

# Operating & Market Review

Since Vision 2030 was announced in 2020, Keppel has made significant progress in accelerating the execution of the Vision, with a view to achieving its targets by 2025.



## Asset Management

We tap third-party funds for growth, while delivering sustainable returns to investors and unitholders.

» Refer to pages 52 to 55



## Energy & Environment

We provide energy and environmental solutions that are essential for sustainable development.

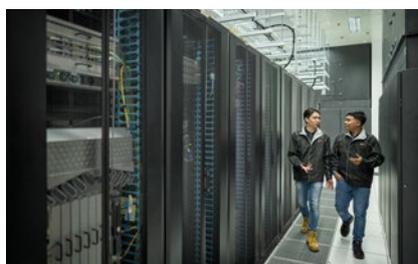
» Refer to pages 56 to 61



## Urban Development

We provide sustainable and innovative urban space solutions, with a growing focus on sustainable urban renewal and senior living.

» Refer to pages 62 to 65



## Connectivity

We connect people and businesses in the digital economy.

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### Vision 2030: The Next Phase

In 2022, Keppel continued to advance its Vision 2030 plans, simplifying and focusing its business, investing in new growth areas while executing its asset-light strategy.

During the year, the Group successfully divested Keppel Logistics<sup>1</sup>. This was followed by Keppel Offshore & Marine's combination with Sembcorp Marine, and the resolution of the legacy rig assets and associated receivables, which were completed by 28 February 2023.

In the next phase of Vision 2030, Keppel is accelerating its transformation from a conglomerate of diverse parts into a global asset manager and operator, with strong capabilities in energy and environment, urban development and connectivity, which is well positioned to seize opportunities through creating solutions for a sustainable future.

### Executing Our Strategy

We continue to grow our assets under management (AUM), expanding our asset classes and growing recurring fee income. As at 31 December 2022, our AUM had crossed \$50 billion, and we are working towards a target of \$200 billion by the end of 2030.

As a centre piece of Keppel's asset-light business, asset management is increasingly playing a critical role as a horizontal that pulls all operating units together to deliver value, as one integrated company. During the year, we announced about \$2.8 billion

worth of energy & environment and sustainable urban renewal-related investments, jointly undertaken by Keppel together with the private funds and/or business trust managed by Keppel Capital.

The investments included onshore and offshore wind energy assets in Europe, a waste management services platform in Korea as well as the development of Singapore's first hydrogen-ready advanced combined-cycle power plant, among others. The ability to tap third-party funds allows us to make significant investments in our growth areas without relying solely on Keppel's balance sheet.

Furthering our ambitions in renewables, clean energy and decarbonisation solutions, we commenced Singapore's first renewable energy import, and are exploring green ammonia and green hydrogen solutions with international partners as we prepare the Group to support the low-carbon economy.

Keppel Land continued its transformation from a traditional real estate developer into an asset-light provider of innovative and sustainable urban space solutions. In 2022, it expanded its sustainable urban renewal offerings in Korea and also embarked on its first senior living community in China.

We are expanding our data centre portfolio and exploring ways to reduce the carbon footprint of data centres. During the year, we acquired new data centre assets in China and the UK. We also made good progress

in the development of the Bifrost Cable System, which is set to meet the growing digital connectivity needs between Southeast Asia and the west coast of North America, when completed in 2024.

Meanwhile, M1 continues to advance on its multi-year transformation from a traditional telco into a cloud native connectivity platform. In 2022, M1's enterprise business grew steadily to become a significant revenue contributor. At year end, M1 had achieved over 95% outdoor coverage in its 5G Standalone network rollout in Singapore and launched various 5G solutions providing fast-speed connectivity, immersive metaverse experiences and edge computing solutions.

To fully harness the Group's synergies, we are driving integration across our operating units through the establishment of the One Real Estate, One Infrastructure and One Data Centre teams, which will evaluate and execute on opportunities in our focus areas.

### Right Space, Right Time

With the world focusing increasingly on sustainable development, climate change and digitalisation, Keppel is in the right space and at the right time to provide solutions which are good for the planet, people and the Company. Guided by our focus on sustainability, leveraging an asset-light model, and harnessing technology and the Group's strong track record, Keppel will contribute to advancing sustainability, while accelerating growth.

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

# Asset Management

We tap third-party funds for growth, while delivering sustainable returns to investors and unitholders.

## Earnings Highlights (\$ million)

	2022	2021
Revenue	195	162
EBITDA	94	116
Operating Profit	91	113
Profit before Tax	340	327
Net Profit	311	301

### Progress in 2022

- Assets under management (AUM) grew to \$50 billion<sup>1</sup> from \$42 billion as at end-2021.
- Set AUM target of \$200 billion by end-2030.
- Completed over \$7.7 billion in acquisitions and divestments across different asset classes.
- Listed REITs and Trust continued to drive value, delivering sustainable returns to unitholders.
- Keppel Capital became a signatory to the United Nations-supported Principles for Responsible Investment.
- Leveraged Keppel ecosystem to originate two new flagship funds – Keppel Core Infrastructure Fund (KCIF) and Keppel Sustainable Urban Renewal Fund (KSURF).

### Focus for 2023/2024

- Harness the strengths and capabilities of the Group to grow AUM and expand sources of recurring income.
- Enhance sustainability efforts in line with Keppel's Vision 2030 and continue to create long-term value for investors.
- Grow new flagship funds KCIF and KSURF.
- Launch the follow-on Keppel Asia Infrastructure Fund II.



Keppel announced \$2.8 billion worth of energy & environment and sustainable urban renewal-related investments, jointly undertaken by Keppel and the Keppel Capital-managed private funds and business trust.

## One of Keppel Capital's key strengths is its ability to harness the synergies of the Keppel ecosystem of Developer-Operator-Manager capabilities.

The Asset Management arm of Keppel Corporation comprises Keppel Capital, as well as the Group's holdings in the listed REITs and business trust, and private funds.

