

# Cryptocurrency and the distributed digital economy in Australia

10 December 2021



# Contents

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- 1 Key messages
- 2 Introduction and context
- 3 Understanding cryptocurrencies and the digital asset ecosystem
- 4 The future of digital assets in the Australian economy
- 5 Appendix: Our approach and supporting documentation

# Key messages: Developing Australia's cryptocurrency and distributed digital economy potential

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## Embracing a more frictionless, dispersed and peer-to-peer economy

- ▶ Many of our economic relationships are reorganising into widely distributed peer-to-peer connections across networks – radically changing the way we communicate, work and consume.
- ▶ In line with this rewiring, cryptocurrencies and related forms of digital assets are rapidly emerging as a fundamental element of our future economy.
- ▶ These blockchain-enabled financial instruments can make payments cheaper and faster, open up new forms of ownership and asset classes, and spur investment in crypto related infrastructure.

## The digital assets market is diverse and expanding

- ▶ New applications for crypto technologies are continually growing with broadscale potential in key areas like:
  - **Cryptocurrencies** – Expansion in the development, investment holding and mining of new digital currencies.
  - **Stablecoins** – Ongoing development of low volatility cryptocurrency to improve their attractiveness as a method of payment.
  - **NFTs** – Creating unique digital assets such as art, patents and property deeds so that they may be traded securely.
  - **DeFi** – Expanding decentralised finance and associated services, without reliance on central intermediaries or institutions.
  - **Web 3.0** – Building out a new version of the internet which focuses on connecting data in a decentralised way, rather than having it stored in centralised repositories.
  - **DAOs** – Emerging forms of corporate governance enabling democratised decision making in which enterprises can operate across borders in a highly distributed manner.

## Unlocking economic and strategic value for Australia

- ▶ Australia has traditionally been a strong adopter of digital innovation. Businesses in all industries are configuring blockchain and digital asset technologies to generate value and reduce transaction costs.
- ▶ Already digital asset related activities are contributing \$2.1 billion to the Australian economy and employing around 11,600 workers. But this is set to significantly expand over the next decade.
- ▶ Under the right policy settings and accelerated adoption, Australia's digital asset economy could grow to \$68.4 billion in 2030 – about 2.6% to the national economy – and employ around 206,000 workers. This step-change growth trajectory reflects the mainstreaming of cryptocurrency and other digital assets within the Australian economy.

## Australia's potential as a leader in cryptocurrency and distributed digital activities needs supporting regulatory frameworks

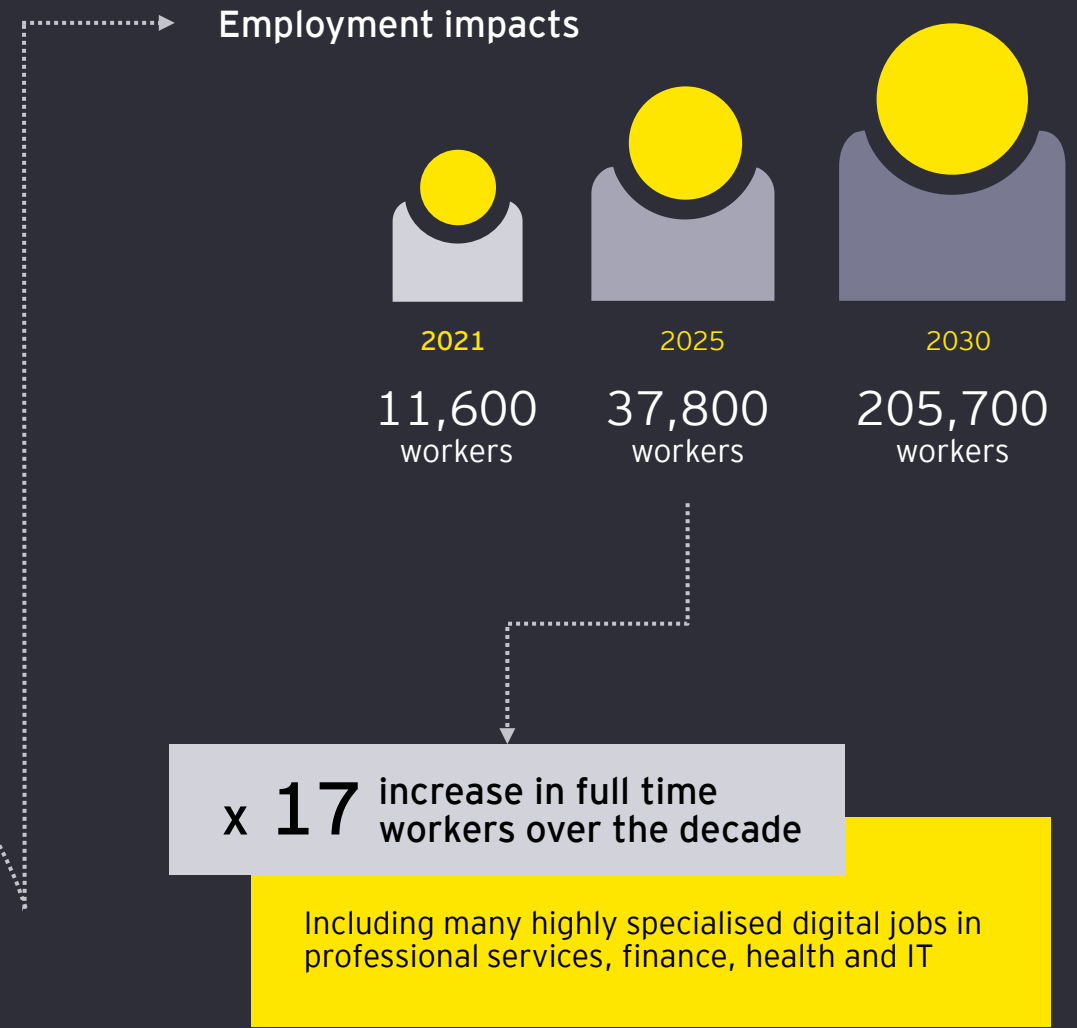
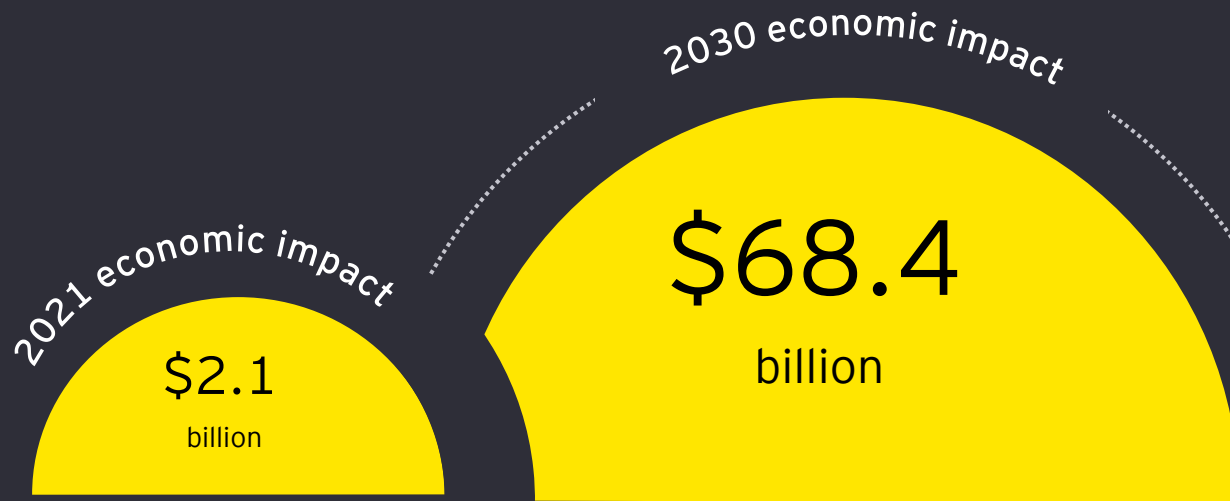
- ▶ Like many rapidly growing technologies, developments in the digital asset space may outpace public policy and regulatory settings.
  - As many of these services and function are novel and can occur outside of sovereign boundaries, there are legitimate concerns about investor protection, market integrity and law enforcement.
- ▶ Australia does not yet have fit-for-purpose regulatory systems to promote certainty for new businesses, investors and consumers in the digital asset space.
- ▶ Well-designed standards and regulation will be needed to drive innovation while managing unfamiliar services and providing proper safeguards. This will be pivotal to unlocking benefits to businesses and consumers to flourish as financial markets become more dispersed, more digital and more crypto-intensive.

