SHIPPING MARKET REVIEW
NOVEMBER 2018

DANISH SHIP FINANCE

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Shipping Market Review – November 2018

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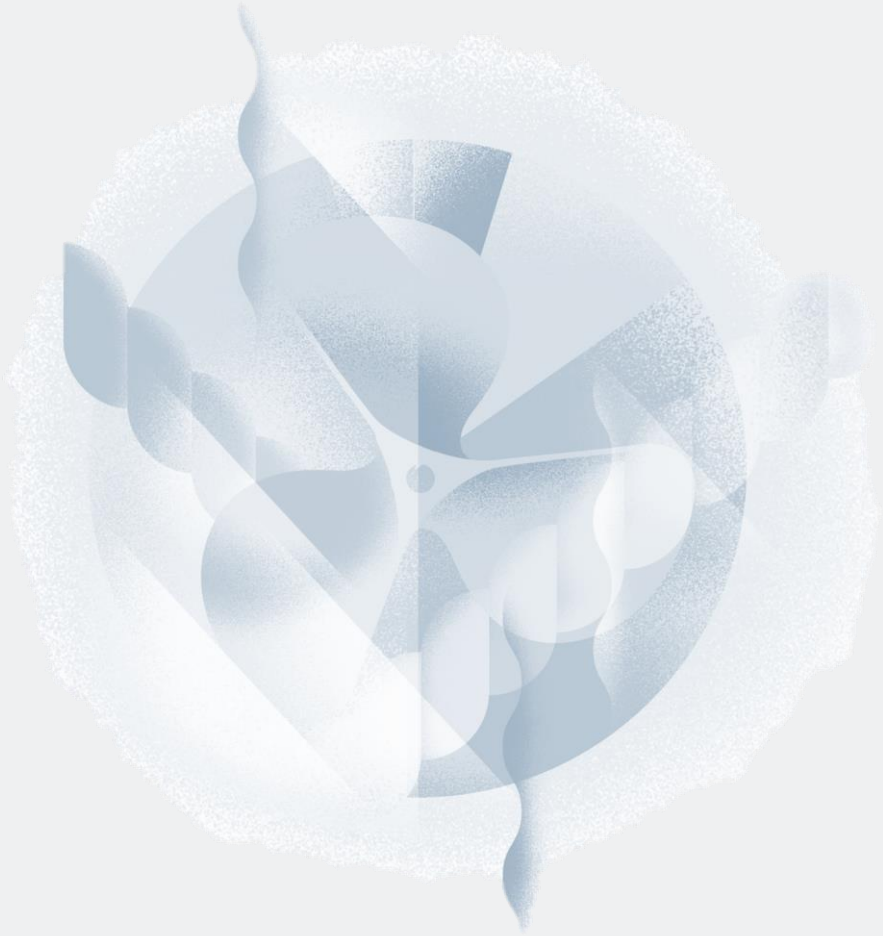


FOREWORD

Shipping Market Review – November 2018

We have been analysing the dynamics that are shaping the shipping industry for more than a decade. Most ship segments have been burdened by surplus capacity for large parts of this period, and most have seen freight rates and ship prices come down to very low levels. Still, several segments have seen periods of recovery in freight rates and secondhand prices, although few of these cycles have lasted long.

While not all our predictions have proved equally accurate, we have been promoting discussion of the challenges facing the shipping industry and in highlighting some global perspectives that might serve as an outlook. We have in this process enjoyed the many bilateral discussions with our valued customers.

We have primarily approached our analysis of the shipping industry from a long-term perspective. This methodology has allowed us to present and discuss some emerging changes but has also created blind spots on the short-term industrial level. It is important to keep in mind that long-term trends only define the dynamics in play. These dynamics may easily be outgunned by temporary forces defining short-term demand that can become sufficiently powerful to raise freight rates or even secondhand prices for several months, or sometimes even longer.

The introduction of new technologies, not just to the global economy, energy supply and manufacturing, but also to the shipping industry has been a recurring theme in our past eight reports. We have, over the years, discussed how the introduction of 3D printers, artificial intelligence, smart materials and robotics are about to change the long-term outlook for the Container industry, the emerging economies' ability to create jobs, and the likely impact on urbanisation and future energy demand.

With our approach to shipping research, we have not previously sought to identify short-term opportunities that enable sudden market improvements to materialise. However, we have decided to increase our focus on these short- to medium-term dynamics, while maintaining a clear-eyed view on the emerging long-term risk and opportunities that are surfacing.

The market research team will continue to analyse the individual ship segments, while a newly established Innovation team will focus on the long-term digital perspectives.

The Innovation team's aim is to identify how to unlock the next level of value in the shipping industry. We will identify and assess new business models, potential new technologies or startups that can upgrade parts of our customers' operations. In essence, we aim to support the creation of value by moving beyond the vessel in an effort to reinvent operating models.

