

EXECUTIVE SUMMARY



VIRTUAL

**2-5
November
2020**

GAS FEST Workshops

Video recording

30 min pre-recorded plenary available for viewing.

**FROM
26 OCT**

**MON
2 NOV**

1400
↓
1530

Workshop 1: Debunking the myths

How can we more effectively separate fact from fiction in the current media landscape around gas as marine fuel?

Workshop 4: Infrastructure development

What is needed are partnerships for green investments that bring together operators, shippers, bunker fuel suppliers, and port authorities.

1000
↓
1130

**TUES
3 NOV**

Workshop 2: What does green really mean?

The maritime fuel story must be told in an open, clear and transparent way.

1000
↓
1130

1400
↓
1530

Workshop 3 (I): CTRL+ALT+FUEL

There's a lot of discussion around alternative fuels at the moment including hydrogen, ammonia and methanol.

Workshop 3 (II): CTRL+ALT+FUEL

There's a lot of discussion around alternative fuels at the moment including hydrogen, ammonia and methanol.

1000
↓
1130

"Live" closing plenary

1400
↓
1430

**THUR
5 NOV**

1400
↓
1530

Workshop 5: Designing for success

What are the new-build vs. retrofit design considerations we haven't yet thought of but should be?

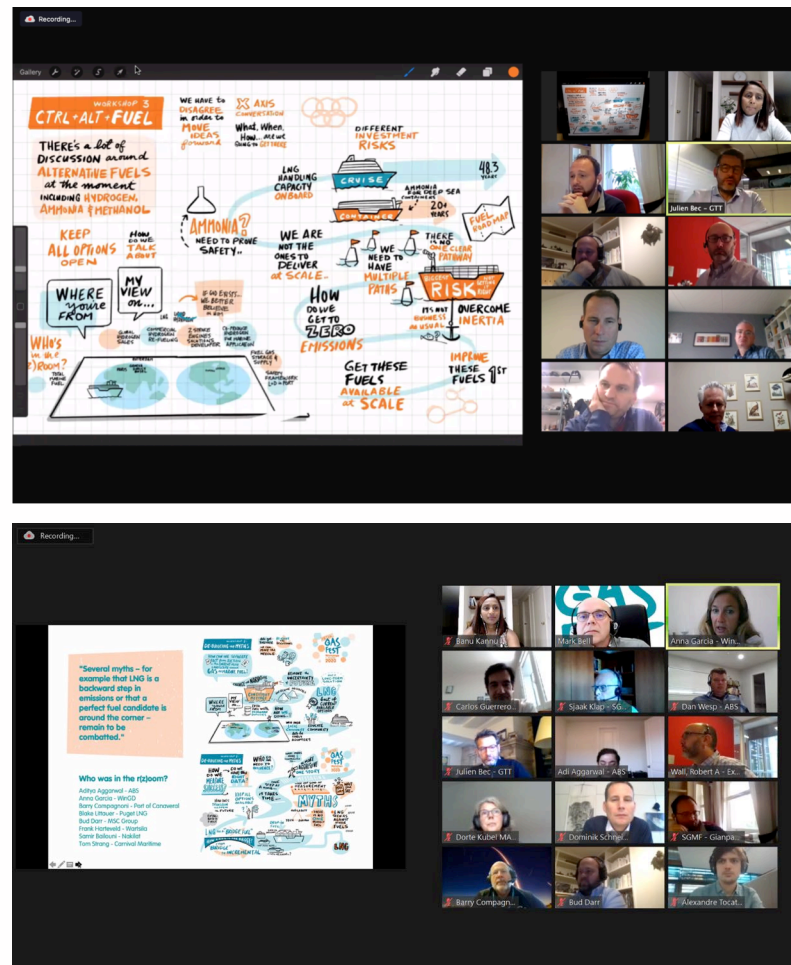
**OUTCOMES
CONTINUE AFTER
THE EVENT!**

Why did we have this week?

