# IS THE MARITIME INDUSTRY SAILING TOWARDS DECARBONIZATION?

*A STATUS REPORT*


**Mobility Department**
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**The international maritime industry** plays a central role in the way our economy works based on the **transcontinental trading of goods.**

Just like the international air transport industry, it has long been absent from international discussion on climate-related issues, as a result players in the sector have adopted a wait-and-see approach to the matter over the past few decades.

The tide, however, is now turning, and the International Maritime Organization, along with a number of key players in the sector, is showing a certain willingness to take action to fight climate change, but between these grand statements of intent and the operational reality of the situation, **what exactly does the current picture look like?** Would we be right to think that only technological means will allow us to make the low-carbon transition on the required scale? What link might be established between **the fight against climate change and the fight against local air pollution?**

Check out our article on maritime transport for a clearer overview of the situation.


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# SUMMARY

## KEY MESSAGES

### SUMMARY OF THE KEY MESSAGES FROM THE STUDY

The **maritime industry** is responsible for around **3% of man-made $CO_2$** emissions and plans to **halve the emissions** generated by international traffic by 2050 in relation to 2008 levels.

The sector notably plans, via its internal governing body, the IMO (International Maritime Organization), to encourage the introduction of **various measures designed to reduce emissions,** including **improving energy efficiency** and **using alternative fuels**.

Both types of initiative represent **very significant theoretical potential**, but actions, of course, always speak much louder than words…
The all-out development of LNG (Liquefied Natural Gas) to replace HFO (Heavy-Fuel Oil) seems to be proving particularly popular, and whilst this is certainly not a revolutionary concept, it is an off-the-shelf solution and one that will help to deal with the issue of local air pollution in ports and areas of heavy traffic.
This otherwise appealing idea does, however, clash with the reality of the war on climate change to which LNG contributes little, if anything at all.

**Energy efficiency and decarbonised energy carriers must therefore feature high up on the sector's agenda,** despite the fact that there is still a great deal of uncertainty surrounding them.
Regardless of whether we are talking about new-generation biofuels, synthetic liquid fuels, liquid hydrogen or ammonia, none of these potential solutions are the 'silver bullet' we are looking for, which is another reason to make an active commitment to the transition - something that the IMO has been palpably reluctant to do following the grand (and voluntary) declarations made in 2018.
Fortunately, some of the key players in the sector (including shipowners and banks) are taking steps and attempting to lead by example.

### CONCLUSION

Only joint pressure from players in the financial sector and public authorities, plus exemplary behaviour from leading companies in the sector will **force the IMO to acknowledge its responsibilities** and take the appropriate steps to trigger the decarbonization of the maritime sector immediately.
In the meantime, **players in the sector**, from shipbuilders to shipowners, **will clearly benefit strategically from preparing for the transition right here and now**; indeed, the longer it takes them, the more they will suffer.

> **"Only joint pressure from players in the financial sector and public authorities and exemplary behaviour from leading companies will force the IMO to acknowledge its responsibilities and trigger the decarbonization of the maritime sector immediately."**

# INTRODUCTION

## THE $CO_2$ EMISSIONS GENERATED BY THE MARITIME TRANSPORT SECTOR TODAY... AND IN THE FUTURE

According to the International Energy Agency (IEA), **maritime transport currently emits around 800 Mt$CO_2$ by means of direct combustion** and is responsible for around 1,000 Mt$CO_2$ if we also take into account the upstream fuel production process (heavy fuel oil and diesel). This accounts for around **2.5% and 3% of global $CO_2$ emissions** respectively.
Data published by the International Maritime Organization (IMO) does not reflect these figures exactly, claiming that the actual emissions levels are slightly higher, at around 1,100 to 1,200 Mt$CO_2$ (including the upstream fuel production process), which is nevertheless the same order of magnitude.
It is also, of course, **difficult to obtain a reliable assessment**, proving that the traceability of energy consumption within the sector is somewhat limited, which is not the case in other comparable sectors such as the aviation industry, for example.
This rounded figure of 1,000 Mt$CO_2$ corresponds to the same level of emissions generated by Germany and is more than the combined emissions of France and the United Kingdom (source: SDES). If the maritime transport sector were a country **it would be the 6$^{th}$-highest in the world in terms of $CO_2$ emissions**. It may well generate 6 to 7 times less than road transport (where passengers and goods are concerned), but it is still on a par with the chemicals industry (source: IEA).

