Port Logistics in Asia

&

IAPH World Ports Sustainability Program

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The International Association of Ports & Harbors
s_naruse@iaphworldports.org

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Outline of Presentation

1. **About IAPH (International Association of Ports and Harbors)**
   - -- Foundation
   - -- Structure
   - -- Activities and Publications
2. **Port Logistics in Asia**
   - -- World Seaborne Trade & Regional Trends
   - -- Future Trends
   - -- Challenges facing Container Terminals
3. **Climate Change and IAPH**
   - -- Creation of WPCI (World Ports Climate Initiative)
   - -- Existing Guidelines (Tool Box, Carbon Footprinting, Onshore Power Supply)
   - -- ESI (Environment Ship Index)
   - -- LNG fueled Vessels and Ports
4. **Creation of WPSP (World Ports Sustainable Program)**
   - -- Aims and Structure
   - -- Future Projects

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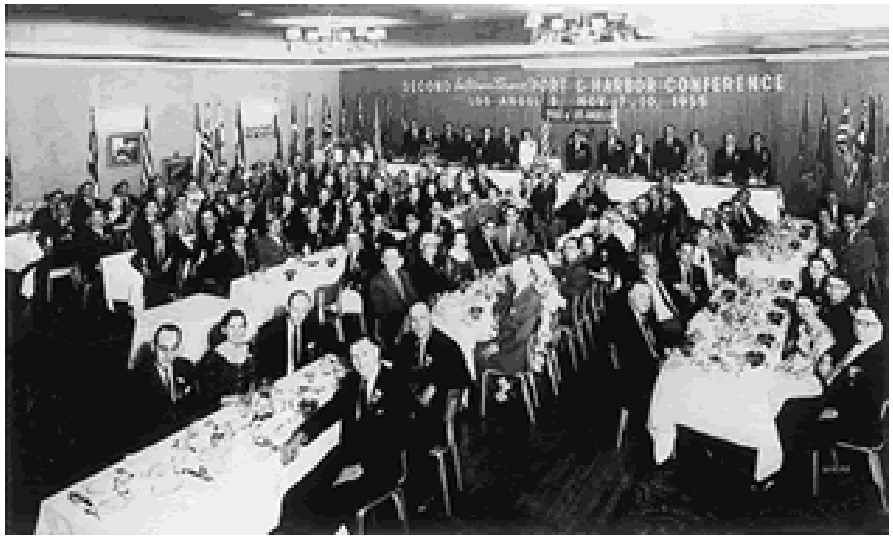
About IAPH (1)　Foundation

Only international association of the world's port authorities and maritime industries.

Established in 1955,

Headquartered in Tokyo



IAPH Vision Statement:

The Global Ports' Forum for Industry Collaboration and Excellence

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About IAPH (2)
Missions and Structure of IAPH

Mission Statement

- Promoting the interests of ports worldwide through strong member relationships, collaboration and information-sharing that help resolve common issues, advance sustainable practices and continually improve the way ports serve the maritime industries.

Members of IAPH

--The major regular members are port authorities.

--Regular members cover nearly 170 ports (4 ports and 3 ministry offices in Korea) in some 90 countries, which handle nearly 70% of the world container traffic, and about 130 port related-organizations as associate members.

Regional Principle

--Six vice-presidents are elected from 6 regions (Asia 1. Asia2 and Oceania, Europe, Africa, and North America and Middle/South America), and the president is elected from among the vice presidents. Korea belongs to “Asia, South/West, East and Middle East Region”.

Consultative Status

--IAPH is given a Consultative Status as NGO from the UN organizations such as IMO, UNCTAD, UNEP and ILO.

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About IAPH (3) Activities

Networking & sharing best practices

- IAPH World Ports Conference, Seminars, etc.
- The 2019 IAPH Conference takes place at the Guangzhou Port, China next year.
- The 2011 IAPH Conference was held in Busan.

Representing the global port industry

- Consultative NGO status

Studying & tackling common port issues

- Technical Committees, etc.
- "World Ports Climate Initiative" to "World Ports Sustainability Program"

Developing human resources

- IAPH training scholarship, essay contest, etc.