Gas Fest is a unique 'for industry, by industry' platform that convenes key players across the fuel value system to **explore the role of gas as a marine fuel on the Maritime Zero Pathway.**

Through these workshops, we wanted to:

- Get back together in the only way currently possible
- Re-start critical conversation
- Commit to continuing these conversations virtually until we can meet again



Society for Gas as a Marine Fuel (SGMF) and Gas Fest are providing this executive summary of the virtual workshops as a public service, but it is neither a legal interpretation nor a statement of SGMF policy. Reference to any specific product or entity does not constitute an endorsement or recommendation by SGMF. The views expressed by participants are protected under Chatham House Rules are their own and their appearance on the program does not imply an endorsement of them or any entity they represent. Views and opinions expressed by SGMF employees are those of the employees and do not necessarily reflect the view of the SGMF. If you have any questions about this disclaimer, please contact SGMF on gasfest@sgmf.info.

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Gas Fest virtual workshops identify incremental pathway for LNG-fuelled shipping

IF LNG IS A 'BRIDGE' FUEL, HOW LONG IS THE BRIDGE? AND, MORE IMPORTANTLY, WHERE IS IT LEADING?

Those questions framed discussions at a series of virtual workshops hosted by Gas Fest and Society for Gas as Marine Fuel (SGMF) last week as senior representatives from shipowners, energy majors, bunker operators, port authorities, class societies and technology suppliers explored how to strengthen the framework for clean fuels in shipping.

The socially distanced edition of Gas Fest, now in its 4th year and hosted for the first time by SGMF, featured interactive online sessions across five areas: infrastructure, design and technology, alternative fuels, communications and defining sustainability. Improving the public and industry understanding of LNG's role in shipping's environmental transformation was a key theme across most sessions.

"Gas Fest has always delivered honest discussions and real action," said Mark Bell, General Manager, SGMF. "Although we could not meet physically this year, the virtual event showed that the community built around the event remains energised and committed to clearing a smooth and safe path for the increasing uptake of LNG and, as they become viable, other fuels that can contribute to cleaner shipping."

Debunk(er)ing the myths

In the opening session, participants explored some of the perceptions of LNG as a marine fuel. Comparisons of clean fuel candidates can give the impression that fuels such as green hydrogen, methanol and ammonia are close to commercial availability. In fact they are many years away and LNG is an important first step, offering clear emission advantages today as well as potential for future greenhouse gas emission reductions, either by synthetic methane or bio-LNG – which can be used as drop-in fuels to gradually lower emissions – or to other cryogenic clean fuels.

Shipowners require long-term certainty and the idea of a 'bridge' fuel may encourage them to look to future solutions that are not yet ready. Describing LNG instead as an 'incremental' fuel that can be gradually made cleaner over the lifecycle of a vessel may provide reassurance that owners' technology investments will not be stranded.

Infrastructure investment

A similar message could help stimulate the investment in infrastructure needed to enable more widespread use of LNG as marine fuel. A separate session found that perceived uncertainty of returns was holding investors back, with few governments giving clear signals about the long-term future of LNG and few companies prepared to take risks to develop bunkering markets without these cues. This investment is needed to drive infrastructure to the stage where it is capable of serving vessels trading on the spot market, which have no fixed schedule and can only bunker where they are sent.

The infrastructure session also took a deep look at the current state of LNG bunkering. Reducing the cost of LNG bunker vessels was seen as key to encouraging uptake, with designers considering how the next generation of vessels could be made more cost-effective. At the same time, it was agreed that a wider range of bunker vessel sizes will be needed to ensure all vessel sizes are served.

Future fuel ready

The incremental advance towards carbon-neutral fuels is also being noted by technology designers, as described by participants in the alternative fuels sessions. Many are already being asked for concepts that are 'future fuel ready' despite the fact that some characteristics of these fuels – their emissions on combustion, for example – remain relatively unknown. That pressure represents a 'palpable change' over the past year or so in the approach shipowners are taking to investigating future fuel options.

While the pace of investigation is accelerating, shipowners have yet to narrow down the direction of change. Participants revealed that owners are reluctant to eliminate fuel candidates prematurely because of the grave risk of making a wrong decision. Another reason is that shipping may have only a limited influence in which fuels it eventually has access to, with competition for clean fuels coming from national grids and other, bigger, industries. In this context, flexibility, preparedness and willingness to deploy new fuels and technologies is more important than predicting which fuels will be available.

The uncertainty of the future fuel outlook again highlights the challenge for LNG's label as a 'bridging' fuel. While clean fuels of the future – i.e. the 'end of the bridge' – are not clear, LNG offers immediate emission advantages today and the potential to incrementally improve environmental impact.

