other central banks, which indicated that enabling financial institutions to directly hold and transact in CBDCs from different jurisdictions on a shared platform could reduce the reliance on intermediaries and, correspondingly, the costs and time taken to process cross-border transactions.⁴ The RBA has also indicated that it is worth considering whether appropriately regulated privately issued stablecoins could play a role in the future in supporting transactions in a tokenised economy.⁵

The RBA’s research into CBDC does not reflect any intention to discontinue access to physical cash. The RBA is committed to ensuring Australians continue to have good access to physical cash for as long as people need or want to use it.

2. Richards, T., Thompson, C. and Dark, C. (2020) *Retail Central Bank Digital Currency: Design Considerations, Rationales and Implications*. In “Bulletin”, Reserve Bank of Australia, September 2020.

3. Reserve Bank of Australia (2021a) “*Project Atom: Exploring a wholesale CBDC for syndicated lending*”, RBA, December 2021.

4. Reserve Bank of Australia (2022) “*Project Dunbar: International Settlements using Multi-CBDCs*”, BIS, March 2022.

5. Reserve Bank of Australia (2021b) “*Payments: The Future?*”. Speech by RBA Governor Philip Lowe on 9 December 2021 to Australian Payments Network Summit.



Research Project

The purpose of the CBDC pilot project outlined in this paper is to explore innovative use cases and business models that could be supported by the issuance of a CBDC. The project will also be an opportunity to further understanding of some of the technological, legal and regulatory considerations associated with a CBDC. The project commenced in July 2022 and is expected to be completed around the middle of 2023.

The project intends to test a general-purpose pilot CBDC issued as a liability of the RBA for use in real-world, pilot implementations of services offered by Australian industry participants.⁶ Any compelling use case - whether so-called 'wholesale' or 'retail' - will be explored in the project.

All use case proposals submitted by industry participants will be used to inform assessments of the rationale for an Australian CBDC. A limited number of these use cases will also be selected for operation within the CBDC pilot project infrastructure.

The design of the project is intended to be minimally prescriptive - both in the kind of CBDC model assumed, and in the kind of use cases explored. The project is seeking to facilitate ideation and innovation in use cases, and in turn use those results to better understand the case for introducing a CBDC in Australia.

Participation in the project is invited from a broad range of stakeholders, including financial institutions, fintechs, public sector agencies, and technology providers, on use cases of value to them. The RBA and DFCRC are engaged with regulators, such as ASIC and AUSTRAC, to work through regulatory implications as they arise.

Research Questions

An initial set of research questions to be addressed by the project are:

01. What, if any, are the emerging business models and use cases that a CBDC would support, that are not effectively supported by existing payments and settlement infrastructures in Australia?
02. What might be the potential economic benefits of issuing a CBDC in Australia?
03. What operational, technology, policy and regulatory issues might need to be addressed in the operation of a CBDC in Australia?

Research Data Gathering

To support the research aims of the project, data will be gathered from industry participants on their submissions of use cases for CBDC, as well as those use cases that are proposed to be built and operated as part of the pilot project. While only a subset of use cases will be able to be piloted, the project hopes to analyse a much larger and broader variety of use cases for their scope to deliver public benefits.

6. It is not intended that the pilot CBDC will constitute legal tender for the purposes of Part V of the Reserve Bank Act 1959 (Cth) or Australian currency for the purposes of the Currency Act 1965 (Cth).

Indicative Project Timelines

The CBDC pilot project consists of several milestones, with indicative timing set out in Table 1, subject to satisfactory industry engagement and implementation of the pilot CBDC platform.

CBDC pilot project timeline		
1.	Publish White Paper to describe project and invite submissions	Sep 2022
2.	Engage with industry participants on pilot CBDC design and usage	Sep – Oct 2022
3.	Deadline for receipt of expressions of interest	31 Oct 2022
4.	Enable selected participants to test use cases on the CBDC platform	Nov 2022
5.	Announce selected use cases for pilot CBDC	Dec 2022
6.	Conduct CBDC pilot and operate selected use cases	Jan – Apr 2023
7.	Shut down CBDC pilot platform	Apr 2023
8.	Publish report with findings	Around the middle of 2023

Table 1: Indicative Project Timelines

Outputs & Outcomes

The key objectives of the project are to identify and understand innovative business models, use cases, benefits, risks, and operational models for a CBDC in Australia. It is expected that industry participants will benefit from testing business models and use cases for CBDC, potentially involving their clients. A report on the findings, including an assessment of the various use cases developed, will be published at the conclusion of the project. These findings will contribute to ongoing research into the desirability and feasibility of a CBDC in Australia.

