ESI the Environmental Ship Index

of the

World Ports Climate Initiative WPCI

World Ports Climate Initiative

Some Facts

- **Houston May 2007**
  IAPH Resolution: Clean Air Program

- **Dunkirk April 2008**
  IAPH Resolution: Support for Climate Challenges

- **Rotterdam July 2008**
  World Port Climate Conference: World Ports Climate Declaration

- **Los Angeles November 2008**
  IAPH Port Environment Committee Symposium:
  World Port Climate Initiative (WPCI)

WPCI Mission Statement

The mission of the World Ports Climate Initiative is to

- **raise awareness in the port community of need for action**
- **initiate studies, strategies and actions to reduce GHG emissions and improve air quality**
- **provide a platform for the maritime port sector for the exchange of information thereon**
- **make available information on the effects of climate change on the maritime port environment and measures for its mitigation**

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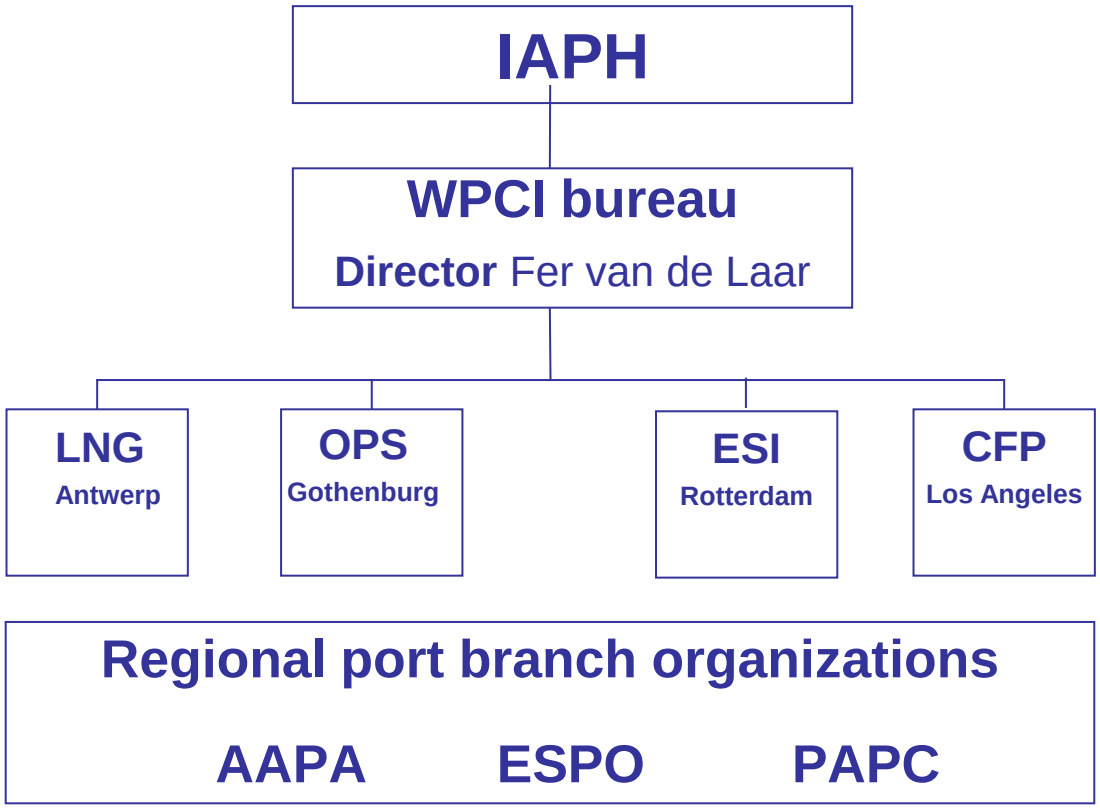
WPCI Organization And Cooperation