# Cryptocurrencies and related digital assets will help shape Australia's future economy

## A SNAPSHOT OF THE POTENTIAL IMPACTS

There is potential for the sector's economic footprint to increase more than 30 times over the decade.

Stronger cryptocurrency and digital asset deployment could lead to significant productivity gains, helping to grow Australia's economy and make our workforce more efficient.



# Introduction and context

# Introduction

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The growth of Australia's technology, finance and digital asset sectors are key to driving the performance of the Australian economy, especially as economic activities become more globalised and connected. There is significant potential going forward to maximise innovation in these strategic sectors.

EY has been engaged by Mawson Infrastructure Group to examine the economic impact of Australia's cryptocurrency and digital asset sector. This report sets out the current state of the sector, an overview of the ecosystem and estimated economic impacts of future growth. Overall, the analysis finds that the cryptocurrency and digital asset sector is expected to provide significant economic benefits to the Australian economy moving forward.

## What is the digital asset industry and how does it relate to blockchain technology?

Australia's digital asset industry includes **cryptocurrencies** and other **emerging digital assets**. These assets rely on blockchain enabled technologies to support transactions.

Blockchain technology facilitates direct trade between parties on a decentralised public or private network.

Each cryptocurrency has its own digital ledger where transactions are recorded as 'blocks' and are connected to the 'chain' of previous transactions.

Each new block is secured to the chain of previous transactions by cryptographical, mathematical algorithms known as hash functions that are incorruptible and entirely transparent.

These characteristics allow cryptocurrency to be traded peer-to-peer without the involvement of intermediaries such as banks or government.

## Demonstrated benefits of blockchain technology, cryptocurrency and digital assets

### 1 Transparency & Trust

Crypto-asset digital ledgers are universally transparent and traceable, facilitating trust between parties to an exchange.

### 2 Security

Cryptocurrencies are secured by incorruptible, mathematical algorithms, creating perfectly reliable transaction records that act as powerful verification mechanisms.

### 3 Ease

Exchanges may be conducted peer-to-peer, without the involvement of intermediary parties such as banks, increasing the speed and efficiency of transactions.

# Substantial uptake of digital assets globally and in the Australian economy

Innovation and competition in digital assets are pushing the frontier of markets, services and infrastructure.

Blockchain technology and cryptocurrency emerged in 2008 with the invention of bitcoin as the first cryptocurrency. Since then, blockchain technology and cryptocurrency has grown and expanded with the creation of new digital currencies, digital commerce, assets and decentralised finance.

Australia has significant potential as a growth centre for digital assets. Recognising the value of the sector to Australia's future digital economy, both the private sector and government have shown a willingness to develop and deploy new crypto and digital asset capabilities.

The rate and scale of cryptocurrency and digital asset take-up in Australia has been strong – underscoring Australia's reputation as impressive technology adopters.

Cryptocurrencies are a growing asset class. Indeed, Australians' investment in digital assets and cryptocurrency is driving substantial growth and changing the way Australians invest. Every day, more Australians are investing in cryptocurrency to diversify portfolios and generate a new source of financial return.

According to the ATO, in 2021 more than...

**600,000** people in Australia are estimated to have invested in digital assets

However, other estimates put the market penetration of cryptocurrencies even higher. According to Independent Reserve\*

The proportion of Australians who have invested or plan to invest could be in the order of

**28.8%**

This represents a significant increase from 2020, where only 18.4% of Australians invested in cryptocurrency.

According to the 2021 Senate Inquiry,

**The market value of the digital asset ecosystem globally is ~AU\$2.8 trillion, with around 221 million users worldwide.**

Global funding is up 384% on 2020. The number of deals is up 24%, and the average deal size has tripled.



# Strong opportunities to grow to cryptocurrencies and drive long-term economic value

The sector is emergent, dynamic and disruptive

There are compelling advantages around blockchain technology, cryptocurrency and digital assets, with applications that cut across many sectors. The ability to streamline transactions and reduce the need for intermediaries can boost productivity and reduce complexity across the economy.

Cryptocurrencies and related digital assets are increasingly merging into the mainstream economy and there are multiple avenues where future growth is expected. For example...

## 1 Financial services

Australian banking and international financial services companies are already involved in cryptocurrency trading. Companies like Commonwealth Bank, PayPal and Square allow customers to hold and use cryptocurrency. Other Australian banks are expected to follow.

## 2 Custody

There are strong opportunities to increase bank services using digital assets. A major advantage involves processing payments faster and bypassing the need for a third-party agency to validate transactions. Banks could provide custody services and mitigate some of the security concerns around cryptocurrency, helping to secure digital currency from theft and hacks.

## 3 Asset management

Cryptocurrency based capital funds show substantial growth potential. Cryptocurrency as an asset class is still in its early days, though is increasingly providing investors with other avenues for investment returns. Globally, there are a number of cryptocurrency hedge funds providing an access point to a portfolio of crypto assets. These hedge funds are a risk-mitigative approach to cryptocurrency investing. There is the potential to expand the number of retail investment, venture capital and hedge funds that invest in cryptocurrency.

## 4 Data management

Data management and services are expected to expand with the growth and use of digital assets. As transactions and deals increase, blockchains grow and new digital assets are created. Data requirements will also expand and push computing and storage limits. This is expected to spur innovation in data management and analytics, as well as other applications in establishing permissions, supporting smart contracts and maintaining financial databases.

## 5 Insurance for cryptocurrency

Insurance for cryptocurrencies is becoming increasingly important, reflecting the widespread economic adoption of this asset class. Concerns regarding the stability of the cryptocurrency ecosystem and the skyrocketing valuation of bitcoin and other cryptocurrencies has increased the risk of theft of online wallets and exchanges. This is opening up huge opportunities for insurers to provide additional market safeguards and risk management services.



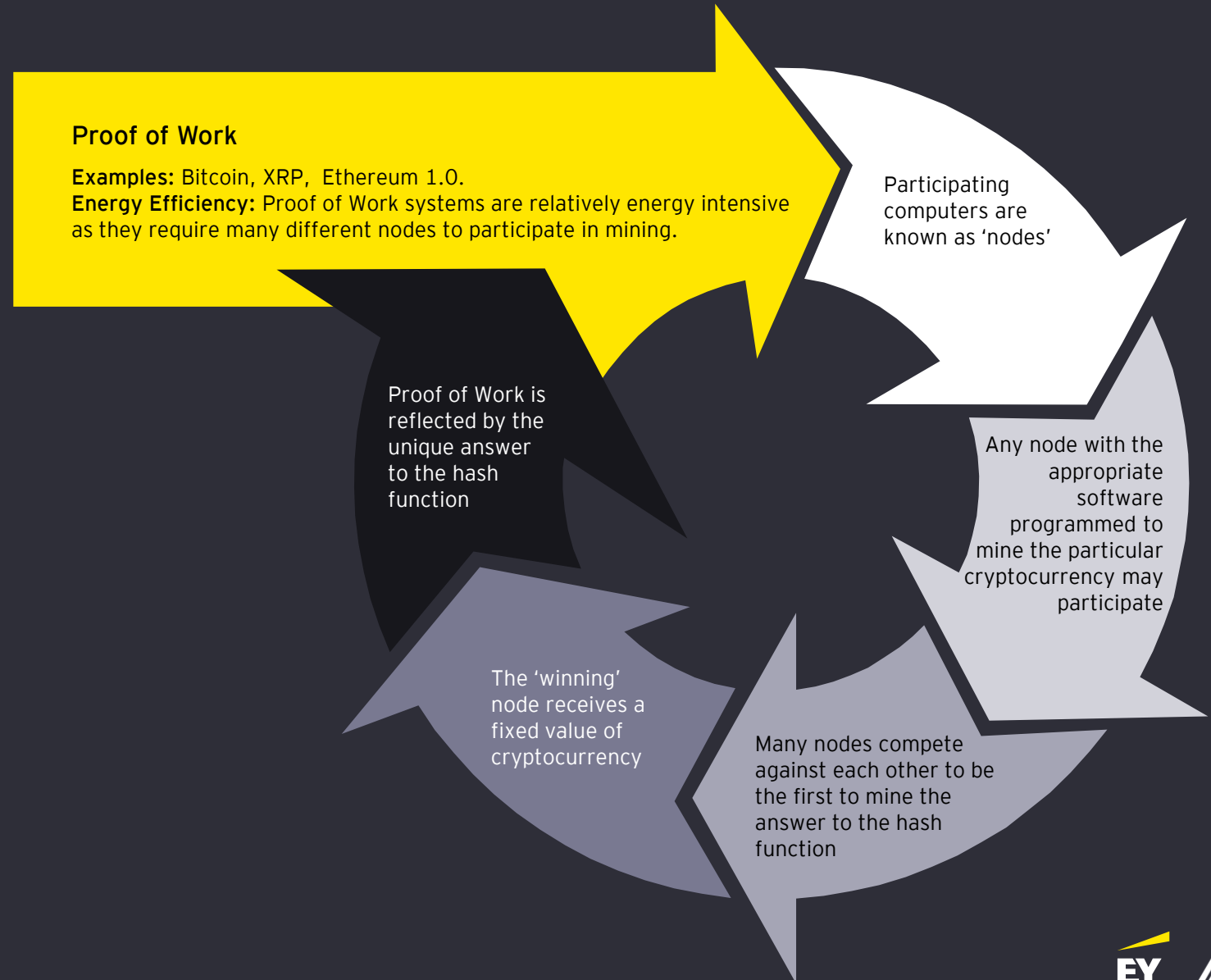
# Consensus mechanisms enable Australians to unlock new cryptocurrency rewards

