

Connectivity

We connect people and businesses in the digital economy.

Earnings Highlights (\$ million)

	2022	2021
Revenue	1,291	1,260
EBITDA	187	288
Operating Profit	62	86
Profit before Tax	70	86
Net Profit	37	64

Progress in 2022

- Scaled up data centre business with new acquisitions in China and the UK, expanding Keppel's portfolio to 32 data centres across 19 cities in Asia Pacific and Europe.
- Achieved ready-for-service status for initial phases of five data centre projects across Malaysia, Indonesia, China and Australia.
- Made good progress in manufacturing cables for the Bifrost Cable System.
- M1 achieved more than 95% outdoor coverage in its 5G standalone network rollout in Singapore, and implemented over 20 5G use cases.
- M1 continued expanding into regional markets, with acquisition of Glocomp Systems in Malaysia.
- Divested logistics businesses in Southeast Asia and Australia, including Urban Fox.

Focus for 2023/2024

- Continue to expand portfolio of quality data centre assets.
- Commence Bifrost Cable System's cable laying operations.
- Continue to pursue innovative data centre solutions, such as the Floating Data Centre Module, hydrogen production and a low-carbon energy hub.
- M1 to work towards achieving nationwide 5G coverage and providing 5G standalone offshore coverage for the Southern coast of Singapore.
- M1 to continue to accelerate 5G-enabled platforms or initiatives to support digital transformation of enterprise customers, deliver an integrated digital offering to consumer customers, and expand its cloud and enterprise business regionally.



Keppel Data Centres is exploring artificial intelligence and machine learning technologies in daily operations and management, leveraging advanced sensor networks and big data analyses to perform predictive maintenance of its data centre infrastructure.

Keppel is uniquely positioned to provide integrated end-to-end data centre solutions, from the provision of clean energy to the development and operation of green data centres, to the raising of funds, to the monetisation of stabilised assets through Keppel DC REIT.

The Connectivity segment comprises Keppel Telecommunications & Transportation (Keppel T&T) and M1, whose business activities span data centres, subsea cable systems as well as telecommunications. In 2022, both Keppel T&T and M1 focused on transforming their businesses and sharpening their value propositions to better capture growing opportunities in digital connectivity. In line with Keppel's Vision 2030, Keppel T&T streamlined and focused its business by divesting Keppel Logistics¹ and monetising its non-core operations, including divesting Asia Airfreight Terminal Company and Radiance Communications. Keppel T&T continued to deliver high-quality and operationally reliable data centre infrastructure, while exploring ways to substantially reduce its carbon footprint.

Meanwhile, M1 advanced its transformation from a traditional telco to a cloud native connectivity platform. It is building up

its enterprise solutions and developing smarter, future-ready solutions and more 5G use cases across sectors. M1 also continued expanding its regional footprint with the acquisition of Malaysia-based digital solutions provider Glocomp Systems.

Data Centres

In an increasingly digitalised world, data centres are playing increasingly important roles in the digital ecosystem. Even as the world makes a return to post-COVID-19 normalcy, businesses and consumers continue to embrace hybrid work practices and the use of conferencing platforms, and push towards further digitalisation, deepening reliance on data-hungry technologies, such as cloud computing, artificial intelligence and IoT.

In addition, the scaling up of disruptive, data-generating technologies,

such as Web 3.0, metaverse, and blockchain, are driving significant demand for data and digital connectivity. Bandwidth demand is projected to increase significantly for the foreseeable future, propelling the growth of the global data centre market.

Keppel is uniquely positioned to provide integrated end-to-end data centre solutions, from the provision of clean energy to the development and operation of high-quality green data centres, to the raising of funds to invest in greenfield developments, to the monetisation of stabilised assets through Keppel DC REIT.

In 2022, the One Data Centre team, comprising Keppel Data Centres and the private funds and Keppel DC REIT managed by Keppel Capital, worked closely together to seek new development and acquisition opportunities in Asia Pacific and Europe.

¹ Includes Keppel Logistics' businesses in Singapore, Malaysia, Vietnam and Australia, as well as UrbanFox.

Operating & Market Review Connectivity

Keppel Capital raised US\$1.1 billion for Keppel Data Centre Fund II (KDCF II), and is tapping Keppel Data Centres' expertise in developing, operating and maintaining quality data centres to capture investment opportunities in greenfield and brownfield data centre assets. In 2022, KDCF II acquired a majority stake in Huailai Data Centre in Greater Beijing, China for which Keppel Data Centres will implement global best practices for data centre operations. During the year, KDC REIT acquired a data centre in London, the United Kingdom and two data centres in Guangdong, China. With these acquisitions, Keppel has expanded its portfolio to 32 data centres across 19 cities in Asia Pacific and Europe.

Keppel T&T is focused on scaling up Keppel's data centre businesses, by developing and managing data centres in a smart, green and connected manner.

Amid rising concerns over climate change, carbon footprint and energy security, Keppel Data Centres continues to prioritise sustainability as a key guiding principle, integrating sustainable design and energy-efficiency technologies to reduce the carbon footprint and water consumption of its assets. As a testament to Keppel Data Centres' commitment to environmental sustainability, Keppel Data Centre Singapore 7 (KDC SGP 7)

M1 has achieved more than 95% outdoor coverage in its 5G SA network rollout in Singapore and has implemented more than 20 5G use cases or applications.

in Genting Lane was awarded the Building and Construction Authority (BCA) Green Mark Platinum Award, the highest green accolade conferred by BCA specifically for new data centre developments.

To enhance its sustainability efforts, Keppel Data Centres is also pursuing innovative ideas with industry partners. Together with industry partners, it is studying the feasibility of developing a low-carbon energy hub and microgrid system, with inputs from various sustainable energy sources, including imported renewable power and hydrogen. The companies will also explore the project's scalability and exportability to other sites and overseas markets.

