

CONNECTIVITY

We connect people, businesses and countries in the digital economy.

PROGRESS IN 2023

- Achieved ready-for-service status for first phase of Building 1 of Keppel Data Centre Campus at Genting Lane.
- Achieved full utilisation at first two phases of Huailai Data Centre in Greater Beijing.
- Continued to make progress on the Floating Data Centre Module (FDCM) and DataPark+, with final investment decision for the FDCM expected in 1H 2024, and actively engaged government agencies on DataPark+.
- Completed close to 50% of overall cable laying operations for Bifrost Cable System.
- M1 achieved nationwide 5G standalone network coverage ahead of schedule in 1Q 2023.
- M1 completed consumer migration to its new cloud native digital platform.
- M1 launched its “solution-in-a-box” offering with a suite of plug-and-play 5G solutions for companies to boost 5G adoption and deployment.

FOCUS FOR 2024/2025

- Accelerate data centre portfolio expansion overseas in Asia Pacific and Europe.
- Continue to develop innovative data centre solutions, such as DataPark+ and the FDCM.
- Target for Bifrost Cable System to go into commercial service by end-2024.
- Pursue subsea cable opportunities in Asia and other emerging markets with Joint Build Partners.
- Grow the enterprise business with more 5G-enabled solutions for enterprises and industries.
- Develop innovative solutions and drive 5G-enabled advancements across industries through collaboration between M1 and Keppel’s operating divisions.



Strong growth in social media and video streaming, the adoption of cloud computing, and emergence of Generative Artificial Intelligence (GenAI), are driving up computing power, bandwidth, and latency requirements worldwide. These in turn underpin the demand for advanced digital infrastructure, such as data centres and fibre networks, as well as 5G connectivity.

access to low-carbon energy provided by Keppel's Infrastructure Division, which helps to power and future-proof its assets and solutions.

DATA CENTRES

Amid climate and energy security concerns, data centre operators are expected to provide higher capacity and rack densities for their clients, while improving carbon emissions and the power usage efficiency of their assets.

Keppel delivers high-quality data centres, subsea fibre cables and 5G connectivity and applications, harnessing the power of its end-to-end value chain.

Keppel's Connectivity segment comprises the Data Centres and Networks Division and M1. The former possesses deep expertise in designing, developing and operating high-quality data centres and subsea cable systems, while M1 provides 5G network and solutions for consumers and enterprises.

As part of a horizontally integrated value chain, the Data Centres and Networks Division works with the Fund Management and Investment platforms to build quality asset pipelines for Keppel's private funds and listed data centre REIT. The Data Centres and Networks Division also benefits from strategic

In Singapore, Keppel DC Singapore 7, the first complex situated within the Keppel Data Centre Campus at Genting Lane, has been in service since 1Q 2023. Meanwhile, the second complex, Keppel DC Singapore 8, achieved structural completion in March 2024, with the first phase of the complex expected to be ready for service in 3Q 2024. For Keppel Data Centre Fund II's data centres in China, the first two phases of Huailai Data Centre in Greater Beijing have achieved full utilisation, while the Shanghai Data Centre was ready for service in early-2024.

Keppel is accelerating the pursuit of data centre projects in new markets across the Asia Pacific, which is one of the fastest-growing regions for digital infrastructure. Home to digitally-connected populations, the Asia Pacific benefits from a high penetration rate of mobile devices and social networking applications, as well as the expansion of 5G networks.

Operating & Market Review

Operating Platform – Connectivity



The proposed DataPark+ is a 1 GW nearshore sustainable data centre campus that is envisioned to be powered by hydrogen and solar energy, and can save nearly 21 billion litres of water annually through the use of seawater for cooling.

In addition to portfolio expansion, Keppel is also exploring ways to future-proof data centre infrastructure by deploying AI and machine learning for predictive failure analyses, as well as incorporating sustainable design and energy-efficiency solutions. To this end, the Data Centres and Networks Division is working with the Infrastructure Division as well as international partners to harness green energy sources that can help to improve the power utilisation and reduce the carbon emissions of Keppel's data centres.

