



# #Onshore Power Supply #OPS, PORT SUSTAINABILITY & ELECTRIFICATION

## Why we can!

#ENERGIZING PORT ELECTRIFICATION #LETSGETCONNECTED #JOINUS

October 2022



## **Executive Summary**

Onshore Power Supply <sup>[see annex 1]</sup> is not a new topic. In fact, we trace OPS back to mid-20<sup>th</sup> century serving battle ships while in Port. Naval applications have been around ever since. Commercial applications serving sustainability goals were installed over 30 years ago with tangible results.

What is new, is the exponential availability of low carbon and renewable energy, rendering the solution truly sustainable and available now. So, why wait?

EOPSA was born on the back of one question: what is taking so long?

European policy ambitions are clear (Fit for 55), our technology is proven and available, expertise abounds, pledges, working groups and position papers stack up<sup>(2)</sup>, research projects have been around for years and yet, policy makers are required to force implementation through <u>AFIR</u>.





EOPSA was set up to show [remind] that by having strong cooperation between an energy producer and energy user [off-taker], projects flourish. Where needed (example renewable energy) public authorities play a key endorsing role, ensuring, with available legislative and funding tools, that the business case is rendered positive.



NOx & SOx are eliminated, a true benefit to local citizens.

Where this ecosystem stimulation model has shown to be highly successful is in the <u>renewable energy industry</u>. With support and incentives, onshore and offshore wind, geothermal, solar, floating solar, etc. ecosystems have generated such competition that public support is becoming gradually obsolete.

Policy + Incentives + Competition is the best mechanism to create sustainable prosperity, jobs, innovation, but primarily and importantly, it substantially

FACT: The carbon footprint of a 10 MW cruise liner, berthed for 10 hours, produces 64 t of CO2, When a cruise liner is connected to the electricity grid, CO2, Therefore, EOPSA promotes faster

Therefore, EOPSA promotes faster implementation, reciprocity, funding & clarity of funding source, cooperation,

standardisation and innovation. We invite you to read further and find clear reasons why #timeisnow.

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## Introduction Shipping emissions to serve global trade



Around 90,000 marine vessels carry out over 90% of the global trade through oceans. Ships, like all fossil fuel powered modes of transportation, emit carbon dioxide and, therefore, contribute considerably towards



global emissions and climate change. More than 3% of the carbon dioxide emissions worldwide are caused by the shipping industry, which continues to grow rapidly to date. If the global shipping industry were considered a country, it would be the sixth largest contributor of greenhouse gas emissions. Only the U.S., China, Russia, India, and Japan emit more CO2 than the entire global maritime fleet.

With regards to the European Union, 77% of the external trade and 35% of all the trade by value between EU members states is carried out by sea, rendering maritime transport a key component of the

international supply chain. Despite a drop-in shipping activity in 2020 due to Covid-19, the sector is expected to grow strongly over the coming decades, fuelled by rising demand for primary resources and

container shipping.

This led the European Environment Agency and the European Maritime Safety Agency to publish the European Maritime Transport Environment Report in 2021 which, in essence, was the first comprehensive health check of the sector. The report indicated that ships emit 13.5% of the all-greenhouse gas emissions from transport in the EU, while emissions from road transport and aviation accounted for 71% and 14.4% respectively. In addition to CO2 emissions, ships that call in European ports contributed around 1.63 million tons of SO2 emissions in 2019.





### Slow pace, why?

The first ferry onshore power supply system was installed in the port of Gothenburg almost 30 years ago! Rotterdam installed inland OPS 15 years ago, Monaco installed Superyacht OPS 10 years ago.

In 2021 within the TEN-T network (328 ports), merely 60 European ports were listed as having installed high voltage onshore OPS systems and 95 with low/medium voltage OPS (\*).

This represents respectively 5% and 8% of the total [1200] European ports. Most of these installations are available around the Nordic and Baltic regions.

In France, excluding Naval applications, two operators installed OPS: La Meridionale in Marseille and CMA CGM in Dunkerque. In the Netherlands, in the largest European port, 2 operators installed OPS: Heerema / Eneco and Stena Lines.

## So, why such slow pace of installations and adoption?



While authorities, as a rule, are quite keen to talk about, research <sup>(1)</sup>, and sometimes promote OPS, there appears to be a commonly approved mantra for delayed implementation:

Grid capacity, availability of renewable electricity, cable management, permitting, political will, public funding, negative business case, low cost of carbon, electricity taxation, lack of European coordination, anticipated imminent availability of other solutions such as hydrogen ammonia, LNG, scrubbers, etc.