Mon 2 Nov 2020, 1400-1530 GMT

The need for clear, positive and proactive communication of LNG's role as a marine fuel was the main theme in the first session of Virtual Gas Fest 2020, titled 'Debunking the myths'. A group representing ship owners, engine developers, fuel suppliers and class societies cut through the confusion that has often clouded the perception of LNG as a marine fuel.

That confusion has real consequences. Ship owners need certainty over a long period before they invest in ships. The image of LNG as ‘only’ a transition fuel – combined with a widespread view of zero-carbon fuels as being closer to viability than they really are – could paralyse investment decisions. That could in turn lead to shipping not taking steps to reduce emissions today, and thus missing future environmental targets.

Perhaps terminology plays a role. LNG as a ‘transition fuel’ raises questions of how long the transition will be and whether it is best to opt straight for carbon-neutral option (despite the unavailability of these options). **A more constructive phrase could be ‘incremental fuel’**, illustrating how LNG fuel and technology will gradually improve shipping’s emissions impact by enabling the use of drop-in synthetic or bio-methane and eventually full running on a range of carbon-neutral options.

That phrase could also check the ‘us vs them’ tone that can emerge when LNG advocates are called to defend the applicability of the fuel. Too often LNG is pitched against alternatives like hydrogen, methanol and ammonia. More realistically it should be viewed as the first step – and the only step feasible today - towards fuels with zero net carbon. The study commissioned by SGMF for release in Q1 2021 is an opportunity to address this perception by considering the fuels alongside each other. But so far even engine designers have not settled the performance characteristics of many new fuels.

Finally, proactive communication is needed to debunk the persistent myths around LNG as a marine fuel. **Several myths – for example that LNG is a backward step in emissions or that a perfect fuel candidate is around the corner – remain to be combatted.**

Proponents of LNG may sometimes have hindered their cause by treading too softly around such myths. But with clarity, positivity and pro-activity, shipowners and other stakeholders – including policy makers and the public – might be convinced of the role gas can play in shipping's transformation.



WORKSHOP 2 WHAT DOES GREEN REALLY MEAN?

the MARITIME FUEL STORY
MUST BE TOLD in an
✓ OPEN, CLEAR and
✓ TRANSPARENT WAY



WORKSHOP 2 WHAT DOES GREEN REALLY MEAN?



Workshop 2 – What does green really mean?

Tue 3 Nov 2020, 1000-1130 GMT

WHICH SHADE OF GREEN FOR SHIPPING?

The second session of Virtual Gas Fest 2020 was titled 'What does green really mean?', but collaborators soon realised that 'who gets to decide' is an equally interesting question. **Is it the markets – the freight owners and passengers – or the regulators that will decide what sustainable shipping should look like?**

There are several vectors to be considered to bring green from a fuzzy marketing concept to a solid foundation for future shipping. It was generally accepted that 'green' should be measured from fuel production through to use (well to wake) rather than just by what comes out of the funnel. The IMO is working towards factoring this into its emissions reduction strategy.

Beyond that, the path is less clear. Does it mean focusing solely on greenhouse gas emissions rather than, for example, local air pollution? Or does that risk overlooking important objectives? And, as SGMF highlighted in an information document submitted to the IMO earlier this year, how can owners make truly green choices while important emissions (methane, for example) are not measured uniformly?

For LNG in particular, timescale is important. Today it is the greenest ship fuel, but it may not be when carbon-free fuels are available. Users of LNG need to place the fuel in that context,

highlighting its role as a step on the road to zero-emission shipping.

But the biggest discussion point was who would set the green agenda for shipping. On one side, the customers of shipowners hold the reins. Some will demand environmental performance that ties in with their own decarbonisation targets. But others are still likely to be attracted to the cheapest fuels – these will not be the cleanest – and will need the constraint of regulation to persuade them to act. **While market demands can drive faster behaviour change, only regulation can provide the rigid rules of play that will require slow movers to go green.**

The likelihood is that both regulators and shipping's customers will have a say in what green really means. Public understanding, which has a hand in both factors, is therefore critical. Supply chain is no longer just a business concern. As passengers, end consumers and influencers of policy, people need visibility of the emissions that accompany their choices right across the supply chain. **Achieving that awareness could be key to improving the perception of shipping, whichever shade of green it finally wears.**

Workshop 3(1) – CTRL+ALT+FUEL

Tue 3 Nov 2020, 1400-1530 GMT

EXPANDING APPETITE FOR ALTERNATIVE FUEL READINESS

Shipowners have shown a 'palpable' change of approach towards alternative fuels in the past year or so, the Virtual Gas Fest 2020 'Ctrl+Alt+Fuels' session heard. But amid a developing sense of urgency there is as yet little direction, with owners reluctant to take the risk of abandoning candidate fuels too early.

