IAPH • PORT ENVIRONMENT COMMITTEE

WPCI

World Ports Climate Initiative

RESULTS FROM QUESTIONNAIRE ON ONSHORE POWER SUPPLY

THE CURRENT SITUATION AND THE FUTURE PLANS REGARDING ONSHORE POWER SUPPLY IN THE WPCI PORTS AS WELL AS OTHER PORTS DURING 2009

AUTHOR: SUSANN DUTT, PORT OF GOTHENBURG. DATE: February 2010.

Acknowledgements

This report contains the result from the questionnaire on *"current status and future plans regarding Onshore Power Supply 2009"* from 53 ports worldwide, covering many geographical areas and sizes of ports, both with and without experience from onshore power supply.

We are very thankful to all ports sharing their current status and future plans regarding Onshore Power Supply (OPS), without your time and input this report could never have been written.

We would also like to thank the European Sea Ports Organisation (ESPO), Green Port Journal and all other organisations/magazines/ports informing about the ongoing questionnaire and giving input to the set up of the questionnaire.

February, 2010

Susann Dutt, Port of Gothenburg, Coordinator of the OPS project within World Ports Climate Initiative
Toon Tessier, Port of Antwerp, participating port within the OPS project
Ton van Breemen, Port of Amsterdam, participating port within the OPS project
Wolfgang Becker, Hamburg Port Authority, participating port within the OPS project
Fer van der Laar, IAPH, International Association Ports & Harbors,

You are welcome to leave any comments on this report to:
Susann Dutt
Port of Gothenburg
susann.dutt@portgot.se

+46 31 731 29 63

Executive summary

Introduction

One of the projects within World Ports Climate Declaration (WPCI) is about Onshore Power Supply (OPS). Port of Gothenburg is the project port and participating ports are Amsterdam, Antwerp and Hamburg + IAPH (International Association Ports & Harbors).

The overall goal of the project is to reduce local air pollutants, greenhouse gas emissions & noise by stimulating as many ports, terminal operators and shipping lines worldwide to implement the technology of OPS where practical and useful.

The detailed goal is to stimulate the further use of OPS by designing and building a web based application, which provides practical guidance on OPS, available for all ports. The application should also contain information for other stakeholders such as terminal operators and shipping lines.

During the summer 2009 an electronic questionnaire **about the current situation and future plans regarding Onshore Power Supply** was sent out to all the 55 WPCI member ports. Special invitations to fill in the questionnaire was also sent out to the port community via ESPO, GreenPort Journal, WPCI website, Port of Gothenburg website and via different Port Associations.

The report contains the result from 53 ports worldwide, covering many geographical areas and sizes of ports, both with and without experience from onshore power supply. The result from the questionnaire shows that there is a strong interest in the technology.

Result – current status

About one third (17 ports) of the responding ports are offering OPS today. Main arguments of introducing the technology are environmental benefits, customers and reputation/goodwill. When indicating environmental benefits as an argument the following pollutants are the most important: nitrogen oxides, carbon dioxide and sulphur.

More than 90% of the ports offering OPS today let private operators have to pay for the use of the OPS investment when the OPS infrastructure is in the port authority's property.

38% of the responding ports have carried out a feasibility study for introducing/increasing the use of the technology and 13% do have a study in progress and 49% have not carried out any feasability study. The WPCI ports are showing an even higher interest in the technology, 55% have already carried out a feasibility study, 23% are in the process and only 22% are not yet onboard.

Result – future plans

85% of the respondents answered yes or maybe on the question "Is your port planning to introduce/expand the technology to more quays within 5-10 years". 96% of the WPCI ports are responding either yes or maybe on the same question. The most sceptical ports to invest in OPS are the ones without experience from the technology.

The main arguments among all ports responding yes or maybe are environmental benefits, reputation/goodwill and benefits for society. Only 20% of the responding ports are responding that economical benefits are an argument.

The result among the WPCI ports differs somewhat; all of the WPCI ports choose environmental benefits as the main argument, followed by reputation/goodwill and benefits for society.

A majority, 86%, of the answering ports are going to choose high voltage and only 14% will invest in low voltage technology. Among the WPCI ports all are planning to invest in high voltage.

Main arguments for not introducing the technology are: no feasibility study has been carried out, cost effectiveness is too low and lack of enough power. Further comments mentioned when discussing the difficulties in introducing the technology are: missing technical standards, integration of external costs, security of constant power supply and cost effectiveness.

The ports offering OPS today and the WPCI ports seem to be more environmentally proactive as 58% and 70% respectively are considering other measures as to improve the environmental performance from shipping while at berth compared to the general result of 50%. The measures mentioned are amongst others: environmental differentiated harbour dues to stimulate clean shipping, AMECS, Waste Collection, Environmental Ship Indexing System and Exhaust scrubbers.

Next step

The WPCI Onshore Power Supply Project will stimulate the further use of OPS by designing and building a web based application, which provides practical guidance on OPS, available for all ports. The input from the responding ports to this questionnaire has been valuable information when developing the website.

A beta version of the Onshore Power Supply website will be launched at the GreenPort 2010 conference in Stockholm, 24 February 2010: http://beta.w3industries.com/dirigo/wpci/. During summer 2010 the final website will be found at: www.wpci.ops.nl and www.onshorepowersupply.org.

A similar questionnaire could be relevant to carry out among shipping companies and terminal operators worldwide to see if there is coherence or gap to the result in this report regarding the future plans to expand/implement OPS.

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Introduction

The World Ports Climate Initiative (WPCI)

55 of the largest ports in the world, see all member ports in appendix 1, have joined forces to do something concrete about climate change. In July 2008, the ports came together at a conference in Rotterdam to sign a climate declaration.

The WORLD PORTS CLIMATE DECLARATION addresses:
• Reduction of greenhouse gas emissions from ocean-going shipping
• Reduction of greenhouse gas emissions from port operations and development
• Reduction of greenhouse gas emissions from hinterland transport
• Enhancement of the use of renewable energy
• Development and auditing of CO2 inventories

The mission of the World Ports Climate Initiative is to:

- Raise awareness in the port and maritime 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

Different projects to support the mission and the climate declaration are going on within WPCI; carbon footprinting, environmental ship index, intermodal transport, IAPH toolbox expansion, cargo handling equipment, lease agreement template and onshore power supply.

For more information about the World Ports Climate Initiative see: www.wpci.nl.

The Onshore Power Supply Project

One of the projects of the WPCI is Onshore Power Supply (OPS) and a formal working group was formed during spring 2009. The Port of Gothenburg is the project port and participating ports are Amsterdam, Antwerp and Hamburg + IAPH (International Association Ports & Harbors)

The overall goal of the project is to reduce local air pollutants, greenhouse gas emissions & noise by stimulating as many ports, terminal operators and shipping lines worldwide to implement the technology of OPS where practical and useful.

The detailed goal is to stimulate the further use of OPS by designing and building a web based application, which provides practical guidance on OPS, available for all ports. The application should also contain information for other stakeholders such as terminal operators and shipping lines.

For more information about the project see: *www.portgot.se*
(environment, World Ports Climate Initiative).

The questionnaire

An electronic questionnaire was put together by the OPS working group during spring 2009 to:
- Get an idea about the current status and future plans regarding OPS
- Give important input to the upcoming work within the OPS project
- Reference information to use when evaluating the project further on

The questionnaire is found in appendix 2.

During the summer 2009 the electronic questionnaire was sent out to all the 55 WPCI member ports. Special invitations to fill in the questionnaire was also sent out to the port community via ESPO, GreenPort Journal, WPCI website, Port of Gothenburg website and via different Port Associations. All responses have been treated anonymously and in confidence.

