

Climate change debate heats up for businesses as Singapore shores up defence against rising sea levels

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When 33-year-old Jeremy Tan first visited the Netherlands as an engineering undergraduate about a decade ago, he was mesmerised by the beauty of the countryside, with its iconic windmills and canals.

"We were looking out over a vast expanse of reclaimed land, or what the Dutch call 'polders,'" Tan says. "As a Singaporean, [I was not as impressed by] reclaimed land anymore. But to learn that the windmills were also part of an elaborate system designed to draw water away from flooded areas — that's a real engineering marvel."

More than a quarter of the Netherlands — whose name means "low-lying lands" — is below sea level. For hundreds of years, the Dutch have harnessed a system of polders and dykes to keep its land dry. The country has 40,000km of dykes, levees and seawalls, as well as innumerable sluices and barriers that swing shut whenever the sea surges. And its experience is now an inspiration for Singapore.

Going Dutch

In his National Day rally speech on Aug 18, Prime Minister Lee Hsien Loong — for the first time on that platform — laid out plans for Singapore to tackle rising sea levels brought about by climate change.

"We are building a small polder at Pulau Tekong, to gain some experience operating one," he said. "They will not only protect existing low-lying areas, but at the same time let us reclaim new land from the sea — new land that we can use for housing and other purposes."

Lee says Singapore is also examining other alternatives along the eastern coastline, noting that while there are good engineering solutions to tackle the problem, "they will all cost money."

One such alternative would be to reclaim a series of islands offshore — stretching from Marina East to Changi — that will be connected by barrages to create a freshwater reservoir.

Already, national water agency PUB has plans to build a second pump house at the opposite end of the Marina Barrage, where water is pumped out of Marina Reservoir into the sea when it rains heavily, thus preventing the city area, including Singapore's financial centre, from flooding.

Further inland, new developments will be built on higher platforms, at least 4m above mean sea level. Critical infrastructure such as Changi Airport Terminal 5 and Tuas Port will be raised at least 5m above sea level.

The United Nations currently projects that sea levels will rise by up to 1m by the end of this century as higher temperatures send ice sheets in Greenland and Antarctica melting into the oceans. In a recent Swiss study, Singapore was found to be one of the cities that will experience unprecedented climate change by 2050, or 30 years from now.

To protect the island nation, Lee estimates that it could cost \$100 billion or more over the next 50 to 100 years. But he stresses that Singapore must treat its battle against rising sea levels "with utmost seriousness" — likening it to the Singapore Armed Forces, which protect the country's



The Marina Barrage pumps water out of Marina Reservoir into the sea when it rains heavily. PUB plans to build a second pump house at the opposite end of the barrage.

sovereignty. Both are matters of "life and death" for Singapore, Lee says. "Everything else must bend at the knee to safeguard the existence of our island nation."

Existential threat

Experts who spoke to *The Edge Singapore* say it is "heartening" that Lee dedicated nearly half of his rally speech to shoring up Singapore's coastal defence.

"It's great that PM Lee is taking this existential threat of climate change and rising sea levels seriously," says associate professor Winston Chow, an expert in urban vulnerability to climate change at the Singapore Management University. "The threat is definitely existential for Singapore." Chow notes that, unlike other cities that are expected to be impacted, Singapore has no hinterland to retreat to.

He also suggests looking at more than just engineering-based solutions: For one, mangrove forests — which were a big part of Singapore's historical landscape but have since given way to economic activity — not only provide natural coastline protection but also create a habitat for wildlife to thrive and humans to visit. According to the National Parks Board, less than 5% of Singapore's original mangrove forests habitat in the early 1800s is still around today.

"The impact of climate change on Singapore businesses is not just limited to our shores," says Didier Belot, CEO for Southeast Asia at Swiss Re Corporate Solutions. Citing a report published by the Swiss Re Institute, he says global insurance losses from natural disasters in 2017 and 2018 were a combined US\$219 billion (\$303 billion) — the highest-ever over a two-year period.

While Singapore's \$100 billion investment to fight rising sea levels may seem big, Belot says that this "may be less daunting when taken into consideration alongside the financial costs of potential impacts".

