Building a Sustainable Future

Oct 2023

Keppel

Who we are

A GLOBAL ASSET MANAGER & OPERATOR

Comprising three platforms:

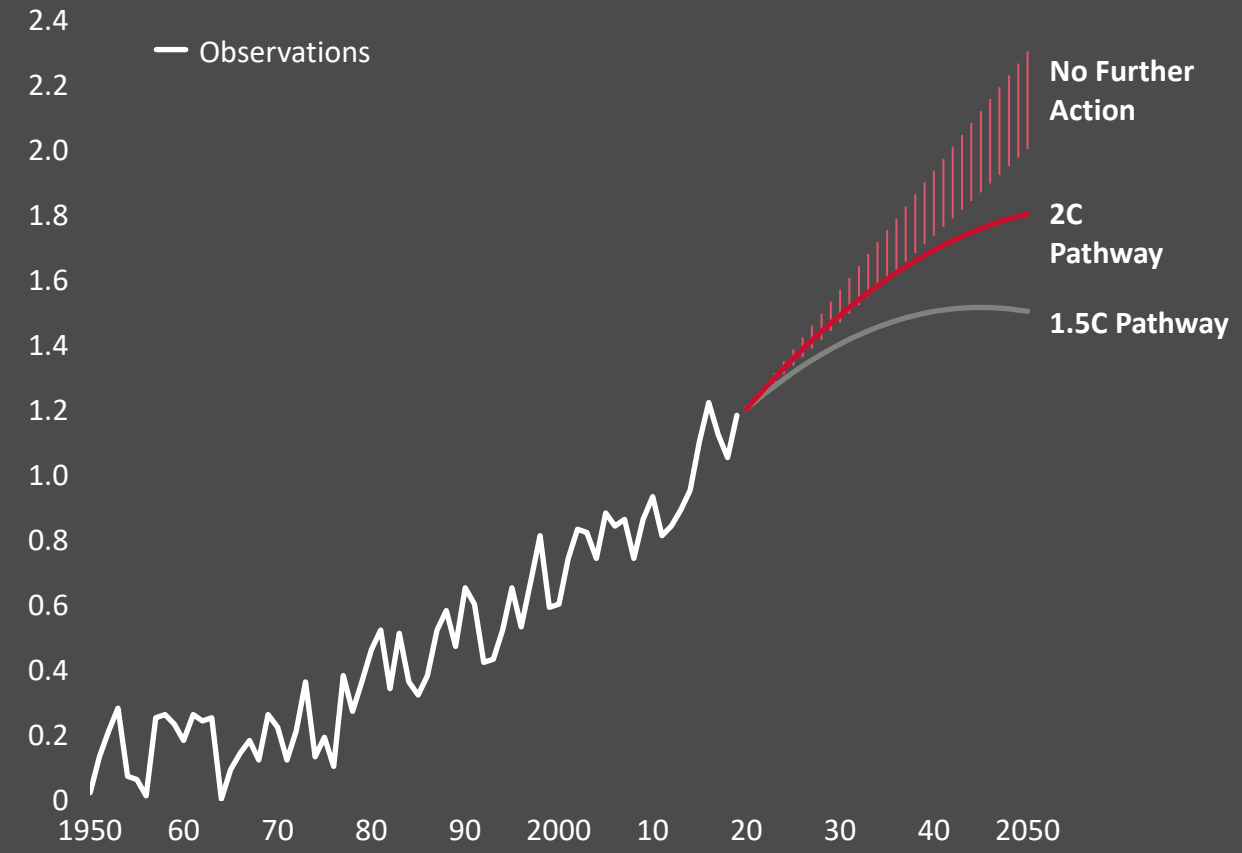
1. Fund Management Platform
2. Investment Platform
3. Operating Platform

with deep operating capabilities in **Infrastructure**, **Real Estate** and **Connectivity**.

The next decade will be a decisive period to both decarbonize and prepare for unavoidable hazards