Respondents

53 ports filled in the electronic questionnaire; Europe (41 ports), North America (4), Asia (3), Australia/Oceania (3), Africa (2).

24 out of these 53 were WPCI member ports, almost 50% of all respondents; Europe (14), North America (4), Asia (3) and Australia/Oceania (3).

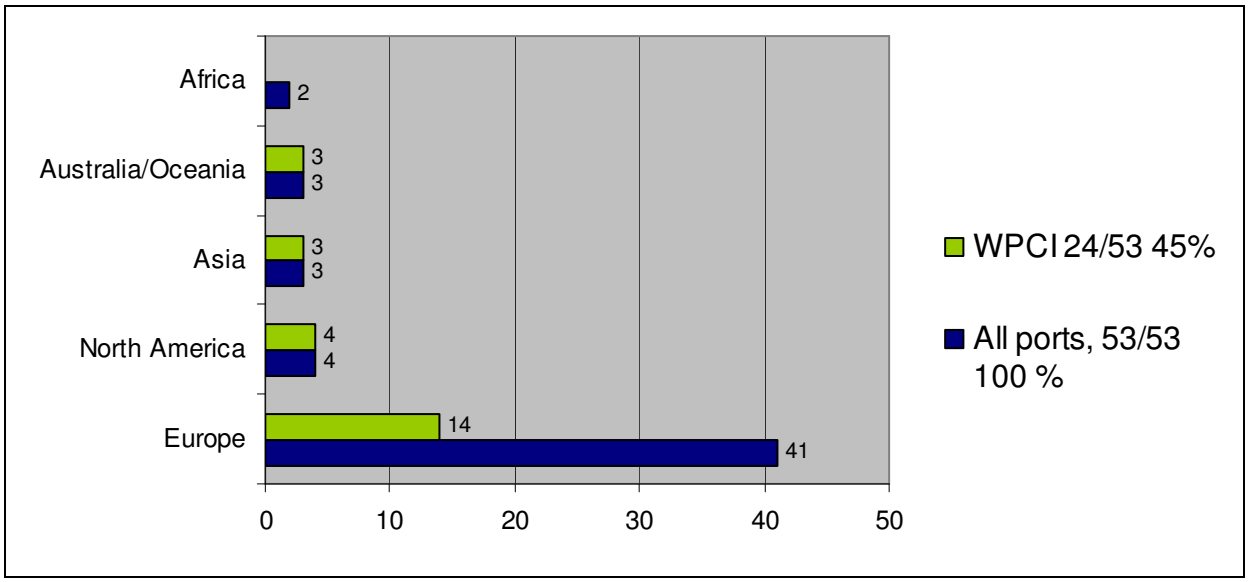

Figure 1: Responding ports in different continents (number of ports)

Additional questionnaires have been received after the closing date, which are not included in the result.

Result

The result presented in this report is based on the 53 received questionnaires.

When a result differs markedly in between the overall result and WPCI ports it is presented under each question. If not, the result from the WPCI ports is similar to the result from all ports. Sometimes the result is also presented based on the ports offering high and/or low voltage today.

In the graphs and under each question you will find the number of ports which responded to a certain question (rate of response) and also the percentage rate based on responding ports/expected ports to respond a certain question, for example 53/53 ports (100%).

The result is also available as a power point presentation.

Current status

Question 1:
Does your port provide onshore power supply (OPS) at any of its berths?

Rate of response 53/53 ports (100%)

About a third, 17 ports, provide onshore power supply today, either with high/low voltage or both.

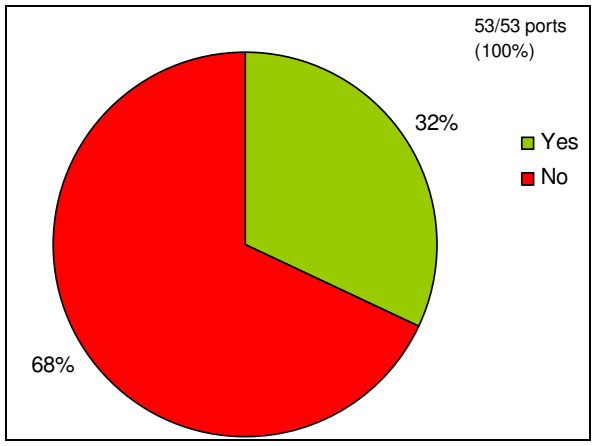

Figure 2:
Does your port provide onshore power supply (OPS) at any of its berths?

Question 2:
If yes for what kind of ships?

Inland barges	5 ports (out of 17 ports)
Ro/ro	8 ports (2 WPCI)
Container	2 ports (1 WPCI)
Cruise	3 ports (3 WPCI)
Ferry	3 ports (1 WPCI)
ROPAX	4 ports (1 WPCI)
Other	9 ports (5 WPCI)

Question 3:
How many vessels in your port are equipped for the technology?

Responses were very diverse and covered all from two vessels up to all vessels.
Some of the responding ports are referring to tugboats, nautical service vessels, patrol vessels, inland barges others are referring to container, cruise and ro/ro vessels.

Question 4:
How many berths are equipped?

Responses were very diverse even in this question. The answers cover a range from all berths to 1 berth.

Question 5 & 6:
Does your port offer OPS with high voltage (above 1kV)?
Does your port offer OPS with low voltage (below 1 kV)?

Rate of response 17/17 ports (100%)

13 ports are offering with low voltage and seven ports with high voltage. Three of the responding ports are offering both low and high voltage.

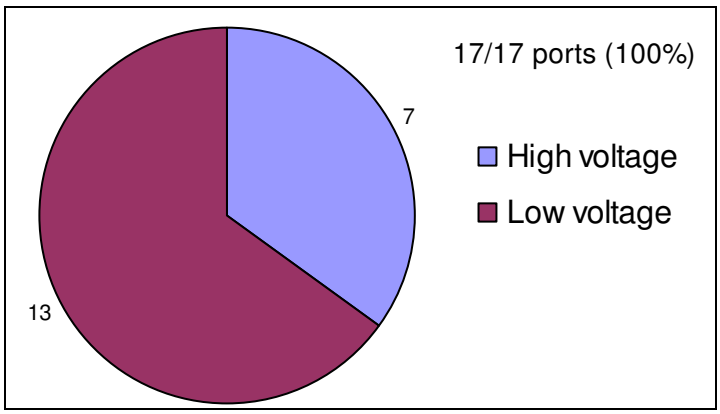

Figure 3: The number of ports offering high or low voltage.

Within the responding ports five European ports and two North American ports are offering OPS with high voltage. OPS with low voltage are found in 11 European ports, three North American ports and one Asian port.

Question 7A:
What has been the main argument/s when introducing the technology?

Rate of response 17/17 ports (100%)

The main arguments when introducing the technology are environmental benefits (94%), customers (70%) and reputation/goodwill (59%). For more detailed information see figure 4 here below.

