

NORDIC CONSORTIUM STUDY BULLISH ON POTENTIAL OF AMMONIA-POWERED SHIPS

VAIBHAV SHUKLA - B.TECH - IV

The Nordic Green Ammonia-Powered Ship (NoGAPS) consortium has announced the results of its latest study on green ammonia-powered gas carrier transporting ammonia in Northern Europe and using zero-emission ammonia as a fuel.

In the past couple of years, ammonia has been creating the buzz, being identified as one of the key alternatives to conventional fuels on the shipping industry's decarbonization path.

Recent research conducted by the Getting to Zero Coalition estimates that zero-emission fuels need to make up 5% of the international fuel mix by 2030 if the industry is to meet decarbonization targets by mid-century.

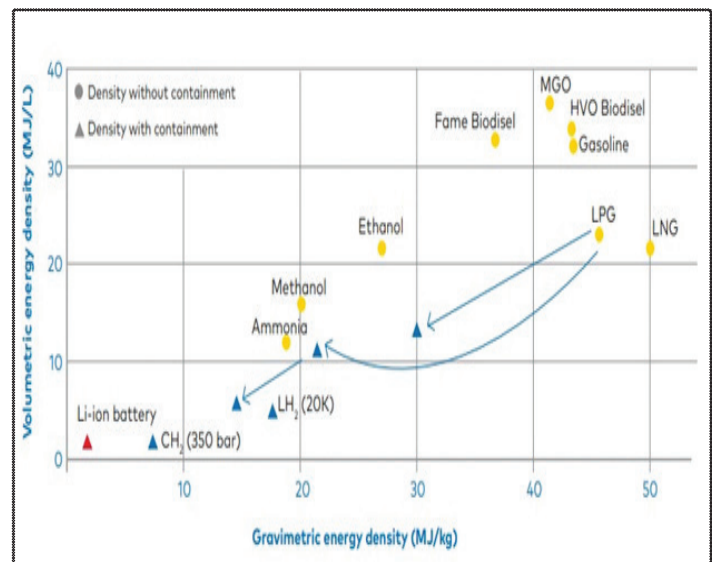
The NoGAPS project report, developed by the Global Maritime Forum and Fürstenberg Maritime Advisory, summarizes the potential of green ammonia-powered shipping in decarbonizing maritime transport.

As disclosed, green ammonia does hold the potential to speed up the decarbonization process if investors and operators are presented with a credible business model.

Courtesy of GMF

"The NoGAPS concept study examines the full value chain viability of powering ships with green ammonia. It finds that using green ammonia as a fuel is both practical and feasible. Focus should now be on measures that can strengthen the business case for zero-emission ammonia," Jesse Fahnestock, Project Director at the Global Maritime Forum, commented. Due to its potential scalability and application on long-distance routes, green ammonia's usage could prove to be a good choice for LPG carriers.

"One key finding of the study is that it is possible to use green ammonia as a natural choice of fuel for an LPG carrier. There are still areas to be explored, but NoGAPS has taken some big steps along the path to ammonia-powered shipping," Hans-



Henrik Ahrenst, Performance Manager, Naval Architect, BW Epic Kosan, pointed out.

The vessel, the fuel and fuelling options, as well as the business, financing and policy considerations were taken into account, while conducting the study.

"The NoGAPS study has helped to identify the most pressing problems and possible solutions for ammonia-powered, zero-emission shipping, from the perspective of the entire maritime value chain," said **Sofia Fürstenberg Stott**, Partner at Fürstenberg Maritime Advisory.

NoGAPS conclusions in a nutshell:

- The potential of green ammonia as the new, carbon-neutral, energy-efficient fuel is significant.
- Neither the technical considerations nor the associated regulatory approval for a green ammonia-powered vessel present major obstacles to putting the M/S NoGAPS on the water.

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• Ammonia synthesized from green hydrogen represents a credible long-term, zero-emission fuel.

• The biggest challenge is to present the money-driven shipping sector that both the vessel design and the fuel sourcing strategy could offer opportunities to reduce risks and costs in meaningful ways.

• Government support and public finance can both accelerate the short-term timetable for investment. Savings of up to 50% may be possible through co-investments.

