



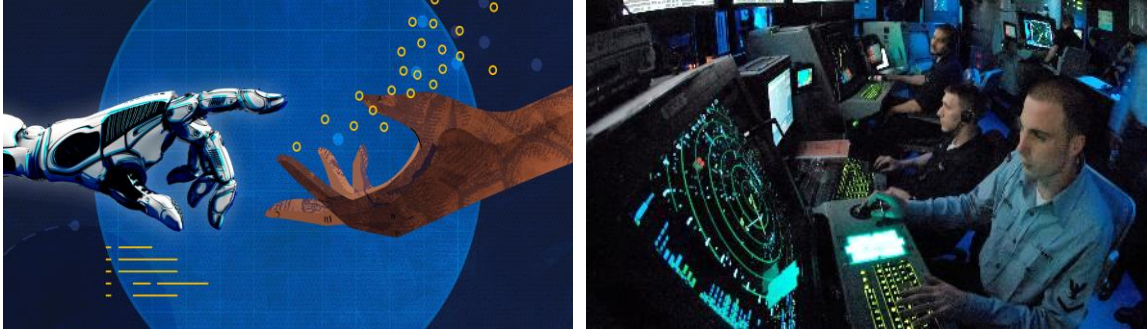
# CATALYSING INCLUSIVE INNOVATION FOR GREEN SHIPPING

Mr TAN Hoe Soon  
Assistant Chief Executive (Corporate & Strategy)  
Maritime and Port Authority of Singapore

IMO-Norway-UNEP Innovation Forum 2022

# Amidst the 3Ds, Singapore believes that innovation is a gamechanger

## Digitalisation



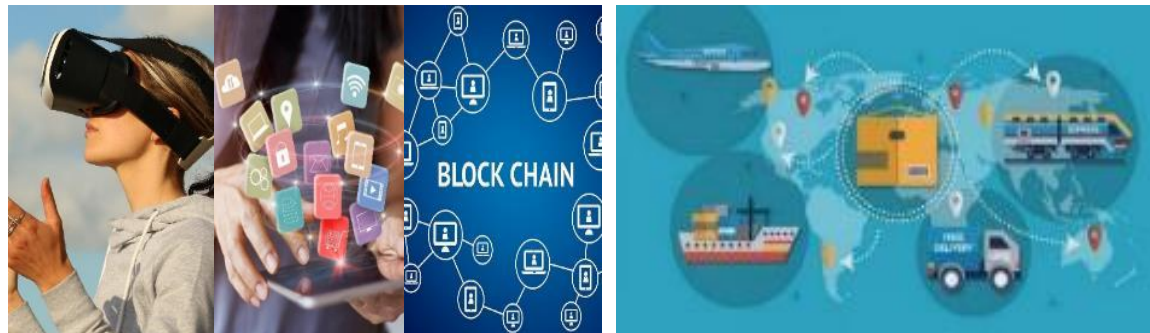
Increasing pace of digitalisation & automation. Opportunities to improve efficiency of navigation and maritime safety & security