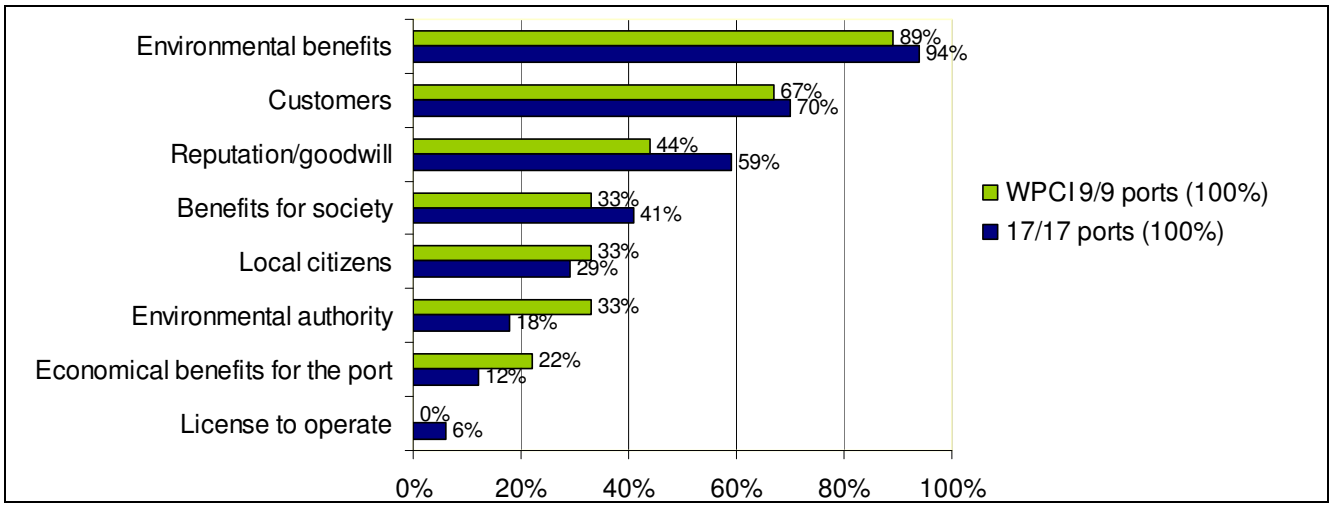

Figure 4: The different argument/s when introducing the technology of OPS

The number of ports listing a certain argument differs somewhat if the port offers high and low voltage respectively (see figure 5 below).

The environmental benefit is an important argument for all ports offering high voltage compared to 79% of the ones offering low voltage. The customers are an important argument for all ports offering high voltage, but only to 50% of the ports offering low voltage.

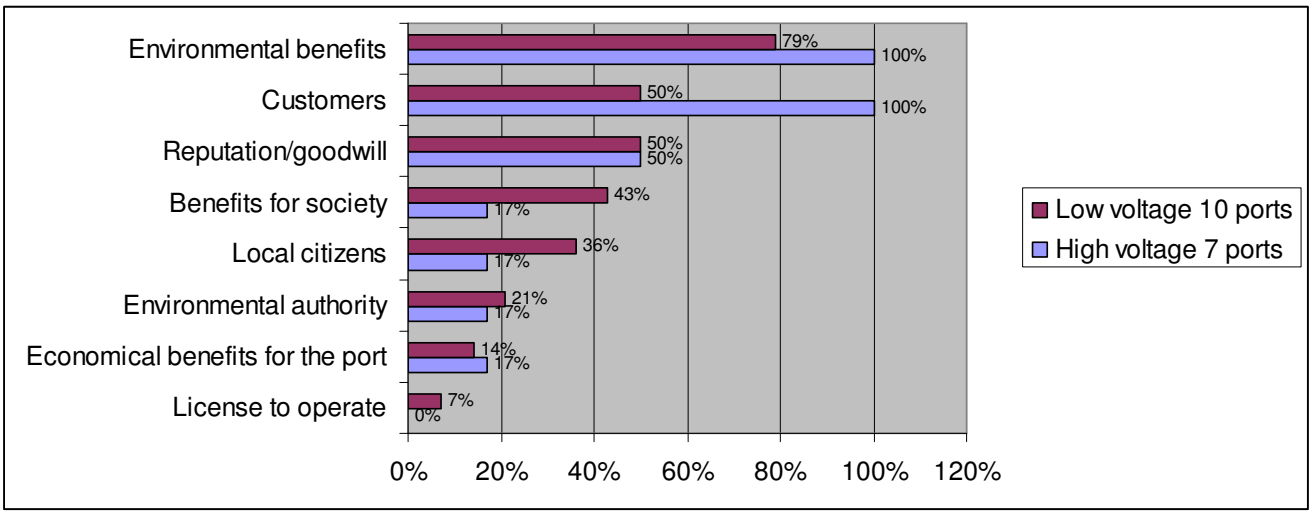

Figure 5: The different argument/s when introducing the technology of OPS
(the difference in between ports offering low and high voltage)

Question 7B:
If environmental benefits are an argument please indicate for what kind of pollutants?

Rate of response 14/17 ports (82%), 6/7 High voltage ports (86%), 10/12 Low voltage ports (83%)

When environmental benefits is an argument nitrogen oxides, carbon dioxide and sulphur are the pollutants that most ports indicate are the most important ones, followed by particulate matters, noise and volatile organic compounds.

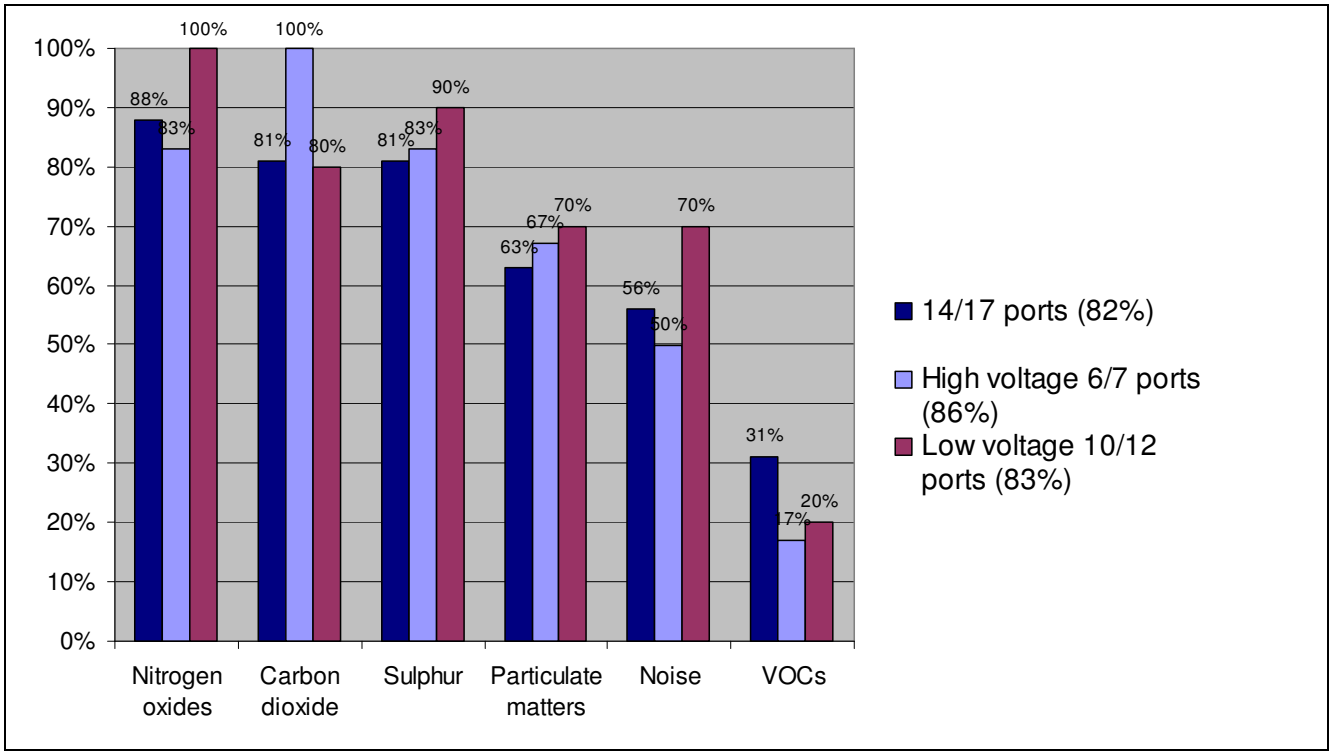

Figure 6: Pollutants that are important when environmental benefits are an argument.