**With this in mind, there is one initial clear observation that comes to mind**: no-one would ever think of saying that Germany should not reduce its emissions on the grounds that it accounts for only 3% of global $CO_2$ emissions. Whilst this figure may appear to be low, this is certainly not the case where climate change is concerned and it is absolutely vital that the maritime sector contribute to reducing $CO_2$ emissions, particularly as **growth forecasts for the maritime transport sector** suggest that these very emissions will rise significantly unless drastic measures are taken. The IMO has talked about an increase of between 50% and 250% (depending on the economic and technological forces at play), whereas the IEA anticipates an increase of around 100% in its RTS baseline scenario. Whilst it is impossible to forecast this trajectory with any certainty, one thing that is however clear is that maintaining the status quo would see the proportion of $CO_2$ emissions generated by the maritime industry soar to **10% of all emissions**, perhaps even more, in the IEA's 2°C scenario that would see other sectors greatly reducing their impacts.

Therefore, there is no denying the findings of this review of the $CO_2$ emissions generated by the maritime sector: **urgent action is required if they are to be reduced in absolute terms.** The IMO is aware of the situation and spoke out in April 2018 in favour of a strategy for halving the emissions generated by international maritime traffic (the lion's share) by 2050 in relation to 2008 levels.

# 1

# PLANNED MEASURES FOR HALVING $CO_2$ EMISSIONS BY 2050

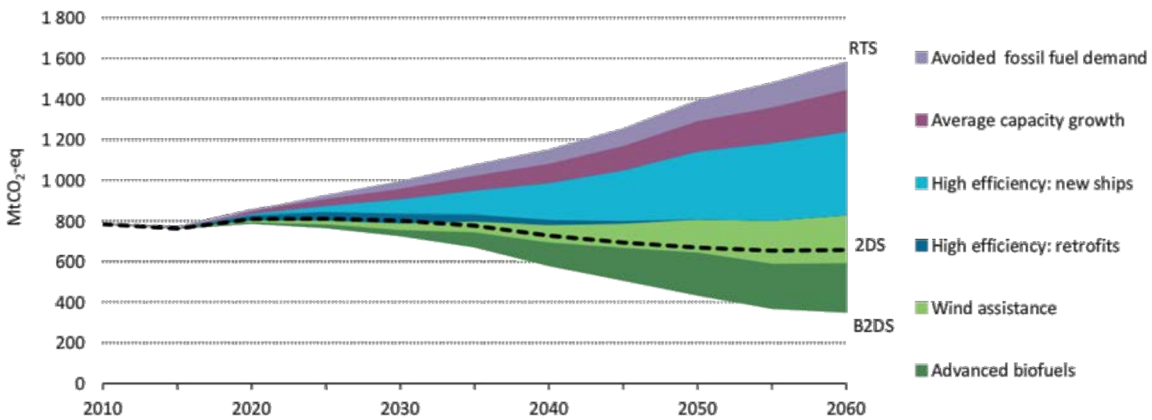
## A TRILOGY OF MEASURES FOR ACHIEVING THE REQUIRED LEVEL OF DECARBONIZATION

In generic terms, there are three types of measure that can be implemented in order to achieve this long-term goal of halving emissions, these being (i) **energy sobriety**, (ii) **energy efficiency** and (iii) **decarbonised energy**.
The first avenue, energy sobriety, involves reducing the need at the source, which, in the case of the maritime transport industry, would mean reducing flows of traffic or at the very least **reducing the growth of these flows** by introducing a growth control policy.

As is the case in pretty much any sector, this issue is something of a taboo since it goes against the patterns of thought that we have held since the Industrial Revolution with regards to the way in which we look towards the future, with the implicit assumption that tomorrow's world will know no limits.

As the IEA reminds us in its analysis, however, the decrease in oil trade as part of a 2°C scenario would lead to a slight reduction in flows in relation to a more trend-based scenario, which would, to some extent, be a form of sobriety imposed by exogenous factors (see figure below showing the 'Avoided fossil fuel demand' category).