## Decarbonisation



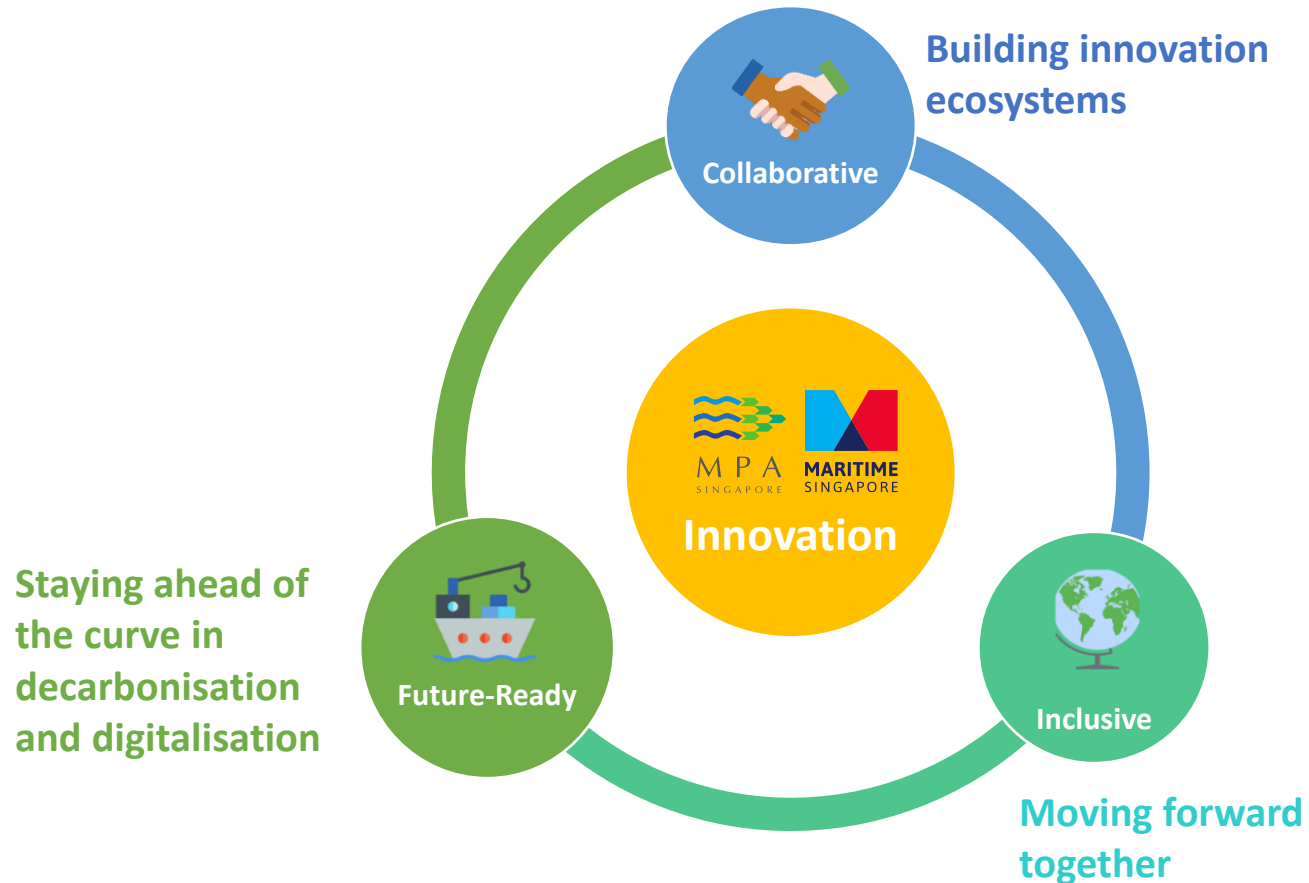
Increasing global pressure on businesses to decarbonise. Prevention and control of marine pollution from ships.

## Disruption



Supply chain disruptions, rise in new business models, shifts in global supply chain