Consensus mechanisms are at the heart of crypto technologies. They allow cryptocurrencies and digital assets to remain decentralised by securely extending the blockchain without the involvement of intermediaries such as banks, network payment processors or Buy Now Pay Later facilities.

The two dominant consensus mechanisms are Proof of Work and Proof of Stake. These forms of crypto-mining provide opportunities for Australian individuals and businesses to passively earn cryptocurrency.

## Proof of Work

- ▶ The world's first and largest cryptocurrency, Bitcoin, continues to use the Proof of Work consensus mechanism.
- ▶ The reward for the 'winning' a Bitcoin mining node will remain 6.25 bitcoin until 2024 when it will halve to 3.125 bitcoin.
- ▶ Currently, 900 bitcoin are mined worldwide per day meaning that at a valuation of US\$56,000 per bitcoin there is approximately US\$315 million in daily rewards absorbed by bitcoin miners worldwide.
- ▶ Currently, only 0.19% of global bitcoin mining is carried out in Australia, compared to 35.4% in the USA and 18.1% in Kazakhstan.

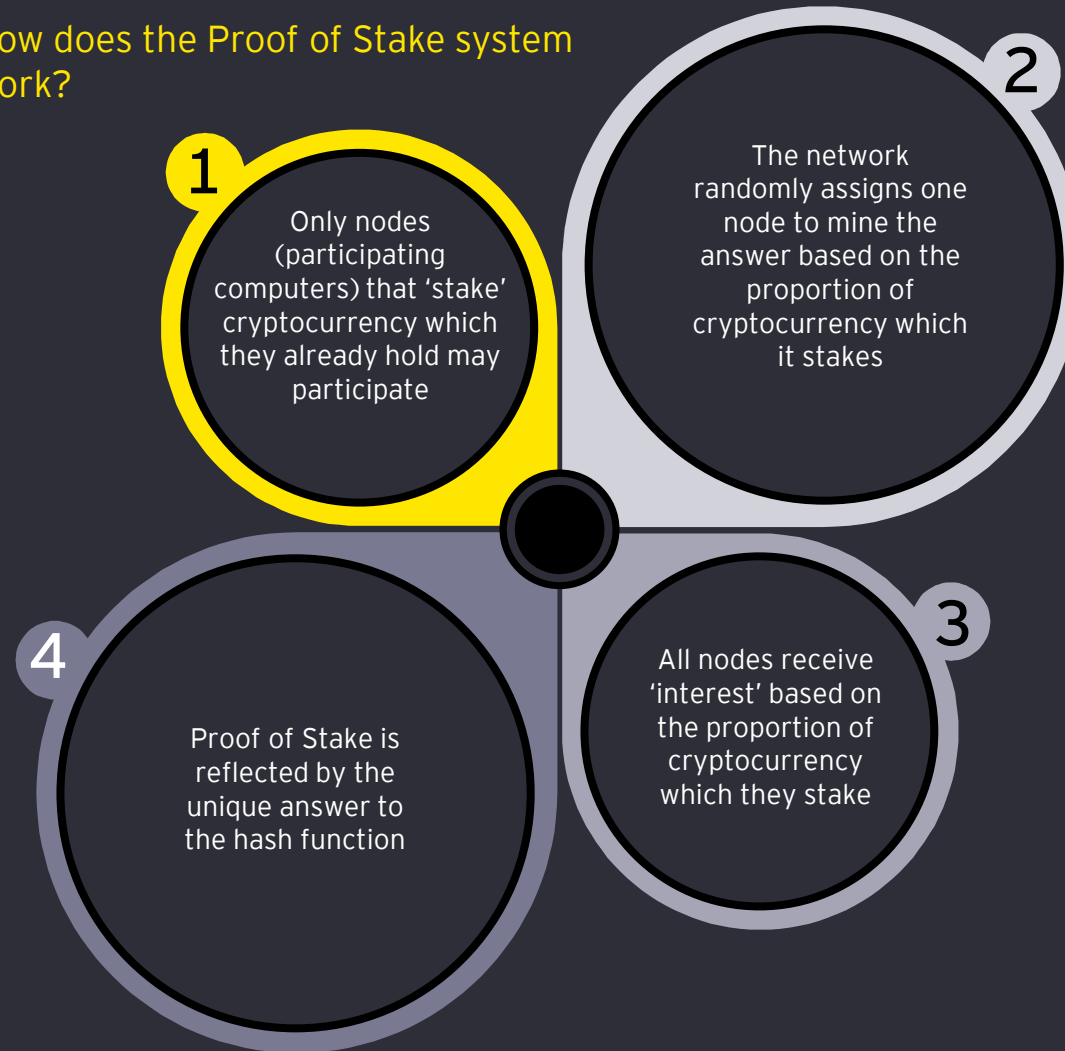


# Proof of Stake consensus mechanisms provide energy efficiency advantages

Proof of Stake also provides opportunities for individuals and businesses to earn cryptocurrency.

- ▶ Proof of Stake systems represent an innovation in Consensus Mechanism, increasing energy efficiency, as they only require one node to participate in mining.
- ▶ Three of the top ten cryptocurrencies by market capitalisation use Proof of Stake consensus mechanisms. They currently offer the following initial annualised interest rates:
  - ▶ Cardano ≈ 5.7%
  - ▶ Solana ≈ 8%
  - ▶ Polkadot ≈ 10%
- ▶ \$77 million of cryptocurrency was staked on the crypto-exchange "Swyftx" in the 12 hours after it started offering staking capabilities on November 2021.

## How does the Proof of Stake system work?



## Energy consumption & Consensus Mechanisms

Consensus mechanisms use large quantities of electricity during mining due to the relationship between increased computing power and the likelihood of successfully mining the correct answer to a hash function.

According to Cambridge's Bitcoin Electricity Consumption Index, Bitcoin is projected to consume 113 TWh of electricity in 2021. This is equivalent to:

- ▶ 0.5% of worldwide electricity consumption.
- ▶ 43% of the electricity consumption of the global banking sector.
- ▶ 47% of the electricity consumption of the global gold mining sector.

# Crypto-mining may reduce electricity price volatility and assist the transition to renewable energy

## What is crypto-mining?

- ▶ Crypto-mining is an essential component of consensus mechanisms.
- ▶ Mining involves nodes connected to a blockchain network solving cryptographic algorithms known as 'hash functions'.
- ▶ The node that successfully mines the answer to the hash function is granted permission to add the transaction into a block.
- ▶ Answers to hash functions are unique and verifiable by other users.
- ▶ This ensures that fraudulent transactions cannot be added to the network and cryptocurrency cannot be double-spent.