**Players in the sector are therefore focusing primarily on the two remaining categories - energy efficiency and decarbonised energy.**




*Source: IEA, ETP scenarios 2017*

## THE VITAL IMPORTANCE OF ENERGY EFFICIENCY

Regardless of the source (IMO, IAE, UMAS, Lloyd's Register, ETC, etc.), the one common finding that has emerged from all of this is that there are **significant savings to be made from improving energy efficiency**.

With this in mind, a formal standard for improvement with regards to the Energy Efficiency Design Index (EEDI) was adopted in 2011 for all new ships, the performance of which is expected to improve by 10% every 5 years as of 2015. That said, given that the majority of ships will be in operation for 20 years or more, the EEDI alone is not enough to ensure that the target is reached, and with this in mind, an additional scheme known as the SEEMP (Ship Energy Efficiency Management Plan) was adopted at the same time (in 2011) in an attempt to tackle the energy efficiency of ships currently in service.

On the accounting front, both the IEA and the IMO believe that **implementing the technical measures outlined in both of these standards could cut the demand for energy in the maritime sector by 50-67% by 2050** in relation to a trend-based scenario. The previous figure taken from recent studies performed by the IEA shows an accurate representation of the anticipated savings.

Indeed, beyond the traditional avenues of improvement such as enhancing the performance of propulsion systems (engines and propellers), more hydrodynamically designed hulls and more optimised loads and routes, wind propulsion, or rather wind-assisted propulsion, first and foremost, could be making a major comeback. This renewed interest in wind propulsion is based on the industrial-scale development of four generic technologies that differ from the traditional soft sail, these being:

- rigid wing sails or wing masts,
- rotor sails
- kytes
- and turbosails.

There are various projects currently under development and the benefits will, of course, depend on the sizes of the ships in question and the routes that they take. In the case of merchant ships travelling along favourable routes, for example, fuel savings of around 30% are expected (although this is undoubtedly at the upper end of the estimation).

Furthermore, **a number of speed reduction measures are also being encouraged**; indeed, not only has France submitted a proposal to the IMO for the introduction of a global regulation on ship speed with the agreement of French shipowners, but an open letter co-signed by the top executives of 107 major companies operating in the sector in late April called for others to follow suit. **It would appear, then, that the future of the maritime transport industry may lie in the solutions of the past!**

> **"Implementing appropriate technical measures could cut the demand for energy in the maritime sector by 50-67% by 2050 in relation to a trend-based scenario."**

## THE ROLE OF ALTERNATIVE ENERGY SOURCES: STILL A GREAT DEAL OF UNCERTAINTY

However advanced it might become, **energy efficiency alone will not put the maritime sector on track to achieve the 2°C target**, and it would appear vital that the sector also act upon the 3rd avenue of improvement, namely the use of **decarbonised alternative energy sources** to replace oil-based fuels (HFO and diesel). There are, in fact, many such alternative energy sources and not all of them have the same properties (far from it):

- **biomass-based biofuels**, which can be produced from various different raw materials and using a number of different processes;
- **electricity stored in batteries**;
- power-to-liquid-type **synthetic fuels** produced from water, CO (or $CO_2$) and electricity;
- **hydrogen and ammonia**, which can mainly be used with a fuel cell to generate electricity. It should also be noted that these two molecules do not generate any $CO_2$ emissions in their use phase but they may cause a lot of emissions further upstream, depending on how they are produced (e.g. natural gas reforming pathway in the case of $H_2$).
- **The direct use of ammonia in high-temperature fuel cells** is one lesser-known potential solution that has not yet, however, been developed to the same degree as for $H_2$. Last but not least, the use of hydrogen and ammonia as fuels for internal combustion engines is an avenue that has been explored (notably by BMW, which sold around a hundred units of its BMW Hydrogen 7 model between 2007 and 2009) but that encountered various issues regarding lubrication, corrosion and accelerated wear and tear (as well as NOx emissions in the case of ammonia) that led to this particular technical solution being abandoned.

We have intentionally omitted **Liquefied Natural Gas** (LNG) from this overview of the low-carbon energy landscape for two main reasons.