The report has been made possible through collaboration with consortium project partners; BW Epic Kosan, Danish Ship Finance, DNB, DNV, MAN Energy Solutions, Wärtsilä, Yara International, and Ørsted with co-funding from Nordic Innovation.

Green ammonia-powered vessels will feature new design

New vessel designs will need to accommodate larger fuel tanks, as well as safety considerations to minimize the possibility of leaks. What is more, the engines should be constructed to minimize the release of unburnt ammonia.

The expected design pathway for these engines will be dual fuel, which can help mitigate the risks to investors in the ships, as the availability of green ammonia fuel remains to be seen.

The consortium expects that these engines should be available as early as 2024.

Potential costs

Even though the current costs of green ammonia are much higher than conventional shipping fuels,

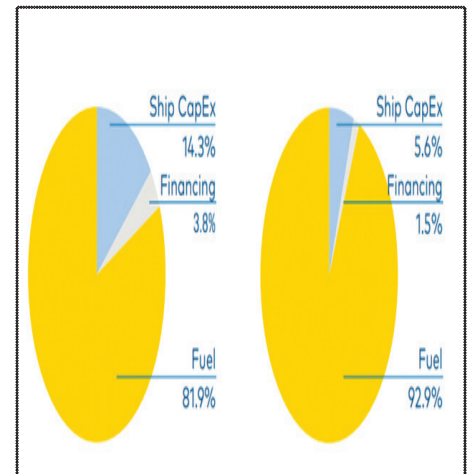
these costs can be expected to come down as production is scaled up and operational efficiency improves.

According to the report, the extra costs associated with the NoGAPS concept are significant. A rough calculation of the costs has been made based on assumptions provided by the partners.

It is estimated that the total annualized cost of ownership of a green

ammonia-powered ammonia carrier goes up to \$16.8 million.

The report reveals that the overwhelming driver of the extra cost is the cost of fuel.



In the case examined, fuel costs accounted for 93% of the additional annualized cost compared to a traditional carrier running on MDO. Share of total annual cost (left) and additional annual cost vs. a standard gas carrier and MDO fuel (right) Courtesy of GWWMF

The additional capital expenditures related to the vessel are significant for the vessel owner (roughly estimated at 25%) though in the overall cost picture they are much smaller

Courtesy: off shore energy.

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TOWARDS UTMOST SUSTAINABILITY

CHAVAN VIKRAM - B.TECH - IV



There was something reassuringly positive about that ancient phrase found in charter parties which required the chartered vessel to “proceed with utmost despatch and without deviation” to her eventual destination.

There could be no equivocation or doubt in the master’s mind; he was called upon to ensure that the ship went like the clappers, to make her number at the arrival port, just as soon as wind, weather and the ingenuity of the engineering staff permitted.

It didn’t, of course, mean that the definition of what constituted “utmost” could not be the subject of a subsequent dispute, if the charterer felt that the colourful account of the severe weather the ship had encountered might have involved a certain hyperbole. Or maybe the speed advertised by the owner’s broker had been on the optimistic side, like those advertisements that suggest the range of an electric car is twice that which practice sadly proves. But both sides of the contract surely understood what was expected of the ship and her performance.

But in the age of sustainability, with the pressure to “optimise” a ship’s speed to arrive so that days are not idled at anchor, far more uncertainties start to creep in. We all know that there is a strong environmental case for burning

less fuel, but a long ocean passage through possibly inclement weather can involve a fairly elastic estimation of the word “optimise” and the ETA can become a moveable feast.

There are more interests involved than those of the charterer and the ship that has been hired. The arrival port is an important third party in this marriage of convenience and needs to co-operate in the quest for efficiency. If the dockers decide to go slow, or the ship unloader breaks down with a ship on the berth, it is futile to suggest that the voyage of a subsequent ship en route will not be affected.

There is also, in a world where suspicion and entitlement regrettably abound, a need to ensure that any benefits from the efficiencies of the “just in time” voyage are properly shared, which implies an increase in the level of transparency between parties.

It is clearly to everyone’s benefit that there is a reduction in fuel consumption, emissions are minimised and there is less wasteful hanging around at anchor. But can this be equably monetised? Co-operation and co-ordination are important elements here, if “just

in time” isn’t going to involve new and exciting dimensions for lawyers specialising in “arrived ship” disputes.