## Reducing electricity price volatility

- ▶ Unlike commodity mining, crypto-mining may be easily switched on and off in response to fluctuating electricity demand, supply and prices. This means that it is well-suited to reduce volatility in electricity prices by:
  - ▶ Using excess electricity during off-peak periods of low demand such as during the night.
  - ▶ Switching off operations during periods of high demand such as hot and cold days.
- ▶ Crypto-miners have 24/7 demand for electricity. This ensures that volatile electricity supply produced by renewable energy sources such as solar and wind always have buyers, increasing incentives to invest in renewable energy production.
- ▶ Because crypto-mining complements renewable energy production, partnerships between data infrastructure and energy infrastructure companies are creating synergies in the crypto-mining and renewable energy sectors.
- ▶ The proportion of crypto-mining powered by renewable energy has already been reported to be as high as 70% worldwide (Harvard Business Review, 2021).

## Mawson & Quinbrook

- ▶ Mawson Infrastructure Group and international renewable energy investment manager, Quinbrook Infrastructure Partners, have recently collaborated to power Mawson's 20MW Byron Bay crypto-mining facility with Quinbrook's nearby biomass renewable energy plant.
- ▶ Mawson and Quinbrook have identified a pipeline of renewable energy assets across the Quinbrook portfolio in Australia and the US where future sites are expected to be jointly developed, creating synergies for the two companies.
- ▶ This partnership showcases how crypto-mining and renewable energy generation can be powerful complements.

# Digital assets contribute \$2.1 billion to the Australian economy in 2021

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The sector creates a meaningful economic impact

**\$1.52** billion  
Direct economic benefits

+

**\$0.54** billion  
Indirect economic benefits



Digital assets contribute to the economy through increasing productivity, improving transparency and increased business efficiencies across sectors.



The technology has strong economic and strategic value, particularly in finance and professional services. Our analysis suggests that cryptocurrency generates over **\$1.0 billion** in economic activity within the finance industry.



The industry also adds to Australia's trade portfolio, generating almost **\$50 million** of IP, capital and other exports each year.

and employs  
around **11,600** workers  
in Australia in 2021

A significant number of Australians make a living through digital asset activities. These individuals are employed within specialised businesses or in related professional and financial services, across a variety of industries. The crypto and digital asset space is becoming truly cross-cutting.



There are huge opportunities for employment growth in the financial services sector. Most employees involved directly in digital assets and cryptocurrency work in advisory, legal, accounting, audit and software development roles. These careers can be related to software engineering, artificial intelligence engineering, data, ICT and information security professionals.

For example, software engineers are responsible for building, improving and maintaining the applications that process transactions, and other technology products. Business professionals are typically involved in analysing cryptocurrency market conditions, developing partnerships and business opportunities or conducting analysis to inform product development.

There is also a range of indirect employment impacts, mostly in sectors like finance and insurance and with strong overlaps with other sectors of the economy. These include areas like banking, accounting, marketing and financial analysis.

# Understanding cryptocurrencies and the digital asset ecosystem

# The digital asset ecosystem and emerging digital asset classes

The digital asset ecosystem is broad and deep, encompassing a range of asset classes and types. Each asset class impacts the Australian economy in different ways, and has different opportunities and applications across industries.

The ability for blockchain-enabled crypto and digital assets to reduce transaction costs is set to transform the future design and efficiency of digital platforms.

This could help revolutionise business processes, opening up an array of new opportunities.

The impact will differ across industries, and will depend on a range of factors, such as the form of potential applications and their 'disruptive' potential, integration with existing infrastructure, and the costs of adoption.

Key areas of advancement are shown to the right.

| Sector                         | What it is  | Examples  |
|--------------------------------|---|---|
| Cryptocurrency                 | <ul style="list-style-type: none"> <li>A digital or virtual currency secured by cryptography.</li> </ul>  | <ul style="list-style-type: none"> <li>Bitcoin, Ethereum.</li> </ul>  |
| Stablecoins                    | <ul style="list-style-type: none"> <li>A sub-class of cryptocurrency designed to retain a stable price by being pegged to the value of another asset.</li> </ul>  | <ul style="list-style-type: none"> <li>USD Coin (USDC), which is pegged to the USD at a 1:1 ratio.</li> </ul>   |
| NFTs                           | <ul style="list-style-type: none"> <li>An NFT acts as digital certificate of ownership by attaching scarcity to digital assets.</li> </ul>  | <ul style="list-style-type: none"> <li>Patents, property deeds, videos, digital art.</li> </ul>   |
| Hash functions & crypto-mining | <ul style="list-style-type: none"> <li>Hash functions are cryptographic algorithms used to verify, record and transfer cryptocurrencies.</li> <li>Crypto-mining involves computers racing to solve hash functions to win cryptocurrency rewards.</li> </ul> | <ul style="list-style-type: none"> <li>Bitcoin mining generates 900 bitcoin of daily rewards worldwide valued at approximately US\$315 million.</li> </ul>  |
| Web 3.0                        | <ul style="list-style-type: none"> <li>Web 3.0 leverages artificial intelligence, machine learning and blockchain technology to create a more intelligent, decentralised and private internet.</li> </ul>   | <ul style="list-style-type: none"> <li>Apple's Siri, Wolfram Alpha or Storj, a cloud-based service using blockchain to store files securely, are components of Web 3.0.</li> </ul>  |
| DeFi                           | <ul style="list-style-type: none"> <li>Decentralised finance is a blockchain-based form of finance that does not rely on central financial to offer traditional financial instruments, and instead utilises smart contracts on blockchains.</li> </ul>      | <ul style="list-style-type: none"> <li>Ethereum-based DeFi is a collective term for financial products and services that are accessible to anyone using Ethereum.</li> </ul>  |
| DAOs                           | <ul style="list-style-type: none"> <li>DAOs are new corporate structures governed by smart contracts, removing the need for central decision-makers and traditional company hierarchies.</li> </ul>   | <ul style="list-style-type: none"> <li>Users have full access to and influence over organisation processes and decisions. In contrast, in a classical corporate structure, shareholders or investors may not always know what management is doing.</li> </ul> |



# Cryptocurrencies

## The predominant form of asset in the digital economy

- ▶ Cryptocurrencies are a digital form of currency secured by cryptography.
- ▶ Units of cryptocurrency may be bought and sold as a store of value or speculative asset much like shares on stock exchanges.
- ▶ Cryptocurrencies may also be stored in digital wallets and used as mediums of exchange much like fiat currencies such as the AUD and USD.
- ▶ Individual cryptocurrencies may be used for several other purposes including:
  - ▶ Remittance transfers e.g. Bitcoin
  - ▶ Facilitation of smart contracting e.g. Ether
  - ▶ High-speed digital currency exchange e.g. Dash
- ▶ There are over 14,000 different cryptocurrencies currently in circulation.

Launched in 2009, **Bitcoin** was the world's first cryptocurrency and remains the largest, currently holding a US\$1 trillion market capitalisation. As at early December 2021, one Bitcoin is worth around US\$56,500. Bitcoin has several different uses including:

- ▶ Speculative asset – approximately US\$37 billion of Bitcoin is exchanged per day.
- ▶ Remittance transfers – faster, feeless international transfer of funds.
- ▶ Store of value – Bitcoin is increasingly being recognised as a substitute for gold, as noted by the US Federal Reserve Chairman, Jerome Powell, in March 2021 (CNBC, 2021).



# Stablecoins

## Stablecoins bridge the gap between fiat currency and the digital economy

- ▶ Stablecoins are a sub-class of cryptocurrency designed to retain a stable price by being pegged to the value of another asset.
- ▶ They are price-stable digital assets that behave somewhat like fiat currency but maintain the mobility and utility of cryptocurrency.
- ▶ Due to their increased stability, stablecoins have the potential to play an important role in the future of global finance.
- ▶ Stablecoins may become a widespread method for payments and financial services.
- ▶ Stablecoins create lower-cost, safe, real-time and more competitive payments compared to what is available in the market today.
- ▶ They could provide a cost effective mechanism for businesses to accept payments and for governments to run conditional cash transfer programs.
- ▶ More than \$113 billion of stablecoins have been issued as at August 2021.