The first, of course, is rather obvious given that this is a fossil energy carrier and the fact that it offers little when it comes to reducing GHG emissions in relation to petroleum-based fuels. The figure of -20% is often quoted based on industrial data taken from test bench measurements, which does not reflect actual operating conditions whereby engine efficiency levels vary. Feedback from the road transport sector (coaches, buses and lorries) and initial studies performed on the dual-fuel ships operating in northern Europe have shown that the actual efficiency levels of engines powered by methane diminish the theoretical benefits obtained in comparison with other fuels. **The very most we could hope for would be a saving of around 10-15% at the operational stage**, assuming, of course, that methane leaks are kept under control right throughout the LNG value chain given the significant impact that methane has in terms of GWP (Global Warming Potential), i.e. around 30 times that of $CO_2$. This is, of course, grossly inadequate, and whilst it might be better than HFO in terms of pollutant emissions (SOx, NOx and particles, see § 'CLIMATE CHANGE AND AIR POLLUTION: KILLING TWO BIRDS WITH ONE STONE?'), **LNG cannot therefore be considered a suitable form of energy for decarbonising the maritime sector sufficiently to meet the targets imposed.**

This being the case, an ambitious and reliable strategy for fighting climate change could only include LNG as a transitional aid rather than a long-term solution. This brings us to the second reason for which we decline to acknowledge fossil-based LNG as part of the alternative energy mix that we are describing here, this being that **placing too much emphasis on this carrier over the course of the next decade presents a risk of the GHG emissions of the corresponding ships being 'locked' for a period of 20 to 30 years**, thus making it impossible to reduce emissions to the required level.

## HOW DO WE CHARACTERISE ALTERNATIVE SOLUTIONS?

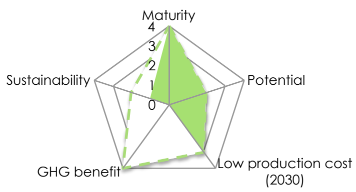
With the exception of LNG, then, the potential solutions for decarbonization outlined above all have their own benefits and drawbacks, which we have summarised in the charts below based on the following factors:

- **potential** (in the sense of the availability of the resource)
- **maturity** (in terms of both technical and industrial maturity)
- **savings in terms of GHG emissions**
- **sustainability** (i.e. the overall societal and environmental impact, regardless of the climate issue taken into account in the previous indicator)
- **the estimated financial cost by 2030**[1]

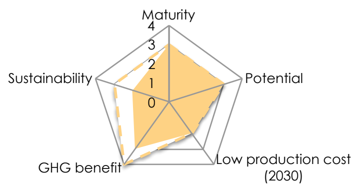
These representations are also based on the assumption that the electricity used is decarbonised.
The dotted lines in the first two diagrams represent favourable cases stemming from the decision to use raw materials that have been produced with little or no climate impact in terms of land use change.

[1]Carbone 4 estimations for biofuels and synthetic fuels. Lloyd's Register estimations for batteries, hydrogen pathways and ammonia pathways.