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About IAPH (4)
Activities & Publications of IAPH

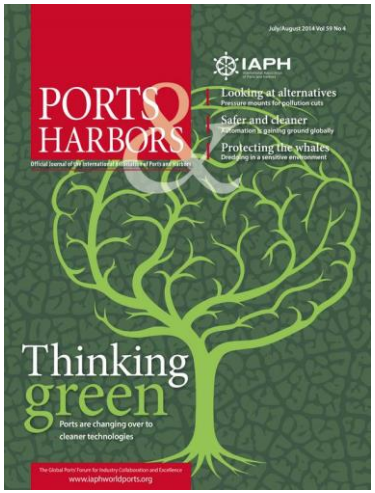
Activities

--IAPH holds “World Port Conference” once every two years.

--Over 600 port people gathered together in Bali, Indonesia for the 30th World Ports in May 2017.

--The next Conference will meet in Guangzhou, China in May 2019.

--Nine (9) technical committees meet at least once a year and periodically publish committee reports.



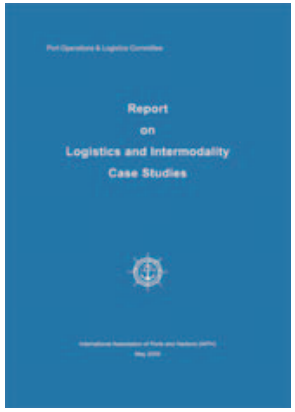
Publications

-- Official Magazine, “Ports & Harbors”, is published once every two months.

-- IAPH on-line news is sent to the members once every two weeks.

-- IAPH Membership Directory is published once a year.

-- Reports of technical Committees are published on an ad hock basis.



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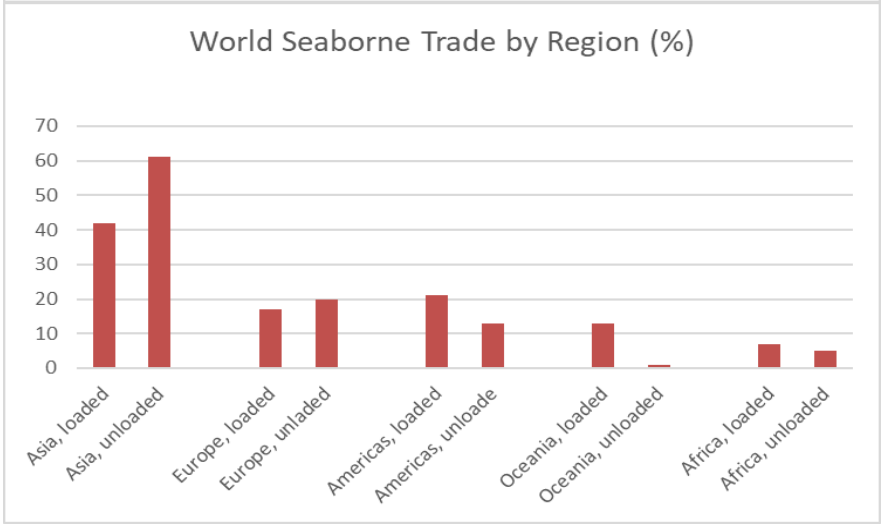
Overview of World Seaborne Trade & Regional Trends



- The world seaborne trade reached nearly 1.1 billion tons in 2017 (UN statistics).
- The growth speed has decreased for last several years, but the volume is still steadily growing.
- Asia accounts for more than 50% share of world seaborne trade.

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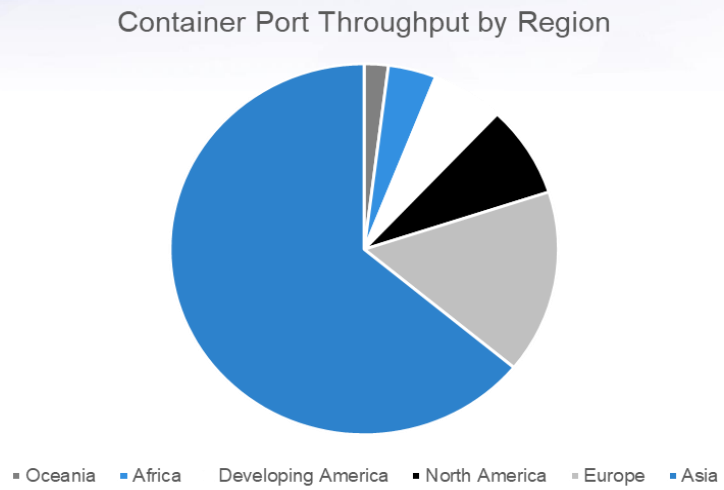
Global top 20 Ports by Cargo Throughput

- The list shows leading global ports measured by total tons of all cargo handled.
- Among top 10 ports, 8 were in Asia mainly from China.
- The Port of Busan is ranked 12th in the world in 2017.