Scope Exclusions & Constraints

The CBDC pilot project has a domestic focus in terms of participants and use cases.

The project is not evaluating the technology most suited to operating a CBDC. The CBDC pilot platform to be implemented is designed to be adequate for the use cases selected but is not intended to reflect the kind of technology that might be used to implement a CBDC, if a decision was ever made to do so.

This is a limited-time project, during which the pilot CBDC may be utilised by approved participants on a private, permissioned ledger. At the end of the project, all pilot CBDC will be required to be redeemed. The project implies no commitment from the RBA to issue a CBDC at the end of the project, or at any future time.



Project Ecosystem

The DFCRC will implement the pilot CBDC platform, with the RBA responsible for issuance and redemption of the pilot CBDC and other oversight and regulatory functions. This will be a stand-alone platform solely for the issuance and transactional operation of the pilot CBDC.

Use case providers will be industry participants responsible for the design and operation of their own technical platforms to implement their approved use case applications in the project. Note that use case providers will not be permitted to deploy any code or smart contracts on the pilot CBDC platform.

KYC providers will attest that holders of pilot CBDC have been identity-verified via an interface into the pilot CBDC platform. Use case providers may also act as KYC providers for their own end users.

The pilot CBDC platform will offer interfaces for use case provider platforms to conduct approved functions. This project ecosystem is depicted in Figure 1.

PROJECT ECOSYSTEM

Use Case Platform(s)

- Developed & operated by use case providers for end users
- Integrated with Pilot CBDC Platform via privacy gateway
- Must KYC end users (directly or via third party KYC provider)

Pilot CBDC Platform

- Implemented by DFCRC, operated by RBA
- Restricts access to approved participants
- Private Ethereum (Quorum)
- JSON-RPC APIs, Smart Contract (ERC-20) Interfaces

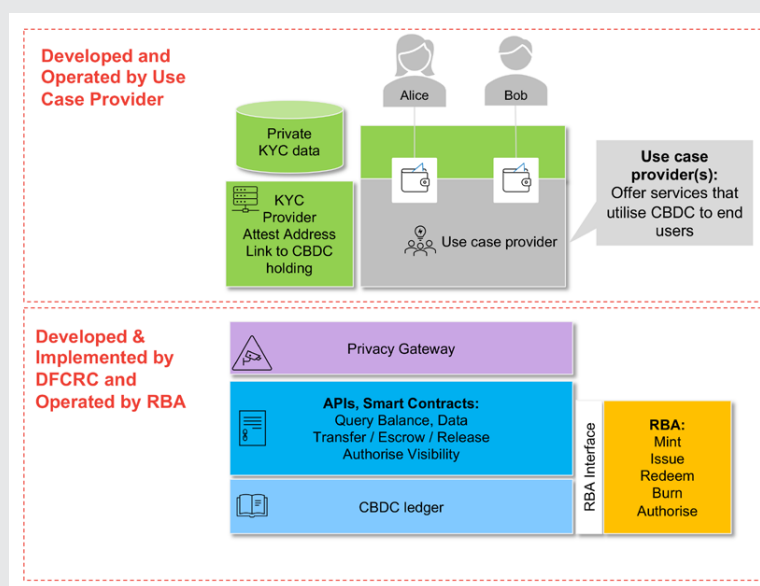
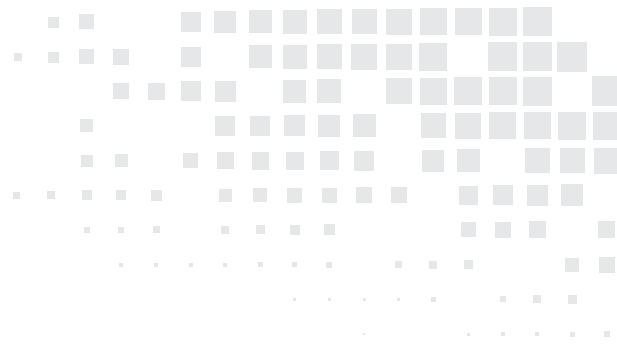