While 2022 was a turbulent year for the international economy, with heightened geopolitical tensions and economic uncertainty over rising interest rates and inflationary pressures, Keppel Capital's listed entities and private funds successfully completed over \$7.7 billion in acquisitions and divestments across different asset classes. As at end-2022, Keppel Capital achieved its 2022 target AUM<sup>1</sup> of \$50 billion.

With global markets grappling with volatility and uncertainty, the Group saw an increased demand for real assets with long-term steady cash flows, which provide resilient and stable portfolio returns.

Keppel Capital's investment discipline and diversification across quality real asset classes of infrastructure, real estate and data centres in key geographies reinforced its resilience amidst challenging conditions. 2022 also saw growing international focus on climate action, sustainable urbanisation and the circular economy, as well as increasing digitalisation. These macro trends have increased the demand for assets and businesses that Keppel is involved in, including data centres, renewable energy, alternative assets, and prime real estate, further enhancing Keppel Capital's unique value proposition.

During the year, Keppel announced about \$2.8 billion worth of energy & environment and sustainable urban renewal-related investments, jointly undertaken by Keppel together with the Keppel Capital-managed private funds and/or business trust.

Keppel Capital has also been aligning itself with global initiatives, and is now a signatory to the United Nations-supported Principles for Responsible Investment, in addition to its commitment to the United Nations Global Compact. Also, as a CDP capital markets signatory, Keppel Capital continues to play its part in driving corporate environmental transparency toward a low-carbon, sustainable future.

One of Keppel Capital's key strengths is its ability to harness the synergies of the Keppel ecosystem of Developer-Operator-Manager capabilities. Leveraging these capabilities, two new flagship funds were conceptualised during the year – the Keppel Core Infrastructure Fund (KCIF) and the Keppel Sustainable Urban Renewal Fund (KSURF). Both funds have attracted positive interest from global investors.

<sup>1</sup> Gross asset value of investments and uninvested capital commitments on a leveraged basis to project fully-invested AUM.

## Operating & Market Review

### Asset Management



KDC Fund II entered a strategic partnership with Heying, a wholly-owned subsidiary of Tianjin Zhengxin Group, to jointly develop Huailai Data Centre, a greenfield data centre in Greater Beijing.

KSURF aims to deliver a stable yield with long-term sustainable returns by investing in high-quality investments with predominantly contracted and stable revenues. This strategy leverages Keppel's expertise, network, proprietary technologies and deep operational insights to generate added value for the fund through prudent investment, operational enhancement and best-in-class management of quality infrastructure assets.

KSURF seeks to decarbonise buildings through implementing solutions that enhance energy efficiency and achieve sustainability targets while delivering financial returns. With a 'brown-to-green' strategy focused on the commercial real estate in Asia Pacific, this sustainability-dedicated fund is attracting keen interest from investors.

#### Real Estate

In 2022, Keppel REIT expanded its portfolio with the acquisition of KR Ginza II (formerly known as Ginza 2-chome), marking Keppel REIT's entry into the Tokyo office market – a strategic move to enhance geographical and income diversification. With a CASBEE<sup>1</sup> A rating, the asset reflects Keppel REIT's commitment towards acquiring green and energy-efficient assets.

Exemplifying Keppel's asset-light business model, Keppel Land collaborated with the Group's private funds, the Keppel Asia

Macro Trends Fund IV (KAMTF IV) and the KB Bank Discretionary Fund, to jointly acquire Samhwan Building, a freehold office tower in Seoul, South Korea. Keppel will undertake asset enhancement initiatives and refurbishment works to enhance the asset's operational efficiency, performance and value. With the asset well positioned to benefit from the rising demand for quality office spaces in Seoul, this joint investment is a valuable addition to Keppel Capital, which has managed close to \$3.4 billion of assets in South Korea since 2004.

In line with Keppel's asset-light business model, Keppel Land, Keppel Vietnam Fund (KVF) and a co-investor of KVF acquired three residential land sites in Hanoi, on which the Group will develop about 1,260 homes.

Meanwhile, Keppel Pacific Oak US REIT (KORE) completed the divestments of Powers Ferry and Northridge Center I & II in Atlanta, Georgia, at prices above their last valuations conducted in 2021. This is in line with the Manager's portfolio optimisation strategy, and improves KORE's financial flexibility.

#### Data Centres

The rapid growth of cloud computing platforms and artificial intelligence has accelerated the trend of digitalisation, driving demand for quality and sustainable data centres. Keppel DC REIT continued to grow its portfolio with acquisitions in

China and the UK. In the UK, Keppel DC REIT acquired a data centre in London, strengthening the REIT's presence in the top global data centre hub of London. Strengthening its presence in Asia Pacific, Keppel DC REIT also acquired two data centres in Guangdong, one of China's most established data centre markets and a major technology hub.

On the private funds side, Keppel Data Centre Fund II (KDC Fund II) closed with US\$1.1 billion of total commitments, including co-investment capital. The fund attracted commitments from a diverse group of institutional investors in Asia and Europe, including the Asian Infrastructure Investment Bank. By collaborating with Keppel Data Centres to leverage their technical know-how in data centre management and operations, as well as their expertise in developing green, energy-efficient data centres, Keppel Capital is able to deliver a wider range of client services as well as higher investor returns. During the year, KDC Fund II entered a strategic partnership with Heying, a wholly-owned subsidiary of Tianjin Zhengxin Group, to jointly develop Huailai Data Centre, a greenfield data centre in Greater Beijing, China's tier 1 data centre market. In line with Keppel's commitment to sustainability, the data centre will be equipped with energy-saving technology capable of reducing energy consumption by 50% or more compared to traditional chilled water systems.

<sup>1</sup> Comprehensive Assessment System for Built Environment Efficiency.

## Infrastructure continues to be an exciting space for Keppel, with decarbonisation and sustainable urbanisation trends accelerating demand for such essential real assets.