Port	Cargo Throughput, 2017	Percentage Change 2017-2016
	million tons	%
Ningbo-Zhoushan	918	9.7
Shanghai	700	0.8
Singapore	593	5.5
Suzhou	574	5.9
Guangzhou	522	8.5
Tangshan	516	9.6
Qingdao	501	1.4
Port Hedland	485	4.3
Tianjin	549	-8.4
Rotterdam	461	1.3
Dalian	429	5.2
Busan	362	10.5
Yingkou	347	4.4
Rizhao	351	2.7
South Louisiana	295	4.4
Gwangyang	283	3.1
Yantai	265	7.6
Hong Kong	257	9.7
Zhanjiang	255	10.3
Huanghua	245	10

Container Port Throughput by Region



Region	2016, million TEUs	2017, million TEUs	Percentage Change
Asia	454	484	6.50%
Africa	30	32	5.50%
Europe	112	119	6.60%
North America	55	57	3.20%
Oceania	12	12	0.50%
Developing America	46	48	4.20%
Total	709	752	6.00%

- Container transport has been increasing steadily.
- Asia accounts for more than 60% of the world container throughput.
- Asia's growth rate still surpasses the average growth rate of the world.
- Intra-Asia container transport is one of the fastest growing among a lot of sea routes in the world.
- Cooperation among the ports in Asia would become important to logistics in the Region.

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Future Forecast of Seaborne Trade

- Several public and private organizations analyzed the future trend of seaborne trade.
- Some of the results of the forecasts are shown below.

Organization	Annual Growth Rate	Years	Trade Flows
UNCTAD	4.00%	2018	Seaborne Trade
	6.40%	2018	Containers
	3.80%	2018-2023	Seaborne Trade
	6.00%	2018-2023	Containers
Lloyd's List	3.10%	2017-2026	Seaborne Trade
	4.60%	2017-2026	Containers
Clarksons	3.40%	2018	Seaborne Trade
	5.20%	2018	Containers
Drewry	4.50%	2018	Containers
	4.20%	2019	Containers

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Megaships and Challenges to Ports

- Megaships with a capacity of more than 20,000TEU are emerging, which does not necessarily result in logistics efficiency.
- Port Productivity Database (by IHS Markit/JOC) shows that from the 1H of 2016 to 1H 2018, average vessel sizes increased by 8%, while average call sizes (the quantity of containers exchanged per port call) rose by 21%.
- However, the data support claims that quayside productivity is not evolving proportionately to bigger ships with larger call sizes.
- The 1H 2018 data shows a flattening curve of berth productivity when call sizes grow by more than 2,000 containers, but shows a decline when call sizes are larger than 4,000 containers.
- As vessels spend relatively more time in ports, it has resulted in a greater number of vessels deployed per service and longer cargo transit times.
- Terminal automation could be one of the solutions for the issue.

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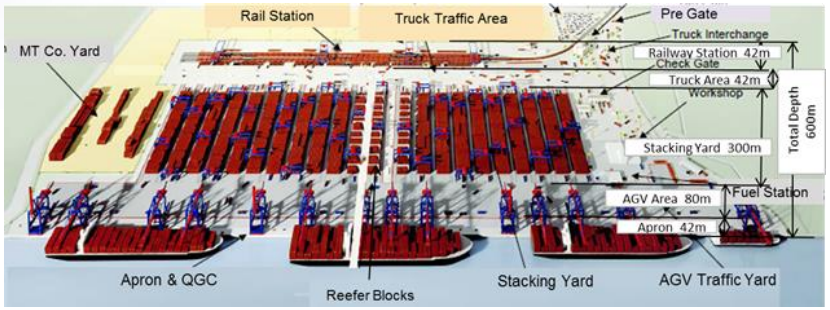
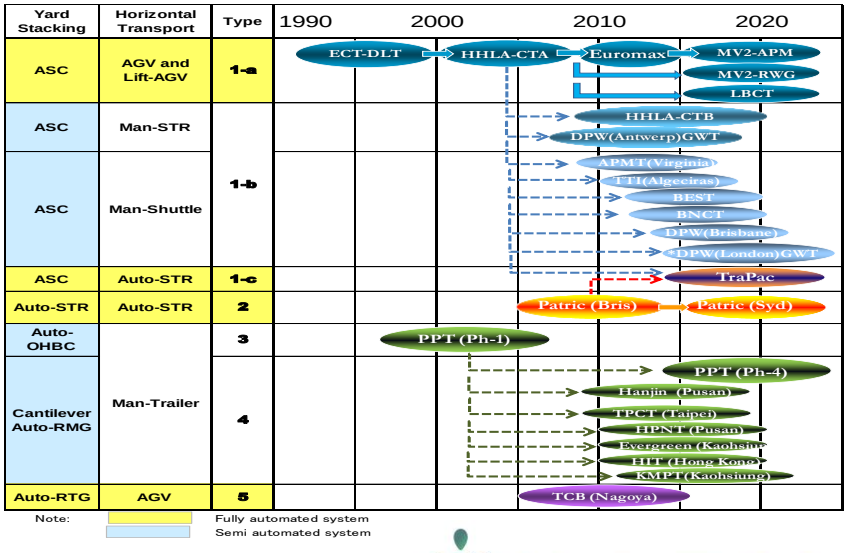
Terminal Automation