In addition to this edition of our Shipping Market Review – November 2018, we are publishing a Maritime Trend Report in collaboration with Rainmaking. We have partnered to publish a report for the maritime industry, in which we look at current trends through the lens of global startups. These findings are flanked by a 'digital 2030 scenario' for the shipping industry, in which Danish Ship Finance presents possible future directions for the industry in terms of business model innovation and value creation.

We see a clear trend of increased digital adaptation in the shipping industry taking off dramatically in 2018. In our digital 2030 vision, we conclude that some of the basic mechanisms for value creation in the shipping industry could be redefined within the next ten to 15 years, even though most of the 160 startups we have analysed are enablers of innovation, rather than disruptors of the traditional business models.

Enjoy reading!

Danish Ship Finance

GENERAL REVIEW AND OUTLOOK

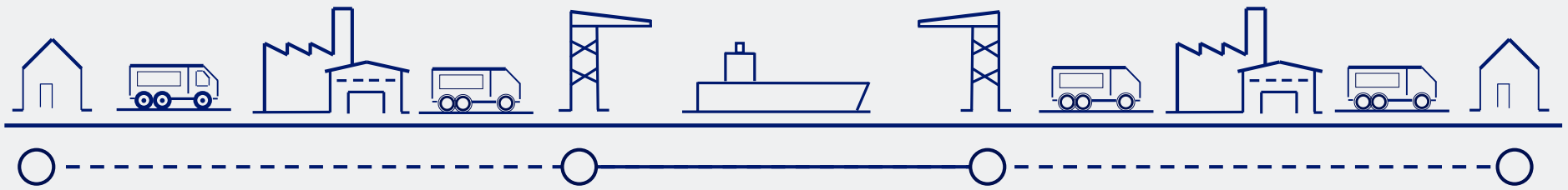
SHIPPING MARKET REVIEW – NOVEMBER 2018

THE DIGITAL TRANSFORMATION

This section is an extract from another report that we are publishing together with Rainmaking.
To read the full report – "Maritime Trend Report" – please visit www.nextgenmaritime.io

EXPANDING MARKETS

Integrating the global supply chain



2018 — PHASE 1 — PHASE 2 — 2030+

INDUSTRY **INNOVATION**

The introduction of new technologies is causing existing business models to be upgraded. We take a look at the global **startup scene** to understand how the industry may innovate in the years to come.

INDUSTRY **TRANSFORMATION**

The new business models will begin to transform value creation in the **shipping industry**. The role of the vessel will change and new competitors will emerge.

INDUSTRY **REDEFINED**

Most of the traditional business models will find it increasingly difficult to compete with ecosystem players who fundamentally **change how value is created** and distributed across the supply chain.

THE DIGITAL TRANSFORMATION OF THE SHIPPING INDUSTRY

The role of the vessels will change

The transport and logistics industry has been slower to introduce digital innovations than many other industries, which is putting several of the industry's established players' business models at considerable risk. As other industries with close links to logistics, such as retail, become revolutionised by digital technology, the chances of digital disruption engulfing the shipping industry increase. While digitalisation threatens to fundamentally disrupt vital parts of business models, it could also help unlock enormous untapped potential.

THE ROLE OF THE VESSEL WILL CHANGE

We argue that the shipping industry is currently being influenced by a number of leading technologies and trends across sectors that in time will redefine significant parts of the industry. The role of a vessel will change: from being central to value creation to becoming an enabler of additional streams of revenue. This shift will reflect the introduction of new technologies, and changes in customer behaviour and industry practices.

The emergence of 'digital native' companies (e.g. Amazon, Google, Alibaba, Tencent) has transformed modern industry. Once bound by geography or sector, companies are now leveraging digital technology to build 'borderless entities' – companies that cross over into seemingly unrelated industries and reach global scale in record time. Rather than conforming to traditional industry structures, these companies have created an ecosystem of products and services that fulfil customers' needs globally.

NEW BUSINESS MODELS ARE BEING DEVELOPED

The introduction of new technology in the shipping industry will attract new market entrants and create new expectations among customers, in turn opening up for new business models. The introduction of digital platforms is one such example, and these are likely to become increasingly important across the logistics industry. Over the next five to ten years, the race to build a dominant global platform will transform the customer's experience of logistics and will be crucial in determining which companies are the winners and losers in a truly digital logistics industry.

An increasingly competitive environment is emerging. New and existing players are finding ways to carve out the more lucrative elements of the value chain by exploiting digital technology and developing new business models. Their aim is to gain control of customer touchpoints and create synergies with their existing businesses. They are forming new entities which, when successfully applied, may be a game changer by redefining the borders of industries, the role of assets and the types of competitor.