The pace of change was highlighted with reference to an industry survey in which a research company presented the clean fuels that shipowners expected to emerge. Ammonia did not even feature in the 2019 results but was in one of the top spots this year – a rating borne out by the extensive focus on the fuel in the Gas Fest session.

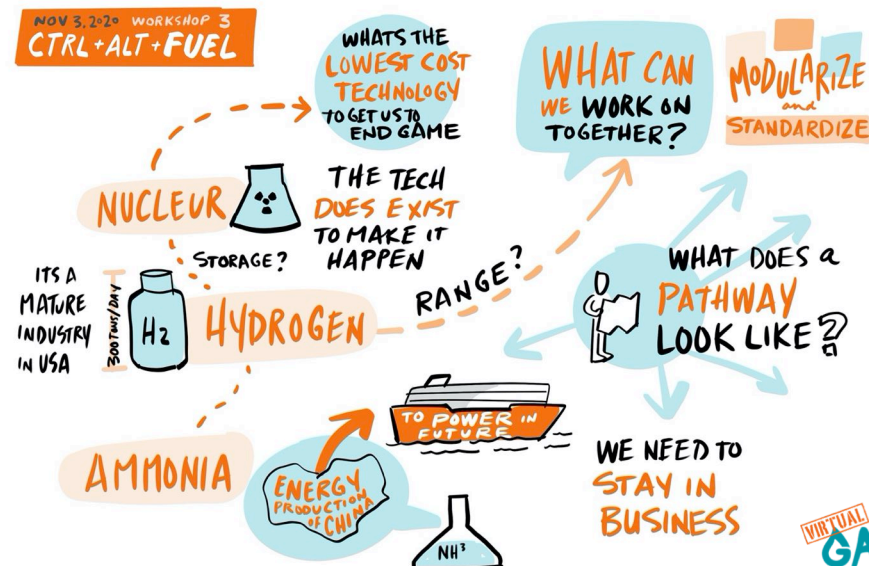
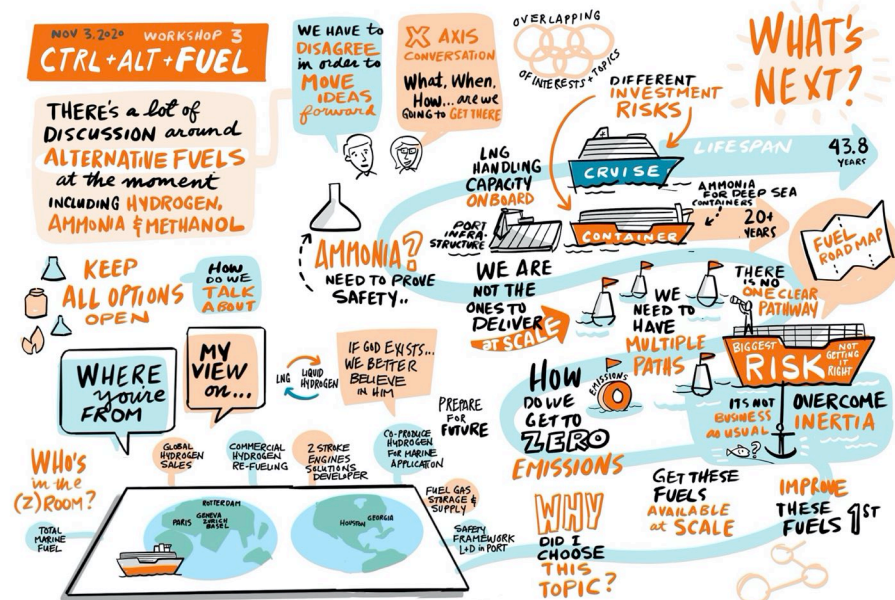
Yet ammonia highlights some of the challenges that remain to be answered before shipowners can narrow their focus. Its emission profile is not yet fully understood, with a finely balanced combustion needed to minimise a trade-off between ammonia slip – causing problems associated to the fuel's toxicity and corrosiveness – and producing emissions of N₂O, a potent greenhouse gas.