# Together with our partners, Singapore catalyses collaborative, future-ready and inclusive innovation



# Collaborative Innovation

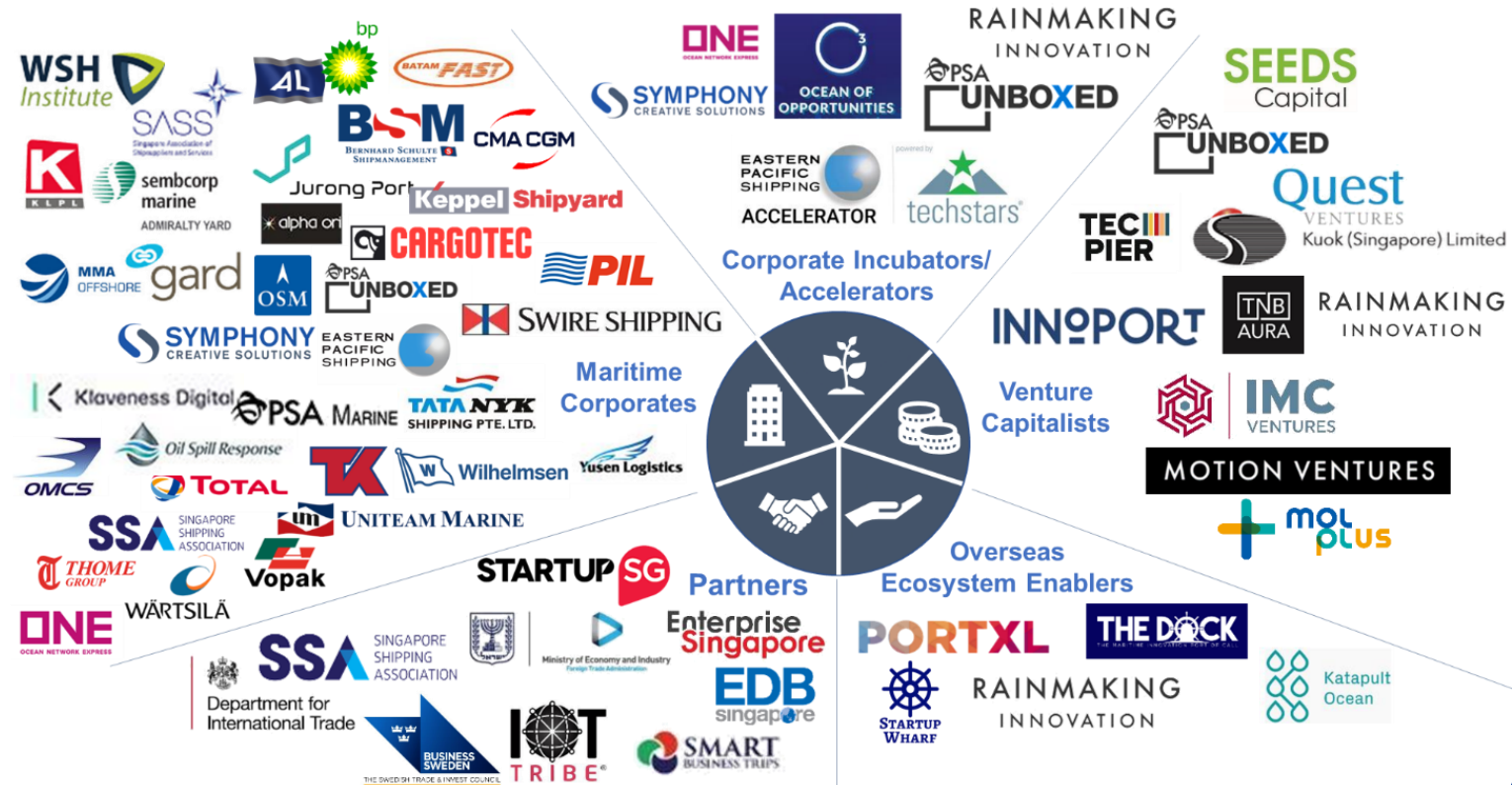
# Building innovation ecosystems

Bringing together Demand and Supply

## PIER71

PIER71™: Port Innovation Ecosystem Re-imagined @ BLOCK71

- ~ 80 start-ups accelerated
- 50 received grant funding
- 17 solutions deployed in maritime sector



# Building innovation ecosystems

## Bringing together Stakeholders across the Value chain

### Global Centre for Maritime Decarbonisation (GCMD)



**Founders/strategic partners**

BHP, DNV, Eastern Pacific Shipping, MPA Singapore, ONE Ocean Network Express, Sembcorp Marine, Hapag-Lloyd, bp

**Coalition partners**

SSA Singapore Shipping Association, IBIA, ashurst, International Chamber of Shipping, IWSA International Windship Association

**Impact partners**

BCG, the human energy company (Chevron)

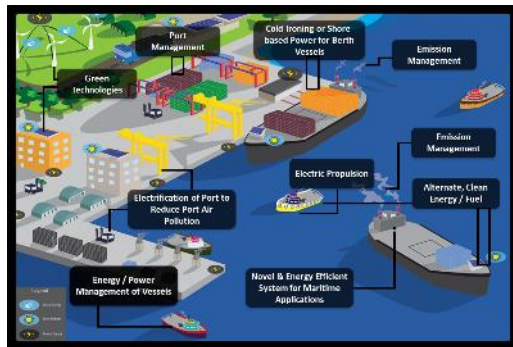
**Knowledge partners**

GLOBAL MARITIME FORUM, Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping, KPLER