(\*)<u>https://alternative-fuels-observatory.ec.europa.eu/transport-mode/maritime-sea/ports-and-infrastructure</u> (\*) <u>https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/site/brochures\_images/ports2013\_brochure\_lowres.pdf</u>



### **Entrepreneurship**

So far, most if not all onshore power supply programs have been very entrepreneurial enterprises, where pioneers were able to bring together the various parties, show real leadership and convince public authorities to bring necessary support. In these pioneering projects, neither technology nor operators' [off-taker] engagement were problematic.



#### In all these projects, the silver bullet proved to be a sound business arrangement between the energy producer and the energy off-taker.

In that, selected Port Authorities fulfilled a key facilitation role, either convincing national policy makers of the benefits and obtaining adequate subsidy, or indeed co-funding the project with own capital through SPV's.

A series of OPS projects were co-funded by shipping owners and/or interested parties – example <u>Waterbus Rotterdam</u> <sup>(1)</sup>, <u>CMA CGM</u> Dunkergue.

## **EOPSA**

**EOPSA** was conceived to accelerate such positive cooperation and ensure each party plays the role they are best placed to play. In that, EOPSA argues that we must not confuse a port authority for an energy producer (Utility) or a TSO.

After a period of incubation, EOPSA saw the light of day in August 2021 and quickly became the premier European organisation for representing the benefits and the opportunities offered by port electrification, OPS (cold ironing, shore connection, shore to ship electrification) and overall port energy sustainability.



Our mission and vision can be found on our website <u>www.eopsa.eu</u> and ensuing, our goals and position. Please follow us on <u>https://www.linkedin.com/company/eopsa</u>









## Faster implementation of OPS across all European Ports

Considering its benefits for local communities, with proven technology, with proven installations and aligned with stated sustainability ambitions (Fitfor55), there are no excuses for delayed installation of impactful port electrification. Here are further arguments serving faster implementation:

#### Economical (Total costs of operations - TCO) Business case

With onshore power supply the total cost of operation of a vessel typically is reduced. For example, experience suggests engines will require less maintenance, giving operators financial benefit.

Similarly, other port operations such as cranes, tractor tugs, reefer stacker and so on should see such benefit from electrification.

#### Environmental

By switching off marine engines substantial  $CO_2$ ,  $NO_X$  and  $SO_X$  can be avoided in the port's environment. Our founding member's project in Rotterdam Callandkanaal avoids the equivalent of  $CO_2$  emissions from 5k-7k cars.

#### **Seafarers & Population Health**



Reducing vibration and noise are key to onboard operators, seafarers, as well as surrounding populations. This was particularly clear during COVID lockdown, giving public officials an additional incentive to deliver this for their constituents and citizens <sup>(3)</sup>.

#### Image: become more sustainable

Pollution is a modern society' predicament. With available technology, expertise, upcoming legislation, political impulses <sup>(3)</sup>, it is now a good time to be among those

who will deliver on the objectives.

Availability of Renewable Energy & energy management software Fast rising availability of renewable and low carbon energy combined with powerful software allow ports, marina' and harbours to become sustainable energy hubs. Clearly, moving to <u>microgrids</u> would be the grail.

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#### Incentives

In line with experience when deploying renewable energy sources, public funding in early stages can drive investment, accelerate implementation and stimulate improved economics, in benefit of people and planet. **Clarity in Roles & Responsibilities – who does what?** 

Authorities often lack the entrepreneurial mandate, and utilities the

On the basis of 132g of CO2 for a car per 100km that consumes 5 litres of petrol, it would take 488,636 cars travelling 100km to emit the same amount of CO2 as a 10MVA cruise ship for a 10-hour stopover, i.e. 64.5 tonnes of CO2. financial incentive; yet both are critical in stimulating successful ecosystems (e.g. offshore wind, solar, EV charging stations etc.).

Low voltage OPS has been around for a long time, e.g. inland shipping OPS in Rotterdam Waalhaven installed by a consortium comprising of GE, Stedin, Eneco and HBR. Similarly, marina electrification and superyacht OPS have been with us for decades, highlighting our expertise in maintaining ship operations with berth electricity.

Concurrently, medium and high voltage OPS was installed in many Nordic countries over the last 30 years and a selected number of southern countries. Clearly, the advent of massive amount of renewable and low carbon energy has brought this solution to the fore.

We now have more than 100 years of experience with power grids. They have required continuous upgrades and we have been



able to do this with relative success, with very few incidents. Clearly, during our industrial revolution, power intensity has risen substantially; and in the last 2 decades we have been complementing the systems with variable renewable capacity.



This transformation, from mainly coal to a mix including nuclear, hydro and gas, and more recently also wind, solar, geothermal, tidal and so on, has meant that industry developed quite some technology and digital solutions to cope. Being aware of these is key in delivering superior sustainability results.

