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CONTRIBUTION BY THE REPUBLIC OF SINGAPORE

"New maritime technologies: challenges and opportunities"

This contribution is made in response to the UN Office of Legal Affair's Note Verbale LOS/SGR/2022/1/ST. It outlines how Singapore is harnessing innovation and advancing science and technology in two maritime areas: the marine environment and energy.

Marine Environment

2 Given the devastating and accelerating impacts of climate change, there is a clear and urgent need to address threats to the coastal and marine environment. Singapore has incorporated new maritime research and technologies in the management, conservation, and sustainable use of our coastal and marine environment, including our mangroves, coral reefs, and intertidal areas.

3 In March 2021, Singapore launched a five-year Marine Climate Change Science (MCCS) programme as a key vehicle to advance the core sciences of marine climate change, and develop solutions to help address the challenges faced by our coastal and marine environment arising from climate change, such as sea-level rise, increasing sea surface temperatures, and extreme storm events. Led by the National Parks Board (NParks), this multi-stakeholder research programme involves partners across government agencies, research institutes and industry. The MCCS programme, with its emphasis on multi-disciplinary and translational research, will lead to the development of evidence-based interventions and solutions to safeguard our coastal and marine ecosystems against the impact of climate change. It will also enhance how we can better utilise our existing natural and blue resources.

4 Other stakeholders in the community are also actively participating in conserving our marine ecosystem. An example is the reef rejuvenation project of the local coral population, which is being spearheaded by local research institutes like the National University of Singapore's Tropical Marine Science Institute.

In 2018, the Singapore Institute of Biology also proposed the Singapore Blue Plan for the conservation of marine ecosystems.

5 Relatedly, Singapore is working on improving technologies in areas where we can minimise impacts on marine biodiversity, such as reducing the discharge of pollutants including highly saline water and other desalination by-products as well as nutrients from aquaculture. The Public Utilities Board (PUB), Singapore's national water agency, recently awarded funding to six projects that are studying new technologies to reduce energy consumption and the waste footprint of desalination, including technologies to improve both the pre- and post-treatment processes for seawater desalination.

6 Finally, in the area of sustainable aquaculture, the Singapore Food Agency (SFA) and the Agency for Science, Technology and Research (A*STAR), launched the "Singapore Food Story R&D" initiative in 2019 to support the development and use of productive, climate-resilient, innovative and sustainable technologies for aquaculture. To protect the quality and sustainability of local aquaculture, the Marine Aquaculture Centre (MAC) was set up in 2003 to research and develop work across the entire hatchery production process.

Energy

7 The Singapore Government supports various research, development, and demonstration (RD&D) activities to harness ocean renewable energy (ORE), i.e., power from tidal currents, tidal range, waves, temperature, and salinity gradients. For instance, the MAKO Tidal Energy Site was opened at the Sentosa Boardwalk (an island off mainland Singapore) in September 2019 to convert the kinetic energy in flowing water into electricity for local use or for charging batteries. It is a two-year project involving academia, industry actors, and government agencies.

8 As a key maritime trading nation, Singapore also aims to promote the use of sustainable fuels for international trade and travel. Singapore is the busiest container transshipment port in the world in terms of tonnage, with more than 130,000 vessel calls annually. We are also the top bunkering port in the world. As a responsible coastal, flag, and port State, Singapore is committed to promoting clean and green shipping. In 2011, the Maritime and Port Authority of Singapore (MPA) launched the Maritime Singapore Green Initiative, which has been extended until 2024, to promote shipping decarbonisation. Singapore is also working with like-minded countries, as well as research and industry stakeholders, to develop Green and Digital Shipping Corridors (GDSC), which serve as valuable

testbeds to trial new technologies and fuels in a sandbox environment, gain operational and safety experience, and optimise route planning, prior to scaling up for wider adoption.

9 Together with industry partners, MPA has also committed to co-fund the Global Centre for Maritime Decarbonisation, which will carry out research on maritime decarbonisation technology with the aim of accelerating the deployment of scalable low-carbon technologies across the maritime ecosystem.

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