Figure 1: Project Ecosystem



Pilot CBDC: eAUD

To support the research aims of the project, the pilot CBDC is intended to have the following attributes and constraints:

- 01.** The pilot CBDC will be called the eAUD.
- 02.** The eAUD will be a liability of the RBA and denominated in Australian dollars. The smallest denomination will be one cent.
- 03.** The amount of eAUD issued will be capped at an amount to be determined by the RBA considering the requirements of selected use case providers
- 04.** No interest will be paid by the RBA on any holdings of eAUD.
- 05.** Only Australian-registered entities and Australian resident individuals may hold eAUD.
- 06.** All (end user) holders of eAUD will need to be invited for participation in the project by an approved use case provider.
- 07.** All holders of eAUD will need to be identity-validated by their use case provider or an approved KYC (know-your-customer) service provider.
- 08.** eAUD will be able to be held in both a 'custodial' wallet (provided by a use case provider) or a 'non-custodial' wallet directly by the end user.

eAUD Platform Technology

The DFCRC will develop and install the eAUD platform as a private, permissioned Ethereum (Quorum) implementation. The eAUD ledger will operate as a centralised platform, under the management and oversight of the RBA.

Approved use case providers will be able to access and interact with the eAUD platform via specified Application Programming Interfaces (APIs) and ERC-20 smart contract interface functions. These interface specifications, as well as a platform for testing, will be provided separately, only to selected use case providers.

The API will offer additional functions to manage and support the privacy of user data.

The eAUD platform will have technical capabilities for security, reliability and performance sufficient to support the operation of pilot use cases. Whitelisting and firewall rules will be used to restrict access to the eAUD platform. The eAUD platform will have transaction throughput limits (with 2-5 second latency) that are not expected to impact the operation of use cases selected for the pilot project

The choice of technology for this project does not reflect any view that any eventual CBDC would be blockchain-based or that Ethereum would necessarily be an appropriate choice for a production system. Rather, it was chosen as a widely used and well-understood platform that would facilitate participation in the project by a wide range of entities.

eAUD Use Case Platforms

The design approach is that the pilot CBDC platform will only manage eAUD balances and transactions, and that the use case functionality and end users' KYC data is held on separate platforms developed and operated by selected use case providers.



Use case providers will need to test and integrate their use case platforms into the eAUD platform, with some limited support provided by the DFCRC team.

Use case providers will interface with the eAUD platform to transfer pilot CBDC or invoke smart contracts. They will need to conduct an identity validation (KYC) of all their own end users (or utilise an approved KYC service provider to do so). They will be responsible for all end user support and other regulatory compliance as required for their use case.

White-listing and firewall rules will limit access to the eAUD platform to approved use case providers and their authorised end users.

The eAUD platform is intended to be agnostic to the technologies and networks that use case providers use to interact with it. Pilot use cases may be implemented on traditional technology platforms, or public or private Distributed Ledger Technology (DLT) platforms, as may best suit the use case and provider preferences.

Business Functions

The minimum functional capabilities of the eAUD platform (and who performs the functions) are intended to be as follows:

- **RBA:** Mint, issue, redeem and burn eAUD; Authorise roles in ecosystem.
- **Use case provider:** Inquire on eAUD balances and transactions; transfer, escrow/release eAUD; conduct ERC-20 functions (see box); authorise visibility of use case end user holdings to pilot participants. (These functions are available to self-custodial end users as well - exercised, in practice, via their use case providers).
- **KYC provider:** Attest holding on eAUD ledger that they have validated the identity of the holder and linked it to the holding address. (Use case providers can also perform the role of KYC provider).

In addition to the business functions outlined above, the RBA will also have additional capabilities to observe, transfer and seize eAUD where necessary to meet any regulatory or compliance requirements that may arise.

ERC-20 Functions

ERC-20 is a widely used industry standard for fungible tokens on the Ethereum platform. This standard defines an API which supports a number of common functions including:

- transfer tokens from one account to another.
- get the current token balance of an account.
- get the total supply of the token available on the network.
- approve whether an amount of token from an account can be spent by a third-party account.

eAUD Holding Structures

Three different structures for holding eAUD may be supported, subject to use-case requirements, as depicted in Figure 2.