The result is somewhat different when analyzing the answers from the ports offering high voltage (see figure 6 above). All these ports put carbon dioxide as a pollutant that they are considering when putting environmental benefits as an argument for introducing the technology, compared to about 80% of all 14 responding ports. Only one out of six ports offering high voltage OPS, 17%, indicate noise as a pollutant that they consider with respect to the introduction of OPS, compared to over 50% when analyzing the answers from all 14 ports and 70% when considering the result from the 10 responding ports offering low voltage OPS. Among the ports offering low voltage OPS nitrogen oxides and sulphur are the top environmental considerations.

Question 7C:
If possible please specify the formula (s) for calculating the environmental benefits.

Quite few ports left any detailed information regarding the formula for calculating the environmental benefits.

- "0,67-0,69 kg carbon dioxide/kWh and 0,002 kg nitric oxides/kWh"
- "Total time at berth vs time plugged into shore power. Actual emission benefit varies if you consider utility emissions in the emission benefit calculations."

Question 8A:
Does the port authority give subsidies for private investments in the OPS technology?

None of the 17 port authorities give subsidies for private investments in the OPS technology. One is considering giving subsidies in the future.

Question 9A:
If the OPS infrastructure is the port authority's property, do private operators have to pay for the use of the investment?

Rate of response 15/17 ports (88%)

When the OPS infrastructure is the port authority's property a majority (93%) of the ports do let private operators have to pay for the use of the investment and one port is answering sometimes.

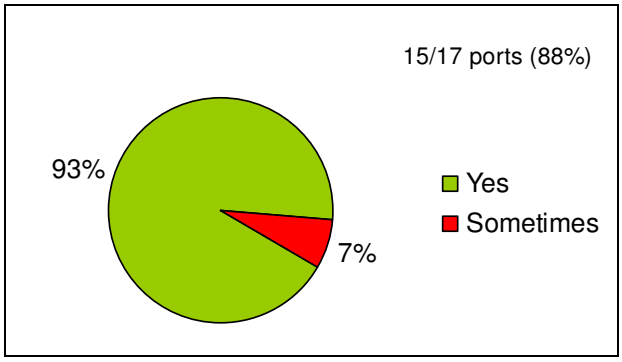

Figure 7: Do private operators have to pay for the use of the investment?

Question 9B:
If yes specify the height of the fees to be paid.

The height seems to differ in between different ports and some of them are not aware about the height.

"I don't know the height". " Actual costs", "Per energy rates", "0,13€/kWh"

"According to the consumption" "Cost of investments/agreed period of years"

"Now 24, from 2010 probably 34eurocent/kWh (energy costs included)"

"Basis the energy consumption" "1x16 A 10€/day, 3x25 A 30€/day, 3x63 A 60€/day"

Question 10A:
Does the port authority give subsidies in order to reduce exploitation costs?

16 out 17 port authorities don't give subsidies in order to reduce exploitation costs and one port authority does it sometimes.

Question 11:
Has your port carried out a feasibility study for introducing/increasing the use of the technology?

Rate of response 50/53 ports (94%), WPCI ports 23/24 (96%)

Regarding feasibility studies, 38% out of 50 responding ports have already carried out a feasibility study (55% of the WPCI ports). 13% ports are in the process of doing a feasibility study, most of them are ports without OPS today. 23% of the WPCI ports are in the process of doing a feasibility study. 49% have not carried out any feasibility yet, 22% of the WPCI ports answers no to the same question.

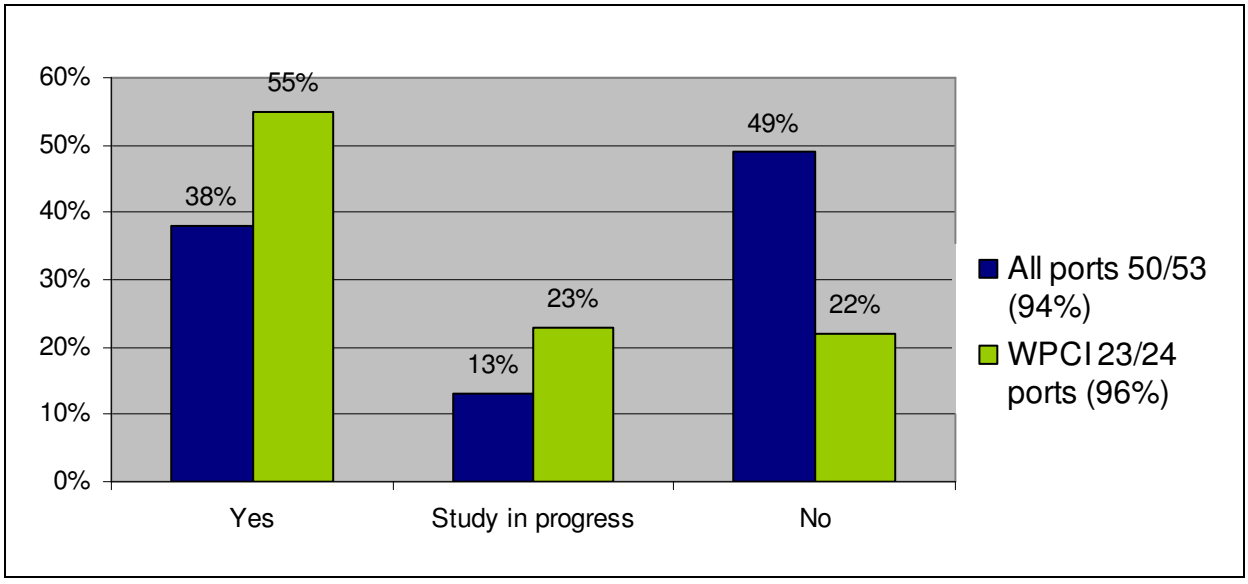

Figure 8: Has your port carried out a feasability study for introducing/increasing the use of the technology?

Future plans

Question 12A:
Is your port planning to introduce/expand the technology to more quays within 5-10 years?

Rate of response 53/53 ports (100%)

A majority, 85% of the 53 respondents, answer yes or maybe on the question ”Is your port planning to introduce/expand the technology to more quays within 5-10 years”. 96% of the WPCI ports are responding either yes or maybe to the same question. The most sceptical ports to invest in OPS are the ones without experience from the technology.