- With enlargement of container ships (over 20,000TEU mega ships), ships call at ports less frequently but load/unload much more cargo for each call.
- Container terminals have to improve their operational efficiencies to handle larger volume of cargo at one time.
- Now, automated container terminals have become the norm with modern busy ports, because they are more efficient and less costly in operation.
- They have been developed since the 1990s, and now become quite sophisticated.
- Automated terminals usually have a lot of advantages in terms of environments with electronic or hybrid cargo handling equipment.





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Climate Change and IAPH
Creation of WPCI in 2008

- **Mitigation Measures**

  -- WPCI (World Ports Climate Initiative) was created by IAPH in 2008.

  -- Eight (8) projects were set up.

    -- Air Quality and GHG Tool Box

    -- Carbon Footprinting for Ports

    -- On-shore Power Supply

    -- Intermodal Transport

    -- Sustainable Lease Agreement Template

    -- Cargo-handling Equipment

    -- Environmental Ship Index

    -- LNG fuelled Vessels and Ports

Adaptation Measures

-- “Seaports and Climate Change - an Analysis of Adaptation Measures - ”, guidelines for adaptation measures for seaports, was published by IAPH.

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Climate Change and IAPH (2)
IAPH Tool Box for Port Clean Programs

- This “Tool Box” provides information on air and climate issues of port.

- It has been expanded to include additional tools on greenhouse gases (GHG, typically CO2) mitigation.

- The users can prepare a clean air plan at their own ports by following the procedures presented in this web-based tool box.

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Climate Change and IAPH (3)
Carbon Footprinting for Port

1. This document serve as a resource guide for ports wanting to develop or improve their greenhouse gas emissions inventories.

2. It provides several different approaches for developing carbon footprint inventories for port-related activities.

3. The approaches range from a detailed one to a simple one (surrogate approach).

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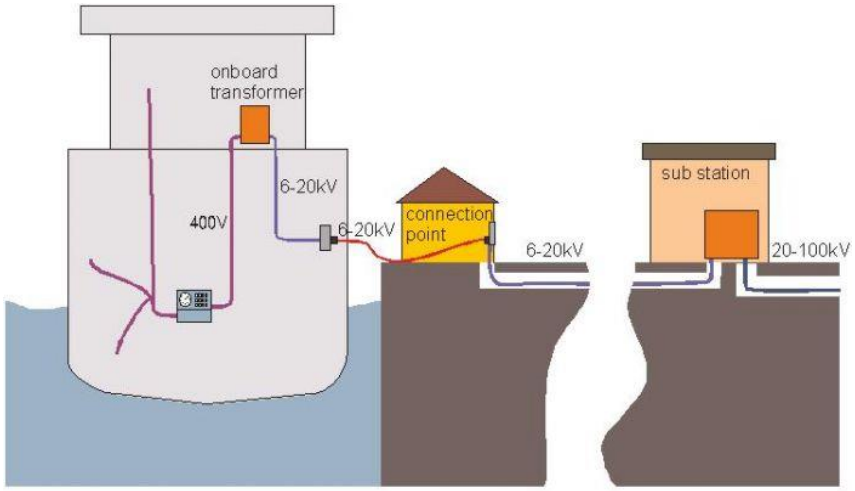
Climate Change and IAPH (4)
On Shore Power Supply

- On-shore power supply is a system to provide electricity from the local grid to ships to meet their power demand.
- As many ports in US West Coast and North Europe have already introduced this measures, interest in the technology is rapidly growing.
- With looking into the OPS website, the users can carry out an initial feasibility study to introduce OPS in their own ports.