- 01.** A direct liability of the RBA to the eAUD end user, represented by an **individual** holding of eAUD on the CBDC ledger by an end user, where the end user also has control of the private key to access their holdings.
- 02.** Direct liability of RBA to end user, with **individual** holdings on the CBDC ledger by end users, controlled by a use case provider on behalf of the end users.⁷
- 03.** Direct liability of RBA to a use case provider, who holds a **commingled pool** of eAUD on behalf of end users. End users have an indirect claim on the eAUD.

eAUD: HOLDING STRUCTURES

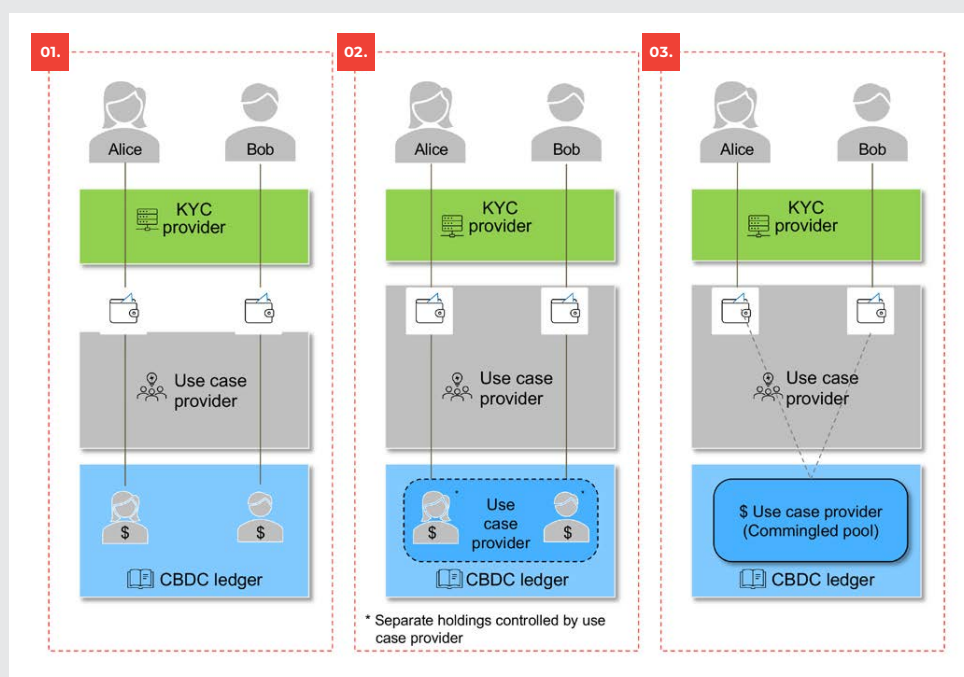


Figure 2: Holding structures for eAUD

The rationale for these different structures is to support the widest range of possible use cases and avoid constraining use case ideas through design. The usage of the eAUD ledger in practice will depend on the design of the use case platform and the representation of eAUD, or rights in relation to eAUD, by use case providers to their own end users.

⁷ The use case provider will have control (custody) of the private keys that access the eAUD holdings of each end user, but the end users will remain the beneficial owners of the eAUD.

Privacy

The eAUD platform is implemented on a private, permissioned instance of Ethereum. It does not store end user KYC information, which is managed by KYC service providers or use case providers on separate platforms.

The privacy models supported are depicted in Figure 3. The platform will allow use case providers to offer end users a model of data privacy in which transactions and balances are not visible to other end users and use case providers. Use case providers will have the option to grant visibility to such entities, if it enhances the value delivered by the use case. For the purposes of the pilot, the RBA will in all instances have visibility over transaction values and account balances, though not the underlying identity of eAUD holders, which is held by the use case provider and/or KYC provider.

eAUD: PRIVACY MODELS

The eAUD ledger is private and permissioned, with no KYC data.

A	A fully-private option offers visibility to end users of use case providers of only their own balances and data.
B	A semi-private option enables use case providers to offer visibility of balances and data to end users of other use cases (if helpful).