### Infrastructure

Keppel Infrastructure Trust (KIT) enhanced its portfolio with the completion of five acquisitions in 2022. The acquisitions extend KIT's footprint into new geographies, namely Germany, Norway, Sweden, the Kingdom of Saudi Arabia and South Korea, and marked its maiden participation in the renewable energy sector. The transactions include two wind farm acquisitions in Europe, namely a 20.5% stake in an offshore wind farm in Germany and a 13.4% stake in a European onshore wind platform comprising three wind farm assets across Norway and Sweden. KIT also completed its minority and non-controlling investment in the Aramco Gas Pipelines Company in the Kingdom of Saudi Arabia, a strong and growing business underpinned by one of the world's largest reserves of natural gas.

KIT collaborated with Keppel Asia Infrastructure Fund (KAIF) and Keppel Infrastructure (KI) to jointly acquire Eco Management Korea Holdings (EMK), a waste management and recycling services provider with six waste-to-energy plants and five sludge drying facilities in South Korea. Beyond income diversification, the acquisition supports both South Korea's green agenda and Keppel's Vision 2030.

In Singapore, KIT completed the acquisition of the remaining 30% stake in SingSpring Desalination Plant, enhancing the operational and business continuity of the asset. KIT has also signed a non-binding term sheet with KI to acquire a 50% equity stake in the Keppel Marina East Desalination Plant, Singapore's first and only large-scale dual mode plant which can treat both seawater and rainwater drawn from the Marina Reservoir.

During the year, KAIF together with its co-investor and Keppel Corporation, raised their joint venture's effective stake in Cleantech Solar Asia Pte Ltd, the asset company of Cleantech Renewable Assets from 25.5% to 75.5%. It also completed the acquisition of 800 Super, a joint transaction with KI and KAIF's first investment in Singapore's environment sector.

Infrastructure continues to be an exciting space for Keppel, with decarbonisation and sustainable urbanisation trends accelerating demand for such essential real assets.

### Alternative Assets

Riding on the resilient and fast-growing education sector in Asia Pacific, the

Keppel Education Asset Fund (KEAF) completed the acquisition of a strategic stake in a premium UK international school in Singapore, further adding to its portfolio of quality education assets. During the year, KEAF also completed the retrofitting and refurbishment of a vacant university campus in Tokyo into a premium UK international school. The asset has been handed over to the tenant, and the long-term lease commenced in October 2022. Looking ahead, Keppel Capital is confident that the demand for quality real estate for schools and campuses will continue to be well supported by macro trends including rapid urbanisation, an expanding middle class and rising affluence, as well as a continued focus on quality education.

Keppel-Pierfront Private Credit Fund, which is managed by Keppel Capital's private credit platform Pierfront Capital, announced a final close of approximately US\$700 million in investable capital, including co-investment commitments. The fund will provide loans to companies with defensive infrastructure-like business models and attractive risk-adjusted returns, spanning asset classes such as transportation, renewable energy and core infrastructure.



KIT collaborated with KAIF and KI to jointly acquire EMK, a leading integrated waste management services player in South Korea.

# Energy & Environment

We provide energy and environmental solutions that are essential for sustainable development.

## Earnings Highlights (\$ million)

	2022	2021
Revenue <sup>1</sup>	4,230	3,560
EBITDA <sup>1</sup>	119	(261)
Operating Profit/(Loss) <sup>1</sup>	86	(291)
Profit/(Loss) before Tax <sup>1</sup>	215	(193)
Net Profit/(Loss) from continuing operations	172	(189)
Net Profit/(Loss) from discontinued operations	88	(225)

<sup>1</sup> Numbers are for continuing operations.

### Progress in 2022

- Announced around \$2.6 billion of joint investments in solar, wind, energy and environmental assets and platforms with private funds and business trust managed by Keppel Capital.
- Opened intelligent Operations Nerve Centre, co-located in *Keppel Infrastructure @ Changi*, Singapore's first Green Mark Platinum Positive Energy building under the new and more stringent Green Mark scheme.
- Commenced import of hydroelectric renewable energy into Singapore via the Lao PDR-Thailand-Malaysia-Singapore Power Integration Project.
- Developing Singapore's first hydrogen-ready advanced combined cycle power plant.
- Signed MOUs to explore several initiatives spanning carbon capture at WTE plants, R&D for hybrid floating renewable energy systems, and green hydrogen and green ammonia value chain with international partners.
- Keppel O&M secured charters for all available KFELS B Class legacy rigs.

### Focus for 2023/2024

- OneInfra team will continue asset-light strategy and leverage third-party funds to pursue opportunities in power & renewables, new energy, and environmental solutions.
- Strengthen bundled rooftop solar, cooling, energy storage and electric vehicle charging through Energy-as-a-Service offerings.
- Continue to grow renewable energy portfolio to achieve 7 GW target by 2030.
- Expand environment solutions with value-added enhancements that improve circularity and reduce carbon intensity.



Keppel Corporation is expanding into the wind energy business, alongside Keppel Infrastructure Trust, through joint investments in offshore and onshore wind energy assets in Europe.

**The global energy crisis presents strong tailwinds for the Group to leverage its deep capabilities and proven track record to help its customers expedite their energy transition.**

The Energy & Environment segment provides technology-based solutions and services spanning power and renewables, new energy, environment, as well as offshore & marine (O&M). The segment comprises Keppel Infrastructure, Keppel Renewable Energy (which has been integrated under Keppel Infrastructure with effect from 1 March 2023) and Keppel O&M (which was merged with Sembcorp Marine on 28 February 2023). Over the course of 2022 and up to early 2023, Keppel streamlined its business, through the combination of Keppel O&M and Sembcorp Marine, as well as the resolution of its legacy rigs and associated receivables.

The Russia-Ukraine war has pushed energy security up the international agenda, with governments actively seeking to reduce their reliance on traditional energy sources and secure alternative energy supplies. Coupled with the higher energy prices and increasing global focus on climate change, recent developments have given new impetus to

the global shift to renewables and clean energy. Supported by the net zero carbon emission commitments of governments and businesses, the current market landscape presents strong tailwinds for the Group to leverage its deep capabilities and proven track record to help its customers expedite their energy transition.