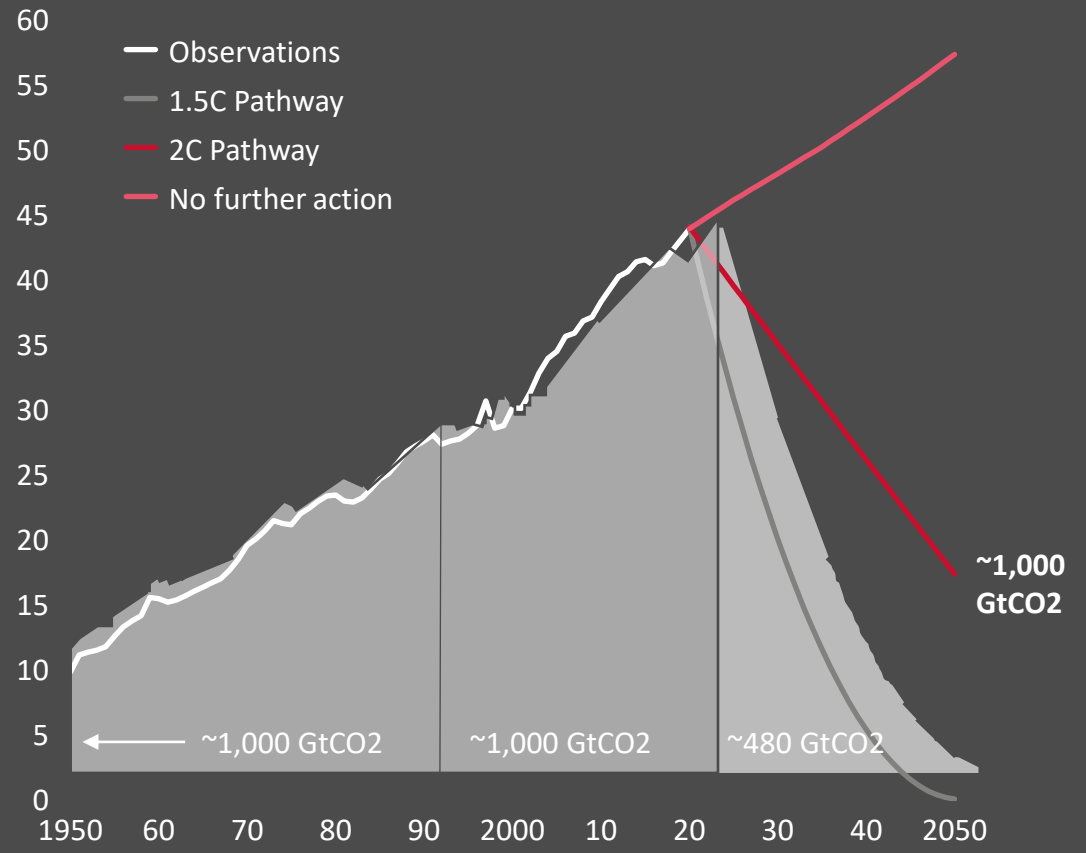
Resilience and adaptation

Rise in average global temperature (°C)



Mitigation

Annual CO_2 emissions (Gt CO_2)



Source: CO2 emissions: Carbon Dioxide Information Analysis Centre, Oak Ridge National Laboratory. Friedlingstien et al. "Global Carbon Budget 2019." Earth Systems Science Data. (2019). Forward projections are illustrative, based on carbon budgets estimated from Rogelj et al (2019) and the IEA CP Scenario, following Hausfather and Peters (2020). Temperature Record: NASA Goddard Institute for Space Studies (GISTEMP –2019) . Warming for "No further action" is the range between RCP8.5 and RCP4.5 ranges, as IEA CPS plus estimates for non-energy emissions following Hausfather and Peters (2020) puts cumulative emissions roughly 3/4ths of the way between RCP8.5 and RCP4.5.

