Technology & Innovation

Innovation has long served as a potent differentiator for Keppel.

Embracing innovation strengthens our unique value proposition as a global asset manager and operator focused not only on delivering enduring value to our Limited Partners (LPs) and our shareholders but also creating a sustainable future.

We leverage innovation to catalyse growth through our virtuous investment cycle, with the shared objective of delivering attractive risk-adjusted returns to our LPs. Our Fund Management and Investment platforms harness digitalisation and artificial intelligence (AI) to improve the way we deploy capital, engage investors and manage our portfolio. Our Operating Platform leverages innovation to design new commercialisable solutions and drive superior asset performance, applying our deep domain knowledge to value-add to the real assets in our listed vehicles and private funds.

While each of our three segments – Infrastructure, Real Estate and Connectivity – is exploring specific innovation themes relevant to their industries, they also share common themes such as accelerating the development of sustainability and energy transition solutions; adopting a full ecosystem and value chain approach to address complex problems; and embedding customer centricity and digitalisation.

ACCELERATING DIGITALISATION AND USAGE OF AI

Across our platforms and centralised functions, we are focused on accelerating digitalisation. Efforts include hallmark projects such as the set-up of our Keppel Data Exchange that allows for multiple streams of data to be integrated in a Keppel-wide data lake. It incorporates robust data policies and governance, as well as the development of an Extended Planning & Analysis platform across all three platforms to enable more efficient financial reporting, planning and forecasting. We are also on a journey to embed digitalisation into our integrated asset management activities to enhance data-driven decision making and promote greater agility. Those initiatives are jointly driven by our platform or division leaders and Keppel's Digital Office and coordinated through our Digital Transformation Steering Committee chaired by Keppel's Chief Digital Officer.

In addition, with the rapid growth of AI and in particular Generative AI (GenAI) technology, Keppel convened an internal AI Forum to actively support experimentation and adoption of AI and Machine Learning across our platforms. This is conducted through risk-managed and guardrail-protected sandboxes for early-stage prototyping, proof of concept and minimum viable product development, in close collaboration with external ecosystem partners.

INNOVATION ECOSYSTEM

Keppel also taps into external networks through ecosystem partnerships with industry stakeholders including institutes of higher learning, government agencies, global and local corporates, venture funds and start-ups.

Stakes in start-ups and venture capital funds (e.g., Fifth Wall) help to broaden our exposure to the start-up ecosystem and accelerate learning on ongoing market developments and technology trends.

We adopt a multi-pronged approach to innovation, looking at efforts across three categories:

1 INCREMENTAL INNOVATION	2 NEW INNOVATIVE SOLUTIONS/DISRUPTIVE INNOVATION	3 TECHNOLOGY FORESIGHT
Enhance and defend current solutions	**Accelerate the commercialisation of new innovative solutions**	**Scan technology trends to identify future growth engines and anticipate potential disruptions on the horizon**
We focus on levers to defend and enhance our existing solutions, by improving customer experience, and reducing costs to develop and operate our assets.	We leverage innovation to design and develop unique customer solutions in our key areas of focus, looking at ways to enhance our value proposition and build on the strengths of our ecosystem of partners to future-proof our business and reduce the time to commercialisation.	Further out in the horizon, we actively explore longer-term opportunities and potential disruptions, under our Technology Foresight umbrella. This aims to future-proof our business, both in terms of identifying future growth engines, and anticipating where we could face disruptions.

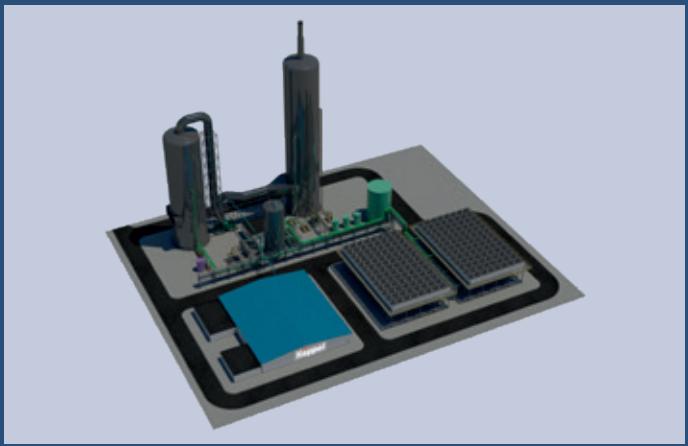
CARBON CAPTURE TECHNOLOGY FOR A SUSTAINABLE FUTURE

Our Infrastructure Division is focused on decarbonising flue gases emitted from waste-to-energy (WTE) plants through carbon capture technologies. Carbon Capture and Storage (CCS) is one of the few carbon dioxide reduction technologies capable of realising negative emissions by permanently storing the captured biogenic carbon fraction.

Many synergies exist between WTE and CCS technologies. Our Infrastructure Division has developed in-house knowledge on optimising the integration of the two technologies with regard to key parameters such as energy provision. This involved detailed engineering work for Feasibility and Pre-Front End Engineering Design Studies on full-scale CCS projects with WTE for Viridor in the UK (approximately 1 million tonnes of CO_2 per annum), and for the National Environment Agency in Singapore (over 3 million tonnes of CO_2 per annum). Proven current CCS technologies typically enable approximately 95% of the CO_2 present within WTE flue gases to be captured. The captured CO_2 can then be utilised in carbonation processes, mineralised or used in the production of sustainable fuels. Alternatively, the CO_2 can be transported and sequestered permanently in depleted gas or oil fields or aquifers.

As part of value chain development, the Infrastructure Division is able to advise on the transportation and storage of the captured CO_2, given its in-house knowledge on WTE and CCS.

These innovations serve to reduce the overall cost of treatment per tonne of CO_2 captured. In-house process and cost modelling have also enabled optimised design of "CCS-ready" WTE plants. This allows for smoother retrofitting of future CCS technologies, thus delivering both time and financial savings in the operation of these infrastructure assets.



Artist impression of a carbon capture facility.

FLOATING DATA CENTRES

To enhance our sustainability efforts, the Data Centres and Networks Division is pursuing innovative ideas with industry partners and clients to design and build innovative new assets such as the Floating Data Centre (FDC). Leading hyperscalers prefer data centres to be close to the heart of major cities, which are often coastal cities that face unique demographic, environmental, and spatial challenges. After extensive brainstorming and innovation development, Keppel is pioneering nearshore FDCs to provide a sustainable solution for the growth of the modern digital economy.

FDCs can be moored permanently or temporarily in nearshore sites. They are mobile, scalable, and customisable. Given its mobility and modular design, a new FDC module can be readily developed and deployed, while the older FDC modules can be reassigned to other locations, contributing to a circular economy. FDCs also have an attractive value proposition for land-scarce regions, as they enable more efficient use of land and free up valuable space for other urban uses. Situated at nearshore locations, FDCs integrate the use of seawater for cooling to substantially reduce the consumption of treated water. FDC modules can be constructed at shipyards in a controlled environment, which expedites their time-to-market and at the same time minimises disruption to shoreside operations at the intended wharf locations.