Harnessing its asset-light model, the Group made around \$2.6 billion worth of energy & environment-related investments, jointly undertaken by Keppel together with the private funds and/or business trust managed by Keppel Capital. These include investments in offshore and onshore wind energy assets across Europe, as well as a solar energy platform in Asia. Reflecting the Group's continued integration efforts, a One Infrastructure (OneInfra) team, comprising senior members from Keppel Infrastructure and Keppel Capital, worked closely together to seize opportunities in decarbonisation and environmental solutions, investing in waste management businesses in Singapore and South Korea.

With its expertise in the development and operation of sustainable solutions as well as asset management capabilities, Keppel is well placed to leverage third-party funds to pursue inorganic opportunities such as acquiring assets, operating platforms and technologies. Looking ahead, the OneInfra team is actively exploring opportunities in power & renewables, new energy, and environmental solutions.

In line with Vision 2030, Keppel has been strengthening its recurring income sources from electricity sales, operations and maintenance of essential infrastructure and bolstering its Energy-as-a-Service (EaaS) portfolio with offerings such as energy optimisation and analytics, energy storage, cooling and electric vehicle (EV) charging. Such services offer customers tangible and realisable pathways to carbon neutrality, while also achieving cost savings for customers. Together, these solutions enable the Group to contribute towards efforts in achieving the world's energy transition and decarbonisation ambitions.

## Operating & Market Review

### Energy & Environment



Keppel MET Renewables, a joint venture between Keppel Infrastructure and Swiss-based MET Group, will pursue and invest in solar and onshore wind assets across Western Europe, starting with an initial portfolio of 213 MW of solar projects in Italy.

#### Power & Renewables

During the year, Keppel grew its renewables portfolio from 1.1 GW to 2.6 GW<sup>1</sup>, as it gains ground on its 7 GW target by 2030.

Keppel Infrastructure formed Keppel MET Renewables, a joint venture with Swiss-based MET Group, to pursue and invest in both greenfield and brownfield solar and onshore wind assets across Western Europe. Keppel MET Renewables was seeded with an initial portfolio of 213 MW of solar projects in Italy, and has a target to scale up to at least 1 GW of operating and ready-to-build renewable energy projects.

As part of the 2.6 GW portfolio, Keppel co-invested approximately \$679 million in onshore and offshore wind energy assets across Germany, Norway, and Sweden, alongside Keppel Infrastructure Trust. The investments will provide Keppel not only with stable recurring income, but also a strong deal flow pipeline in well-established markets in the Nordics and the United Kingdom.

In Asia, Keppel, along with Keppel Asia Infrastructure Fund (KAIF) and KAIF's co-investor, increased their stake in Cleantech Solar Asia, the asset company of a leading solar energy platform from 25.5% to 75.5%. With solar assets located in India and ASEAN, the platform is

expected to benefit from the growing demand for renewable energy in the region.

Keppel is also pioneering cross-border power trade of renewable energy into Singapore, with the commencement of the nation's first import of hydropower under the Lao PDR-Thailand-Malaysia-Singapore Power Integration Project. As at end-2022, more than 180 GWh of electricity had been successfully transmitted into Singapore's power grid. In addition, Keppel Infrastructure is pursuing other renewable energy opportunities and cross-border interconnections with Cambodia, Lao PDR and Indonesia.

Other opportunities are in the pipeline for Keppel Infrastructure to scale up its offerings in the renewable energy sector. It was awarded a grant from the Energy Market Authority and JTC Corporation to pilot Singapore's first membrane-based nearshore floating solar photovoltaic system, which is designed to harness solar energy reliably amid rough sea conditions. Keppel Infrastructure is also collaborating with the National University of Singapore and Nanyang Technological University to develop a first-of-its-kind floating hybrid renewable energy system to harness solar, wind, and tidal energy for continuous power generation.

<sup>1</sup> On a gross basis, including projects under development.

Beyond renewables, the Group is at the forefront of efforts to decarbonise Singapore's power generation sector. Keppel Infrastructure is building the nation's first hydrogen-ready and most advanced combined cycle gas turbine power plant. When completed in 2026, the 600 MW Keppel Sakra Cogen plant will be the most energy-efficient power plant in Singapore, capable of saving up to 220,000 tonnes per year of CO<sub>2</sub> emissions, as compared to Singapore's average operating efficiency for equivalent power generated. In line with Keppel's asset-light business model, the Keppel Sakra Cogen Plant is intended to be owned by Keppel Energy and KAIF.

Keppel Infrastructure completed a high efficiency (HE) upgrade for a generating unit in Keppel Merlimau Cogen Plant, the first HE upgrade in Southeast Asia. Following the upgrade, the unit is delivering improved efficiency and flexibility, while reducing its fuel consumption, carbon footprint, and environmental impact.

In 2022, Keppel Renewable Energy entered into late-stage development for its flagship 500+ MW solar project in Queensland, Australia. Keppel Renewable Energy has also been collaborating with Keppel Data Centres to explore the import of renewable energy from Indonesia.

Since 1 March 2023, Keppel Renewable Energy has been integrated under Keppel Infrastructure to optimise synergies.

#### New Energy

Keppel Infrastructure positioned itself to capture the demand for decarbonisation in Singapore and around the region through its sustainable EaaS offerings. In 2022, it secured multi-year contracts with a total value of over \$250 million. Moving forward, the EaaS business model is expected to add to the sources of quality recurring income for the Group.

The effectiveness of the sustainable EaaS concept is demonstrated in the retrofitted *Keppel Infrastructure @ Changi*,

which showcases Keppel's ability to blend innovation and sustainability into a value-added energy service. *Keppel Infrastructure @ Changi* houses Keppel Infrastructure's intelligent operations nerve centre, which harnesses smart technologies, such as artificial intelligence and IoT to streamline processes, improve productivity, and enhance the reliability of Keppel's assets and operations.

The building is expected to yield about 600,000 kWh/year of renewable energy, more than double of the building's consumption, earning it the highest accolade of Green Mark Platinum Positive Energy by the Building and Construction Authority.