Like other fuels, ammonia will not suit all vessel segments, notably passenger ships. And safety regulations have yet to emerge. In ammonia's case, bunkering at city ports could pose a political challenge – but the same can be said for LNG when it was first introduced as a marine fuel. Whichever fuels conquer the marine market, robust safety frameworks will need to be established.

But another rationale for shipowners keeping their options open is more mundane. In the end, it may not be shipping that dictates which fuels it uses. As demand for clean energy increases, shipping will have to compete with other industries and political projects, particularly for renewable electricity needed to create clean fuels. Showing the will and readiness to deploy alternative fuels and power technologies – whichever emerge – is therefore as important as correctly predicting which fuels will be available.

That readiness is complicated by differing perspectives on whether fuel flexibility is feasible. Having systems and ship designs that could change between fuels – or maybe switch in midlife as new options come online – would mean that owners do not have to place their bets on one or two options. But while some in the session saw this as essential to a clean fuel future, others doubted whether it was technically possible or operationally desirable.

The whole gamut of alternative fuels were discussed during the session, including the recently resurgent nuclear option. The discussion may not have provided certainty for any future fuel speculator, but the general theme of increasing readiness – whatever the fuel – was undeniable.



WORKSHOP 4: INFRASTRUCTURE DEVELOPMENT

WHAT IS NEEDED ARE PARTNERSHIPS
for GREEN INVESTMENTS
that BRING TOGETHER
OPERATORS, SHIPPERS, BUNKER
FUEL SUPPLIERS and
PORT AUTHORITIES

ALTERNATIVE
FUELS

CAN WE
CONVERT
TOP 20
PORTS

LNG

WHERE
YOU'RE
FROM

SMALL
SCALE
LNG
IS THE
WAY...

WE'RE
READY
TO GO!

HOW DO
WE RUN
ON LNG?

POWER
STATIONS
GO
ON
LNG

FRANCE
GO
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LNG

ITALY
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LNG

UK
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USA
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CHINA
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INDIA
GO
ON
LNG

NOT IN
SMALLER
PORTS

BUNKER
LNG

SCALE
STANDARDISED
BUNKER
VESSELS

USE STIMULATE
PUBLIC
ACCEPTANCE

WHAT'S
THE COST
SAVINGS

SMALLER
BARGES
IT MAKES
NO SENSE TO
US
WE HAVE
NO INCENTIVE
TO MOVE ...

IT'S TOO
COSTLY!

WE NEED
THE RIGHT
INGREDIENTS

MAKE A
CAKE

LNG

SLIM DOWN TO
MAKE LNG
ATTRACTIVE

WHO'S
GOING
TO PAY?

BUILD INFRASTRUCTURE

LNG is a
STRONG FOUNDATION

WORKSHOP 4: INFRASTRUCTURE DEVELOPMENT

partnerships for
GREEN INVESTMENTS

ENCOURAGE
INVESTMENT
in BUNKERING
around
THE WORLD

BUNKERING
FACILITY

INCLUDE
SHIPS IN THE
INFRASTRUCTURE

BUNKERING
VESSELS

HYDROGEN

WHO WILL
DELIVER
TO THE
SHIP?

WHO'S
GOING TO
CONTROL
IT

WHERE DO WE
FOCUS?

WHERE'S THE
BALANCE

WE HAVE
SUPPLY

RISK
ADVERSE

WHY
BIGGER
COMPANIES?

RIGHT
SCALE
= EFFICIENT

COMMERCIAL
VIABILITY

POLITICAL
WILL

INFRASTRUCTURE

BIGGER
COMPANIES

SMALLER?
MORE RISK

BIG COST \$
AGENDAS

BIG GREEN
AGENDAS

IMO

BUILD
smaller
STRUCTURES
to open
possibilities

H₂

IMU

Workshop 4 – Infrastructure development

Wed 4 Nov 2020, 1000-1130 GMT

THE BIG PICTURE ON BUNKER INFRASTRUCTURE

New iterations of bunker vessels and how to attract investment in bunker projects were the main focuses in the 'Infrastructure Developments' session at Virtual Gas Fest 2020. As so often in shipping, the question of size dominated discussions. But it is clear why economies of scale and financial strength are sought after in the challenging LNG bunkering market.