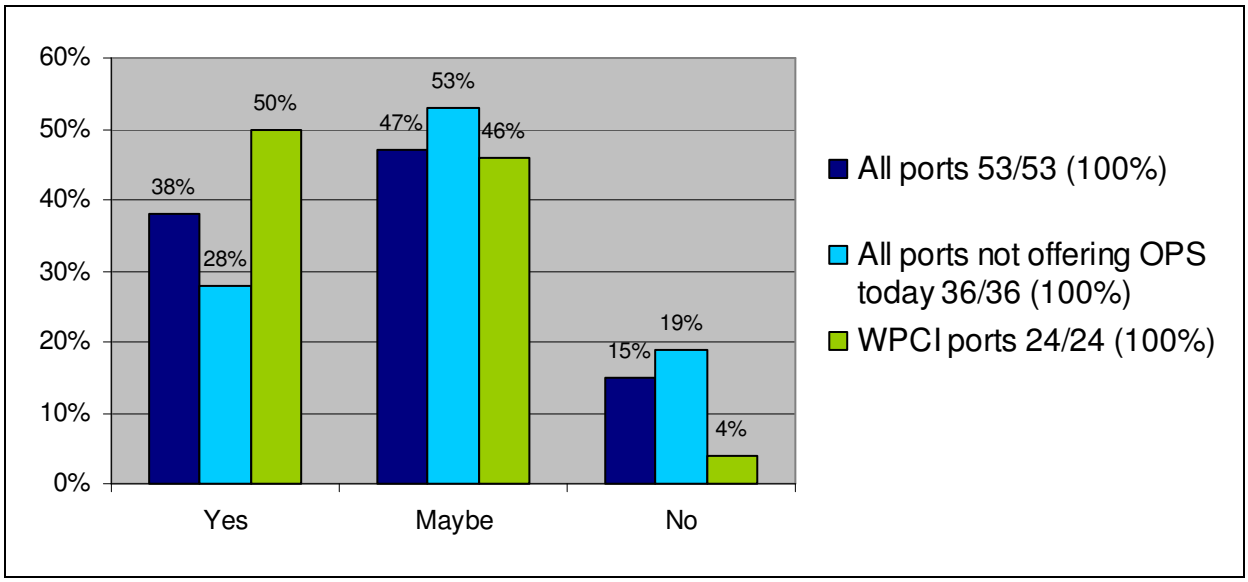

Figure 9: Is your port planning to introduce/expand the technology to more quays within 5-10 years?

Ports without OPS today:
Over 50% of the ports not offering OPS today answer No compared to only 15% when analyzing the responses from all responding ports. The biggest difference are among the answers ”maybe”, 47% in the total result and only 19% among the ones not offering OPS today.

Ports with high voltage:
The ports offering high voltage today ALL answer yes (83%) or maybe (17%) to the question, if they are planning to expand the technology within 5-10 years.

Ports with low voltage:
A majority (91%) of the ports offering low voltage today answer yes (45%) or maybe (45%) to the same question.

Question 12B:
If yes, what is the main argument/s to introduce/expand the technology?

Rate of response WPCI ports 22/23 (95%), 40/45 ports (88%)

The result below include all ports answering either yes or maybe on question 12A ”Is your port planning to expand/introduce the technology within 5-10 years?”.

The main arguments among all ports responding yes or maybe are environmental benefits (85%), reputation/goodwill (63%) and benefits for society (48%). Only 20% of the ports are stating that economical benefits are an argument.

The result among the WPCI ports differs somewhat; 100% of the WPCI ports choose environmental benefits as the main argument, followed by reputation/goodwill (81%) and benefits for society (62%).

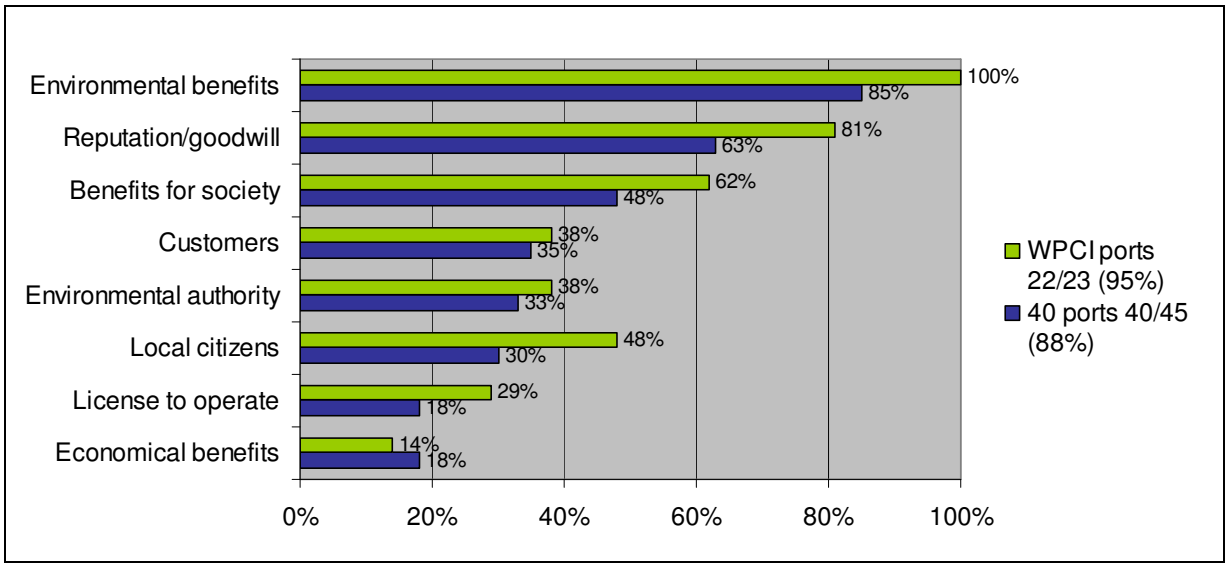

Figure 10: If yes/maybe what is the main argument/s to introduce/expand the technology?

Question 12C:
If yes are you planning to introduce/expand the technology with high voltage (above 1 kV) or low voltage (below 1kV)?

Rate of response 35/40 ports (87,5 %)

A majority, 86%, of the answering ports are going to choose high voltage and only 14% will invest in low voltage technology. Among the WPCI ports all are planning to invest in high voltage.

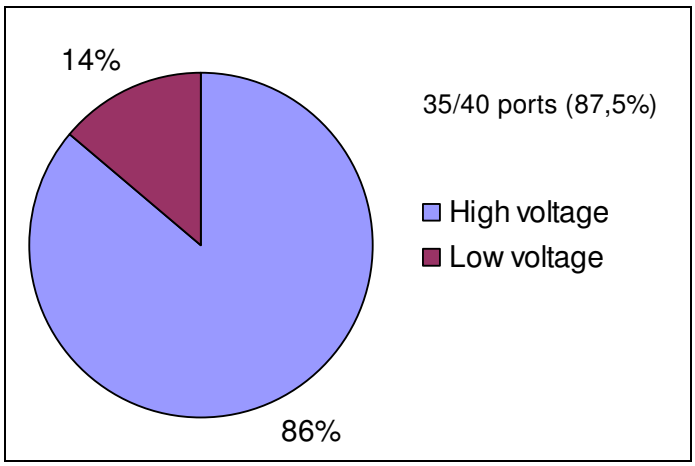

Figure 11: If yes, are you planning to introduce/expand the technology with high voltage (below 1 kV) or low voltage (below 1kV)?

Question 12D:
If yes, for what kind of ships?

Rate of response 35/40 ports (87,5%)

18 ports are planning to introduce/expand OPS for Container, 14 ports for cruise, 21 ports for ro/ro and 16 ports for other kind of ships.

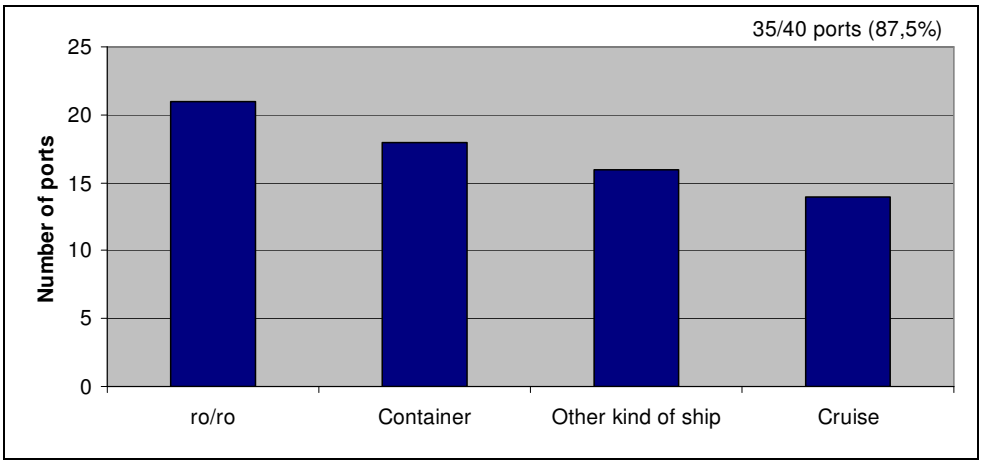

Figure 12: If yes, for what kind of ships?