Current Projects

•	**Carbon Foot Print**	**CFP**	**Los Angeles**
•	**On-shore Power Supply**	**OPS**	**Gothenburg**
•	**Environmental Ship Index**	**ESI**	**Rotterdam**
•	**LNG as a fuel**	**LNG**	**Antwerp**

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WPCI current projects

Environmental Ship Index

Ship emissions, why ports care

- **Responsibility for local quality of life**
- **Air quality as a limiting factor for port development**
- **Implications of climate change**
- **Incorporate sustainability in the port, licence to operate and grow**

Ship emissions, current options for ports

Regulations of international / regional bodies

IMO	**NO_x / SO_x**	**Mandatory limits**
	CO_2	**Ship fuel efficiency**

(European Union & California Air Resources Board)

ESI: what it is [1]

- **The ESI is a measure for the environmental performance of seagoing ships (air emissions) relative to IMO rules**
- **Provides a tool that assists ports and other parties to promote clean shipping**
- **Use is on a voluntary base using self declaration**
- **Maximum responsibility with the ship owner**
- **Suitable for all sizes and types of ships**

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ESI: what it is [2]

ESI is composed of credits (0 – 100) for above-baseline environmental performance regarding NO_x, SO_x (indirectly PM) and CO_2

- **NO_x: depending on performance of main and auxiliary engines**
- **SO_x: depending on the sulphur content of the fuels used**
- **CO_2: bonus for monitoring and reporting of data**

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ESI: how it works [1]

- **Ships may obtain an ESI Score by reporting on engine certificates, bunker fuel information and CO_2 reporting, via a secured web-based application**
- **The ESI Score is calculated and managed in the ESI central database and shown on the public part of the web site**
- **Ports develop their own incentive scheme based on ESI points and report to the ESI administration**
- **These ESI incentives will also be shown on the public part of the web site**

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ESI: score calculation [1]

OVERALL CALCULATION ESI SCORE

$$\frac{2 \times \text{ESI } NO_x + \text{ESI } SO_x + \text{ESI } CO_2 + \text{OPS}}{3.1}$$

(maximum 100)

ESI: score calculation [2]

The ESI formula is built up of different parts for NO_x, SO_x, CO_2 and OPS

NO_x : Baseline Tier I; input rpm, rated power of all engines.
Engines built before 2000: instead of EIAPP, approved statement is accepted.
100 sub-points maximum score

SO_x : Baselines for HFO and MDO/Gasoil; input thru BDN: date, amount and sulphur content.
100 sub-points maximum score

subdivided as follows
High 30 Mid 35 Low 35

ESI: score calculation [3]

CO_2 : **Include data on fuel consumption and distance sailed as defined in MEPC.1/Circ.684 ***
10 sub-points fixed bonus

OPS : **Where a Class approved OPS system is fitted, regardless of its use**
35 sub-points fixed bonus

*** MEPC.1/Circ.684 Guidelines for Voluntary Use of the Ship Energy Efficiency Operational Indicator EEOI**

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ESI: score calculation [4]

$$\text{ESI } NO_x = \frac{100}{\Sigma \text{ Rated Power of all Engines}} \times \frac{(NO_x \text{ limit value} - NO_x \text{ rating}) \times \text{Rated Power}}{NO_x \text{ limit value}} \quad \Sigma \text{ of all Engines}$$

ESI: score calculation [5]

FUEL	HIGH	MID	LOW
Sulphur Content % (m/m)	≤ 3.5	≤ 0.5	≤ 0.1
Baseline	3.5	0.5	0.1
Multiplying Factor	30	35	35
Relative Sulphur Content	x	y	z

HIGH 0.5 < S % ≤ 3.50

MID 0.1 < S % ≤ 0.5

LOW S % ≤ 0.1

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ESI: score calculation [6]

Average sulphur content of fuel for quarters 1 & 2 2015 :

$$\frac{Mass_1 \times sulphur\ content_1 + Mass_2 \times sulphurcontent_2 \ldots\ldots + Mass_x \times sulphurcontent_x}{\sum(Mass_1 \ldots Mass_x)}$$

HIGH	**a**
MID	**b**
LOW	**c**

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ESI: score calculation [7]

x = the relative reduction of the average sulphur content of HIGH
(3.5 - a) / 3.0

y = the relative reduction of the average sulphur content of MID
(0.5 - b) / 0.4

z = the relative reduction of the average sulphur content of LOW
(0.1 - c) / 0.1

If the average sulphur content (a b c) is above the baseline level, the ESI SOx sub-points of that period for that particular fuel is set on zero (no negative scores).