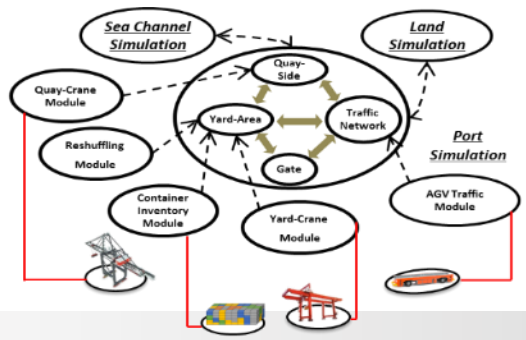
- Programme office for tech development, test-bed and trials
- Joint Industry Projects (JIPs)
- Knowledge Sharing

### Singapore Maritime Institute – Centres of Excellence (COE)

#### COE in Maritime Energy and Sustainable Development (MESD) – NTU



#### COE in Modelling and Simulation for Next Generation Port (C4NGP) – NUS



#### COE for Maritime Safety (CEMS) – Singapore Polytechnic

**Maritime Navigation**

- Advanced Navigation Simulation Systems
- Advanced Navigation Research Simulator
- Autonomous Vessels – Regulations
- IMO INTERNATIONAL MARITIME ORGANIZATION
- UNCLOS, SOLAS, COLREGS, etc

**On Board Human Operations**

- Human Machine Interface
- Head-mounted displays for VR Training
- Training & Assessment Systems
- Assistive System to improve Situational Awareness

#### COE for Autonomous & Remotely Operated Vessels (CEAOPS) – TCOMS

**TCOMS CEAOPS**  
Centre of Excellence for Autonomous & Remotely Operated Vessels

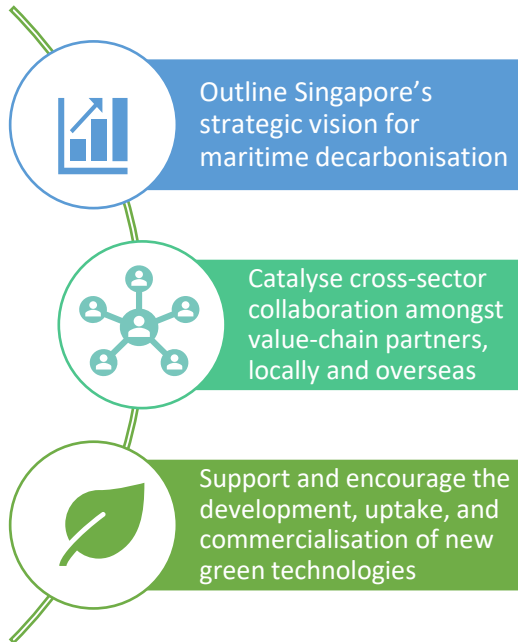
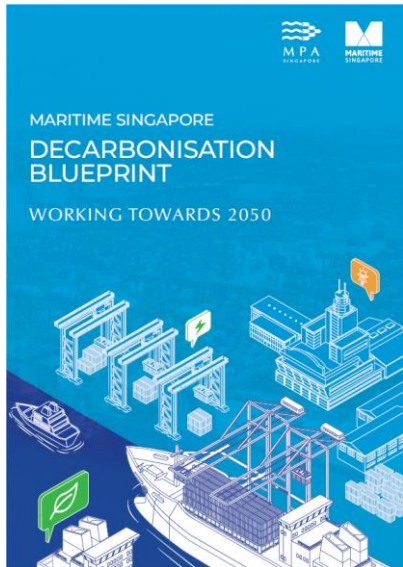
- Digital twin of physical operating environment to support test bedding & performance verification involving critical "what if" scenarios
- Shore Control Centre
- Dynamic assessment of vessel structural health to enable predictive maintenance of hull structures
- Prediction of vessel interactions, particularly in tight scenarios & mixed traffic, to ensure safety in encounter scenarios & efficiency in cooperative operations
- Accurate prediction of vessel voyage performance through enhanced environmental awareness to enhance fuel efficiency & safety
- Digital Metocean: advanced sensing & prediction of physical environment for safe & efficient navigation in open sea