However, Lawrence Loh, an associate professor at NUS Business School and director of the Centre for Governance, Institutions and Organisations, rues that the impact of climate change remains one of the least discussed topics among companies here.

"Companies are still looking at issues that directly affect their financial bottom lines rather than at climate change," Loh says, stressing that "companies do play a pivotal role in Singapore's response to climate change, especially in its mitigation."

One of the problems, notes Kevin Phun, centre director at The Centre for Responsible Tourism Singapore, is that unlike the Dutch who have had a long history of battling against rising sea levels, Singaporeans are not equipped with the same mindset.

"Business as usual" will no longer be the norm," warns Phun. "We will have to bring in more climate-related business ideas from abroad and encourage foreign direct investments that focus on climate change. We need all the technologies that can help us fight rising sea levels and other aspects of climate change."

Not business as usual

In this light, Stefan Ullrich, director of sustainable finance at Paia Consulting, believes that Singapore is well positioned to take leadership on sustainability in the region.

He notes, however, that the current focus appears to be on adaptation over mitigation. "While adaptation is necessary to ensure Singapore's future, no effort should be spared to mitigate and avoid the worst impacts of climate change," Ullrich says. "It is also important to remember that climate change has implications far beyond rising sea levels. Singapore's impact on climate change extends far beyond its own emissions: Its role as a major global tourism, shipping and refining hub means that it can play an active role in shaping the regional and global response."

Already, some are excited about Singapore's \$100 billion war against rising sea levels. They include **Koh Brothers Group**, the Mainboard-listed engineering and construction services provider that in 2004 beat 47 other local and overseas groups to clinch the \$226 million contract from PUB to build the Marina Barrage and reservoir.

"The award-winning Marina Barrage project was a momentous milestone for us," says Francis Koh, managing director and group CEO of Koh Brothers. "Many industry watchers hadn't expected a local company to win the tender, believing that only the foreign firms had the capabilities."

Together with Catalyst-listed subsidiary **Koh Brothers Eco Engineering**, the group says it has grown even stronger since then. And it believes the construction of polders and dykes, or even a chain of reclaimed islands connected by barrages, would also "fit nicely" within its drainage expertise.

"In terms of relevant track record, we've previously worked on a reclamation project

in China that had spanned about 500mu (333,333 sq m) in area," says Koh.

The positive effects of Singapore's upcoming coastal defence projects are likely to also trickle down to other areas, such as job creation. At the peak of the Marina Barrage project, Koh Brothers employed some 200 workers, excluding sub-contractors. "While we are supported by a strong team of experienced engineers and workers, depending on the demands of the contract, we may also hire experts to supplement areas of competencies that we require," Koh says.

Tackling change at home

In his National Day rally speech, PM Lee also highlighted several key initiatives to tackle nearer-term challenges. These include raising the retirement and re-employment ages by three years each to 65 and 70, respectively, by about 2030. Central Provident Fund rates for older workers above 55 will also be raised over 10 years starting from 2021, to be on par with those for younger workers.

Meanwhile, preschool fees will be made more affordable. The income ceiling for Singaporean households seeking extra subsidies will be raised to \$12,000 next year, from \$7,500 currently.

Higher education will also be made cheaper for Singaporeans, especially those from lower-income households.

Annual charges for full-time general degrees at the Singapore Institute of Technology and the Singapore University of Social Sciences will be reduced, while government bursaries for general university degrees will be raised, along with bursaries for polytechnic diploma courses.

Lee also reiterated plans to develop the Greater Southern Waterfront, which will span over 30km of Singapore's southern coastline.

One of the first developments in the district is the construction of about 9,000 public and private housing units on the site of Keppel Club. Pulau Brani will also be redeveloped to host new attractions similar to Universal Studios on Sentosa.

"Over two centuries, we have built and rebuilt generations of buildings," Lee says. "A new generation will have another opportunity to imagine and build part of their vision for Singapore."

But, as the city state looks forward into the future, all these could be for naught should it fail to win the war against rising sea levels. ■