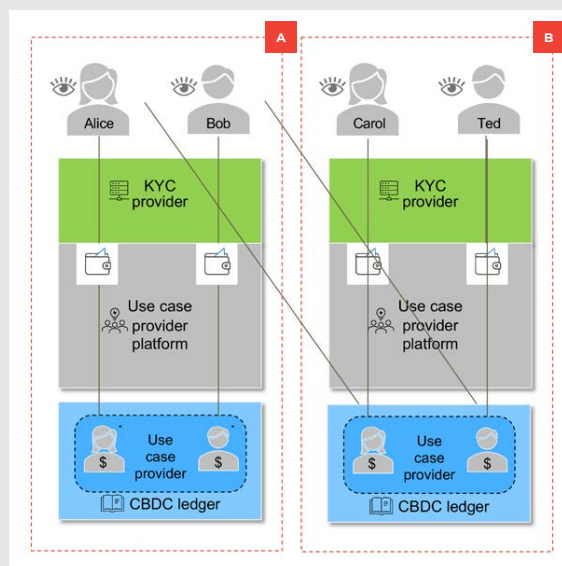


Figure 3: Privacy options for eAUD

eAUD Distribution & Redemption

The RBA will mint and issue eAUD (against payment of the equivalent amount of Australian dollars) to approved use case providers and an eAUD Distributor. The eAUD Distributor is intended to be an entity approved by the RBA which will distribute eAUD to use case providers that are unable to receive eAUD directly from the RBA. At the conclusion of the pilot, all end users will be

required to transfer their eAUD to their use case provider, who will pay an equivalent amount in Australian dollars. Use case providers, in turn, will be required to redeem their eAUD holdings with the RBA (possibly via the eAUD Distributor). Once all outstanding eAUD has been redeemed, the RBA will burn (destroy) the eAUD. The eAUD will not exist beyond the conclusion of the pilot project.



Industry Participation

Why Participate?

The emergence of a tokenised economy and new forms of money offer the potential to deliver new economic and social value, thereby contributing to the welfare of the Australian people. The eAUD project offers an opportunity to experiment and test new business models for current and emerging markets, on a platform designed for innovation. The involvement of the RBA and key regulators offers additional support for such exploration.

Use Case Providers & Engagement

Use case providers may be existing financial institutions, public sector agencies, established businesses, fintechs, start-ups and technology providers. There may also be opportunities for different entities to collaborate on use case proposals.

All participants will be consulted on their proposed use cases, and the attributes of CBDC important to their use cases.

A number of use case providers will be given access to the eAUD platform to test and demonstrate their use cases without eAUD. A smaller number will be selected to operate their use cases with eAUD in a live pilot environment.

CBDC Capabilities in Use Cases

We expect that the eAUD will offer new capabilities to be leveraged for cost, speed or quality outcomes, for example:

- Atomic settlement of transactions involving tokenised assets
- Multi-party or syndicated transactions
- Escrowed transactions
- Enabling conditional or programmable transactions
- As a verifiable reserve asset to reduce counterparty risks
- 24x7 operations

We invite new ideas for the use of CBDC that may offer substantial improvements over existing payments and settlements infrastructure.

Use Case Design Workshops

The pilot project team will assess Expressions of Interest to select a shortlist of use case pilots, via the process indicated in Figure 4. Selection considerations will include:

- Merits of the use case in terms of how it leverages the pilot CBDC capabilities
- Economic or social impact of the use case, including potential benefits and costs
- Clarity of success criteria and their ability to be tested in the pilot
- Compliance with legal and regulatory obligations or the ability to obtain necessary exemptions
- Ability of use case provider to build, implement and conduct pilot within project timeframes

Selected participants will be invited to dedicated workshops with the project team to flesh out their proposals and use case platform design and refine integration with the eAUD platform. After a regulatory assessment, selected providers can confirm their participation in the pilot.