SHIPOWNERS DO NOT HAVE AN EXCLUSIVE RUNWAY

The shipping industry is only part of the picture. Shipowners do not have an exclusive runway in the race for future value creation. Multiple players from various industries are investing to obtain a share of the future value. We expect to see a shift in the ownership structure of vessels and profound changes to operating models when ecosystem players move beyond the vessels and integrate across the global supply chain.

The vessels themselves will continue to be central to the operation of moving cargo from port to port. But the data they generate will be integrated into the range of services that customers require and begin to drive future value creation far beyond freight rates. Ecosystem players tend to build strong customer bases in one industry, and then move laterally into others to be able to cater for all their customers' needs from origin to destination.

THE CASE FOR DIGITAL DISRUPTION IN THE SHIPPING INDUSTRY

Freight rates may decouple from supply and demand

The global supply chain will still require vessels in the future, but their direct contribution to value creation could be marginalised. Freight rates could decouple both from the supply and demand balance and from vessels' operating expenses. A possible scenario is that freight rates approach zero or stabilise at transaction-based low levels. In the event of this, secondhand prices of vessels will leave little room for the asset play that currently represents a large part of value creation for many shipowners.

Experience from other industries shows that any industry that becomes digitalised is likely to enter the world of exponential growth and exponential change. Digital information is easy to access, share, and distribute within and across industries. Once something can be represented in ones and zeros – from containerised trade to smart materials – it becomes an information-based technology that can chain react with other technological progressions and disrupt existing industries and business models, as well as unlocking new layers of untapped potential. We argue that the business models of asset owners and ship operators are as likely as those of shipowners (i.e. who run an integrated business where either technical management, commercial management or both are managed internally) to be disrupted, but for very different reasons.

Many people will disagree with us, but we urge them to recall the following example: when something starts being digitalised, its initial period of growth and change is deceptive, because exponential trends do not increase very fast at first. Let us illustrate the point with a Moore's law example. Starting with a market share of 0.01% and doubling each year, it will take seven years to pass 1% but only another seven to reach 100%. The market changes that are currently emerging are clearly at a very early stage, but this is no reason to conclude that they do not have the potential to be massive within the next decade.

The core services in traditional business models (i.e. transporting goods from port to port) will be losing their value in a digital industry, and risk being usurped by other services. Vessels will still be needed to perform the task of moving cargo from port to port, but it is the data this generates rather than the cargo itself that will start to be monetised, not only from port to port but through the entire value chain from origin to destination.

The problem is, though, that once something has been digitalised, more people are able to access the information without owning the asset (e.g. warehouses, ports, vessels, etc.). This constitutes a real problem for traditional players, since a new type of player may enter various parts of the global supply chain. These newcomers may start to upgrade specific parts of the supply chain or the entire customer journey without owning a single asset. The separation of data from the asset opens up a wide range of new possibilities in terms of business models and value creation. This will change the borders of industries and the role of assets, and introduce new groups of competitors that are not normally seen in this setting.

WHAT DIGITALISATION MEANS FOR THE SHIPPING INDUSTRY

Shipping 2030: Where will the most interesting digital opportunities and threats emerge?

Most shipping companies today are scrambling to become more digital. But what does digitalisation really mean? And what changes should we prepare for?

For some, it is about technology (e.g. digital ships). For others, digitalisation offers a new way of engaging with customers (e.g. trading platforms). And for others still, it represents an entirely new way of doing business (digital operation, ship-as-a-service, value beyond the vessel). We consider **digitalisation less a thing and more a new way of doing things**.

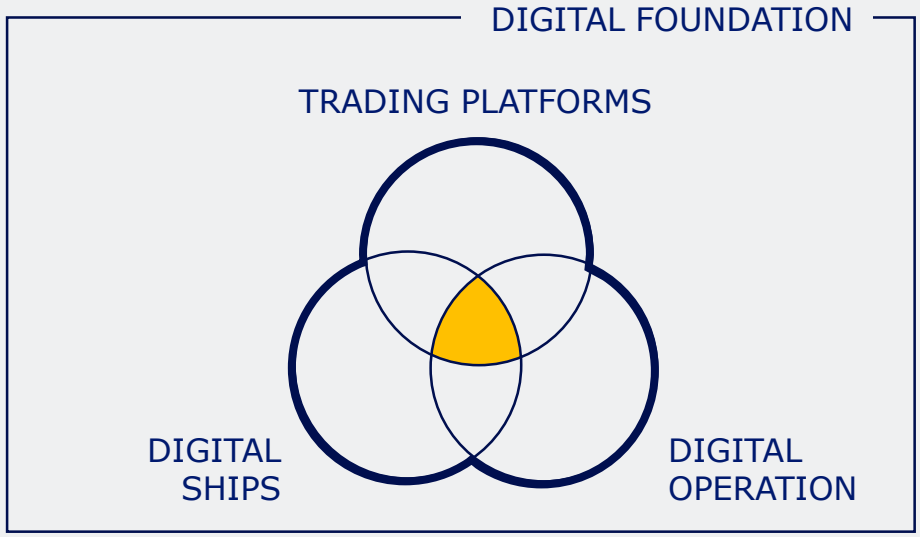
To capture the potential and not simply fall victim to the emerging changes, the industry needs to upgrade its foundations. This is about digital ships (or vessels being upgraded to higher digital standards), digital operations and trading platforms. Some parts are already under construction, while other elements are still prototype concepts that need to be tested and validated.