Keppel Infrastructure continued to expand its energy-efficient district cooling services. The construction of the district cooling systems in Bulim Phase 1 of the Jurong Innovation District in Singapore and in the Sam Yan commercial area in Bangkok are progressing well.

**The Group leveraged its asset-light model to invest about \$2.6 billion in energy & environment-related assets and platforms in 2022, alongside the private funds and/or business trust managed by Keppel Capital.**



Mr Koichi Watanabe, CEO of Jurong Engineering; Ms Cindy Lim, CEO of Keppel Infrastructure; Mr Loh Chin Hua, CEO of Keppel Corporation; Dr Tan See Leng, Minister for Manpower & Second Minister for Trade and Industry; Mr Ngiam Shih Chun, Chief Executive of Energy Market Authority; and Mr Osamu Ono, CEO of Mitsubishi Power Asia Pacific were present at the signing of the engineering, procurement and construction contract for the construction of the Keppel Sakra Cogen Plant.

## Operating & Market Review Energy & Environment

Gearing up for the low-carbon economy, Keppel Infrastructure explored partnerships in the low-carbon ammonia/hydrogen, carbon capture utilisation and sequestration (CCUS) and decarbonisation spaces. It signed a Memorandum of Understanding with Greenko, one of India's leading renewable energy companies, to explore green ammonia and renewable opportunities to meet the growing demand for low-carbon energy in India, Singapore and globally. It also entered into a joint study with Pertamina Power Indonesia and Chevron New Energies to explore the development of selected green hydrogen and green ammonia projects using geothermal energy located primarily in Sumatera, Indonesia. During the year, Keppel Infrastructure formed a consortium with Air Liquide, Chevron and PetroChina to advance the development of large-scale CCUS solutions and integrated infrastructure in Singapore.

### Environment

In 2022, the OneInfra team leveraged third-party capital for the acquisition of South Korean waste management company, Eco Management Korea, and Singaporean environmental services company, 800 Super. The transactions complement and broaden the range of environmental services that

**In line with Keppel's Vision 2030, Keppel Infrastructure has been strengthening its recurring income sources from electricity sales, operations and maintenance of essential infrastructure and bolstering its EaaS portfolio.**

Keppel Infrastructure offers, and create opportunities to synergise operations.

Notwithstanding the impact of the COVID-19 pandemic on construction and development, Keppel Infrastructure forged ahead with the construction of the Hong Kong Integrated Waste Management Facility and Tuas Nexus Integrated Waste Management Facility, achieving good progress in 2022. In Australia, Keppel Seghers is supporting the client in the final commissioning works of the Kwinana Waste-to-Energy (WTE) project, Australia's first thermal WTE facility.

Carbon capture for WTE is a key target on Keppel's decarbonisation roadmap, as it

spearheads the decarbonisation of Singapore's waste infrastructure through a joint study with the National Environment Agency on the feasibility of carbon capture for selected WTE plants in Singapore as well as the potential development of a pilot carbon capture facility integrated with these plants. In Europe, Keppel Seghers is an active member of the European Supplier of Waste-to-Energy and the chair of its CCUS taskforce.

In line with the Group's plans to advance the circular economy, Keppel Seghers, together with its partners, is exploring the treatment and use of Incineration Bottom Ash (IBA) as an alternative construction material for WTE plants. In Qatar, plans for plastic recycling and use of IBA are already underway to improve the circularity of the Domestic Solid Waste Management Center (DSWMC). This will reduce the volume of IBA going to the landfill, thus improving the circularity of waste streams and prolonging the lifespans of existing landfills.

During the 2022 FIFA World Cup, Keppel Seghers supported the Government of Qatar in managing the higher volumes of waste through treatment at the DSWMC. Leveraging its strong track record in Qatar, Keppel Seghers will continue to widen its presence in the Gulf Cooperation Council countries, many of which have embarked on WTE projects as a means of diverting waste from conventional landfills.

At the same time, there continues to be strong demand for energy-efficient WTE plants in other regions where Keppel Seghers is present. Europe is facing the need to replace ageing WTE plants with more energy-efficient technology, in order to maximise energy recovery from waste. Meanwhile, in Southeast Asia, where most waste is still being landfilled, there has been burgeoning demand to explore WTE as a sustainable waste management alternative. Keppel Seghers, with its broad international experience and strong execution track records, is well poised to meet the growing interest from governments.



Keppel continues to expand its customer base for EaaS offerings, such as district cooling, solar panels and EV chargers.



Carbon capture for WTE is a key target in Keppel's decarbonisation roadmap. (In picture: Keppel Seghers' Beijing Fangshan District Circular Economy Industrial Park.)

### Offshore & Marine

In 2022, amid improving conditions in the offshore and marine sector, Keppel O&M secured about \$8.1 billion of new orders, bringing its net orderbook to \$11.0 billion, the highest level since 2007. This includes two floating production storage and offloading units for Petrobras.

During the year, Keppel O&M continued to strengthen its foothold across the value chain of offshore renewables. Keppel O&M completed a wind turbine installation vessel crane upgrade project and secured a contract to build its sixth offshore substation. Its first two offshore wind substations for Ørsted, which were for the Greater Changhua 1 & 2a wind farms in Taiwan, have successfully generated their first power.

In specialised shipbuilding, Keppel O&M achieved several industry 'firsts' with the successful completion of its maiden autonomous vessel project. Capable of autonomous vessel navigation as well as collision detection and avoidance, the Maju 510 tug, owned and operated by Keppel Smit Towage, is the first vessel in the world to receive the Autonomous and Remote-Control Navigation Notations from ABS classification society. Keppel O&M also delivered to Dutch maritime company Van Oord the Vox Ariane and Vox Apolonia, high-specification dual-fuel dredgers with several features that reduce fuel

consumption and carbon emissions, including the ability to run on liquefied natural gas.

The offshore drilling market has seen continued fixture activity, predominantly in the Middle East, resulting in a steady upward trajectory of utilisation and day rates for jackup rigs. As at end-2022, all of Keppel O&M's available KFELS B Class legacy jackup rigs had secured bareboat charters. It successfully bareboat-chartered four of its legacy B Class rigs and redeployed another two B Class rigs to drilling contractors in the Middle East, securing stable recurring charter income over the next three to five years.