Stablecoins can be pegged to any of the following asset classes depending on the type of stablecoin:

- ▶ Fiat currencies like AUD
- ▶ Commodities such as metals, oil or real estate
- ▶ Other cryptocurrencies

**USD Coin (USDC)** has a 24 hour trading volume of US\$4.8 billion. It is pegged to the US dollar at a 1:1 ratio and runs on the Ethereum, Stellar, Algorand, Solana, Tron and Hedera Hashgraph system.



# NFTs

## NFTs are a significant innovation in digital authentication technology

- ▶ Non-fungible Tokens (NFTs) are 'one-of-a-kind' digital assets.
- ▶ NFTs attach digital scarcity to non-interchangeable, unique digital assets using smart contracting.
- ▶ NFTs are unique assets in the digital world that can be bought and sold like any other piece of property, but which have no tangible form of their own.
- ▶ NFTs act as digital certificates of ownership by embedding the unique identity of digital assets as a 'block' on a 'chain'.
- ▶ The transparent, incorruptible nature of the blockchain means the unique identity of the digital asset is permanently viewable.
- ▶ NFTs allow the authenticity of digital assets to be verified even after being traded many times.
- ▶ NFTs represent a significant innovation in authentication technology, providing opportunities to:
  - Replace human-centred guarantors of authenticity
  - Replace escrow services
  - Increase the efficiency of trade of unique digital items
  - Revolutionise copyright and intellectual property law

Many unique items can be converted into NFTs, including:

- ▶ Patents
- ▶ Property deeds
- ▶ Escrow deeds
- ▶ Digital images
- ▶ Videos
- ▶ Collectables

The value of worldwide NFT trade topped \$2 billion during Q1 2021

The largest NFT sale to date was a digital artwork created by artist **Beeple** which sold for US\$69 million in March 2021.

(This is a reproduction of course, the original has a certificate of ownership which cannot be counterfeited.)



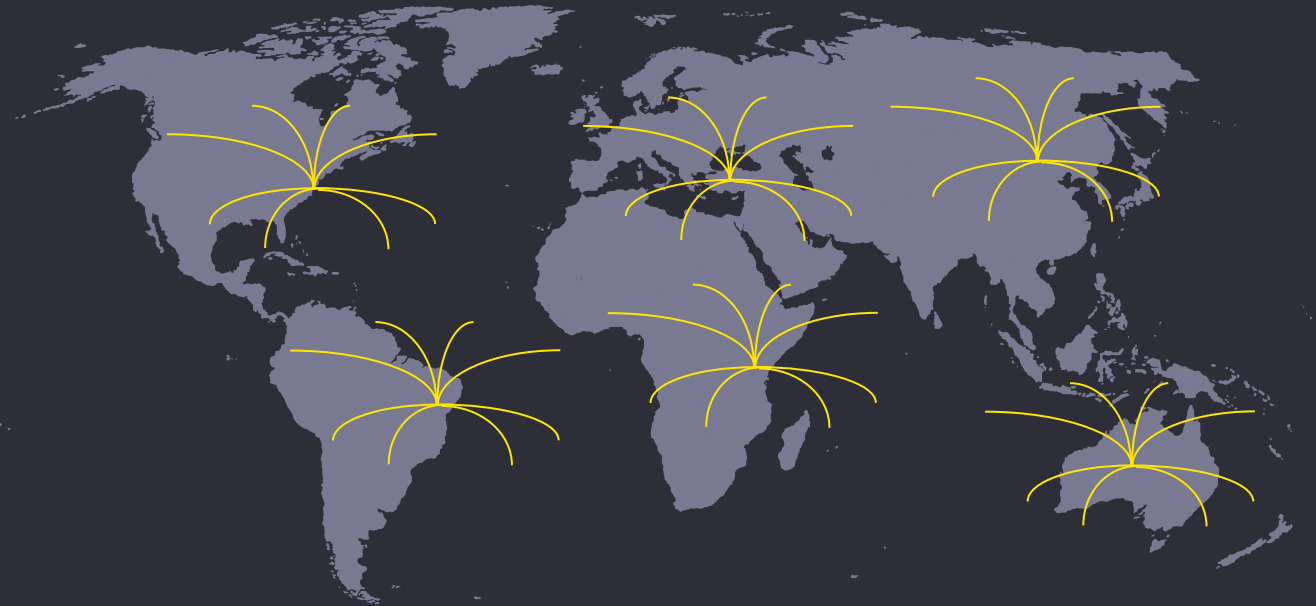
# DAOs

## DAOs are laying a marker for a new form of corporate governance

- ▶ Decentralised autonomous organisations (DAOs) are new corporate structures governed by smart contracts and without a need for central decision-makers and standard company hierarchies. They are member driven, not top-down or hierarchical, and can function leaderless and autonomously.
- ▶ DAOs are unique because their governance consists entirely of rules written in the blockchain.
- ▶ DAO shareholders make decisions by setting forth and voting for proposals. People stake cryptocurrency or money into DAOs in exchange for tokens, which grant them voting power in decisions.
- ▶ DAOs resolve the issues of trust, by programming their governance rules in smart contract algorithms, to steer the organisation towards the common interest of participants.
- ▶ The main driver behind DAOs are their use cases, which are likely to expand with advancements in AI, IoT and blockchain technology.
- ▶ A major advantage of DAOs is their transparency. Users have full access to and influence over organisation processes and decisions. In contrast, in a classical corporate structure, shareholders or investors may not always know what management is doing.
- ▶ DAOs are building organisations on shared, open-source, platforms.

DAOs are still in their infancy, and developers are still refining the infrastructure, however, so far, DAOs are being used for:

- ▶ Investments and ventures
- ▶ Charity
- ▶ Fundraising and grants
- ▶ Borrowing
- ▶ Buying NFTs
- ▶ Freelancer networks



# Web 3.0

## Blockchain is central to the emergence of Web 3.0

- ▶ Web 3.0 represents the next phase of the evolution of the internet. Each phase is shown to the right.
- ▶ Web 3.0 leverages artificial intelligence, machine learning and blockchain technology to create a more intelligent, decentralised and private internet.
- ▶ Cryptocurrencies are foundational to Web 3.0, providing a method by which web-created content may be authenticated and transferred securely.
- ▶ Web 3.0 involves over 1 billion websites, and intelligence clouds where user-generated information is uploaded and published content is downloaded by over 2.5 billion users.

## Users control data and investors control finance currency on Web 3.0

- ▶ Data ownership is decentralised such that users of Web 3.0 have control over their own data.
- ▶ Private keys held only by cryptocurrency investors must be inputted to transfer cryptocurrency out of personal digital wallets. This gives investors direct control over their finances.

| Web phase | Characteristics  | Example component  |
|-----------|--|--|
| 1.0       | Original web, human users may only read content                              | Encyclopaedia Britannica   |
| 2.0       | Interactive web, users may read and write content                            | Wikipedia  |
| 3.0       | Decentralised internet, web may independently read and write its own content | Apple's Siri or Storj, a cloud-based service using blockchain to store files securely, Wolfram Alpha |

### How does Web 3.0 work?

Every time you buy something on a major online platform like Amazon, the websites' algorithm will look at other items that people who have purchased your product went on to buy and then recommends those items to you.

Web 3.0 learns from other users to produce an advanced user experience for yourself and suggest relevant products.



# DeFi

## DeFi provides a platform of increased accessibility for all users

- ▶ Decentralised finance (DeFi) is a blockchain-based form of finance that does not rely on central financial intermediaries such as brokerages, exchanges, or banks to offer traditional financial instruments, and instead utilises smart contracts on blockchains.
- ▶ DeFi platforms allow people to lend or borrow funds from others, speculate on price movements on a range of assets using derivatives, trade cryptocurrencies, insure against risks, and earn interest in savings-like accounts.
- ▶ Growth in DeFi has been extraordinary, with a tenfold increase decentralised finance protocols in 2020 alone. As of March 2021, approximately \$41 billion has been invested in DeFi (Forbes, 2021).
- ▶ Decentralised finance aims to use technology to remove intermediaries between parties in a financial transaction.



The most common decentralised finance platform is facilitated by **Ethereum**. Ethereum and the smart contracts that live in it are not centrally owned, giving everyone an opportunity to use DeFi.