The phenomenal growth of ship-to-ship LNG bunkering was explored in depth. This method of taking on gas fuel is efficient for both time-constrained ship operators and space-limited ports. It has also delivered an entirely new vessel segment to the shipping market. With 57 bunkering vessels in service and several more on order, the market is mature enough for a cool hard look. Participants noted the extravagant expense of these early vessels and mooted that later generations might profitably be stripped of over-specified functions. All manner of cost-effective options were proposed, from bunker vessel conversions to mini-FSRUs.

But every bunker vessel needs a supply hub, and for all the projects being announced, very few are being executed. Various reasons were proposed, all under the banner of 'failing to attract investment'. One was that investing in a project related to international shipping was not as attractive as a domestic emerging market prospect. Another was that government policy often failed to give investors the necessary cues that LNG projects could provide credible returns.

The question of who should manage the bunkering operation from a terminal was also debated. Although molecule owners have the resources and the product, they are not always keen to devote resources to a small market of end users with an uncertain future. But while small independents may have the vision and commitment to the market, they might not have the underlying financial strength to weather turbulent times.

All these factors – the high cost of bunker vessels, market uncertainty and unsettled commercial models – have a direct impact on the cost and perceived risk of LNG operations for owners. Unless they are resolved, demand may never grow beyond those that can guarantee their own long-term fuel supply, or who have ships that are big enough to take maximal advantage of lower fuel cost.

A fruitful detour explored the emergence of biofuel as a bunker candidate. Successful small-scale biogas plants are already operating throughout Europe, and some ships in the Nordic region are already taking on biogas. But while they show benefits at local level, these can quickly be lost as supply and feedstock sourcing is scaled up. The high cost of production is another disadvantage. Bigger may often be better, but not in the case of fuel bills.

Workshop 5 – Designing for success

Wed 4 Nov 2020, 1400-1530 GMT

THINKING OUTSIDE OF THE TANK

How can tomorrow's gas-fuelled vessels accommodate alternative fuels? That was the main thread of the 'Designing for success' session at Virtual Gas Fest 2020. The challenge, it seems, is less about the technology than the timeframe within which new designs – and the accompanying infrastructure, regulations and training – need to be delivered.

While gas-fuelled ship designs are relatively mature by now, new technologies offer new opportunities – but also potential headaches for designers, integrators and regulators. Plugging the gaps between regulations and practical design – often filled by class rules and flag state requirements – was one topic of interest. Even where regulation is thorough there is often room for interpretation by different regimes. These interpretations have a practical impact, with ship designs varying depending on the rules to which they are constructed. This can affect the compatibility of bunkering systems, for example, as well as increasing costs.

Future proofing ship designs was a key consideration. One element of this is spotting issues that may cause problems for the ability to use a vessel across its lifetime. Could black carbon regulation be such an issue, one workshop asked? The industry needs to get better at spotting such hazards from a reasonable distance.

Not surprisingly, the biggest future challenge today is to prepare LNG-fuelled ships to use cleaner alternative fuels as

they become available. Shipowners are already asking for ammonia-ready concepts, the group heard. From a design perspective, using bio-LNG or synthetic methane as a drop-in fuel is probably the immediate next step. But technology companies clearly feel pressure from paying customers to develop new concepts for alternative fuels.

Facing that commercial pressure, an equal concern is to make sure naval architects and marine engineers are not prematurely pushed into delivering designs for new fuels. Here, history offers some reassuring lessons. Previous fuel transitions – from sail to coal to diesel – have all taken place over several decades. Unfortunately, modern shipping does not have that long and, to complicate matters further, it will likely need to adapt to multiple fuels at once.

The discussion also turned to some of the regulatory instruments that are impacting ship design and engine technology. IMO's Energy Efficient Design Index may offer a short-term opportunity for LNG as the regulator considers accelerating the timeframe for container ships to comply with the next phase. But participants questioned whether other indexes – for example one that relies on in-service measurements – might be more effective in driving emission reductions. While real-life data could give a more accurate picture, it remains extremely challenging to get the data that would be needed for a meaningful operational emissions index.