The new clause for bulk sector voyage charter parties announced recently by Bimco has been designed to address such problems that might prevent JIT working. It gives charterers the right to ask owners to optimise speed to meet a specified arrival time and enables the voyage to proceed without breaching charter party obligations. Under the organisation’s imprimatur, it provides a proper contractual framework under which the parties can agree a strategy for the voyage that benefits both efficiency and the planet. You might ask what’s not to like. Just in time operations have worked in the liner trades and although the bulk sector is more fragmented, there ought to be no real reason, given goodwill and understanding between the parties, why it should not become routine in this huge and important branch of the industry.

You might also argue that meaningful efficiencies on passage will become more important if the tranche of environmental regulations now in the pipeline start to bite, with ships expected to demonstrate improvements in their carbon intensity indicators and their annual efficiency ratio. The mysteries of both are only now being digested by the industry. Additionally if power is to be limited in the future, and we don’t want to end up with more ships to carry the same amount of cargo, “optimum speed” will become a more familiar term.

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World's 1st ULCV LNG-conversion completed

AKASH MUKHERJEE - B.TECH - IV



LNG bunker tank being into Hapag-Lloyd's Sajir; Image courtesy: Hapag-Lloyd

The world's first conversion of a large containership to LNG as fuel has been completed, German liner company Hapag-Lloyd has confirmed to Offshore Energy – Green Marine.

The 15,000 TEU vessel Sajir, now renamed Brussels Express, departed the Chinese shipyard **Huarun Dadong Dockyard Co.** last Saturday and is now underway in the North China Sea heading toward Busan, Korea.

“We will have some guarantee work to do though which will be completed during the next months,” Hapag-Lloyd said.

The ship is now phasing back into service.

The vessel arrived at the Shanghai yard on August 31, 2020, for the

refit, which was set to start in May 2020.

The project was delayed due to the COVID-19 impact, marking its official start on September 2.

The ship was fitted with 6,500-cbm LNG Mark III tank was designed by the French LNG containment specialist GTT.

MAN Energy Solutions was tasked with the conversion of the vessel's HFO-burning MAN B&W 9S90ME-C engine to a dual-fuel MAN B&W ME-GI.

The conversion is expected to cost around \$35 million.

The Sajir is one of the 17 vessels in Hapag-Lloyd's fleet that were originally designed to be LNG-ready.

The project is the core of Hapag-Lloyd's sustainability strategy, as using LNG has the potential to

reduce CO2 emissions by 15 to 30 percent and sulphur dioxide and particulate matter emissions by more than 90 percent.

Earlier this year, the company has ordered also six 23,500+ TEU containerships, set to be powered by LNG.

The \$ 1 billion investment will see the LNG-powered vessels delivered to Hapag-Lloyd between April and December 2023.

The vessels will be fitted with fuel-efficient high-pressure dual-fuel engines, that will operate on LNG. However, they will have alternatively sufficient tank capacity to operate on conventional fuel, the company said.

Hapag-Lloyd has secured green financing for the newbuilds worth a total of \$889 million.

Courtesy: off shore energy

Effective Communication on Board

DINESH. T - B.TECH - IV



In all aspects of our lives, communicating is an essential skill that we use to make friends, build relationships, and carry out everyday functions at work and play. Everyone has their individual style of communicating, some people being more effective at it than others. Your ability to communicate can determine how successful you will be at maintaining relationships or progressing through the ranks in the workplace. Rarely does this ability or lack of it become life threatening. If the communication process breaks down, we can retreat to another room, office or even get away from the situation . . . and life will go on.

At sea, the situation is very different. Your safety, along with the safety of crew and vessel, is dependent on how well people communicate on the vessel. Not only the safety concerns, but everyday life on the vessel can be “awkward” if the communication process breaks down. There is nowhere to retreat to or get away from the situation – the issues are full front and

center. Using the wrong wording or a “perceived” improper tone can easily lead to mutiny. Appropriate communication on the vessel will not only make it safer and maintain an amicable attitude amongst crew, but will also make daily life much more pleasant.

Communication is the process of exchanging information, knowledge, emotion and understanding between parties. This process can be executed in three ways.

1. One way communication

- Transmission from sender to receiver with no desire or intention for feedback

- o Fast, simple instructions
- o With no feedback, we are unsure if the message was heard or understood

- o Crew may not hear the full message or misinterpret it, resulting in confusion. This misunderstanding will leave both parties frustrated and stressed.