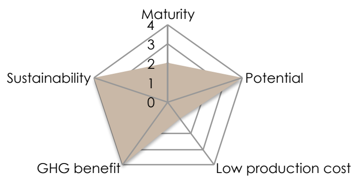
**HEFA-type biofuel**



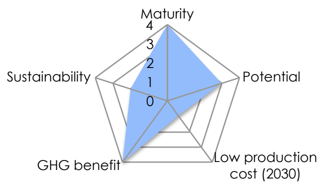

**Fischer-Tropsch-type biofuel**



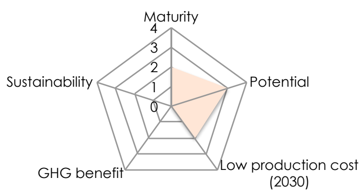

**PtL synthesis fuel**



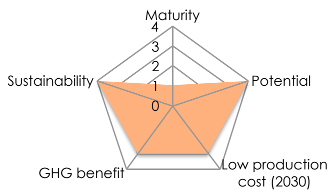

**Electricity storage (batteries)**



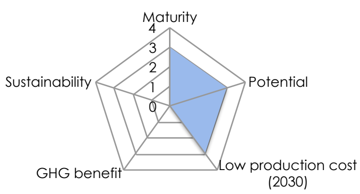

**Ammonia from natural gas**



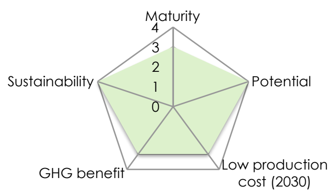

**Ammonia from electrolysis**




**H2 from natural gas**




**H2 from electrolysis**



Clearly, **there is no silver bullet**, which is why **expert opinions vary so much with regards to the role that these different energy solutions could play** in the maritime transport sector of the future.
The absence of hydrogen or ammonia carriers in the IEA's 2DS and B2DS[2] scenarios, despite the fact that they play a central role in the road map drawn up by the IMO and the scenarios developed by some of the bodies specialising in the sector (such as UMAS and Lloyd's Register), is a prime example of this. Staying with this issue of inconsistency between players, it is worth noting the perspective of the International Transport Forum[3], which maintained, in a 2018 report and based on the IMO's initial GHG strategy, that it was indeed possible to completely decarbonise the sector… by 2035! This despite the fact that the IMO itself was 'happy' to halve emissions by 2050.

The reality of the situation is that **perceptions among players in the industry of the various obstacles to the widespread adoption of these new forms of energy vary greatly**, and these different visions will ultimately lead to such solutions being implemented within the global maritime fleet at different speeds over the course of the coming decades. Furthermore, the fact that some of the aforementioned solutions can be 'hybridised', such as batteries and hydrogen (with the fuel cell), or even ammonia and diesel (or biofuel), makes it all the harder to establish an overview.

Whilst it might be very difficult to predict what our future technological choices will be and at what speed they will be introduced, **there are nevertheless a number of issues on which the players concerned unanimously agree**:

- **electric battery propulsion** will be used **exclusively for small ships** travelling short distances, typically for inter-island passenger transport;
- likewise, **hydrogen** used to power **fuel cells** is also likely to be reserved for this type of ship and activity, even though it could potentially also be used for travelling greater distances owing to the high energy density of hydrogen;
- **alternative technologies** such as ammonia and hydrogen (as fuels), biofuels and synthetic fuels will need to be adopted for **long-distance journeys and larger ships**;
- **any electricity used will also have to be decarbonised as much as possible** if it is to help fight climate change, whether it is stored directly in batteries or used as an intermediate source of energy in hydrogen, ammonia or synthetic fuel production processes;
- power-to-liquid-type **synthetic fuels** (and perhaps even, one day, solar-to-liquid fuels[4]?) will continue to be **expensive** in the long term owing to the combination of their generally poor energy performance, the cost of low-carbon electricity and the cost of capturing $CO_2$.
- certain raw materials produced from **biomass** (or 'feedstock', in technical terms) should not be used to produce biofuels owing to the harmful effects that this can have in terms of both GHG emissions (land use) and various other factors such as deforestation, water resources, etc.

[2]These terms respectively refer to the '2°C scenario' and the 'Beyond 2°C scenario' (around 1.75°C in practice).

[3]An inter-governmental organisation belonging to the OECD and dealing with all methods of transport.

[4]The solar-to-liquid sector is still at the R&D stage and has a long way to go before reaching industrial maturity. It involves focusing the sun's rays to trigger a thermochemical reaction based on water and $CO_2$ in order to produce a synthetic gas that can be used to create synthetic fuels, meaning that it is very similar to the power-to-liquid concept but does not require electricity.

# 2

# THE TRAFFIC GROWTH DILEMMA: IS IT COMPATIBLE WITH THE 2°C TARGET?

## IT'S NOT EASY TO REDUCE WHEN YOU'RE TRYING TO GROW...

The **IMO anticipates growth of 50-250% in transport flows by 2050** based on various economic assumptions.
Needless to say, these different rates of growth will have a definite impact on efforts to improve energy efficiency and the proportion of decarbonised energy used. In other words, **as soon as you start to think in absolute physical terms** (which is vital if we are to come up with an appropriate response to climate change), **the more intense the growth of the sector and the harder it is to achieve the 2°C target, which may even be impossible** at a certain stage.

As is the case in the aviation industry, then, this raises the issue of **controlled growth**, and it is vital that we break the taboo surrounding this issue since **international awareness** is crucial if we are to find an appropriate response to the problem. Never in its recent history has humanity had to ask itself this sort of question, always focusing instead on ways to expand. It is vital now, however, that we look at the issue of regulating volumes with the aim of achieving two goals, the first of these being **decarbonization**, the second being to ensure **fairness** between the players involved. In the absence of any obvious ready-made solutions we are going to have to identify them ourselves.