Question 13A:
If no what is the reason for not introducing the technology in your port?

Rate of response 8/8 ports (100%)

The eight ports that are not planning to introduce/expand the technology points out the following main reasons for not introducing the technology in their port: other reason not specified (100%), no feasibility study has been carried out (88%), cost effectiveness is too low (75%) and lack of enough power (75%).

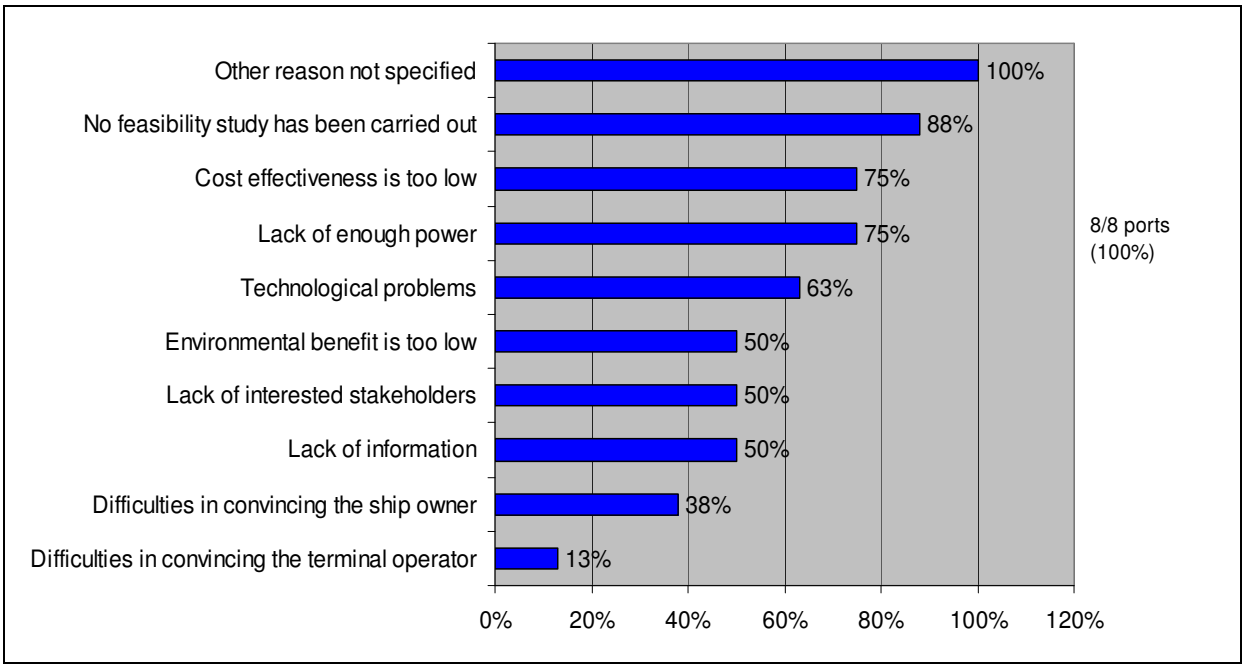

Figure 13: Reasons for not introducing the technology.

Question 13B:
If too low cost effectiveness has been a reason please specify the formula (s) how the cost effectiveness was calculated.

The answers that were received are as follows:

"Compare price of oil and electricity, and the lack of tax for onboard oil."

"Economical benefits do not appear"

"Not yet calculated, it would be the main reason not to implement OPS"

"Based on existing analyses of cases in other ports (literature); no local air quality problems and future implementation of new regulations on ship's fuels and emissions in ECA North Sea"

"N/A"

"Not done formally"

Question 14:
Would you like to share your experience with the OPS project within World Ports Climate Initiative?

Rate of response 47/53 ports (88%)

78% of all responding ports would like to share experience with the OPS project.

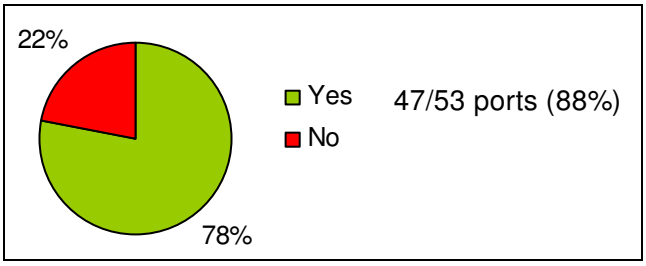

Figure 14: %-rate of ports that would like to share their experience with the OPS project within WPCI.

Question 15A:
Is your port considering other measures to improve the environmental performance from shipping while at berth?

Rate of response 46/53 ports (87%), OPS ports 17/17 (100%) WPCI ports 23/24 (96%)

48% are considering other measures to improve the environmental performance from shipping while at berth. The response is quite different when looking just at the ports offering OPS today, 58% are considering other measures and 70% of the WPCI ports are looking into other measures.

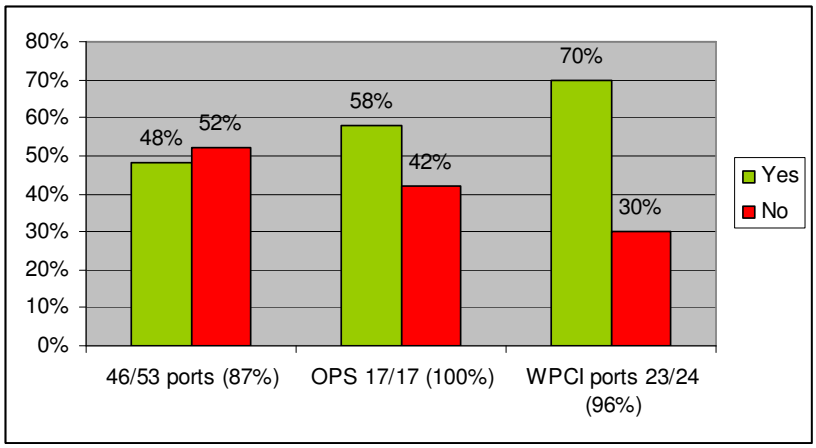

Figure 15: Is your port considering other measures to improve the environmental performance from shipping while at berth?

Question 15B:
If yes please specify what other measures.

The measures that are mentioned are listed below:

"Environmental differentiated harbour dues to stimulate the clean shipping, continuous dialogue with different stakeholders about the issues."

"Non-grid based power supply, scrubbers, exhaust collection and scrubbing technologies, alternative fuels"

"Incentive for use of low sulphur (.2%) fuel "

"fuel switching – ECAs"

"Different port charge, of the fuel".

"Environmental pollution costs"

"Use of "clean" fuel"

"Under investigation"

"Waste collection"

"ESI study"

"We have been told by suppliers to provide services to Cruise Ships"

"AMECS"

"Contributing to processes leading too improvement of ship's installations: benefit not only in ports but during whole journey"

"Waste collection & green award"

"Monitoring air quality in port area and in the city, monitoring noise levels"

"Automatic Water Supply and Energy Efficiency Program in Maritime Station"

"Noise and emissions"

"Today we already measure the emissions generated from the port. Substances that we measure are: Sulphur, carbon dioxides and PM10."