# Future-Ready Innovation

# Staying ahead of the curve

## Charting ambitious, long-term strategies through the Maritime Singapore Decarbonisation Blueprint

### Key Objectives:



The Blueprint was co-created following a series of public and industry consultations with over 50 organisations



*"We should adopt a mature technology at this moment to kick start the decarbonization process of the harbour crafts, and in transition in phases to future technologies when these technologies are ready." - BH GLOBAL CORPORATION LTD*

*"As the world's fifth largest ship registry, Singapore can greatly influence the trajectory of zero-emission ship registration." - PACIFIC ENVIRONMENT*

*"There is not one silver bullet technology for decarbonisation. The mix of technologies should include both currently (or soon) viable solutions, such as sustainable biofuels, and future technologies, such as hydrogen." - GOODFUELS*

**emissions by 2050**

- PORT TERMINALS**  
Transit towards a low-carbon future through the adoption of cleaner energy, automation and digitalisation  
↓ 60%  
in emissions from 2005 levels by 2030  
Net Zero
- DOMESTIC HARBOUR CRAFT**  
All harbour craft will operate on low-carbon energy solutions by 2030  
↓ 15%  
in emissions from 2021 levels by 2030  
↓ 50%  
in emissions from 2030 levels by 2050
- FUTURE MARINE FUELS, BUNKERING STANDARDS AND INFRASTRUCTURE**  
Be ready for a multi-fuel transition to support the future of international shipping  
Multi-Fuel Bunkering Transition  
Supply low and zero-carbon marine fuels and enable green technologies
- SINGAPORE REGISTRY OF SHIPS (SRS)**  
Recognise and incentivise owners to operate green ships  
50% of SRS fleet to be green ships by 2050
- EFFORTS AT INTERNATIONAL MARITIME ORGANIZATION (IMO) AND INTERNATIONAL PLATFORMS**  
Standard-Setter and Bridge-Builder  
Advocate strong, credible and inclusive climate action at the IMO and international fora
- RESEARCH & DEVELOPMENT AND TALENT**  
Global Hub for Maritime Decarbonisation R&D  
Enabled by a vibrant ecosystem with the talent and expertise to develop and deploy innovations
- CARBON AWARENESS, CARBON ACCOUNTING AND GREEN FINANCING**  
Green Maritime Finance Hub  
Promote green financing landscape and strengthen carbon accounting and reporting



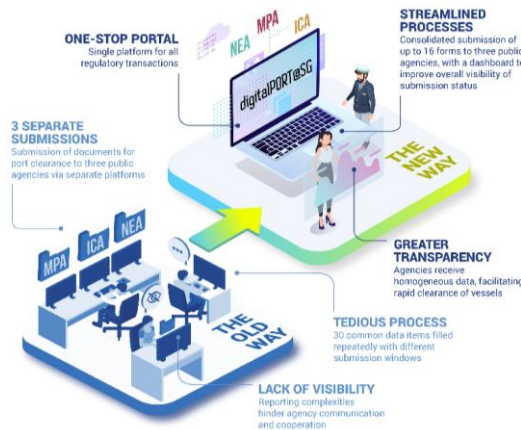
# Staying ahead of the curve

## Leveraging digitalisation for energy efficiency and productivity

### DigitalPORT@SG™



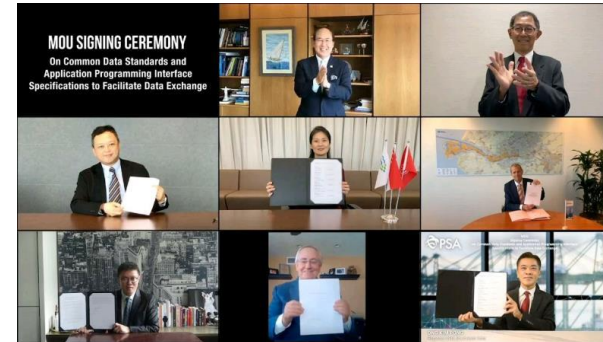
MPA's digitalPORT@SG, launched on 30<sup>th</sup> October, will enhance the efficiency, user-friendliness, and transparency of document submissions, providing one-stop clearance for vessel-related transactions. This initiative is estimated to save 100,000 man hours per year in productivity.