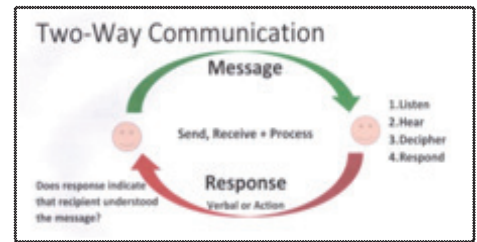
2. Two way communication

- Transmission of information back and forth between parties

- o This process requires more time

- o You receive feedback that helps you determine whether the message has been received and interpreted properly

- o If the message has been misunderstood, the person delivering the message will know this immediately and they will have to transmit the message again, with increased volume or different choice of wording



3. Non-verbal communication

- Transmission of information and feelings through gestures and body language

- o Non-verbal communication may be the only way to transmit your message, if there is a lot of background noise or a substantial distance between the two parties, as can often be the case when we are at sea.

- o If we combine non-verbal methods with a verbal message, we will increase the impact of the transmission and it may be deciphered and understood quicker than a verbal message alone. A watch captain's verbal message to raise an anchor can be enhanced by pointing up and rotating hand.

- o However if we are utilizing two ways of transmitting a message, we must make sure that they are in sync and delivering the same message. Otherwise the recipient will get mixed messages and confusion results.



his non-verbal communication is a little confusing, happy hands...angry face. “Do you want that genoa sheet eased or hardened, or do you want me to get you a bucket and call a doctor?”



Here is a great example of non-verbal communication – while at anchor after a long passage, the message is obvious . . . “DO NOT DISTURB and I am NOT making dinner!”

Focusing on two-way communication is the key to increasing safety on the vessel.

- Use standard, known, and agreed upon phrases to simplify the process and reduce the chances of confusion

- o READY TO TACK

- Listen for ALL to respond to ensure the message has been received, decoded, and the recipient is ready to act on the message

- o READY

- If feedback is not received or the feedback is not relevant to the expected response, then the message must be repeated. You may have to enhance the message using more volume or gestures. Remember that you are in a noisy environment and it can be difficult to hear.

- Try to make eye or physical contact during the communication process. This will improve awareness and effectiveness of the message.

Effective communication on board a vessel also relies on crew members being good listeners. They must be attentive in order to receive and decipher the complete message, as well as make the speaker feel heard and understood. If the audience is not focused on the speaker, only

part of the message is received, resulting in frustration and hostility in both parties.

An effective communicator needs to be an attentive listener. This can be quite difficult at sea, with wind and wave background noise, and the message being muffled through layers of head wear.

On beautiful sunny days at sea, with moderate wind on the stern quarter, life on the vessel can be pure bliss. However, a small change in weather conditions, or a mechanical failure can increase the stress levels on the vessel, putting the emotional atmosphere on the vessel into a tailspin. This is when effective communication is required the most, but the increase in stress usually reduces our ability to transmit messages and listen effectively. This in turn leads to a misinterpretation of the message and friction builds between the parties.

If the physical environment (weather/mechanical breakdown) continues to deteriorate, emotions will run high and possibly get out of hand. The communication process becomes disrupted and can completely break down. Crew relations and safety will be jeopardized.

This is a time when effective communication needs to be at its peak so all crew can work as a team. Quite often, changing environmental conditions require quick thinking, problem solving, and creative ideas. If the crew is

communicating well with each other, they will remain focused, allowing ideas and solutions to flourish.

No two crew members are wired the same, each one communicates in their own way. When faced with stressful situations at sea, my brain sparks and my concentration goes into overdrive. Along with this, my communication level focuses on providing only essential information to crew. I only want pertinent information communicated to me. On the other hand, Carol becomes much more verbal in these situations and also wants every fragment of information communicated to her so she can analyze and process it in her mind, to fully understand the picture. These completely different processes work for each of us; however, we need to co exist, and even thrive, in these stressful situations. Carol is looking for increased amounts of communication from me at the same time that I am clamming up, trying to concentrate. We have come to realize these differences and make a purposeful effort to accommodate each other’s communication style, reducing the chances of conflict.