"Dust control"

"Environmental ship indexing system"

"Exhaust scrubbers, alternative fuels, electrified high-capacity container cranes"

"Using more energy efficient equipment in the port"

Question 16:
I would like to be informed about the progress within the WPCI Onshore Power Supply Project.

Rate of response 52/53 ports (98%)

96%, 51 ports, would like to be informed about the progress within the WPCI Onshore Power Supply project.

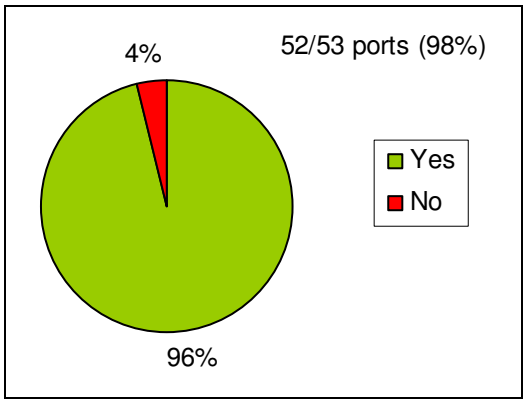

Figure 16: Percentage rate of ports that would like to be informed about the progress of the OPS project within WPCI

Please add any further comments you would like to make about your experience/questions regarding Onshore Power Supply

The following comments were received regarding experience/questions on Onshore Power Supply:

"Key to moving this forward has been commitment from Cruise Line to convert ships to receive shore power. Key issue is getting shore power supplier to provide electricity rate (cost/KW-Hr) that is economically viable for Cruise line."

"In my opinion standardisation of connectors on ship and shore as well as frequencies need to be achieved before any significant take up of shore power will occur."

"The lack of standards for the connection has to be solved."

"On our teminals container (feeder traffic) and Ro/Ro is the time on berth so short that it is a problem to shut the engines for so short time. The whole costs for the ship is not reduced. Higher costs with OPS and no environmental advantage."

"Port of x follows the international technology. Hopefully there is standardization in about 5 -10 years."

"Local air quality is not currently an issue in x. The national infrastructure is currently inadequate to support onshore power supply to shipping. The only significant benefit for us would be if adequate renewable onshore electricity supplies were available."

"Future legislation should be enforced with careful cooperation with the maritime industry due to the present problems with different standards/systems today."

"x Port is interested in OPS and for that reason has the port carried out an feasibility study for OPS. The result of that was that the Port of x (owned by, municipality of xxx) would have to invest about € 1,8 million."

"Normalization is necessary."

"Feasibility study cruise terminal underway. No political decision at this stage. When green light is given willing to share information about OPS."

"We could request info. for TOR for feasibility study to be executed."

"With our automatic system of water supply to ships we have achieved savings of 20% in consumption due to perfect control the filling of water reservoirs."

"We have not conducted a formal feasibility study. We believe the economic benefits to the port are too low. It is feasible in 10 years, however with MARPOL VI we do not know if the vessels will invest in fuel technology and shorepower."

"Regarding introduction of Onshore Power Supply, we will continuously make efforts to collect information on the trend of the national government and other ports in Japan."

"Q3: varies by season, Q6: low voltages installations found at marinas and not always taking the place of engines."

"We are looking at the matter together with the terminal operator and monitoring developments in the industry."

"Main problems encountered when preventing furter development are":

1. **Cost-effectiveness:** Emission-reductions by cleaner ships (with better fuel) are more effective. Emission control areas could be extended. Cleaner ships can be awarded or shipping will be part of trading of emission certificates.
2. **Instruction to use cleaner fuel in European ports at 2010:** Sulfur has to be reduced in fuel from 1.5 %S today to 0.1%S, which will lead to a reduction of SO_2- and PM-emissions.
3. **Necessary integration of emissions by land based power supply:** Depending to the land based power supply total emission of CO_2 and SO_2 can be higher than using cleaner fuel (0.1%S). Reductions are often limited to NOx and PM.
4. **Limited benefit is connected with high investments:** Especially for HVSC there are high costs on board, at the terminal, in the network and maybe in further power plants. Still there is no economical solution (without subsidies).
5. **Missing technical standards**
6. **Legal problems** (e.g.: commitment)
7. **Security of constant power supply**
8. **Cost-effectiveness of power supply plant**
9. **Integration of external costs**

Conclusions

The questionnaire shows that there is a strong interest in Onshore Power Supply (OPS).

About one third of the responding ports are offering OPS today. Main arguments of introducing the technology in the 17 ports already offering the technology today are environmental benefits, customers and reputation/goodwill. When indicating environmental benefits as an argument the following pollutants are the most important: nitrogen oxides, carbon dioxide and sulphur. Most port authorities do let private operators have to pay for the use of the OPS investment when the OPS infrastructure is in the port authority's property.

38% of the responding ports have carried out a feasibility study for introducing/increasing the use of the technology, 21% do have a study in progress and 49% are answering no on the question. The WPCI (World Ports Climate Initiative) ports are showing an even higher interest regarding the technology, 55% have already carried out a feasibility study, 23% are in the process right now and only 22% are answering no.

A majority, 85% of the 53 respondents, answer yes or maybe on the question "Is your port planning to introduce/expand the technology to more quays within 5-10 years". 96% of the WPCI ports are responding either yes or maybe on the same question. The most sceptical ports to invest in OPS are the ones without experience from the technology.

The main arguments among all ports responding yes or maybe are environmental benefits, reputation/goodwill and benefits for society. Only 20% of the responding ports are responding that economical benefits are an argument.

A majority, 86%, of the answering ports are going to choose high voltage and only 14% will invest in low voltage technology. Among the WPCI ports all are planning to invest in high voltage.

Main arguments for not introducing the technology are: other reasons not specified, no feasibility study has been carried out, cost effectiveness is too low and lack of enough power. Further comments mentioned when discussing the difficulties in introducing the technology are: missing technical standards, integration of external costs, security of constant power supply and cost effectiveness.

The ports offering OPS today and the WPCI ports seem to be more environmentally proactive as 58% and 70% respectively are considering other measures as to improve the environmental performance from shipping while at berth compared to the general result of about 50%.

Next step

The WPCI Onshore Power Supply Project will stimulate the further use of Onshore Power Supply (OPS) by designing and building a web based application, which provides practical guidance on OPS, available for all ports. The input from the responding ports to this questionnaire has been valuable information to consider when developing this website.

A beta version of the Onshore Power Supply website will be launched at the GreenPort 2010 conference in Stockholm, 24 February 2010: http://beta.w3industries.com/dirigo/wpci/. During summer 2010 the final website will be found at: www.wpci.ops.nl and www.onshorepowersupply.org.

A similar questionnaire could be relevant to carry out among shipping companies and terminal operators worldwide to see if there is coherence or gap to the result in this report regarding the future plans to expand/implement OPS.