\*Portal for One-stop Regulatory Transactions

- A one-stop portal for maritime regulatory submissions, providing port stakeholders with real-time information to better coordinate, plan and allocate resources
- Enhances efficiency of port operations and minimises ships' idling time which cuts GHG emissions from ships

### digital CEANS



Foster global systems interoperability across the maritime transport chain through Open/Common Exchange And Network Standardisation

- Enhance Port Efficiencies
- Expand Digital Connectivity
- Create Business Opportunities & Catalyse Ecosystem Development

#### Where We are Today

- Established MoU with strategic partners
- Developing Port Clearance API standards
- Developing technical standards referencing IMO's FAL compendium (non-technical)

# Inclusive Innovation

# Moving Forward Together

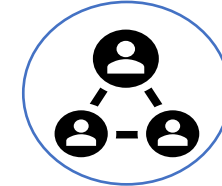
## Global information-sharing and stakeholder collaboration through NextGEN



Towards Green and Efficient Navigation



A joint initiative by:



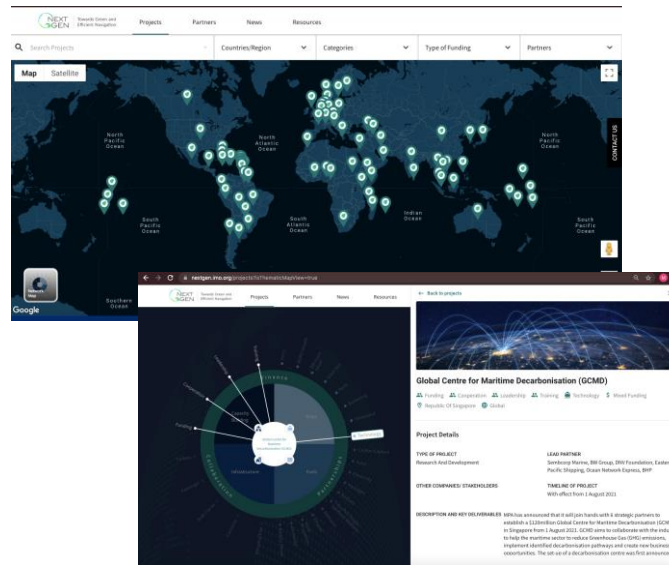
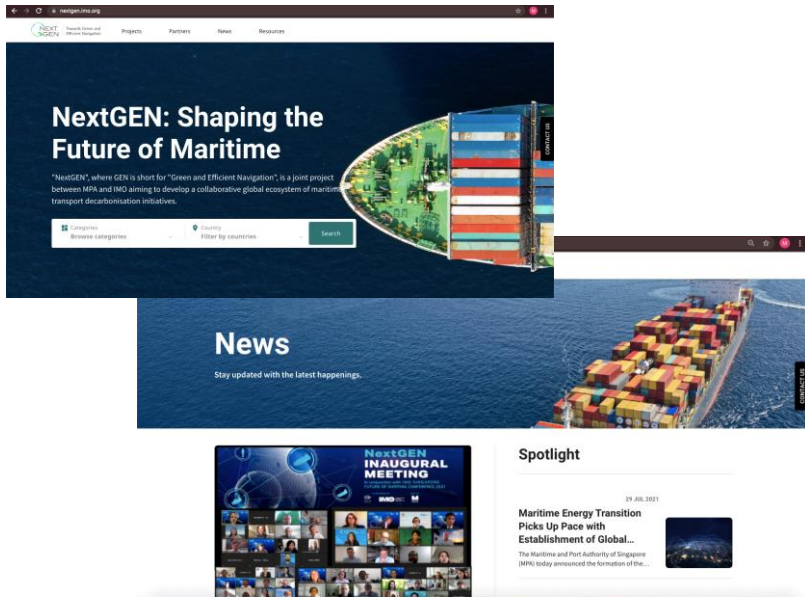
Tools and events to expand cooperation and info-sharing between stakeholders



Dynamic, global, one-stop resource website for maritime decarbonisation



Mapping of maritime decarbonisation universe across the value chain; users can search for projects by geography, fuel type or theme



# Moving Forward Together

Catalysing inclusive “route-based action plans” for GHG emissions reduction in Asia Pacific