A quick and somewhat intuitive look at the situation may give the impression that regulating or even **preventing the growth of the maritime sector in terms of volume would inevitably be detrimental** to the players operating in the sector, whereas, in actual fact, nothing could be further from the truth; indeed, **it could actually benefit ship-builders** with regards to replacing or retrofitting fleets with new low-carbon solutions, shipowners could create more value by further optimising their activities, and certain countries could even see this as an opportunity for them to better protect their industrial operations, among other potential benefits.

This is all hypothetical, of course, but it does show that **the debate surrounding growth must also be considered in terms of the opportunities it can create.**

> **"When you start to think in absolute physical terms, the more intense the growth of the sector and the harder it is to achieve the 2°C target, which may even be impossible."**

It is interesting to note, at this stage in the consideration that is being given to the matter within the sector (notably in the framework of various IMO initiatives), that **the maritime sector does not want to go down the same route as the aviation sector and adopt a so-called market-based economic mechanism for reducing its impact**.
Indeed, the ICAO - the aviation industry's equivalent of the IMO - adopted the CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) scheme in 2016 which involved introducing a system for **offsetting** any rise in the **$CO_2$ emissions** generated by the international aviation over and above the 2020 levels, initially on a voluntary basis as of 2021 and later on a compulsory basis as of 2027. **The aviation sector hopes that this mechanism will help it to achieve 'carbon-neutral growth' as of 2020.** The use of sustainable alternative fuels will also enable airlines to obtain reduction credits in the framework of the scheme.

Whilst the maritime sector certainly appears not to be going down this route (at least for the time being), **this could be because it is aware of all of the criticisms that such an offsetting system might come up against**, regardless of whether or not they are justified. The disagreements surrounding its implementation that have made the news and notably relate to the quality and robustness of eligible carbon credits within the CORSIA scheme, for example, have not yet been resolved. Moreover, **the sustainability of such a system in a world that aims to limit global warming to 2°C is something that obviously has to be addressed** since it will no doubt not be possible to transfer reductions from one sector to another (the definition of offsetting) in such cases because **we will need both reductions to be achieved simultaneously in order to meet the ambitious 2°C target.**

## WHAT IS TO BE MADE OF THE STRATEGY ADOPTED BY MAERSK - THE WORLD'S LARGEST SHIPPING COMPANY?

In this effervescent context in which **the maritime sector is finally addressing the vital issue of GHG emissions**, shipping company Maersk (which generated a turnover of $39bn in 2018) recently expressed the following aims with regards to its business strategy [5] on the matter:

- To achieve **carbon neutrality** by 2050
- To have the **first** commercially viable **zero-emissions ship** by 2030
- To **reduce** its scope 1 and 2 GHG **emissions** [6] **by 60%** (in relation to the 2008 levels) by 2030
- To **improve its energy efficiency** by 60% (in relation to the 2008 levels) by 2030
- To develop an approach for **managing climate change-related risks** with a view to implementing the recommendations made by the Task force on Climate-related Financial Disclosures[7]

Efforts to reduce GHG emissions will initially focus on activities relating to the maritime transport sector, which account for 64% of all emissions (39 MtCO2eq) generated by Maersk. The company, whose strategy is based on **transport services spanning the entire logistics chain**, will then focus on reducing the emissions generated by its land-based activities, which the group expects to grow significantly in the future.
The **efficiency objective**, meanwhile, will allow it to **honour its commitment to reducing GHG emissions** whilst not, Maersk claims, having any impact on international trade and supporting the creation of new jobs.
A pilot ship running on 20% second-generation biofuel made the 25,000-nautical-mile (~45,000km) round trip between Rotterdam and Shanghai[8] between March and June, with Maersk keen to point out that this initiative is believed to have saved 1,500 $tCO_2eq$ in emissions and 20 tonnes of sulphur.