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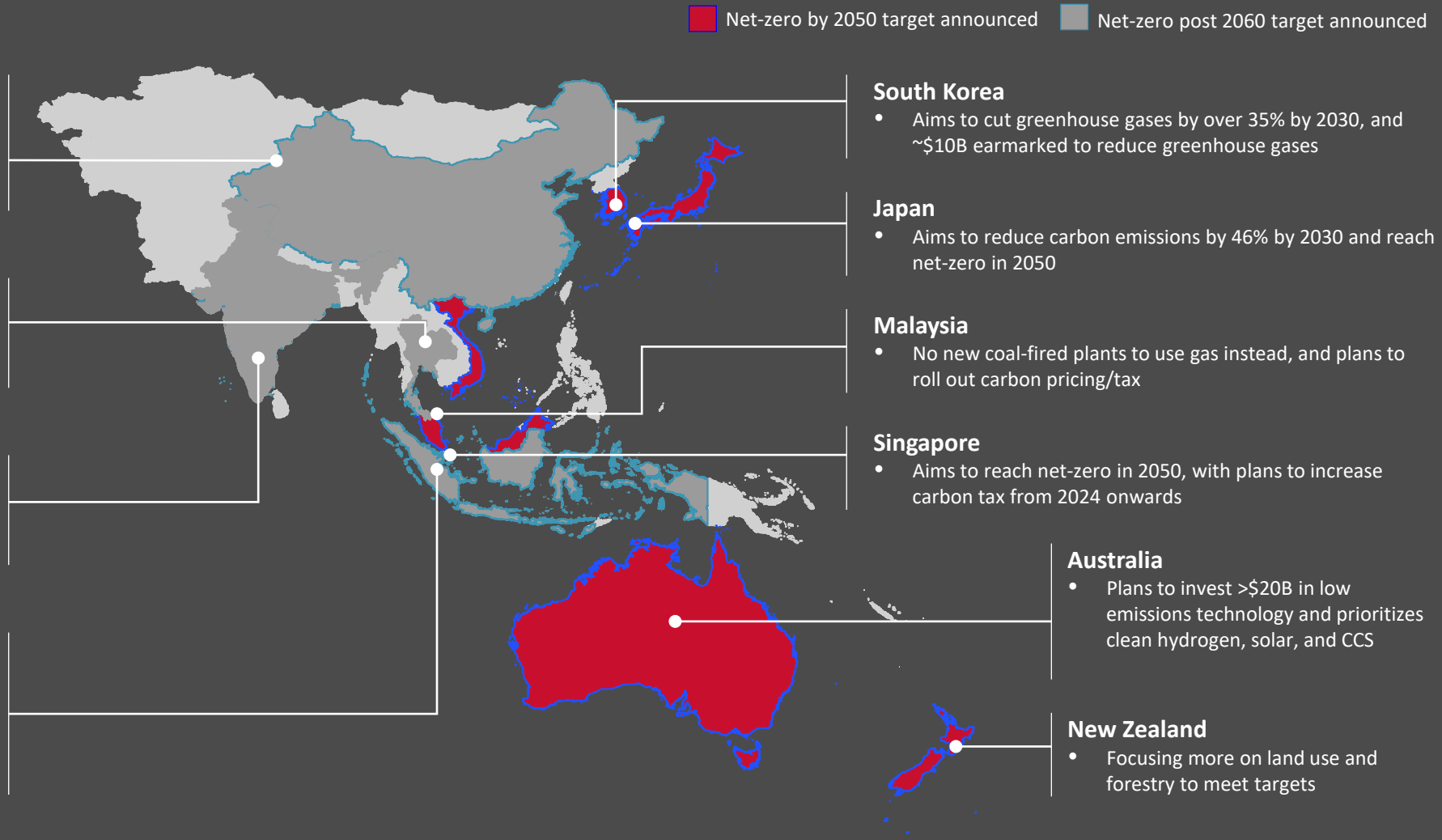
In Asia, a growing number of net-zero commitments drive the pace of decarbonization



China
- Investment and research starting, reaching net-zero by 2060 will be largest scale, speed globally as current emissions double of US and triple of India

Thailand
- Combination of commitments to new technologies e.g., EVs and commitments to plant 100 million new trees by 2022

India
- Committed to source 50% of energy demand from renewables
- Reduce carbon intensity by 40% by 2030

Indonesia
- Challenge of shifting away from low-cost coal to renewables for electricity generation with government studies projecting $1T/year investment needed in next 4 decades

South Korea
- Aims to cut greenhouse gases by over 35% by 2030, and ~$10B earmarked to reduce greenhouse gases

Japan
- Aims to reduce carbon emissions by 46% by 2030 and reach net-zero in 2050

Malaysia
- No new coal-fired plants to use gas instead, and plans to roll out carbon pricing/tax

Singapore
- Aims to reach net-zero in 2050, with plans to increase carbon tax from 2024 onwards

Australia
- Plans to invest >$20B in low emissions technology and prioritizes clean hydrogen, solar, and CCS

New Zealand
- Focusing more on land use and forestry to meet targets

Our Sustainability Solutions Ecosystem

Covering 360 degrees of Sustainability Needs

- **Sustainable Building Solutions**
- **Enterprise Solutions and Operations**

- **Network Enterprise Solutions**
- **5G Solutions**

- **Cooling**
- **EV charging**

- **Conventional Energy**
- **Renewable Energy**

- **Energy Storage Systems**
- **Optimization and Energy Analytics**
- **Microgrids**

- **Renewable Energy Certificates**
- **Carbon Credits**
- **Green Energy Importation**