Appendix 1-
Ports within World Ports Climate Initiative

Africa
Port Autonome de Cotonou
http://www.portdecotonou.com
Port Autonome de Dakar
http://www.portdakar.sn
Kenya Ports Authority
http://www.kpa.co.ke
Ministry of Transport, Kenya
http://www.transport.go.ke
Lagos State Government
http://www.lagosstate.gov.ng/web/lagos/home
Transnet National Ports Authority, South Africa
http://www.transnet.net
Port Autonome d'Abidjan
http://www.paa-ci.org

Asia
Dubai Port Authority
Port of Hong Kong
http://www.mardep.gov.hk
Mundra Port & Special Economic Zone Ltd
http://www.mundraport.com
Jakarta Capital City
http://www.inaport1.co.id
Port of Kobe (Port and Urban Projects Bureau, City of Kobe)
http://www.city.kobe.jp/cityoffice/39/port/index_e.htm
Nagoya Port Authority
http://www.port-of-nagoya.jp/english/index.htm
Ministry of Transport & Communications, Oman
http://www.motc.gov.om/en
Seoul Metropolitan Government
http://english.seoul.go.kr
Maritime and Port Authority of Singapore
http://www.mpa.gov.sg
Sohar Industrial Port Company
http://www.portofsohar.com
Port Authority of Thailand
http://www.port.co.th
Bureau of Port and Harbor, Tokyo Metropolitan Government
http://www.kouwan.metro.tokyo.jp/english/index.html
Port of Yokohama
http://www.city.yokohama.jp/me/port/en

Australia/Oceania
Ports of Auckland ltd.
http://www.poal.co.nz
Port of Melbourne Corporation
http://www.portofmelbourne.com
Sydney Ports
http://www.sydneyports.com.au

Europe
Port of Amsterdam
http://www.portofamsterdam.nl
Port of Antwerp
http://www.portofantwerp.com
Port of Barcelona
http://www.portdebarcelona.es
Associated British Ports
http://www.abports.co.uk
Ports of Bremen/Bremerhaven
http://www.bremenports.de
Port of Cork Company
http://www.portofcork.ie
Dublin Port Company
http://www.dublinport.ie
Port of Dunkerque Authority
http://www.portdedunkerque.fr
Port of Gdansk Authority
http://www.portgdansk.pl/en
Port of Gothenburg
http://www.portgot.se
Hamburg Port Authority
http://www.hamburg-port-authority.de
Grand Port Maritime du Havre
http://www.havre-port.fr
Klaipeda State Seaport Authority
http://www.portofklaipeda.lt/en.php
Port of London Authority
http://www.pla.co.uk
Port of Marseille Authority
http://www.marseille-port.fr
Port of Moerdijk
http://www.havenschapmoerdijk.nl
Port of Oslo
http://www.oslohavn.no
Freeport of Riga Authority
http://www.freeportofriga.lv
Port of Rotterdam Authority
http://www.portofrotterdam.com
Ports of Stockholm
http://www.stoports.com
Port of Tallinn
http://www.portoftallinn.com

Port of Trelleborg
http://www.trelleborgshamn.se
Port Authority of Valencia
http://www.valenciaport.com
Zeeland Seaports
http://www.zeeland-seaports.com
Port Authority of Algeciras Bay
http://www.apba.es

North America
Port of Houston Authority
http://www.portofhouston.com
Port of Long Beach
http://www.polb.com
Port of Los Angeles
http://www.portoflosangeles.org
Montreal Port Authority
http://www.port-montreal.com
Port Authority of New York & New Jersey
http://www.panynj.gov
Port of Oakland
http://www.portofoakland.com
Port of Seattle
http://www.portseattle.org

South America
City of Buenos Aires
Port of Santos Port Authority
http://www.portodesantos.com

Appendix 2- The Questionnaire

Questionnaire on Onshore Power Supply

The World Ports Climate Initiative´s working group on Onshore Power Supply would highly appreciate if your port would like to share your experience/questions regarding OPS by filling in the questionnaire below!

Instructions:

If you answer NO on question 1 please CONTINUE to question number 11.
If you answer YES on question 1 please answer ALL questions.

OPS = Onshore Power Supply

All individual port responses are going to be treated anonymously and in confidence.

Please fill in the questionnaire **no later than 15 August 2009.**

Press the submit button "SEND" in order to complete/send the questionnaire.

Name of the Port:
Country:

E-mail address

Contact name

Website address

1. Does your port provide onshore power supply at any of its berths ?

- ○ Yes
- ○ No

2. If yes for what kind of ships ?

- ☐ Inland barges
- ☐ Ro/ro
- ☐ Container
- ☐ Cruise
- ☐ Ferry
- ☐ ROPAX
- ☐ Other

3. How many vessels in your port are equipped for the technology ?

4. How many berths are equipped ?

5. Does your port offer OPS with high voltage (above 1 kV)

- ○ Yes
- ○ No

6. Does your port offer OPS with low voltage (below 1 kV)

- ○ Yes
- ○ No

7A. What has been the main argument /s when introducing the technology (please tick each relevant argument)?

- ☐ Customers
- ☐ Environmental authority
- ☐ Local citizens
- ☐ Environmental benefits
- ☐ Benefits for society
- ☐ Economical benefits for the port
- ☐ Reputation/goodwill
- ☐ License to operate

7B. If environmental benefits is an argument please indicate for what kind of pollutants

- ☐ Carbon dioxide
- ☐ Sulphur
- ☐ Nitrogen oxides
- ☐ Particulate matters
- ☐ Volatile organic compounds
- ☐ Noise
- ☐ Other

7C. If possible please specifiy the formula (s) for calculating the environmental benefits

8A. Does the port authority give subsidies for private investments in the OPS technology ?

- ○ Yes
- ○ No

8B. If yes specify percentage and /or amount

9A. If the OPS infrastructure is the port authority 's property do private operators have to pay for using of the investment ?

- ○ Yes
- ○ No
- ○ Sometimes

9B. If yes specify the height of the fees to be paid ..

Results from the questionnaire on current status and future plans regarding Onshore Power Supply 2009

10A. Does the port authority give subsidies in order to reduce exploitation costs ?

- ○ Yes
- ○ No
- ○ Sometimes

10B. If yes specify amounts € /kwh

11. Has your port carried out a feasability study for introducing /increasing the use of the technology ?

- ○ Yes
- ○ No
- ○ We are doing it right now

12A. Is your port planning to introduce /expand the technology to more quays within 5-10 years?

- ○ Yes
- ○ No
- ○ Maybe

12B. If yes what is the main argument /s to introduce /expand the technology (please tick each relevant argument)?

- ☐ Customers
- ☐ Environmental authority
- ☐ Local citizens
- ☐ Environmental benefits
- ☐ Benefits for society
- ☐ Economical benefits for the port
- ☐ Reputation/goodwill
- ☐ License to operate

12C. If yes are you planning to introduce the technology with

- ○ High voltage (above 1 kV)
- ○ Low voltage (below 1 kV)

12D. If yes for what kind of ships ?

- ☐ Container
- ☐ Cruise
- ☐ Ro/ro
- ☐ Other

13A. If no what is the reason for not introducing the technology in your port (please tick each relevant reason)?

- ☐ Environmental benefit is too low
- ☐ Cost effectiviness is too low
- ☐ Technological problems
- ☐ Lack of interested stake holders
- ☐ Lack of enough power
- ☐ Lack of information regarding the advantages and how to proceed
- ☐ Don´t know (no feasability study has been carried out)
- ☐ Difficulties in convincing the CEO
- ☐ Difficulties in convincing the ship owners
- ☐ Difficulties in convincing the terminal operators
- ☐ Other reason

13B. If too low cost effectiviness has been a reason please specify the formula (s) how the cost effectiviness was calculated

14. Would you like to share your experience with the OPS project within World Ports Climate Initiative ?

- ○ Yes
- ○ No

15A. Is your port considering other measures to improve the environmental performance from shipping while at berth ?

- ○ Yes
- ○ No

15B. If yes please specify what other measures

16. I would like to be informed about the progress within the WPCI Onshore Power Supply project

- ○ Yes
- ○ No

17. Please add any further comments you would like to make about your experience /questions regarding Onshore Power Supply