### WHAT SHOULD WE MAKE OF IT AT THIS STAGE?

First and foremost, the fact that **a major player like Maersk is making a strong public commitment**, at least as far as its declarations go, to **helping to achieve the aim of decarbonising the maritime transport sector** is to be welcomed, not least because it sends out a very positive message to other shipowners in this respect.
That said, there is an element of doubt regarding the validity of this commitment. Maersk has, in fact, outlined an increasingly rapid trajectory for reducing its emissions with a view to achieving **'zero emissions' by 2050**. This acceleration is based notably on a series of **hypothetical breakthrough innovations** that they hope to see ("*Massive innovative solutions and fuel transformation must take place in the next 5-10 years*"), the effects of which will be strongly felt in 15 years' time and even more marked in 25 years. **Basing its strategy on these sorts of grounds**, which depend heavily on the commitment demonstrated by various other stakeholders and span increasingly long periods of time, **clearly challenges the feasibility of Maersk's plan**.
Furthermore, **transparency and precision** regarding the nature of these commitments and previous results **could be improved**. Maersk has committed to reducing emissions in the event of its fleet doubling in size by 2055, and with this in mind it claims to have achieved a "41% relative reduction" in 2018 in relation to 2008 levels, stating that it now aims to achieve a "60% relative reduction" by 2030 in relation to 2008 levels. **It is difficult to tell** from reading the report **what exactly these 'relative reductions'** that Maersk claims to have achieved **actually entail**, since the company fails to explain how they are calculated. We might assume that it relates to a reduction in the carbon intensity of the group's activities (reductions in its emissions per t.km transported, or per $bn in turnover).

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[5] *Moller, A.P. - Maersk – Sustainability Report 2018*
[6] *In terms of intensity, as we see it, and not in absolute terms, since the declaration made by Maersk was not clear on this point.*
[7] *Moller, A.P. - Maersk – Sustainability Report 2018*
[8] *Press release – 'Dutch Sustainable Growth Coalition partners with Maersk in world's largest maritime biofuel pilot' - March 2019*

However, the group has emitted as much GHG in absolute in 2018 as in 2008 (39MtCO2eq), although Maersk's turnover was 30% lower in 2018 than it was 10 years earlier[9]: its emissions per million dollars of turnover have therefore increased over this period, suggesting that if the "relative reduction" mentioned by Maersk is indeed a reduction in intensity, it seems surprising that it could have happened in this context. This decrease in turnover may have various origins, but if we make the conservative assumption that this situation has occurred at a level of activity at best equal, the carbon intensity of Maersk could not have declined.

The scope and nature of this "relative reduction" is therefore to be clarified, all the more so in the context of a doubling of the fleet, if the target of -60% of "relative reduction" is actually based on absolute emissions, it seems very ambitious.

Ultimately, the scope of and proposed method outlined in Maersk’s commitment may be perfectly honourable but they do fail to acknowledge a number of major issues. What Maersk actually seems to be aiming for is a situation of ‘zero gross’ emissions rather than ‘zero net’ emissions where Scopes 1 and 2 are concerned, meaning that it would have to rely solely on initiatives designed to reduce the carbon footprint associated with operating its fleet (energy efficiency and 100% decarbonised energy sources) and not on any offsetting initiatives, the relevance of which is being increasingly called into question. Nevertheless, a significant proportion of the emissions that Maersk has to generate in order to operate is excluded from this aim. This concerns its Scope 3 emissions which, according to Maersk, are generated primarily upstream of its operations (fuel production, purchasing, etc.). These Scope 3 emissions account for over a third of the total carbon footprint declared by Maersk, meaning that a significant proportion of Maersk's exposure to the climate risk is not covered by its strategy, particularly since there is no guarantee that it will achieve its ambitious Scope 1 and 2 targets.