Use Cases

Energy Use Index
114.5 kWh/m^2/year

KEPPEL BAY TOWER

1st Commercial Building
- Fully Powered by Renewables

Chiller Plant Efficiency
0.575 kW/RT

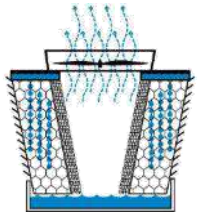
Singapore's 1st Green Mark Platinum (Zero Energy) Commercial Building

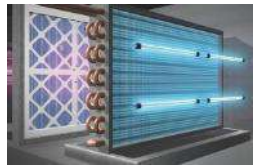
Air-side Efficiency
0.20 kW/RT

Smart/LED Lighting

Smart Building Control

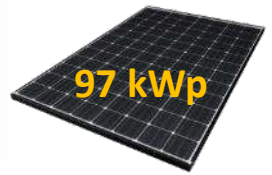
Cooling Tower Water System
20 COC





UVC Emitter

On-site Photovoltaic



Air-con Nets

Building Dashboard

100%
Green Leasing

100%
RECs offset

Lighthouse Projects: Keppel Infrastructure @ Changi

Development overview

KI @ Changi is one of Singapore's first **Positive-Energy Building (PEB)**. The building has been designed with sustainability solutions in mind, resulting in a **50% reduction in water and energy consumption**

! **Received the BCA Green Mark for positive energy**

Green energy

650k **kWh/year** potential through **building-integrated photovoltaics** (BIPV)

Cooling

60% reduction in energy savings Auto-cleaning condenser tubes and highly efficient AC

Insulation

33.7 w/m^2, which is considered a low ETTV and WWR value, **with minimum glass façade**

Lighting

Sun pipes, occupancy sensors and LED lights – and vertical greenery creates prime indoor environment with significant reduction in energy consumption

Circularity

Rainwater harvesting, automatic drip irrigation, irrigation with reclaimed wastewater to reduce consumption

Decarbonization

438t **of CO_2 emissions reduction** annually

Singapore Green Labelling Scheme and Singapore Green Building Certification Sustainable materials such as such as organic compound paint, zero-ozone depletion potential refrigerant were used for the building

Source: Press search

Today's takeaways

1

Sustainability is for everyone; everyone has a role to play

- Brownfield/Greenfield assets both can be decarbonized
- Zero or minimal CAPEX can be achieved via innovative business models

2

Cost savings are a by-product of being sustainable

- Through designing for energy efficiency and utilizing on-site generation assets, cost savings can be realized
- Up to 40% energy consumption reduction in some instances

3

In a complex energy landscape, Digital Tools are critical for enhancing asset availability and boosting energy efficiency

- Through AI/ML algorithms alone, up to 10% energy savings can be realized.
- Digital tools allowing remote command and control also allow for better business continuity planning and efficiency

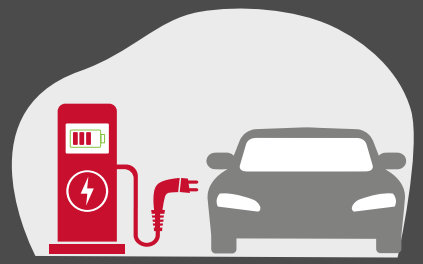
We have a clear vision of how your business and portfolio could be transformed to be leaner and greener in collaboration with Keppel

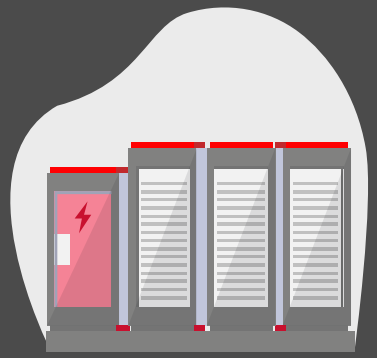
Your properties could become the next big green developments – making your property more attractive to **tenants**, **management**, and **shareholders**

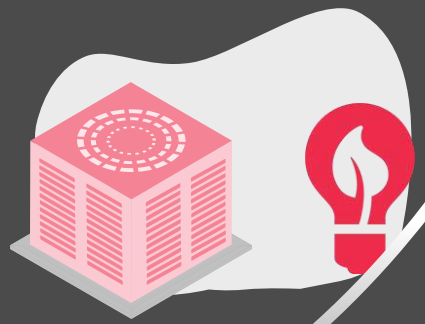
Have more insights

Create shareholder value

Command higher rent prices







Reliable green energy provision

Energy efficient cooling units

Energy Management Systems

Rooftop solar panels

EV Charging

Joint Solutions development

Impact

Keppel

Accelerating your decarbonization journey

Connect with us

EaaS@kepinfra.com

Follow us on


Your pathway to sustainable, reliable energy starts with Keppel Infrastructure