With effect from 28 February 2023, Keppel O&M has been merged with Sembcorp Marine to create a premier global player offering solutions in offshore renewables, new energy and cleaner solutions in the O&M sector. Keppel's legacy rig assets and associated receivables have also been transferred to Asset Co, the majority of which is owned by external investors. Amidst the improving offshore rig market, Keppel is hopeful that the monetisation of the legacy rigs can take place sooner, leading to earlier repayment of the vendor notes issued by Asset Co. Keppel has received \$4.25 billion in vendor notes, which come with a coupon rate of 4% that translates into approximately \$170 million of interest income per annum.

# Urban Development

We provide sustainable and innovative urban space solutions, with a growing focus on sustainable urban renewal and senior living.

## Earnings Highlights (\$ million)

	2022	2021
Revenue	904	1,629
EBITDA	319	1,036
Operating Profit	288	993
Profit before Tax	418	1,072
Net Profit	282	763

Progress in 2022	Focus for 2023/2024
<ul style="list-style-type: none"> <li>Established OneRE team, comprising Keppel Land and Keppel Capital, focused on sustainable urban renewal (SUR) investments.</li> <li>Acquired Samhwan Building in partnership with private funds managed by Keppel Capital, expanding Keppel Land's SUR footprint into South Korea.</li> <li>Monetised two assets in China with total proceeds of about \$347 million.</li> <li>Entered China's senior living market with the announced acquisition of a senior living facility project in Nanjing.</li> <li>Announced acquisition of a stake in a residential site in Shanghai alongside co-investors through Keppel's China Urban Development Investment Programme.</li> <li>Re-entered Hanoi, alongside Keppel Vietnam Fund and its co-investor, with the announced acquisition of a 49% interest in three residential land plots.</li> </ul>	<ul style="list-style-type: none"> <li>Accelerate asset monetisation and unlock capital that can be reinvested for growth and higher returns, leveraging the Group's asset-light model.</li> <li>Keep developing operating capabilities and seek opportunities in the new growth engines of SUR and senior living.</li> <li>Invest strategically and selectively in new projects across Asia Pacific, the US, the UK and Europe with a focus on providing Real Estate-as-a-Service.</li> <li>Continue to develop innovative solutions to redefine urban spaces in collaboration with other Keppel business units.</li> <li>Continue to develop the Sino-Singapore Tianjin Eco-City in China as a model for sustainable urbanisation.</li> </ul>



The joint investment of Samhwan Building (left) in Seoul by Keppel Land and Keppel Asia Macro Trends Fund IV and KB Bank Discretionary Fund managed by Keppel Capital is a prime example of the Group's ability to harness complementary strengths and tap third-party funds for growth.

**As part of its pivot to an asset-light model, Keppel Land has been reinvesting in new growth engines and shoring up capabilities in sustainable urban renewal and senior living, which will add further streams of recurring income.**

The Urban Development segment delivers innovative, multi-faceted urban space solutions as well as end-to-end master development of smart, sustainable urban projects. It comprises Keppel Land, Keppel Urban Solutions (which has been integrated under Keppel Land with effect from 1 January 2023), and the Group's associated company, Sino-Singapore Tianjin Eco-City Investment and Development Co., Ltd. (SSTEC), the master developer of the Sino-Singapore Tianjin Eco-City (Eco-City).

**Urban Space Solutions**

As the world transitions to living with COVID-19, pandemic-driven changes over the past three years continue to have a lasting impact on the future of work, fuelled by new technologies and digitalisation. The design and practice of work, which in turn shape the mix of physical and digital workspaces required to meet business outcomes, are also evolving as organisations respond to hybrid work trends and the growing need for more sustainable operations.

More companies are seeking offices that offer flexible spaces, digital platforms or shared amenities that also promote health and wellness of employees. In addition, companies are also increasingly looking for sustainable features that not only reduce the carbon footprint of the buildings but also uplift the quality of life of the occupants.

Meanwhile, increasing life expectancy, rising affluence, and cultural shifts continue to drive the expansion of ageing populations and deepen focus on well-being and healthy ageing, boosting demand for senior living facilities with community-based services.

Keppel Land has been positioning itself to seize opportunities from these macro trends, with its pivot to be an asset-light provider of innovative and sustainable urban space solutions. To advance its transformation, Keppel Land is strategically monetising its assets, while reinvesting in new growth engines and operating platforms in the areas of sustainable urban renewal (SUR) and senior living, which will add further streams of recurring income.

In 2022, Keppel Land embarked on its first dedicated senior living facility project in Nanjing, China. To be fitted out and operated by Keppel Land, the facility is expected to open in 2H 2023. Located in Nanjing's Qixia district and with a capacity of around 400 residents, it will be a premier assisted living community with care capabilities. Designed as a low-carbon and environmentally friendly project, the Nanjing assisted living community project will serve as a launchpad for Keppel's expansion into other senior living markets in China and beyond.

During the year, Keppel Land expanded into South Korea with the acquisition of Samhwan Building in Seoul jointly with private funds managed by Keppel Capital, where it will apply its SUR capabilities to retrofit, future-proof and extend the lifespan of the office building. Keppel Land will deploy its in-house design capability to map out customer or tenant journeys, before formulating suitable configurations or services that value-add to their experiences. It will also harness digital technologies and the IoT to develop

## Operating & Market Review

### Urban Development

smart platforms that can both enhance user experience as well as greatly reduce the asset's carbon footprint.

Keppel Land is committed to redefining urban spaces for a sustainable future. For the existing assets that it manages, such as Keppel Bay Tower, the first commercial building in Singapore to be certified as a Green Mark Platinum (Zero Energy) building, Keppel Land deploys continual improvement principles, regularly upgrading building performance and offering services that promote occupier wellness. In all its operating markets, Keppel Land pursues the top two tiers of green building ratings.