*NextGEN Connect invites stakeholders to propose “route-based action plans” to reduce greenhouse gas emissions between points along a shipping route in the Asia-Pacific region. The winning proposal will be implemented on a pilot basis with global partner support.*



Towards Green and  
Efficient Navigation

FOSC 2022

Projects

Partners

News

Resources

Log In

## NextGEN Connect Challenge 2022

Route-based action plans to reduce GHG emissions

Submit Your Proposal

2

DAY

16

HOUR

27

MIN

02

SEC

[nextgen.imo.org/challenge](https://nextgen.imo.org/challenge)

*Deadline for Submission: 1 October 2022*

CONTACT US

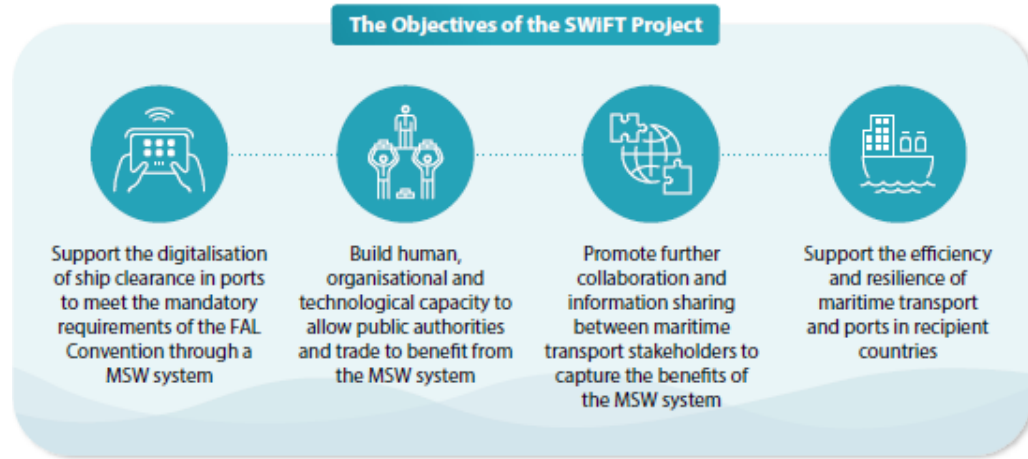


NextGEN Connect is organised by



# Moving Forward Together

## Technical cooperation to facilitate inclusive digital transformation



Source: Port of Lobito, Angola

- Call for expressions of interest in March 2021 to help developing countries build their own Maritime Single Windows (MSWs)
- On 15 Nov 2021, the pilot phase commenced in the Port of Lobito, Angola
- To share our experience from the pilot project, Singapore is looking at developing a resource kit containing learning points and guidance on the implementation of MSW systems.



A joint initiative by:

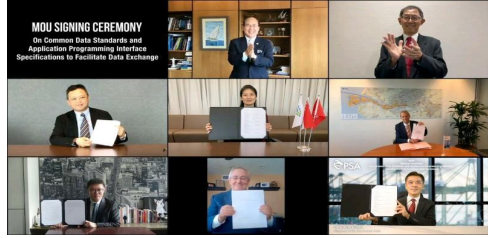


**||** The willingness and determination of the Republic of Angola to put forward the Port of Lobito as candidate for the IMO–Singapore pilot project to establish an efficient digitalized system for electronic exchange of information in ports for ship clearance, and consequently being selected, is in my humble opinion evidence that the country has (since opening its Permanent Representation to the IMO in London in 2005) been working very hard to make sure that our presence as a coastal State in the global economy is well noted and accounted for.

Although aware of the challenges and complexities of implementing the project, Angola is ready to listen to and learn under IMO's and Singapore's wise guidance. We therefore thank the IMO and Singapore for their trust and confidence in our abilities to deliver what the project will demand."

— *Olívio Jacinto, Deputy General Director for Technical Affairs, Maritime Port Institute of Angola (IMPA)*

# Join us in collaborative, future-ready and inclusive innovation



## Singapore outlines blueprint for maritime decarbonisation

An additional \$8300 million to be spent to support strategies and goals to be achieved by 2050

**By The Straits Times**  
 International Maritime Organization (IMO) and other international partners, research & development and talent, and carbon accounting and green financing.