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ESI: score calculation [8]

Scenario 1 **Three fuels**

HIGH, MID and LOW

ESI SO_x = 30 * x + 35 * y + 35 * z max. 100

Scenario 2 **Two fuels**

HIGH and MID (no LOW)

ESI SO_x = 30 * x + 35 * y + 0 max. 65

HIGH and LOW (no MID)

ESI SO_x = 30 * x + 35 + 35 * z max. 100

MID and LOW (no HIGH)

ESI SO_x = 30 + 35 * y + 35 * z max. 100

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ESI: score calculation [9]

Scenario 3 **One fuel**

HIGH							
ESI SO_x	**=**	**30 * x**	**+**	**0**	**+**	**0**	**max. 30**
MID							
ESI SO_x	**=**	**30**	**+**	**35 * y**	**+**	**0**	**max. 65**
LOW							
ESI SO_x	**=**	**30**	**+**	**35**	**+**	**35 * z**	**max. 100**

ESI: score calculation [10]

ESI SUB-POINTS

FUEL BUNKERED	HIGH	MID	LOW	TOTAL MAX.
1: HIGH	max. 30	-	-	30
1: MID	bonus 30	max. 35	-	65
1: LOW	bonus 30 *	bonus 35	max. 35	100
2: HIGH & MID	max. 30	max. 35	-	65
2: HIGH & LOW	max. 30	bonus 35	max. 35	100
2: MID & LOW	bonus 30	max. 35	max. 35	100
3: HIGH & MID & LOW	max. 30	max. 35	max. 35	100

* only if vessel sailed outside ECA

ESI: how it works [2]

Examples of ships	ESI Score
• Ship A in compliance with IMO rules on NO_x, SO_x and no EEOI Data sets and no OPS	0
• Ship B performing 10 % better on NOx, SOx	9
• Ship C performing 20 % better on NOx, SOx	17
• Ship D performing 20 % better on NOx and using only MID and LOW	26
• Ship E performing 20 % better on NO_x and using only LOW 0.08	36