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Climate Change and IAPH (5)
Environmental Ship Index (ESI) (1)

- The ESI system has been developed and operated by IAPH since the inception.
- The ESI is a measure for the environmental performance of seagoing ships (air emissions). It provides a tool that will assist ports and other parties to promote clean shipping.
- ESI is composed of credits (0 – 100) for above-baseline environmental performance regarding NOx, SOx(indirect PM) and CO_2
  - -- NOx: depending on performance of main- and auxiliary engines
  - -- SOx: depending of the sulphur content of the fuels used
  - -- CO_2: bonus for monitoring and reporting of CO_2 emissions
- Ports develop their own incentive schemes based on ESI points and inform the ESI administration

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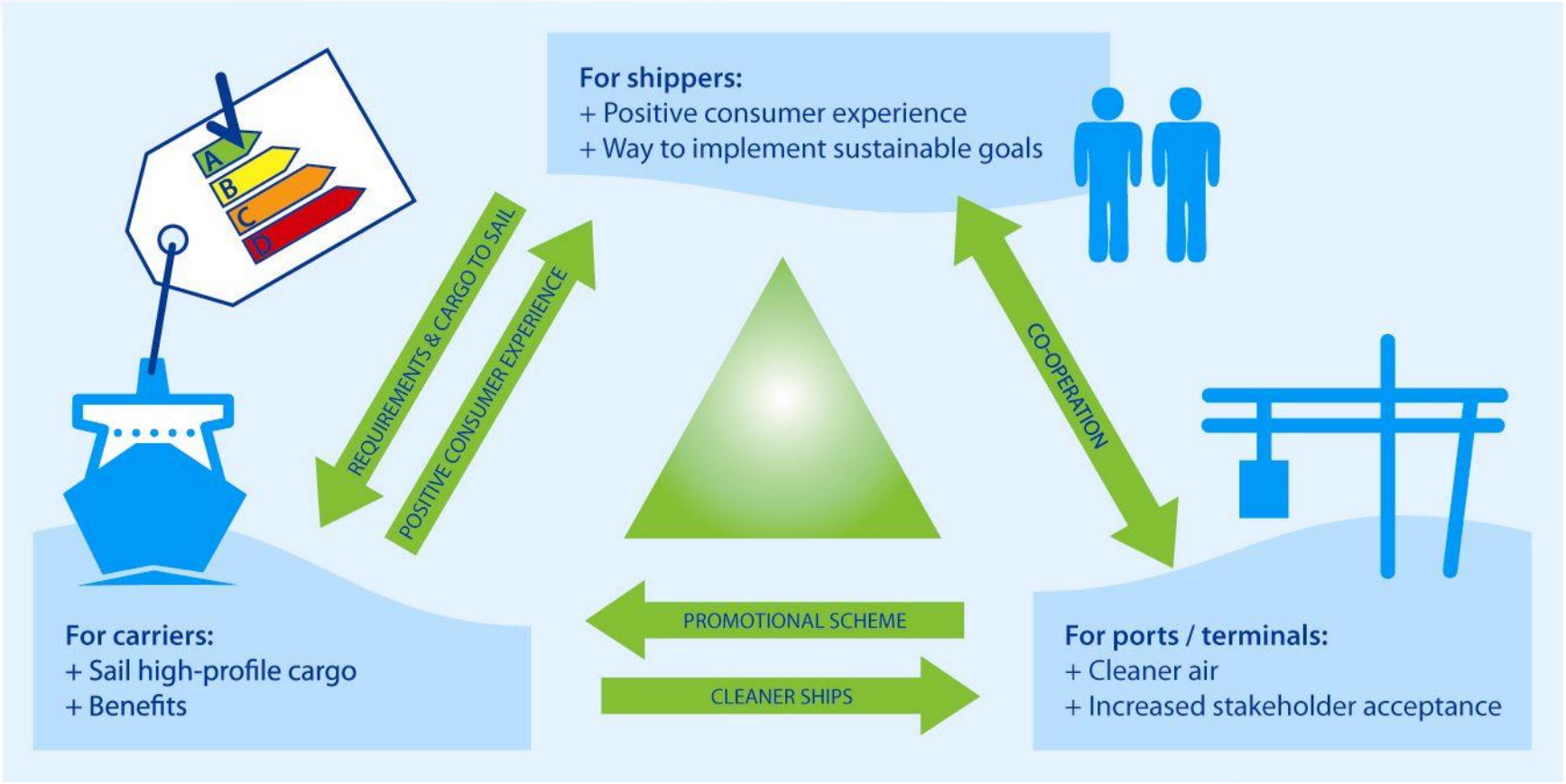
Climate Change and IAPH (6)
Environmental Ship Index (ESI) (2)