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[9] *$69bn in 2008 as opposed to $39bn in 2018*

# 3
# CLIMATE CHANGE AND AIR QUALITY: KILLING TWO BIRDS WITH ONE STONE?

## WHEN ALTERNATIVE ENERGY SOURCES OFFER DOUBLE BENEFITS

The issue of climate change should not eclipse **the problems associated with air quality,** which should be examined more specifically at **local level**; indeed, **sulphur content in port areas and areas that experience high levels of maritime traffic is significantly higher than the levels found in major city centres**. The literature reports that 5% of the world's SOx emissions are caused by marine transport, that is double the amount of $CO_2$.
Likewise, NOx levels in these areas are higher than those found in major cities, and recent epidemiological studies (conducted at the port of Civita Vecchia) have shown an **increase in the number of cases of cancer of the airways and diseases of the nervous system** among those living within 500m of the port boundary.
The issue of **particles** is equally concerning, with measurements varying greatly depending on particle size (ultra-fine particles). Some studies show that the bulk density of particles surrounding large cruise ships (50-100m from the ship) with little wind (10 knots) is at least equal to the levels recorded in major city centres during rush-hour with no wind. We know that **these particles are harmful to our lungs** and that the smallest of particles can infiltrate deep down into the pulmonary alveoli.

With regards to **port areas**, a number of measures, such as the **use of cleaner fuels during the approach phase and while in port**, are already in place. The preferred solution would of course be to **connect ships to an electricity supply** whilst in port, meaning that they could then cut their auxiliary engines and service the ship using the electricity supply.

Whilst this would initially appear to provide a satisfactory solution to the need to improve local air quality, the issue of the way in which the electricity is produced can nevertheless be of critical importance, such as in the case of islands and islets, for which electricity production and the corresponding air emissions are sometimes relocated to just a few miles away.
This is where **the use of renewable energy sources** really comes into its own, with fewer installation restrictions, in theory, than onboard solutions. In any case, the improvement in air quality that connecting ships in port to an electricity supply and adopting decarbonised electricity production methods would bring about would have a positive impact on reducing $CO_2$ emissions.
With regards to areas experiencing high levels of maritime traffic, there is also close correlation between the approaches outlined above for reducing $CO_2$ emissions (improving energy efficiency and using decarbonised energy sources) and their impact on local air quality.

> **"The improvement in air quality that connecting ships in port to an electricity supply and adopting decarbonised electricity production methods would bring about would have a positive impact on reducing $CO_2$ emissions."**

# CONCLUSION

## SO, IS THE MARITIME SECTOR ON COURSE FOR DECARBONIZATION?

### UNFORTUNATELY NOT...

The 74th Marine Environment Protection Committee (MEPC, under the remit of the IMO) was held in London last May. **A series of short-term measures to be implemented by the maritime sector with a view to reducing its GHG emissions was expected to be outlined** following this round of negotiations. The actual results observed, however, fell short of these expectations and were found to be far more restrained and less committal than the grand statements made in spring 2018 might have suggested.

Indeed, the Committee decided to perform an initial assessment of the impact of the proposed measures, as a result of which the 74th MEPC's working group on GHGs focused exclusively on outlining a procedure for assessing such measures and putting together a series of working groups to apply said procedure to the proposed measures. Therefore, the IMO has postponed its recommendations for short-term initiatives to the next rounds of negotiations. **The outlining of medium and long-term measures will be subject to even further analysis.** This is clearly very disappointing and France has officially expressed its upset at the situation[10]. In light of this, and despite the fact that its strategy for reducing GHG emissions is questionable on a number of counts, **the aviation industry is making faster and more concrete progress in this respect than the maritime industry.**

That said, **many players in the industry would like to see evidence of firmer and more proactive commitment.** The IMO, for example, received a letter signed by over 100 maritime companies and environmental organisations[11] last April requesting that an average **speed limit** for container ships be introduced, along with an absolute speed limit for all other types of ship.

**The financial sphere is also starting to take action**, with 11 major banks funding the construction of merchant ships to the tune of over US$100bn set to start taking environmental criteria into account in their investment decisions having signed up to a programme known as the Poseidon Principles[12]. Doing so, they commit to achieving the decarbonization targets outlined by the International Maritime Organization.

**Actually, only joint pressure from players in the financial sector and public authorities, plus exemplary behaviour on the part of the leading companies in the sector will force the IMO to acknowledge its responsibilities and take the appropriate steps to trigger the decarbonization of the maritime sector immediately. In the meantime, players in the sector, from shipbuilders to shipowners, will clearly benefit strategically from preparing for the transition right here and now; indeed, the longer it takes them, the more they will suffer.**

10 AEF
11 Financial Times
12 Poseidon Principles

**Bertin Energie Environnement** supports industries and regions in making the energy transition through a series of safe and innovative technical solutions.

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