There are also situations where crew members need to react very quickly. An approaching hazard may require immediate response to commands and there may be little time for two-way communication. The “order” comes across urgently and the crew needs to react with speed and precision. It will be the tone of voice and the volume that will demand the appropriate response. Many times, it is just this tone and volume that gets the backs up of crew members. Therefore, in the general day-to-day running of the vessel, communication needs to be clear

and concise, involving participation from both parties. This takes time and quite often a concerted effort. The “Captain Bligh” type commands must be reserved for those very few (hopefully never) imminent situations when response time is critical to the safety of crew and vessel. If crew members understand that this is the communication style used on the vessel, they will respond to the Captain Bligh order urgently, without hesitation nor getting their backs up. If the Captain Bligh style is used too often (more than once), then crew will not know which situation is critical and safety will suffer, not to mention there will be degraded morale on the vessel.

There are other situations on a vessel that are not conducive to effective communication – anchoring and docking come to mind. These can be stressful situations, because at the same time the parties are trying to communicate, they are focused on their individual task. The crew members are separated by some distance, background noise levels are high, and there is little or no eye contact. That is, everything that you need for communication to be effective is removed from the equation! In these cases, it is important to come up with a plan of action and communicate it with the crew prior to entering into the situation. Sort of like a huddle in football, or a morning strategy meeting at the office. A plan of action is communicated and all parties are assigned a task. There may even be a Plan B discussed. This means that there is less information that will have to be communicated when completing the assignment and crew members can focus on their individual, preassigned tasks.



Voyageur 10.10 is approaching an unfamiliar dock in Horta – a stressful situation that is not conducive to effective communication. There is distance between crew members and everyone is facing a different direction. We completed a reconnaissance pass by the dock, returned to safe water, communicated a plan to the crew and were then able to execute the plan with little additional communication. (Photo: Jeanine Hooper-Yan)

Communicating on the radio offers its own challenges. The only tool we have to get the message across is our voice; no gestures, expressions or eye contact. Most times we cannot see the recipient, or even know that they are there. The recipient has their own challenges . . . static, poor reception, and background noise. There may even be a language barrier. They don't know you, see

you or even know where you are. In radio communication, you only have the tone and volume of your voice to get your message across.

In this case, you must use carefully chosen words to give the recipient a true picture of your situation and avoid any confusion. You need to understand the recipient's challenges and help them overcome them by speaking slowly and clearly, enunciate every word and pause between them. The only way that you know that they have received and understood the message is to have them repeat it back to you. Since you cannot see them, you will know if they are taking action or what their response is unless they tell you so, you may have to deliberately ask them.

On our last day of an Atlantic crossing, the radio crackled away with a MAYDAY. The male voice had a heavy accent but the basic message was clear “Meyday-Meyday-Meyday dis iz . . .” We quickly responded and asked them to repeat the nature of emergency and location, as it was difficult to decipher the heavy accent.

A new English female voice came over the radio: "100' wood schooner, 5 crew on board, engine room is on fire, all electrical and mechanical have failed, life raft has been launched". Her voice made it obvious that the situation was urgent and they feared for their lives, but no sign of panic. This enabled her to communicate clearly. They were only 7 miles away and making a course change to Barbados under full sail.

For the next 8 hours we provided an escort to the vessel, in case the situation on the vessel deteriorated to the point where it was necessary for them to abandon ship. We shadowed them, as they were a faster vessel, never getting closer than 4 miles

and never gaining visual contact. However, we could vividly see the vessel and crew in our minds. The communications officer on the schooner had an incredible ability to stay calm in an emergency while keeping us aware of the situation, and to make sure that we there for them if needed. We continually gave reassurance that we were with them, but their handheld VHF died after 7 hours. The Barbadian Coast Guard had monitored all communication and intercepted the schooner 20 miles from the coast, at which point the Coast Guard gave the okay to break off the escort.

As we are a teaching vessel, we have witnessed many different

personalities and communication styles while at sea. Some styles definitely prove more effective than others. Quite often the style of communication you use will be different for various crew members, depending on their personality or their relationship to you. Crew members must make an effort to overlook challenging personalities and respectfully interact with each other.

Effective communication is one of the key factors that helps create and maintain a safe environment on and around your vessel. This will not only make for safer voyages, it will maintain an amicable crew, and miles of pleasant sailing.

Courtesy Ken Gillstrom



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