

6.11.6 Understanding Gas Implications

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The OMG members recommend the Federal Reserve invest [Research Development Test & Evaluation \(RDT&E\) Funding](#) in developing and perfecting the concept of [Gas](#) that is a measurement roughly equivalent to computational steps (for Ethereum). Every transaction is required to include a gas limit and a fee that it is willing to pay per gas; miners have the choice of including the transaction and collecting the fee or not. Every operation has a gas expenditure; for most operations, it is ~3-10, although some expensive operations have expenditures up to 700 and a transaction itself has an expenditure of 21000.

For an explanation of what Gas is, how Gas price is determined for processing and for Data Storage, and a detailed example of how the actual costs are calculated, see the OMG DDO-RA section on [Understanding Gas](#). Although these numbers represent an Ethereum Proof-of-Work (PoW) paradigm from 2017 rather than a Proof-of-Stake (PoS) currently used by Ethereum, the problems associated with Gas needs to be researched before decisions can be made to move forward. The multiplication factors of using a product like Ethereum's for a U.S. CBDC and eventually a GCBDC could be staggering.

In order to successfully operate the U.S. CBDC based on Cryptocurrencies, even if they are [Stablecoins](#), it is important to determine if Gas is necessary and if so how much it will cost and who will pick up the cost of processing. Based on the example provided in the DDO-RA on Gas costs on PoW Ethereum, the cost is about is approximately 40 Million to 400 Million times more expensive than using a centralized server-based solution such as [Amazon Web Services \(AWS\)](#).

There are some high profile CBDCs (see Table 1) that are underway, ad these need to be analyzed for applicability to a U.S. CBDC.

Table 1: high profile CBDCs and CBDC Efforts.¹⁾

Country/Region	Currency Name	Description
Bahamas	Sand Dollar	The Sand Dollar was issued by the Central Bank of the Bahamas in October 2020. It was the first nationwide CBDC in the world. In the Bahamas, parts of the population can't access financial services as it's not profitable for commercial actors to operate in all areas in part due to the country's geography as it's split up into many different islands. As a result, 20 percent of the population is estimated to not have a bank account. It is hoped that the Sand Dollar can help improve financial inclusion and strengthen security against money laundering and illicit economic activities.

Country/Region	Currency Name	Description
Nigeria	eNaira	Nigeria became the first country in Africa to launch a CBDC last October. The eNaira is stored in a digital wallet and can be used for contactless in-store payments, as well as for transferring money. By the end of January 2021, the eNaira wallet had received almost 700,000 downloads. Nigeria's population is around 219 million. According to the Nigerian media outlet Stears Business, 90 percent of Nigerians have mobile phones, but only 10-20 percent use a smartphone, which is needed to use the eNaira. To access the eNaira, the user must also have a national identification number (NIN). This has led to criticism. Proponents of CBDCs say they are to reach out to people who don't have a bank account. However, critics say there will be an overlap between those without bank accounts and those without a NIN or smartphone.
Eastern Caribbean Currency Union	DCash	Countries in the Eastern Caribbean Union created their own form of digital currency meant to help speed transactions and serve people without bank accounts. The seven countries involved are Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Vincent, and the Grenadines. Anguilla was the only country in the union that opted out. The Eastern Caribbean Central Bank said "DCash" is the first such blockchain-based currency introduced by any of the world's currency unions, though some individual nations have similar existing systems. The system allows users even without bank accounts - but with a smartphone - to use a downloaded app and make payments via a QR code. Those without bank accounts would go to a previously approved agent or non-banking financial institution who would verify a person's information and then approve a DCash wallet.
Sweden	e-krona	Sweden is undertaking to test of a digital currency that has been dubbed the e-krona. There are plans for the testing to advance from simulated participants to a testing environment with external participants. Sweden's Riksbank has developed a proof of concept and is exploring the technology and policy implications of CBDC. One of the key targets of the project is to ensure broad access to the e-krona in the future. It wants to safeguard the elderly and people with certain disabilities to make sure they aren't adversely affected in a cashless society.
China	e-CNY	China became the world's first major economy to pilot a digital currency in April 2020. The People's Bank of China is aiming for widespread domestic use of the e-CNY, or digital yuan, in 2022. It currently has more than a hundred million individual users and billions of yuan in transactions, according to the IMF. The country is currently providing digital yuan payment services to visitors of the Beijing Winter Olympics which kicked off last week. Visitors are able to download the digital yuan wallet app or store the money on a physical card.

Country/Region	Currency Name	Description
Jamaica	JAM-DEX	Jamaica's prime minister Andrew Holness confirmed that the Bank of Jamaica will roll out a digital Jamaican dollar in 2022 following a successful pilot last year. "This will serve as a foundation for Jamaica's digital payments architecture and will facilitate greater financial inclusion, increase transaction velocity while reducing the cost of banking for the Jamaican people," he said on Thursday. As part of the test project, J\$230 million (€1.28 million) worth of digital currency was minted. 57 customers conducted person-to-person, cash-in, and cash-out transactions and this included transactions with small businesses such as a local craft jeweler. The Bank of Jamaica will roll out our own digital Jamaican dollar in 2022 after a successful pilot during 2021. – Andrew Holness (@AndrewHolnessJM) February 10, 2022
Ukraine	e-hryvnia	The National Bank of Ukraine has been exploring the possibility of issuing a national digital currency since 2016. Now the country is preparing a pilot test of its own CBDC. The upcoming pilot "will serve as a technological basis for the issuance of electronic money, and is the next key step to advance innovation of payment and financial infrastructure in Ukraine," said Oleksandr Bornyakov, Ukraine's deputy minister of digital transformation in a statement.
India	digital rupee	India is set to launch a state-backed digital currency by next year, the government announced last week. The "digital rupee" will be based on blockchain technology and is expected to be up and running by the end of March 2023. It will be backed by the Reserve Bank of India. The Indian minister for finance Nirmala Sitharaman said the digital currency would provide a "big boost" to the digital economy and it would also lead to a more efficient and less costly currency management system.
Eurozone	digital Euro	The European Central Bank (ECB) announced last July that it is actively looking into creating a digital version of the euro. "Our work aims to ensure that in the digital age citizens and firms continue to have access to the safest form of money, central bank money," Christine Lagarde, the president of the ECB, said at the time. As the currency's custodian, the ECB has been closely watching the rise of private cryptocurrencies like Bitcoin as the COVID-19 pandemic accelerates a shift away from cash. The European Commission announced on Wednesday that a bill for a digital euro will be proposed in 2023. The ECB will continue work to develop its digital euro in the meantime.

1)

Ian Smith, Central Bank Digital Currencies: Which countries are using, launching or piloting CBDCs?, Euronews, 8 March 2022, Accessed: 19 May 2022, <https://www.euronews.com/next/2022/03/09/cbdcs-these-are-the-countries-are-using-launching-or-piloting-their-own-digital-currencies>

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