The key to unlocking such developments has been sound commercial engagements between generation and offtake, aided by government



mechanisms (policy – drivers, targets, framework – contracting entities, incentive schemes, financing) to accelerate and achieve scale.





## Promote reciprocity and ensure marine operators are served all along their shipping routes.

Stena Lines sails from Hoek van Holland to Harwich. OPS is installed in Hoek van Holland, but not in Harwich. Yet, Stena' Dutch utility and project partner operates both in the Netherlands and in the UK.

GNV sails from Port de Sète to Barcelona, yet authorities had not envisaged cooperation to install reciprocal systems. Many international utilities are active in both France and Spain.

Public and port authorities located along shipping routes, on highways of the seas, have had the tools to partner with European experts and facilitate issuance of common OPS tenders (caveat = Brexit?).

A joint procurement mechanism has been available for quite some time and used for many other topics:

https://ec.europa.eu/environment/gpp/pdf/toolkit/module1\_factsheet\_joint\_p rocurement.pdf



This is typically, in Roles & Responsibilities distribution, where port authorities and public officials (e.g. mayors) can contribute by coordinating between peers, and set a common vision.

EOPSA therefore proposes to work with established experts and associations to help connect port authorities, port-city mayors, energy companies and technology experts to favour use of joint procurement mechanisms for OPS.





## Promote equivalence and clarity in Public Funding.

Despite stated political ambitions and a plethora of pledges <sup>(1)</sup>, port electrification is, today, still not seen as firm contributor to our global sustainability goals.

European policy aiming to increase the share or renewable energy sources in the power mix brought about hundreds of billions of public funding and unlocked private investment.

This was one of the greatest market catalysts, now proven successful not only in terms of clean energy sources with



resulting benefits to community and future generations, but also in terms of technology and industry development, employment and benefits to public coffers.

For example, in the Netherlands, Princess Amalia offshore wind park opened in 2008 with substantial support in the form of feed-in tariffs, but recent Holland Kust Zuid offshore wind tender awarded a "negative" subsidy

project. Along this path, ports and the maritime industry have developed new areas of business activity across planning, construction and maintenance stages. Local universities have been involved in research and innovation; fishing, maritime and offshore energy expertise has been redeployed, and new generations are being trained in

specific skill sets.

EOPSA is proposing to use same mechanism for sustainable technological solutions in ports, Installing OPS where it makes sense is a very natural result of sound business practices between incentivised commercial partners.

ensuring that community, energy producers and users [off-takers] reap the benefits while policy makers can count on competition to gradually reduce budgets for support schemes.

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Furthermore, Renewable energy has seen support in the billions while Port Sustainability has seen only millions. As example is the recent SDE++ 2022 vote by the NL parliament, approving €13Billion in support, while only 31 million is earmarked for OPS (\*).



While Italy voted a €720 M budget for port sustainability [electrification]

Legislative Decree n. 59 of 2021, concerning the Fund Complementary to the National Recovery and Resilience Plan (NRRP), the Art. 1, comma 2, letter C)



assigned to the Ministry of Infrastructure and Sustainable Mobility (MISM) - operators report being confused as where or indeed how to apply for these funds.

Maritime operators, technology suppliers, utilities and all those involved in OPS, according to EOPSA, should have one place to apply. A ministry or public administration office should be dedicated to port electrification and sustainability, making application simple, fast and just.

(\*)https://www.rvo.nl/subsidies-financiering/walstroom-zeeschepen#voorwaarden





# Ensure the entire OPS value chain works together to reach the Green Deal (Fit for 55) goals.

The alternative fuel infrastructure regulation (AFIR) and FuelEU maritime

provide legislative ground to accelerate implementation of overall investment in port electrification and OPS.

While the text proposes rather humble objectives, it opens the door to national, regional and European incentives, and this is crucial.



Installing OPS where it makes sense is a very natural result of sound business practices and clear, adequate support.

In providing adequate support, either in the form of extending existing cohesion, renewable energy stimuli (Feed-in/CFD) and/or recovery funds, or indeed voting dedicated funds, ultimately, this will require the ecosystem to work together toward implementation.

As with any other form of energy supply, energy producers (e.g., utilities) and energy users will bear the brunt of the programs, determine where best to apply which technology for which gains and obtain, with the support of local and port authorities, FID's, closings and installations for maximum benefits.



EOPSA is bringing all the actors together to share best practices and promote collaboration.





## Promote innovation & standardisation.

Shore power plants are segmented into medium, and low voltage based on their operating profile.



The re-charging leisure market will seek connections similar to the car industry, with an operating profile of either fast cabotage recharge or overnight recharge.

Replicating the car industry standards appears to be the best formula and several companies and startups are working to develop a European wide leisure network.