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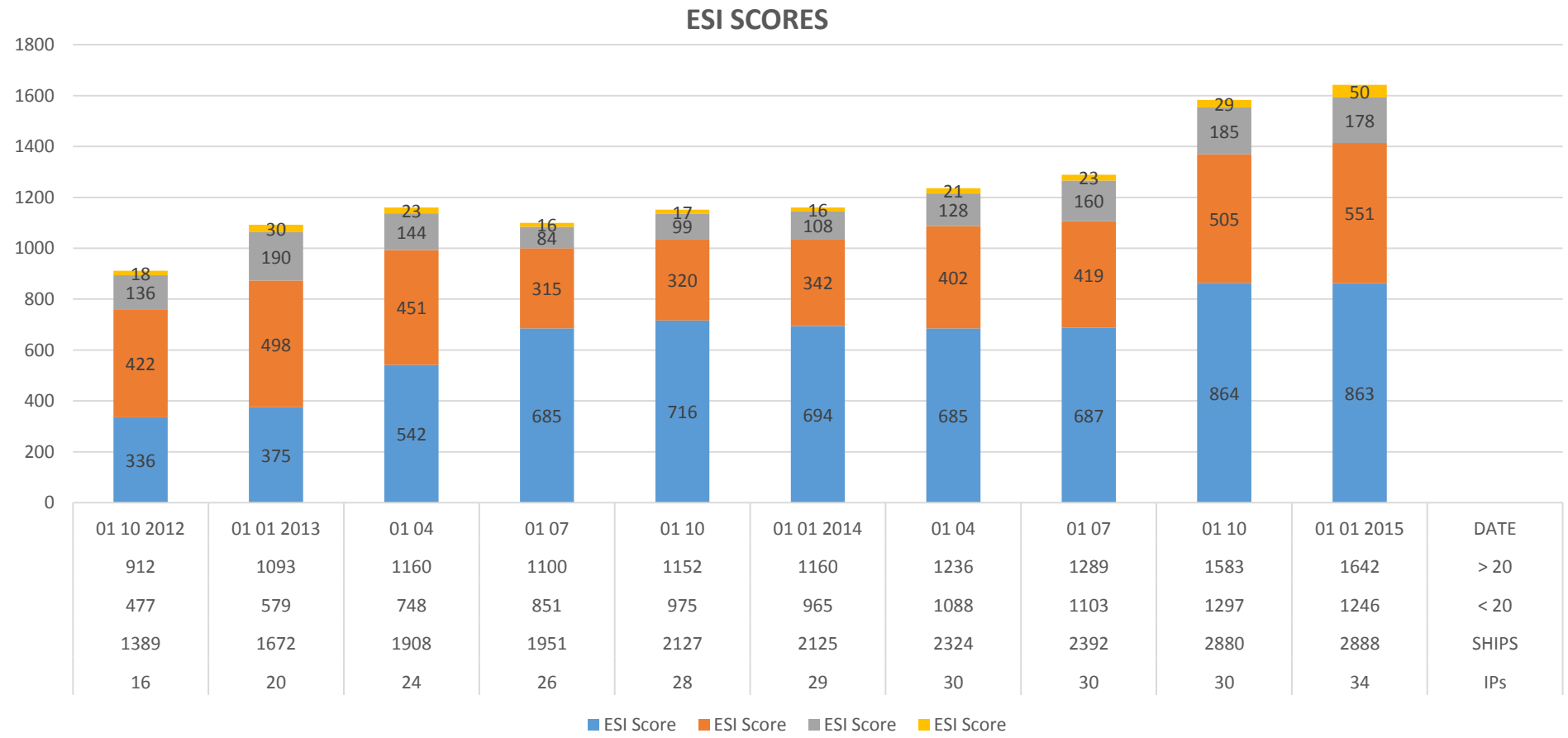
ESI: how it works [3]



ESI: how it works [4]

ACTIVE SHIPS 1 JANUARY 2015

- **2888 recorded in the data base**
- **1642 ESI Score over 20**
- **863 ESI Score between 20 and 30**
- **551 ESI Score between 30 and 40**
- **178 ESI score between 40 and 50**
- **50 ESI score ≥ 50 (top 92.6)**

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ESI: how it works [5]

SHIPS (1 JANUARY 2015)

ESI score	≥ 50	(selection)
• BERGENSFJORD	92.6	LNG (fuel)
• TERNVAG	83.1	SCR
• AL AREESH	78.3	LNG (carrier)
• STENA GERMANICA	70.2	SCR
• THARSIS	64.7	ECA
• EUROPA 2	60.4	CRUISE
• ASIATIC SPRING	59.1	CON / OPS
• HYUNDAI PRESTIGE	53.8	CON / OPS

ESI: how it works [6]

- **On entering an ESI Port, the ship may inform that port of its participation in ESI**

- **The port may then apply incentives in accordance with the ESI score**

Whenever a port so wishes

- **it can appoint an auditor to verify the ESI Score and check the data on board and**
- **report the results to the ESI administration**

ESI: how it works [7]

ACTIVE PORTS (1)