Ethereum transactions are processed using its purpose-made cryptocurrency, Ether.

There are four layers that comprise the Ethereum DeFi stack:

1. The blockchain
2. The assets – Ethereum and other tokens
3. The protocols – smart contracts
4. The applications – the products we use to manage the protocols

# The future of digital assets in the Australian economy



# Australia's cryptocurrency and digital asset economy has substantial opportunity to grow

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The digital asset ecosystem is expected to experience strong growth over the next decade and make a sizeable contribution to Australia's economy.

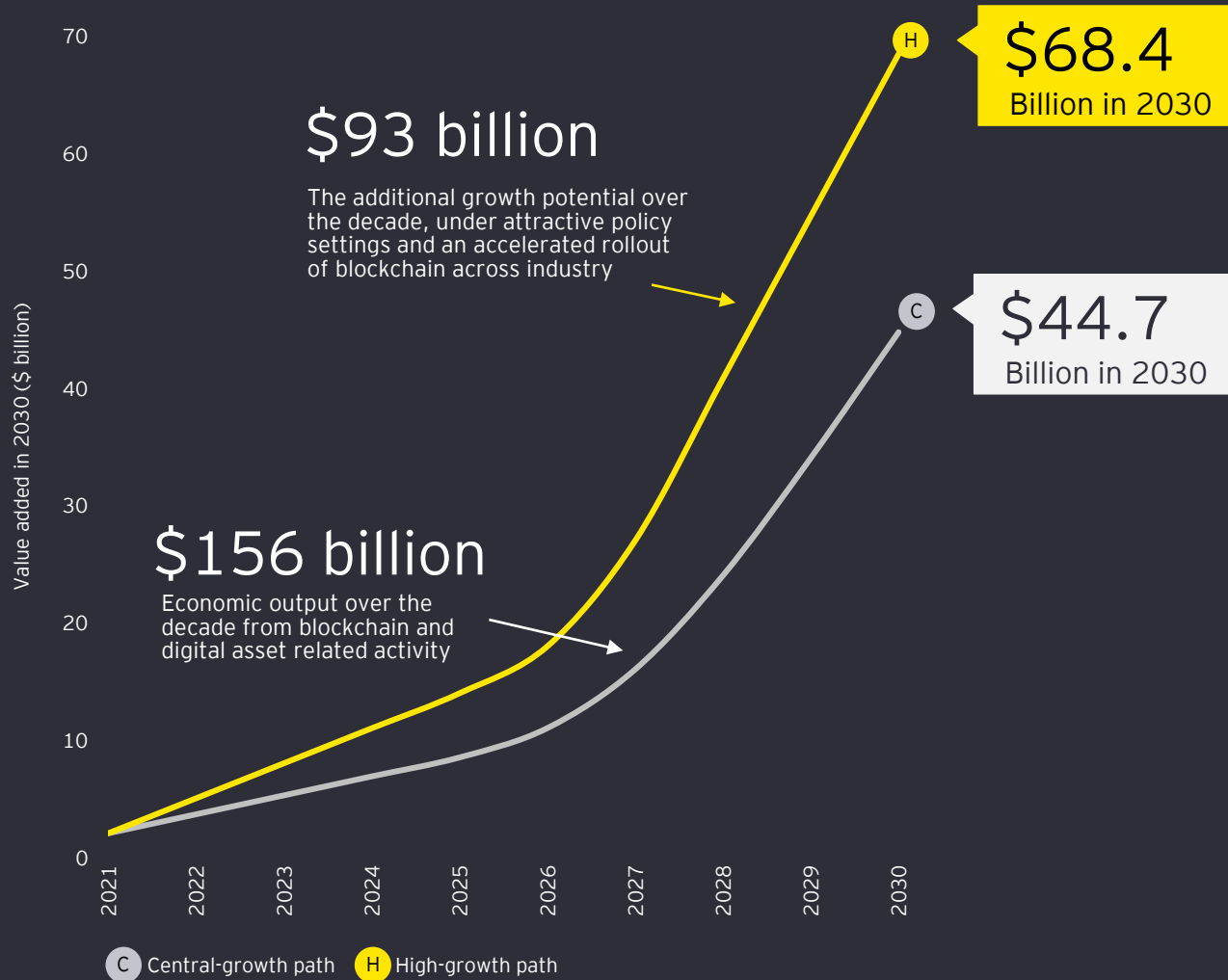
- ▶ The size of this expansion will depend on two critical factors:
  1. The policy environment. Attractive, internationally competitive tax and regulatory settings can help spur investment within the sector.
  2. The rollout of digital assets. Successful uptake of assets given the feasibility of the technology at scale, its integration with other technologies and digital data assets, and industry buy-in.
- ▶ Given the speculative and dynamic nature of this emerging technology, EY has modelled two prospective growth paths for the sector:
  - Ⓒ **Central scenario** – the likely growth pathway under current policy settings.
  - Ⓗ **High-growth scenario** – the growth potential under an accelerated rollout pathway, where policy settings support the sector's ability to flourish.

We explore the potential growth arising from the acceptance and uptake of digital assets as mainstream. In the Australian economy and with a defined policy and regulatory environment, increased confidence and adoption of digital assets is expected to drive innovation and growth across various industries.

With the variety in digital asset markets, from cryptocurrency to decentralised finance to NFTs, there could be a substantial change in domestic and international markets. This is not without challenges – there are inherent uncertainties in the pursuit of digital assets as a form of currency and investment asset. And much will depend on technology development in data, artificial intelligence, machine learning and automation.

Yet, there is substantial upside. The widespread development and adoption of technology in the past, and innovation in general, has fostered new productivity growth and increased economic activity, in Australia and globally. Recognising the potential economic dividends, a constructive policy environment and effective regulatory mechanisms can provide decision-makers with the confidence to enable new markets and services and secure the potential benefits from the digital asset ecosystem.

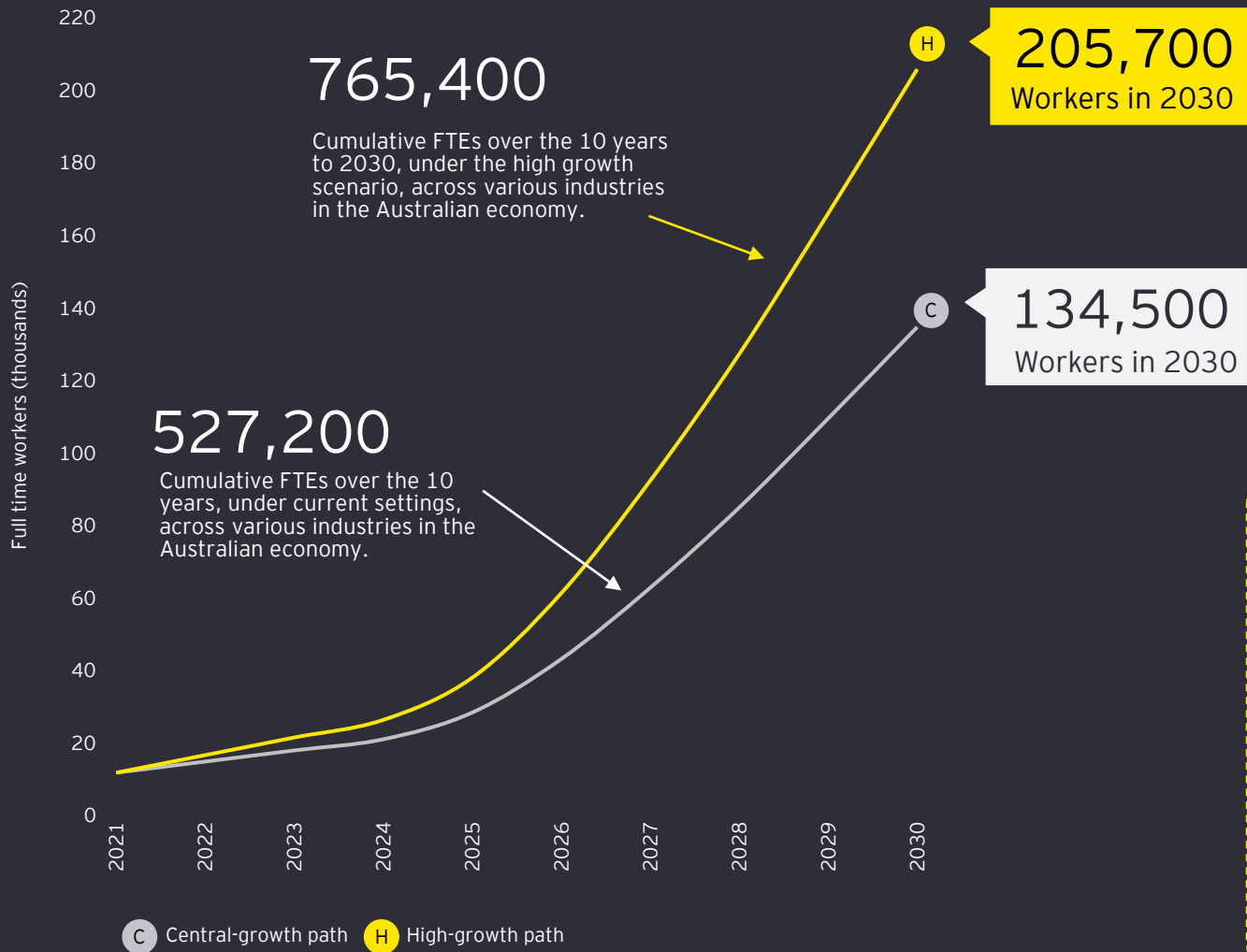
# With reform and growth, the digital asset ecosystem could deliver \$250 billion in economic benefits over the next decade