For its firm commitment to raise the sustainability performance of its assets, Keppel Land received several prestigious sustainability accolades in 2022. These include the Singapore Green Building Council – Building and Construction Authority (BCA) Leadership in Sustainability Award, the Overall Top Real Estate Developer Globally by Euromoney, and the second position in Asia in GRESB's Diversified – Non-listed category.

Accelerating its shift towards an asset-light model, Keppel Land works closely with

Keppel Capital to tap third-party funds to invest in quality projects, while generating fee-based income from asset development and operation. Examples include the abovementioned Samhwan Building in Seoul and a 49% interest in three residential land plots in Hanoi alongside private funds managed by Keppel Capital. During the year, Keppel Land also invested in a residential site in Shanghai together with co-investors through the China Urban Development Investment Programme (CUDIP), under which Keppel Land and Keppel Capital serve respectively as overall development manager and investment manager. The CUDIP aims to invest in residential developments in Tier 1 and Tier 2 gateway cities in China alongside co-investors.

Advancing the Group's ambition as one integrated business, Keppel Land and Keppel Capital established the One Real Estate (OneRE) team, which harnesses Keppel's complementary strengths across real estate solutions and asset management to source for deals and undertake SUR projects. Through such efforts, Keppel Land will focus on delivering on-the-ground development or operational capabilities, while Keppel Capital acts as a financial

twin, prospecting new investors and raising funds, thus allowing the Group to scale up quickly in its key markets in an asset-light manner.

In Singapore, cooling measures announced in September 2022 and rising interest rates have placed pressure on sentiments in the residential market. Keppel Land sold about 30 residential units in 2022, lower year-on-year partly due to a lack of new launches and reduced inventory. In the office space, while demand is expected to moderate given the ongoing consolidation in the technology sector, rents are expected to be boosted by the limited new office pipeline. Expected to be completed towards the end of 2024, the Keppel Towers redevelopment will incorporate features, technology and services that meet the highest standards in sustainability, connectivity, wellness and flexible working. In the retail space, following major asset enhancement works, Keppel Land officially opened i12 Katong, a living laboratory for novel retail concepts and a 'phygital' environment. The retail mall is on track to obtain the BCA Green Mark Platinum award and had an occupancy rate of above 95% at end-2022.

**Keppel Land deploys its in-house design capability to formulate suitable configurations or services and harnesses digital technologies to develop smart platforms that can enhance user experience as well as reduce an asset's carbon footprint.**



Keppel Land has built a strong and diverse track record in Vietnam, winning several industry-leading awards and drawing good buyer demand for its developments. (In picture: Celesta Avenue in Ho Chi Minh City, was named the Best Housing Development at PropertyGuru Vietnam Property Awards.)

In China, the real estate market faced considerable headwinds in 2022, as market sentiments were impacted by the economic slowdown and the COVID-19-related restrictions. Despite the challenging environment, Keppel Land monetised two projects in Shanghai, with total proceeds of about \$347 million. Keppel Land also sold about 1,080 homes in China.

As China's real estate sector moves away from a debt-driven growth model, Keppel is well placed to work with local developers by leveraging its capabilities in deal sourcing and fund-raising to invest in attractive sites. Following the relaxation of China's zero-COVID policy and the introduction of policies that support the real estate sector, the market has started to show signs of improvement since the end of 2022. Meanwhile, the demand for quality homes in well-located areas is expected to be resilient over the mid to long term, underpinned by urbanisation trends and growing affluence.

In Vietnam, the economy grew 8.0% in 2022, the highest increase in the last decade, backed by strong domestic retail sales and exports. In the real estate sector, while demand remained healthy, challenging approval processes limited the number of new launches in the country. In 2022, Keppel Land sold about 70 homes in Vietnam, noticeably lower compared to 2021. However, reflecting the strong market demand, the first batch of units launched at Keppel Land's Celesta Avenue in Ho Chi Minh City was fully sold within a month.

During the year, Keppel Land was awarded 12 prestigious awards from PropertyGuru Vietnam for developing some of the country's finest and most sustainable mixed-use and residential developments.

Together with Keppel Urban Solutions, Keppel Land continued to develop a smart and sustainable planning roadmap for Saigon Sports City, which is expected to be a model integrated smart and sustainable development. Keppel Urban Solutions is also targeting similar large-scale development projects in other markets.

Since 1 January 2023, Keppel Urban Solutions has been integrated under Keppel Land to streamline the Group's business and optimise synergies.

In India, the net absorption in office markets is on track to return to its 5-year average of the pre-pandemic era, as the country is expected to become an attractive spot for

global shared-services firms to expand operations. During the year, Keppel Land completed the acquisition of the remaining 49% stake in a Grade A commercial office project in Bangalore. It sold about 730 homes across two projects in Bangalore and Mumbai.

In Indonesia, strong demand for quality landed homes around Jakarta continued to boost sales despite the pandemic. Keppel Land sold about 280 units, primarily from a new launch of the Wisteria project in East Jakarta. Meanwhile, Chillax, a lifestyle and placemaking commercial hub situated on the former International Financial Centre Tower 1 site, was successfully launched in November 2022.

#### Sino-Singapore Tianjin Eco-City

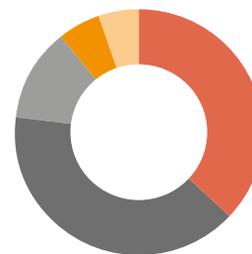
Keppel leads the Singapore consortium, which works with its Chinese partner to guide the 50-50 joint venture, SSTEC, in its role as master developer of the Eco-City.

In 2022, the Eco-City continued to grow as a vibrant, smart and green city, attracting residents to live, work and play in. Its current population of 130,000 people<sup>1</sup> and 20,000 registered companies<sup>1</sup> are well served by highly accessible quality amenities, as well as the two newly opened large-scale commercial complexes and an outdoor sports and activities hub. In 2022, more than 3,300 homes were sold in the Eco-City, including more than 300 homes from projects developed by SSTEC.