High and low voltage technology however will see the need for standardisation and innovation. So will the advent of battery technology for diverse applications (e.g fast charging for leisure).

Current IEC/IEEE 80005-1:2019 is the recognized technical standard which is widely followed to deploy shore power systems around the world. Alongside the ecosystem will need to work on communication and interoperability standards and more.

Shipping, depending on geographical location, will have either 50Hrz or 60Hrz. Frequency conversion has been around for a very long time.

Standardisation is to be particularly obvious to serve the cruise industry, allowing vessels calling at over 700 different world ports to connect.

Alongside standardisation, innovation is key. As mentioned above, the best sustainability model is known



as the <u>microgrid</u><sup>(4)</sup>, where decentralised renewable production is matched to local demand using most advanced digital solutions. Storage through batteries <sup>(4)</sup>, osmotic power, hydrogen and fuel cells, consulting <sup>(4)</sup>, financing and so forth, are among the most pressing innovations to serve the OPS ecosystem, multimodality decarbonisation <sup>(3)</sup> and citizens.

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## **Conclusion:**

Everything is available and ready to substantially accelerate implementation and with our call for action below, EOPSA commits to:

- 1. Pool all available information from all different actors;
- 2. Generate best practice programs;
- 3. Organise regular ecosystem cooperation meetings;
- 4. Advocate!

## **Call for action:**

- 1. Extend existing incentive tools to port electrification and OPS;
- 2. Promote transparency from all parties to help rapidly build business cases, including, for example, ship calls data;
- 3. Include OPS as a key and available decarbonisation tool in supply chains.
- 4. Deliver a feasibility study, FEED and/or conceptual designs of at least 3 OPS projects per port (including terminals) in 2023-2024;





<u>Annexes</u>



## (1) Onshore Power Supply & Electrified Multimodality

When at berth, ships require electricity to support activities such as loading, unloading, heating, lighting and operation of other technical systems. Normally, ship's propulsion engines are switched off when they are berthed and the necessary energy is provided by auxiliary engines powered by diesel or other fossil fuels.

With the implementation of OPS, also known as shore-side electricity or cold ironing, ships can switch off their engines while at berth and connect to a renewable energy source. In this way, the ship's energy load is transferred to the shore power supply without interrupting any on-board services, resulting in zero emissions to the surrounding environment. Other key benefits include reduced noise and vibration.

Alongside, OPS can serve the up-and-coming electrified multimodality and electrified shipping<sup>(3)</sup>.





## **References**

(1) Pledges, reports, events calls to action https://ealingproject.eu/ports-2/ https://www.magpie-ports.eu/ https://sustainableworldports.org/wpcap/ https://sustainableworldports.org/areas-of-interest/#climate-and-energy https://splash247.com/european-ports-join-forces-on-onshore-power-supply-forcontainarship-giants/ https://www.ecsa.eu/news/joint-letter-ecsa-advanced-biofuels-coalition-clecat-cliaespo-efuel-alliance-enmc-esc-ewaba https://www.espo.be/media/The%20new%20energy%20landscape%20v20221018.pdf https://ec.europa.eu/transport/infrastructure/tentec/tentecportal/site/brochures\_images/ports2013\_brochure\_lowres.pdf

(2) Political impulses :

https://actu.fr/provence-alpes-cote-d-azur/marseille\_13055/marseille-la-petitionlancee-contre-les-bateaux-polluants-compte-deja-50-000signataires\_53445936.html#:~:text=Fin%20juillet%2C%20le%20maire%20de.une%20no uvelle%20fois%20sa%20mobilisation La région veut accélérer l'électrification des quais dans les ports https://www.energiesdelamer.eu/2022/10/19/maritime-acceleration-delelectrification-a-quai-et-reduction-drastique-des-emissions-de-gaz-a-effets-pour-lesnavires/

(3) Port Multimodality

https://www.wartsila.com/marine/products/ship-electrification-solutions https://www.nj.com/news/2021/08/new-eco-friendly-trucks-part-of-nj-port-terminalsplan-to-be-fully-electrified.html https://www.researchgate.net/figure/Electrified-RTG-Crane\_fig2\_320415808 OCEANA, "Shipping Pollution," [Online]. Available: https://europe.oceana.org/en/shipping-pollution-1#:~:text=More%20than%20three%20percent%20of.industry%20continues%20to%20gr ow%20rapidly European Enviornment Agency, "EU maritime transport," [Online]. Available: https://www.eea.europa.eu/highlights/eu-maritime-transport-first-environmental

(4) Innovations

https://www.maritimebatteryforum.com/ https://www.sweetch.energy/ https://www.gepowerconversion.com/industries/Energy-Transition/Microgrids https://gridvise.com/en/ https://www.sustainable-ships.org/