Benefit of each Party



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Port Environments and IAPH (7)
Environmental Ship Index (ESI) (3)

- ESI is a system in which we identify ships that perform better than usual ships in reducing gases emissions and ports give some incentives to these environmentally friendly ships.
- As of July 1st, 2018, about 6,900 ships and 53 incentive providers including 50 ports (Amsterdam, Hamburg, Los Angeles, Tokyo, Busan and others) participate in the system.
- Some examples of incentives are shown in the table below.

Incentive Provider	Minimum Requirements	Incentives
Port of Amsterdam	**ESI score 20 or more**	**6% or more reduction on port dues**
Port of Rotterdam	**ESI score 30 or more**	**10% or more reduction on port dues**
Port of Oslo	**ESI score 20 or more**	**30% reduction on port dues (tankers only)**
Port of Antwerp	**ESI score 30 or more, or 25 best ships**	**10% or more reduction on port dues**
Port of Hamburg	**ESI score 20 or more**	**10% or more reduction on port dues**
Los Angeles	**ESI score 25 or more**	**Incentive grant ($250 - $1,250)/call based on ESI scores**

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Climate Change and IAPH (8)
LNG fuelled Vessels (1)

- As of January 2020, sulphur content of all ocean going ships' fuels will be limited less than 0.5% in all areas in the world.
- The prices of high quality oil, however, are quite expensive.
- LNG (liquefied natural gas) is much a cleaner energy and less expensive source, which can almost eliminate sulpher emissions and particulates, reduce CO2 and Nox by 26% and 80-90% respectively.
- At the moment some seagoing vessels are already fueled by LNG and new engines are being developed by the manufactures.
- The challenges to ports are the development of LNG bunkering facility at ports, securing the safety of LNG bunkering operations, etc.

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Climate Change and IAPH (9)
LNG fuelled Vessels (2)

- Goals --- to construct international standards/guidelines for port infrastructure, safety and security at ports and legal aspects.

- Items to be studied:
  -- safety distance and allocation of bunkering berths
  -- bunkering safety procedures
  -- supervision of procedures (worker education and crew awareness)
  -- preparation for possible accidents (facilities and equipment, training, procedures)
  -- other items including influence on ISPS code

- IAPH created the dedicated web-site in 2016, which include the detailed safety checklists of LNG bunkering at ports (ships to ships, trucks to ships, tanks to ships, and so forth), and industry standard “LNG Bunker Operations Audit Tool”.

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Creation of World Ports Sustainable Programs (WPSP)

- **Background and Aims**

  -- The IAPH decided to broaden the scope of WPCI and look into many other ways ports can implement practical changes that lead to a more sustainable future.

- **Programs**

  -- The programs includes: “Climate change and energy conservation”, “future-proofed infrastructure”, “Societal integration of ports”, “Safety and security”, and “Governance and ethics”.

- **Structures to be organized**

  -- To begin with, IAPH will create an “information bank” and a “knowledge-sharing center”.

Sustainable Development Goals (UN, 2015)

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Inauguration of WPSP and its Work Programs

1. Inauguration event of WPSP

WPSP was officially inaugurated in Brussel in March 2018, with the presence of the Queen Mathilde and IMO's Secretary General, Lim.

2. WPSP's initial Work Programs

- Creation of Smart toolbox to optimize ships' arrival
- Research on implications of autonomous vessels and vehicles
- Facilitation of energy transition in ports
- More projects are being discussed under the scheme

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Future Projects of WPSP

- **Four themes for the future work were identified.**

1. Resilient Infrastructure

-- to develop “Smart Toolbox for optimizing ships arrival”.

2. Climate and Energy

-- to continue and upgrade the WPCI’s projects, “ESI”, “LNG fueled Vessels and Ports”, and “Onshore Power Supply”.

3. Safety and Security

-- to study “Autonomous Ships and Ports”.

-- to collect data and information sharing about cybersecurity.

4. Governance and Ethics

-- to prepare “Code of Practice on Corporate Governance of Port Authorities”.

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