WORKSHOP 3(II) CTRL+ALT+FUEL

THERE'S a lot of DISCUSSION around ALTERNATIVE FUELS at the moment INCLUDING HYDROGEN, AMMONIA & METHANOL



WORKSHOP 3(II) CTRL+ALT+FUEL



Workshop 3(II) – CTL+ALT+FUEL

Thu 5 Nov 2020, 1000-1130 GMT

A MATURING APPROACH TO EMERGING FUELS

The question of LNG's infrastructure advantage was an interesting strand of debate during the second alternative fuels session at Virtual Gas Fest 2020. A conventional argument in favour of gas-fuelled shipping is that drop-in synthetic or bio-methane – or even other cryogenic fuels – could piggyback on existing LNG infrastructure, thus reducing capex investment in shoreside infrastructure for clean fuels and making LNG an important first step in decarbonising shipping.

There is a case to be made for LNG as a first step, but it is not about infrastructure, the session heard. First, the LNG bunkering market is so small today that it is barely a blip compared to the landside investment that will be needed for other fuels. Second, onshore use of alternative fuels such as methanol and ammonia already outstrips LNG (albeit produced from fossil sources), meaning that the global supply network for these fuels is already bigger.

Whether it is LNG or something else, the shoreside infrastructure investments needed to support a cleanly fuelled global fleet will be gigantic. Most of the cost – and even most of the decision making – will not be borne by shipping, participants agreed. It will be global governments and major industries that decide what fuels the world runs on. In general, the shipping market will be able to make fuel choices only when it knows what is available, and only then need concern itself with last-mile logistics.

Rather than being frustrated at the ability to narrow down fuel options, shipping needs to prepare to handle many of them. **New**

technologies and fuels need to be validated, and compatibility with existing systems confirmed or improved. LNG could be positioned as a 'no regret' investment if this compatibility can be shown – and if, as suggested in the session, IMO's 2050 can be met by using biogas or synthetic methane as a drop-in fuel.

Shipping's limited ability to choose its own future fuels suggests that greater cooperation is needed with government and industry stakeholders outside shipping, many delegates noted. But arguably there is a need for greater cooperation within shipping as well. **This would give the industry a bigger voice and hopefully an earlier consideration in national and global discussions about carbon-neutral fuels.** At the same time, **greater industry cohesion could instil some discipline in the runaway number of alternative projects currently underway.** Without an overarching structure it can be hard to assess the quality of so many projects.

The first alternative fuels workshop this week noted a change in how shipowners are approaching alternative fuels. This second workshop embodied that change. As the discussion evolves, the simple comparison of alternatives is being replaced by a more considered investigation of exactly how shipping can best prepare itself for whatever lies ahead.

Who was in the r(Z)oom?

Participants:

Aditya Aggarwal - ABS
Alexandre Tocatlian - GTT
Anna Garcia - WinGD
Barry Compagnoni - Port of Canaveral
Blake Littauer - Puget LNG
Bob Oesterreich - Chart Industries
Bud Darr - MSC Group
Carlos Guerrero - BV
Cees Boon - Port of Rotterdam
Cyril Hugoo - TOTAL
Daniel Wesp – ABS
David Haynes - SGMF
Dominik Schneider - WinGD
Dorte Kubel - MAN ES
Frank Hartevelde - Wärtsilä
Fraser Bennie - Chart

Frederic Meyer - TOTAL
Gianpaolo Benedetti - SGMF
Jacob Granqvist – Gasum
Jan Kvaalsvold – DNV GL
Julien Bec - GTT
Margot Matthews – LNG MFI
Mark Bell - SGMF
Martial Claudepierre - BV
Mathias Jansson - Wärtsilä
Peter Kirkeby - MAN ES
Rasmus Bidstrup – MAN ES
Ray Gillett – GTT
Robert Wall - ExxonMobil
Samir Bailouni - Nakilat
Sean Bond – ABS
Serge Fossati – Viking Cruises
Sjaak Klap - SGMF

Tobias Koenig - Lexington LNG
Tom Strang - Carnival Maritime
Volkmar Galke – WinGD

Crew:

Banu Kannu – SGMF
Marcus Magee – Uncommon Conferences
Tim Hamons – Art of Awakening
Gavin Lipsith – Wake Media
Lydia Dorai – SGMF

6 workshops | 9h+ conversation | 21 organisations | 36 participants | 1 community

Our work continues until we meet again in 2021...