USE CASE DESIGN & ENGAGEMENT PROCESS

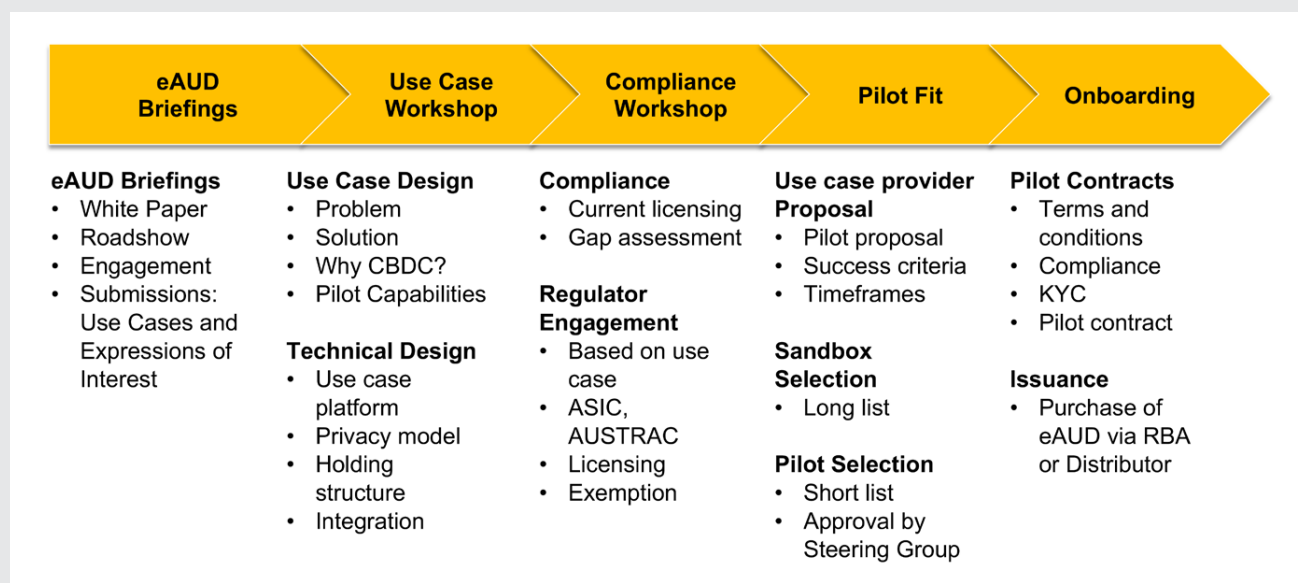



Figure 4: Use case design and engagement process.

Compliance Assessment

It is a prerequisite for participation in the pilot that use cases comply with all relevant laws and that relevant parties hold all necessary licences and permits. Use case providers who are short-listed to participate in the pilot will therefore need to assess their use case against current regulatory requirements and their own licensing and compliance status. For example, use case providers should consider whether their conduct will involve the provision of financial services. These assessments will in many cases require use case providers to seek independent legal advice.

Short-listed participants will at some stage be asked to contact relevant regulators, such as ASIC, to confirm their ability to operate the proposed use case under the law. At this point it will also be open to use case providers to discuss the possibility of an exemption from, or modification of, some regulatory requirements. The provision of any such exemption or modification will depend upon the circumstances of the specific use case. Any such exemption or modification will be limited to the purposes of this pilot. The RBA and DFCRC are also engaged with AUSTRAC to explore options for streamlining any necessary regulatory requirements under the anti-money laundering and counter-terrorism financing legislation.



Any exemption, modification or other form of support provided by any regulatory body or DFCRC does not constitute an endorsement or approval of any entity or business model and should not be the subject of any representation to that effect.

Any exemption, modification or other form of support provided by any regulatory body would not, in any case, be an indication that the same or similar relief would be available for activities provided under the use case outside the pilot.

Pilot Engagement & Contracts

Selected use case providers will be required to execute a CBDC Pilot Engagement Agreement (and any other necessary contracts) to cover the terms and conditions of their participation in the pilot.

Costs

Pilot participants will bear their own costs for the conception, design, development, implementation and piloting of use cases, if selected. Each of DFCRC and the RBA is under no obligation to select any proposed use case for the pilot nor to support implementation or conduct of the pilot by participants.

Use Case Submissions/Expressions of Interest

The DFCRC invites submissions from industry participants of (a) use cases that utilise CBDC and (b) expressions of interest to operate their use case in the CBDC pilot project. These submissions and information from subsequent engagements will be utilised for research purposes by the DFCRC, RBA and Treasury, and may be shared with other relevant regulators. Conclusions and summaries may be published in the public research report, but participating organisations will not be identified without their written permission.

Resources

To make a submission and for additional information and resources as they are made available, please visit:

<https://dfcrc.com.au/cbdc>





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