As the digital asset ecosystem grows and becomes embedded in our future economy, there is the potential for strong improvements in workplace productivity and economic growth. The magnitude of the economic benefits will depend on the speed and scale of uptake and the transformational potential of technology across different industries.

- ▶ Over the next decade, cryptocurrency and digital assets could add up to \$250 billion. In 2030, this is expected to contribute around 2.6% to the national economy.
- ▶ The sector's forward outlook is extremely positive and by 2030, the cryptocurrency, digital asset and blockchain economy could be bigger than Australia's tourism, agriculture and energy industries.
- ▶ Activity is expected to grow exponentially over the decade – under a high-growth scenario, the sector's economic contribution is expected to grow more than 50% each year.
- ▶ The impacts are distributed across different parts of the economy. In 2030, the sector is estimated to generate more than \$2.8 billion in high-value exports.
- ▶ There is scope for large economic gains in finance, professional services and the health sector. Given the energy-intensive nature of many crypto related activities, the resource and energy industries, including renewables, also stand to benefit strongly.

# Over 200,000 high-impact jobs will be available for Australians in 2030 in the cryptocurrency sector



As the ecosystem expands, thousands of digital, capital-intensive jobs will be created.

- ▶ Many of these roles will require specialised skills, and there will need to be a focus on lifting the digital maturity of workers.
  - Targeted upskilling, as well as skilled migration, can help to support this transition towards a more digitally enabled workforce.
  - This should help to improve workplace efficiencies and provide employees with highly-marketable skills.

## Example careers in 2030...

- ▶ Supercomputing technician
- ▶ Security architect
- ▶ Transaction auditor
- ▶ Cryptocurrency market analyst
- ▶ Digital trader
- ▶ Treasury dealer
- ▶ Software development
- ▶ Data scientist
- ▶ Fund manager
- ▶ Crypto-asset manager
- ▶ Customer experience
- ▶ Software engineer
- ▶ Lawyer
- ▶ Accounting and audit

# Australia requires a clear regulatory framework to support innovation and investment in digital assets

## Key areas where regulatory attention could help to enable the development cryptocurrency and digital asset services

- ▶ **Regulation** – Australia does not currently have fit-for-purpose regulatory systems for cryptocurrency. This uncertainty has prompted some businesses to relocate overseas where there are clearer regulatory requirements supporting long term investment.
- ▶ **Human capital** – Australia should focus on upskilling our future workforce and growing the talent pool, including through skilled migration. This will help ensure we have workers with the skills needed to facilitate a movement along the digital frontier.
- ▶ **Tax** – There is a currently lack of certainty surrounding many tax requirements (for example, capital gains tax treatment of cryptocurrencies). This could act as a barrier to future investment in emerging digital asset classes. Tax settings which recognise the features digital assets and the way they are transacted could help facilitate further expansion of the sector.

## Roadblocks could frustrate Australia's potential growth path

- ▶ Like many rapidly growing technologies, new blockchain and crypto applications can outpace public policy and regulatory settings. Digital assets are not prescriptively regulated in Australia, and most cryptocurrencies currently available in Australia can fall outside the regulatory perimeter of existing bodies.
- ▶ As many crypto and blockchain services are novel and can occur outside of sovereign boundaries, there are legitimate concerns about investor protection, market integrity and law enforcement.
- ▶ Australia does not yet have fit-for-purpose regulatory systems to promote certainty for new businesses in the digital asset space. Some countries have pursued a common approach that covers banking and payment systems, and investment dealing and consumer protection.
- ▶ Well-designed standards and regulation will be needed to drive innovation while managing unfamiliar services and risks. This will be pivotal to enabling the very large benefits to businesses and consumers to flourish in the years ahead.

### 2021 Senate inquiry

The recently published inquiry on regulation of cryptocurrency and digital assets in Australia has identified key areas of policy focus. These include, though are not limited to:

- ▶ A market licensing regime for currency exchange
- ▶ A custody regime for digital assets with minimum standards
- ▶ Characterisation of asset tokens
- ▶ Amending the Capital Gains Tax regime
- ▶ Tax incentives for businesses undertaking digital asset mining

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Cryptocurrency ownership has surged in Australia, signalling it's coming of age as an investment for everyday Australians, but the sector still desperately needs regulation to catch up and provide greater security for both investors and cryptocurrency businesses.

Independent Reserve, 2021

# Appendix A

## Our approach and supporting documentation

# Our methodology and approach

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## Types of economic assessment

- ▶ The analysis estimates the direct and indirect impacts of the digital assets:
  - The direct economic impact measures the output, employment and labour income generated by various components of the cryptocurrency and digital asset economy.
  - The indirect impact measures the flow-on impacts of the sector to the rest of the economy.

## Constructing the economic structure of Australia's cryptocurrency and digital asset economy

- ▶ A structural economic profile was developed using data and information from:
  - Commonwealth Scientific Industrial Research Organisation (CSIRO)
  - Australian Bureau of Statistics (ABS)
  - Department of Industry, Science, Energy and Resources (DISER)
  - Australian Taxation Office (ATO)
  - Australian Securities & Investments Commission (ASIC)
  - World Bank
  - Organisation for Economic Co-operation and Development (OECD)
  - World Economic Forum (WEF)

## Input-output modelling estimated the flow-on effects of the industry to the national economy

- ▶ IO modelling estimates how the economic impacts of a market activity affect the broader Australian economy.
- ▶ Input-output (IO) multipliers were used to quantify the total economic contribution from cryptocurrencies in Australia (i.e. the direct and indirect impacts).

## Key limitations of IO modelling

- ▶ IO modelling does not consider supply constraints, price changes or structural changes in the economy.
- ▶ The method also considers average economic effects rather than marginal effects – this means that IO models do not account for economies of scale, unused capacity or technological change.

## Timeframe for the analysis

- ▶ The economic contribution of the industry is reported on an annualised basis for the 2021 calendar year.

## Key assumptions

- ▶ In accordance with research by Krause and Tolaymat, the analysis has assumed that for 8.5 MJ of energy is consumed to generate \$1 (AUD) in cryptocurrency value (Krause and Tolaymat, 2018).

# About Mawson Infrastructure Group

*"We aim to bridge the gap amidst the rapidly emerging Digital Asset Industry and Traditional Capital Markets." - Mawson Infrastructure Group*

Mawson Infrastructure Group is a global leading-edge sustainable digital asset infrastructure company

- ▶ Mawson Infrastructure Group (NASDAQ: MIGI) is a digital infrastructure provider, with multiple operations throughout the USA and Australia. Mawson's vertically integrated model is based on a long-term strategy to promote the global transition to the new digital economy. Mawson matches sustainable energy infrastructure with next-generation mobile data centre (MDC) solutions, enabling low-cost Bitcoin production and on-demand deployment of infrastructure assets. With a strong focus on shareholder returns and an aligned board and management, Mawson is emerging as a global leader in ESG focused Bitcoin mining and digital infrastructure.