	ESI SCORE	INCENTIVE
Amsterdam	≥ 20	~ 6 % reduction in port dues
Rotterdam	≥ 31 or best 25	~ 10 % reduction in port dues
Oslo	> 25	20 % reduction in port dues
	> 50	40 % reduction in port dues
Antwerp	> 31 or best 25	~ 10 % reduction in port dues
Hamburg	> 20	~ 10 % reduction in port dues + LNG rebate

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ESI: how it works [8]

ACTIVE PORTS (2)

	ESI SCORE	INCENTIVE
Green Award		**ESI ships obtain extra GA points**
Bremen /	**> 20**	**5 % reduction in port dues**
Bremerhaven	**> 31**	**10 % reduction in port dues**
Kiel	**> 30**	**10 % reduction in port dues**
Zeebrugge	**> 20**	**10 % reduction in port dues**
Groningen	**> 20**	**5 % reduction in port dues**
Le Havre	**> 20**	**10 % reduction in port dues**

ESI: how it works [9]

ACTIVE PORTS (3)

	ESI SCORE	INCENTIVE
Brunsbüttel	20 - 31	5 % reduction in port dues (max. € 750)
	> 31	10 % reduction in port dues (max. € 1 000)
Los Angeles	> 30	US $ 750 per call
	> 35	US $ 1000 per call
	> 40	US $ 1250 per call
Ashdod	> 31	non disclosed financial incentive
JadeWeser	> 31	5 % reduction on port dues

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ESI: how it works [10]

ACTIVE PORTS (4)

	ESI SCORE	INCENTIVE
Tata Steel NL	> 20	scaled reduction in port dues
Rightship	ESI ships obtain extra Rightship points	
New York/	> 15	US $ 1500 per call (add 5 VSR points)
New Jersey	> 25	US $ 2500 per call (add 5 VSR points)
Ghent	> 20	5 % reduction in port dues
	> 30	10 % reduction in port dues
Zeeland Seaports	ESI score^2 / 1000 = x %	reduction in port dues

ESI: how it works [11]

ACTIVE PORTS (5)

	ESI SCORE	INCENTIVE
Port Metro	> 20	23 % reduction in port dues
Vancouver	> 30	35 % reduction in port dues
Setubal	> 20	5 % reduction in port dues
Civitavecchia	0.1 - 30	scaled reduction of waste collection fees
Prince Rupert	> 20	10 % reduction in port dues
Port Authority	> 31	20 % reduction in port dues
Port of Paris		financial incentive (info on request)

ESI: how it works [12]

ACTIVE PORTS (6)

	ESI SCORE	INCENTIVE
Port of Setubal	> 30	3% reduction in port dues
Port of Rouen	> 25	10 % reduction in port dues
Port of Rostock	> 20	3 % reduction in port dues
Port of Sohar	> 20	5 % reduction in port dues
Ports of Nieder-sachsen	20 - 30	2.5 % reduction in port dues
	31 - 50	5 % reduction in port dues
	> 50	10 % reduction in port dues
Port of Busan	> 31	15 % reduction in port dues

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ESI: how it works [13]

ACTIVE PORTS (7)

	ESI SCORE	INCENTIVE
Atlantic Port La Rochelle	20 - 30	10 % reduction in port dues
	30 - 60	13 % reduction in port dues
	> 60	15 % reduction in port dues
Port of Kristian-Sand	25 - 50	30 % reduction in port dues
	> 50	50 % reduction in port dues
Norway's Pilots & Coastal Service	> 50	50 % reduction in pilotage fee
Gothenburg Port	> 30	10 % reduction in port dues + LNG rebate

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ESI: what ports next ?

Your Port

Port X .....

Port Y .....

Port Z .....

ESI: website

AUDITOR

- **ESI Database: new section for registration of Auditors and audits**
- **Auditors are appointed by an IP and authorized by ESI Administrator**
- **Auditors: experienced ship inspectors**
- **Changes in force on 1 January 2014**

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ESI: website

www.environmentalshipindex.org

www.wpci-esi.org

www.esi.wpci.nl

ESI: info

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