In 2022, Keppel's various business units enhanced their sustainability-related offerings in the Eco-City. Keppel Land secured the Tianjin Climate Exchange Carbon Neutrality certification for the retail mall of Seasons City, its first commercial development in the Eco-City. Keppel Land is also developing a carbon-neutral smart precinct in the Eco-City's Northern District that is aligned with China's 'dual carbon' goals.

Keppel Infrastructure successfully developed its first rooftop solar photovoltaic system at the Landmark Building, supplying clean energy to the tenants. Its second rooftop solar photovoltaic system is currently under development at one of the ready-built factories in the Eco-Innovation Park. To cater to the population growth, the Sino-Singapore Tianjin Eco-City Water Reclamation Centre, a joint venture between Keppel Infrastructure and Tianjin Eco-City Investment and Development Co. Ltd, commenced phase 2 of its development, offering an additional water treatment capacity of 70,000 tonnes per day.

**Keppel Land's Total Asset Distribution By Country (%)**  
as at 31 December 2022



● Singapore	37.0
● China	40.0
● Vietnam	12.4
● Indonesia	5.5
● Others	5.1
<b>Total</b>	<b>\$12.3 billion 100.0</b>

**Keppel Land's Total Asset Distribution by Segment (%)**  
as at 31 December 2022



● Property Trading	33.9
● Property Investments	61.4
● Others	4.7
<b>Total</b>	<b>\$12.3 billion 100.0</b>

<sup>1</sup> Includes the Central Fishing Port and Tourism District.

# 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 Logistics<sup>1</sup> 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.

<sup>1</sup> 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.

# Scenario Planning

We are building a future-ready company, identifying risks and opportunities as we execute Keppel's Vision 2030 plans.

## Planning for an Uncertain World

Amidst an uncertain global environment characterised by heightened geopolitical tensions, slowing economic growth, financial volatility and increasingly frequent extreme climate events, Keppel conducted a scenario planning exercise in 3Q 2022 to test and enhance the resilience of Keppel's Vision 2030 strategy.

The scenario planning exercise, conducted based on an established scenario planning methodology, involved Keppel Corporation's senior management, as well as the leadership teams in the different business units. The scenarios as well as the strategic responses to the scenarios were then presented and discussed at Keppel Corporation's Board Strategy Offsite in end-September 2022.

## Three Alternative Scenarios

A set of three scenarios was developed using an inductive methodology. At a broad level, each scenario was defined in terms of a range of outcomes in the 2030 timeframe along three primary dimensions: (i) the geopolitical and economic order; (ii) the climate change response and energy transition landscape; and (iii) the global financial environment.

In terms of the geopolitical dimension, the scenarios envisaged a range of plausible international political configurations and dynamics ranging from a deeply decoupled and conflictual world, to a multipolar environment characterised by greater stability and more balanced global growth. Beyond the ongoing conflict in Ukraine,

the scenarios also explored the possible implications of an escalation in Cross-Strait tensions. In terms of the global financial environment dimension, the scenarios depicted a range of alternative levels and geographic patterns of economic growth, as well as varying degrees of financial system stability, in particular with respect to monetary policy and its various potential effects.

On climate change and the energy transition, the scenarios considered a range of potential global warming trajectories, alternative speeds of the energy transition, the nature of the global response to climate change, as well as varying degrees and forms of climate-related physical and transition risks. One of the three scenarios was based on the relatively benign 1.5°C global warming trajectory, corresponding to the range of potential temperature changes by 2081-2100 in SSP1-2.6<sup>1</sup>. To ensure rigorous testing of the resilience of the Group's strategy and risk management, the other two scenarios were built on 3.5°C and 4.0°C global warming trajectories<sup>2</sup>, which envisaged significantly higher climate risks, and more frequent and extreme climate-related events. In terms of the global response to climate change, the scenarios explored a range of possibilities, from unified global mitigation efforts to disparate adaptation-centred efforts.

While the full impacts of the scenarios, especially those related to climate change, may manifest themselves more clearly over a longer period, this exercise was focused on developing a set of plausible scenarios

<sup>1</sup> IPCC AR6 WGII Technical Summary.

<sup>2</sup> The global warming trajectories in these two scenarios are consistent with the SSP3-7.0 and SSP5-8.5 scenarios respectively.



Keppel is well placed to provide solutions to help its customers and stakeholders on their journeys to net zero.

that represent a range of future operating conditions that Keppel may face over the next 5-10 years, and which would be particularly relevant to Keppel as the Group executes its Vision 2030. The scenarios did not assign probabilities to specific future conditions, but rather served to generate inputs to the Board and management when considering the Company's strategy, while also identifying risks and opportunities.

**Responding to Uncertainty**

Beyond specific responses to individual scenarios, the Group also identified and considered a range of 'no regret' actions that would be likely to generate the greatest expected strategic value across all three scenarios, in order to strengthen the future-readiness of the group strategy. These robust actions included, for example, raising the Group's fund-raising capabilities,

anticipatory regulatory awareness, and strengthening the Group's networks of investors across its targeted markets, in line with Keppel's Vision 2030 plans to be a leading global asset manager and operator. Through the review of alternative plausible geopolitical scenarios, the Group also discussed its long-term human resource requirements and the importance of strengthening talent with relevant market knowledge in different geographies.

On the climate change and energy transition front, across all three scenarios, it was envisaged that there would be growing demand for renewables, clean energy, decarbonisation solutions and climate-resilient infrastructure – sectors which Keppel already operates in and which represent considerable growth opportunities for the Group. The importance

of incorporating climate-related risk assessment in future strategies was emphasised across scenarios, whether in terms of decarbonising the Group's operations, assessing specific acquisition targets, or evaluating the commitment and capacity of local governments to address physical climate risks when making long-term investment decisions. Importantly, Keppel also discussed how the Group could leverage its unique strengths and track record to offer solutions to help its customers and stakeholders on their journeys to net zero.

Beyond the initial scenario analysis exercise, a set of qualitative and quantitative signposts was also identified to facilitate the monitoring of future operating conditions, thus helping the Company to take suitable anticipatory actions and adjust its strategy in response to the evolving landscape.