## Energy reimaged

- ▶ Established in 2019, Cosmos Capital Pty Ltd began testing its proof-of-concept Modular Data Centre with purpose-built High Performance Computing in the USA, co-locating adjacent to stranded or under-utilised energy sources. Upon successful completion, Cosmos began to scale its operation rapidly, deploying ASIC's across multiple sites in the USA.
- ▶ In the late 2020s, Cosmos underwent a reverse takeover of Wize Pharma, and thus was born Mawson Infrastructure Group, Inc (NASDAQ: MIGI).

## A global vision

- ▶ Mawson Infrastructure Group, Inc currently operates a flagship facility in Washington County, Georgia, a co-location facility with Compute North LLC in Kearney, Nebraska and recently signed a new 100MW site in Midland, Pennsylvania. In October 2021, Mawson's first facility in Australia became operational – using 100% renewable energy on the east coast of Australia in partnership with Quinbrook Infrastructure Partners, a global green energy infrastructure fund. Mawson thus has operations in the USA and Australia in conjunction with over 1GW of qualified power infrastructure pipelines.

## Energy focused digital asset infrastructure

- ▶ Our innovative business model solves a global problem – the large mismatch between energy generation and end-users. Stranded and/or underutilised energy assets are paired with our industry leading modular data centre (MDC) technology, to deliver high margins across our various operations.
- ▶ With a strong focus on ESG, ROI and shareholder returns, Mawson Infrastructure Group is well positioned to take advantage of this evolving energy dynamic.

## Digital asset management

- ▶ Digital and traditional financial asset markets are converging, and Mawson Infrastructure Group is at the forefront of this evolution. By providing a bridge between traditional capital markets and digital assets, Mawson provides investment exposure to this rapidly growing industry.
- ▶ Our digital asset management business offers investors easy access to this rapidly growing asset class, via our listed and unlisted products.



Sir Douglas Mawson  
5 May 1882 -  
14 October 1958

Sir Douglas Mawson OBE FRS FAA was an Australian geologist, Antarctic explorer, and academic. We honour the legacy of Sir Douglas Mawson, a leader in increasing the world's understanding of the Antarctic and its fundamental importance to the health and survival of our planet. We consciously chose his name and recognise his legacy through our move to carbon emission neutrality, protecting native habitats and furthering education on this extraordinarily important topic for the human race.



# References

- ▶ Andoni, M, Robu, V, Flynn, D, Adram, S, Geach, D, Jenkins, D, McCallum, P, Peakcock, A (2019), Blockchain technology in the energy sector: a systematic review of challenges and opportunities, *Renewable and Sustainable Energy Reviews*
  - ▶ Australian Bureau of Statistics (2021), Australian Industry
  - ▶ Australian Bureau of Statistics (2021), Australian National Accounts: National Income, Expenditure and Product
  - ▶ Australian Bureau of Statistics (2021), Australian National Accounts Input-Output Tables 2018-19
  - ▶ Australian Bureau of Statistics (2021), Labour Force Australia
  - ▶ Australian Cyber Security Centre (2021), *Cryptomining*
  - ▶ Australian Securities & Investments Commission (2021), Initial coin offerings and crypto-assets
  - ▶ Australian Taxation Office (2021), Cryptocurrency under the microscope this tax time
  - ▶ Australian Stock Exchange (2021), About CHES replacement
  - ▶ Bragg, A (2021), The Senate, Select Committee on Australia as a Technology and Financial Centre
  - ▶ Bratanova, A, Devaraj, D, Horton, J, Naughtin, C, Kloester, B, Trinh, K, Weber, I, Dawson, D (2019) Blockchain 2030: A Look at the Future of Blockchain in Australia, CSIRO Data61
  - ▶ Bruce, A (2021), The near-term future of blockchain: tracking carbon offsets, *Forbes*
  - ▶ Cambridge Centre for Alternative Finance (2021), *Bitcoin Electricity Consumption Index*
  - ▶ Catalini, C & Gans, J (2019), Some simple economics of the blockchain, *NBER Working Paper Series*
  - ▶ Chen, H, Jarrell, J, Carpenter, K, Cohen, D & Huang, X (2019), Blockchain in healthcare: a patient-centred model, *Biomed J Sci Tech Res*.
  - ▶ Chiu, J & Koepl, T (2018), *The economics of cryptocurrencies - Bitcoin and beyond*
  - ▶ Chohan (2021), Non-Fungible Tokens: Blockchains, Scarcity and Value
  - ▶ CNBC (2021), *Powell calls cryptocurrencies 'not really useful stores of value' and says Fed will move slowly*
  - ▶ Data 61 CISRO (2017), Risks and Opportunities for systems using blockchain and smart contracts
  - ▶ Department of Industry, Science, Energy and Resources (2020), The National Blockchain Roadmap: Progressing towards blockchain-empowered future
  - ▶ European Commission (2021), Blockchain for climate change
  - ▶ Forbes (2021), *What's The Big Deal About DeFi And How Do You Invest In It?*
  - ▶ Gaur, V & Gaiha, A (2020), Building a transparent supply chain, *Harvard Business Review*
  - ▶ Harvard Business Review (2021), *How Much Energy Does Bitcoin Actually Consume?*
  - ▶ Hileman, G & Rauchs, M (2017), Global cryptocurrency benchmarking study, *Cambridge Centre for Alternative Finance Reports*
  - ▶ Karg, Wilson and Ghaderi (2021), Prospecting non-fungible tokens in the digital economy: Stakeholders and ecosystem, risk and opportunity, *Business Horizons*
  - ▶ Krause, M & Tolaymat, T (2018), Quantification of energy and carbon costs for mining cryptocurrencies, *Nature Sustainability*
  - ▶ Mendelkamp, E, Garttner, J, Rock, K, Kessler, S, Orsini, L, Weinhardt, C (2018), Designing microgrid energy markets: A case study: The Brooklyn Microgrid, *Applied Energy*
  - ▶ McWilliams, D, Niculescu-Marcu, C & Cruz, B (2018), The economic impact of smart ledgers on world trade
  - ▶ Nakamoto, S (2008), Bitcoin a peer-to-peer electronic cash system
  - ▶ Neureuter, J (2021), The institutional investor for digital assets study
  - ▶ Organisation for Economic Co-operation and Development (2020), Opportunities and challenges of blockchain technologies in health care
  - ▶ Organisation for Economic Co-operation and Development (2021), Blockchain and distributed ledger technology
  - ▶ Remplan (2021), Economic Development Australia - Economy, jobs and business insights
  - ▶ Sier, J (2021), Byron Bay becomes the new home of Aussie bitcoin mining, *Australian Financial Review*
  - ▶ Swan, M (2017), Anticipating the economic benefits of blockchain, *Technology Innovation Management Review*
  - ▶ The World Bank (2021), GDP (current US\$)
  - ▶ The World Bank (2021), Science & technology
  - ▶ Universal carbon (2021), The clean crypto
  - ▶ World Economic Forum (2021), Digital assets, distributed ledger technology and the future of capital markets
  - ▶ World Trade Organization (2018), Can blockchain revolutionise international trade?
  - ▶ Yeoh, Y (2021), Cryptocurrency exchanges in Australia, *IBISWorld*
- Image sources:
- ▶ Thought Catalog (2021), on *Bitcoin* Unsplash, <https://unsplash.com/@thoughtcatalog>
  - ▶ Executium (2021), *Ethereum* on Unsplash, <https://unsplash.com/@executium>
  - ▶ Ash\_Ismail (2021), *Coins* on Unsplash, [https://unsplash.com/@a\\_ismail](https://unsplash.com/@a_ismail)

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Ernst & Young was engaged on the instructions of Mawson Infrastructure Group (“you”) to examine the economic contribution of Australia’s blockchain sector (“Project”), in accordance with the Engagement Agreement dated 28 September 2021.

The results of Ernst & Young’s work, including the assumptions and qualifications made in preparing the report, are set out in Ernst & Young’s report dated 28 September 2021 (“Report”). The Report should be read in its entirety including the transmittal letter, the applicable scope of the work and any limitations. A reference to the Report includes any part of the Report. No further work has been undertaken by Ernst & Young since the date of the Report to update it.

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