Keppel also continues to explore disruptive innovations, such as the energy-efficient Floating Data Centre Module, which is expected to reach final investment decision in 1H 2024. The Data Centres and Networks Division has also been actively engaging government agencies and authorities to advance the development of DataPark+, a 1 GW nearshore net zero data centre campus concept.

DataPark+ is envisioned to be a self-sustaining, carbon neutral campus that will operate on clean energy derived from a private smart grid powered by sustainable hydrogen and solar energy. DataPark+ is engineered to tap seawater for

its cooling needs. This is estimated to reduce the use of treated water for cooling by about 21 billion litres annually, enough to fill 1,200 Olympic size swimming pools.

Featuring a modular design, DataPark+ can be developed in phases in tandem with demand, and the availability of clean and low carbon energy. By aggregating cooling and power requirements, DataPark+ is designed to greatly enhance the efficiency of data centre operations.

SUBSEA CABLE SYSTEMS

In 2023, the Bifrost Cable System, the largest capacity high-speed transmission cable and subsea connectivity hub across the Pacific Ocean, achieved financial close, with Keppel securing private investors to take a 60% stake in Keppel's share of the fibre pairs.

The construction of Bifrost is progressing well, with key milestones achieved, including the necessary permits and licenses for marine installation. Cable laying operations were close to 50% completed as at end-December 2023, with cable laying activities in the international waters of the Pacific Ocean fully completed. Construction of the landing facilities in Singapore, Indonesia, Mexico, and

the US have commenced. When completed, these landing facilities will integrate the subsea cable with data centre infrastructure, to create an ecosystem of throughput connectivity.

When Bifrost achieves commercial service status, currently expected in end-2024, it will connect Singapore directly to the west coast of North America, bolstering connectivity by providing a route through Indonesia, the Philippines and Guam.

The Data Centres and Networks Division is also working with Keppel's Fund Management and Investment platforms to explore opportunities to invest in and develop more subsea cables in Asia and other emerging markets.

DIGITAL CONNECTIVITY

As part of its multi-year digital transformation, M1 accelerated the rollout of highly personalised services and completed the migration of all its mass consumer customers to its new cloud native digital platform. The new platform supports streamlined digital services, enables an efficient digital experience for customers through automation, enhances sustainability through future-proofing of the business, and optimises resources with cloud native applications.

M1 is looking to harness AI and GenAI to further enhance its productivity and service quality in customer experience and engagement. For instance, it is exploring the integration of ChatGPT with its chatbot, as well as the deployment of Salesforce AI which can help improve information accuracy and service speed of call agents.

M1 completed its nationwide 5G standalone network rollout ahead of schedule in 1Q 2023, and has since achieved nationwide outdoor 5G coverage for all consumers. M1 has implemented over 50 5G solutions in partnerships with various enterprises across the maritime, energy, utilities,

smart estate vehicle and tourism sectors. In 2023, M1 launched its 5G-powered "solutions-in-a-box" offering, the first of its kind in Southeast Asia. The suite of SMART solutions include applications for worker safety to detect risk and forecast accidents, real-time security surveillance and management solutions at sea, autonomous robotics for the inspection of critical assets, and workforce productivity solutions. The solution's plug-and-play approach provides hassle-free integration and deployment of 5G-powered solutions for companies.

M1 drives growth by providing best-in-class 5G solutions to consumers and enterprises through its cloud-native connectivity platform.

In 2023, M1's growing enterprise business saw an increase in revenue of 27% year on year, driven by robust demand for its information and communications technology services, digital connectivity, hybrid multi-cloud offerings, as well as infrastructure and application modernisation services to help enterprise customers with their digital transformation.

In the realm of AI and data management, enterprise customers seek swift, on-demand, and flexible provisioning of graphics processing units (GPUs). M1 is collaborating closely with its key enterprise clients to provide GPU-as-a-Service solutions, enabling enterprises to harness GPU resources to address diverse, multiple workloads with ease, while enjoying substantial cost savings.

M1 continues to harness its strong synergies with Keppel's operating divisions, including bundling enterprise services for colocation data centre clients, as well as enabling smarter product features for several of Keppel's customer-facing services.