In addition, Keppel Data Centres is also making progress on its Floating Data Centre Module. It has received approval from the regulatory authorities to proceed and is in leasing negotiations with the site owner for project deployment. Keppel Data Centres is

also working with other partners to study the feasibility of establishing a long-term, stable supply chain of sustainable liquid hydrogen from Western Australia and gaseous hydrogen from Indonesia to Singapore.

During the year, Keppel Data Centres further enhanced its capabilities and service offerings to effectively support the dynamic business needs of its customers. To improve the operational reliability of its assets, Keppel Data Centres is exploring artificial intelligence and machine learning technologies in daily operations and management, leveraging advanced sensor networks and big data analysis to perform predictive maintenance of its data centre infrastructure.

Together with AsiaPac Technology (AsiaPac), a wholly-owned subsidiary of M1, Keppel Data Centres is introducing intra-Asia interconnectivity across its data centres, by delivering turnkey cloud implementation solutions to its clients.



KDC SGP 7 in Genting Lane has achieved the BCA Green Mark Platinum Award, based on the Green Mark for New Data Centres. This is the highest green accolade conferred by Singapore's BCA specifically for new data centre developments. The data centre incorporates green features such as energy-efficient equipment and advanced technologies to improve performance of the chiller plant and data hall cooling systems, as well as reduce water consumption.

The collaboration enables clients to easily transform their existing infrastructure to take full advantage of a secure hybrid multi-cloud framework. By packaging Keppel's world-class data centre colocation, stronger intra-Asia connectivity, and hybrid multi-cloud services into an integrated, synergistic offering, Keppel Data Centres is able to deliver a holistic and seamless digital transformation offering to its clients.

Subsea Cable Systems

The intra-Asia interconnectivity across Keppel's data centres will be enhanced by Keppel's Bifrost Cable System (Bifrost), a multiple fibre pair, high-capacity submarine cable system that Keppel T&T is developing with other partners, connecting Singapore directly to the west coast of North America. During the year, Keppel T&T made good progress on the Bifrost project, signing definitive agreements with several customers and receiving enquiries from potential customers in India and ASEAN.

Keppel T&T is commencing cable laying operations in early 2023, and is targeting to achieve ready-for-service status in 2H 2024. When fully commissioned, Bifrost will be the single largest high-speed capacity-bearing subsea optical cable across the Pacific Ocean, and will help to address the demand-supply gap arising from the retirement of a large number of cable systems in the next decade, as well as the rapid growth in internet traffic related to social and messaging platforms and services from over-the-top operators.

Digital Connectivity

Today, customers look for more than just convenience and accessibility of connectivity. They seek lower latency, higher speeds, as well as novel virtual or augmented reality experiences, which will further boost demand for 5G. M1 is meeting the needs of today's customers with the ongoing digital transformation of its products and services, particularly the development of its 5G network. By end-2022, M1 has achieved more than 95% outdoor coverage in its 5G standalone (SA) network rollout in Singapore, and has implemented more than 20 5G use cases or applications for the consumer, enterprise and government sectors, as well as across the Keppel ecosystem.

Working in partnership with M1, Keppel Offshore & Marine was the first in Southeast Asia's maritime industry to implement an immersive 5G Augmented and Virtual Reality Smart Glasses solution at its yard, optimising the efficiency of remote operations.

Harnessing 5G's high-speed and low-latency connectivity, M1 is collaborating with Gardens by the Bay and Electronic Sports to provide immersive metaverse



M1 is collaborating with Gardens by the Bay and Electronic Sports to provide fast-speed 5G connectivity and immersive metaverse experiences that complement Gardens by the Bay's physical offerings.

experiences in Gardens by the Bay's indoor venues, delivering rich content in the form of extended reality and gamification to visitors on the go. M1 is also adding new layers of interactivity and immersiveness in Singapore's museums, as it collaborates with its subsidiary AsiaPac and Keppel Data Centres, to provide 5G SA connectivity and edge computing solutions to the National Museum of Singapore and Children's Museum Singapore.

In the world's first public and largest maritime testbed at sea, M1 collaborated with the Maritime and Port Authority of Singapore and the Infocomm Media Development Authority (IMDA) to provide a 5G SA network to trial, develop and deploy new maritime 5G use cases. As a result of a separate trial with IMDA and Airbus, M1 co-developed the world's first aeronautical and maritime 5G SA modem, which is on par with military-grade modems and is commercially ready.

M1 is also expanding its cloud and enterprise solutions and capturing new profit pools. Its enterprise business has been growing steadily, making up about 33% of M1's revenue in 2022, up from 20% in 2020. In 2022, M1 also acquired digital solutions provider Glocomp Systems.

As M1 broadens its enterprise offerings, it continues to strengthen its consumer

business in line with its digital transformation into a cloud native connectivity platform. To cater to changing customer needs and expectations, M1 is offering hyper-personalisation services and migrating customers to its new cloud native digital platform. The integration of M1's digital services will allow customers to enjoy its new 5G plans, and cloud services such as cloud gaming. It will also improve customer acquisition and lower M1's cost to serve.

In 2022, M1 expanded its customer base to 2.5 million, up from 2.2 million in 2021. It achieved the second-largest postpaid customer base in Singapore at 1.9 million customers. Its average revenue per user has grown across its postpaid and fibre broadband segments, and roaming revenue has increased with the progressive reopening of economies post pandemic.

Aligned with the Group's sustainability commitment and strategy, M1 continues to implement various carbon emissions reduction initiatives in its daily operations. M1 will embark on the continuous overhaul and upgrade of its equipment, software, and building infrastructure, to achieve better energy efficiency. In 2022, M1's science-based targets were validated by the Science Based Targets initiative.