The sea state expects to be ready to transit to multi-fuel vessels offering low and zero-carbon marine fuels, including sustainable biofuels, and potentially green technologies such as carbon capture, storage and utilization.

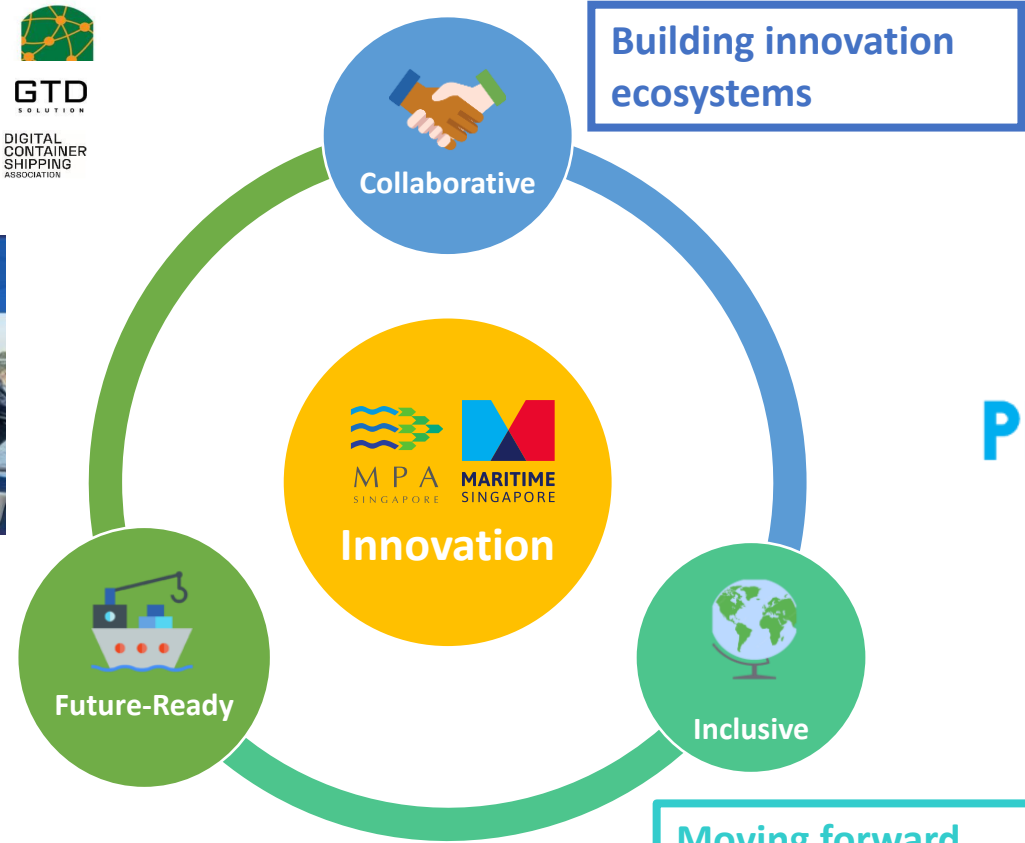
The SPS will recognise and incentivise owners to operate green ships, with a goal of 10 per cent of Singapore-registered fleet in the green ships by 2050. The current fleet consists of some 6,000 ships.

Separately, Cheong Hin Tin, the senior minister of state for Transport, announced at the debate that the expanded Sea Transport capabilities of Singapore port and



small and medium-sized enterprises (MSMEs) in the maritime sector, with the setting of a blueprint that sets out strategies and goals to be achieved by 2050 and to be an additional \$8300 million to support these initiatives.

Developed by Minister for Transport S. Iswaran at the Ministry of Supply, the Maritime and Port Authority of Singapore (MPA) and the Maritime Singapore Decarbonisation Blueprint 2050 will focus on 7 key areas. These are part terminals, decarbonisation, low-carbon marine fuels, bunkering standards and infrastructure, the Singapore flag, and the Singapore efforts at the IMO.



Building innovation ecosystems



PIER71



Towards Green and Efficient Navigation

Moving forward together

Staying ahead of the curve in decarbonisation and digitalisation



IMO-Singapore project to establish digital ship clearance system in Port of Lobito, Angola





**For Information**