The shipping industry's digital transformation is part of a broader journey whereby all components of the global supply chain have been or are in the process of being digitalised and integrated together. Each of the individual industries or sectors along the global supply chain is being challenged by new players – ecosystem players – which are optimising customers' journeys from origin to destination rather than operating within that particular industry.

IT WILL NO LONGER BE ALL ABOUT THE VESSELS

So, we have argued that the traditional business model in the shipping industry will undergo a significant transformation within the next decade and could be outright disrupted over the following decade.
Today, most shipowners earn their money by transporting cargo from port to port while others are playing the volatility (i.e. the asset play). In the future, value creation will focus less on the vessel but more on the customer journey.

Imagine a situation where access to consumers is consolidated across the global supply chain on a handful of trading platforms. Only vessels with access to these trading platforms can gain access to cargo.



In this scenario, ownership of the fleets becomes less important and scale becomes less important. The very role of the shipowner is thrown into question.

The largest threat may come not from the traditional competitors – other shipowners – but from structural changes that are not even on our radar today.

We argue that the industry could soon be subject to considerable influence from ecosystem players that do not own or control any vessels. From a value creation perspective, it may no longer be enough to move cargo from port to port in a cost-competitive and trading-efficient way, and the next upswing in secondhand prices may not be sufficient to ensure a proper risk-adjusted return on invested capital

THE COMPETITIVE PLAYING FIELD

The transformation process

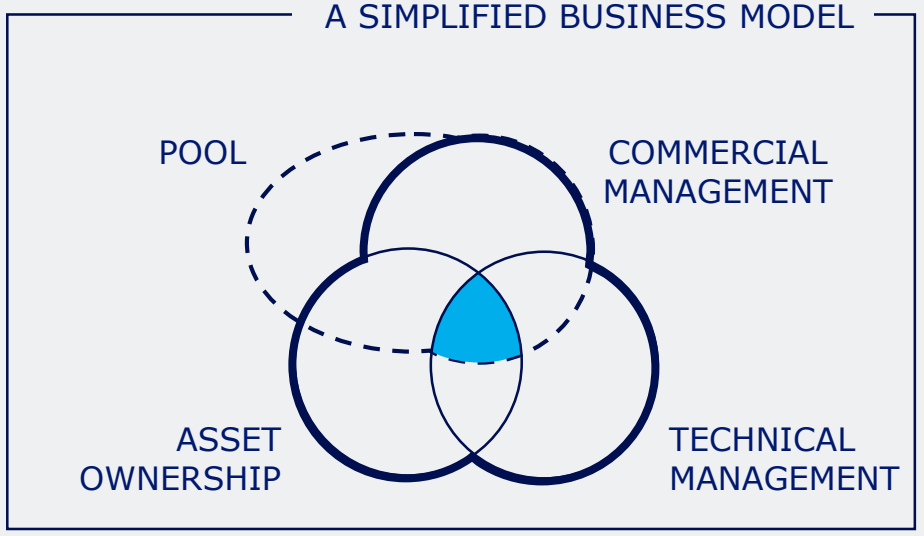
Our aim is to help create a roadmap for the shipping industry's transformation towards a digital future. When companies begin to acquire end-to-end visibility into the data exhaust from their operations, they can begin to experiment with new business models and more integrated customer experiences. In time, the data from their operations could prove at least as valuable as the transactions themselves. But we are not there yet. How will the short and medium term play out?

The low freight rate environment, which has persisted for large parts of the past decade, has spurred a consolidation process on the vessel -owning side. This trend seems to be continuing, and we are also beginning to see a clear trend towards increasing digital investments.

Shipowners who run integrated businesses, where both technical and commercial management of their fleets are handled internally, are most likely to invest in initiatives to upgrade both the cost and the revenue side of their operations. These investments could be made in sequence or in parallel, or perhaps by merging with others or simply acquiring candidates that have already mastered the requisite skills. But not all players are running operations that would offer more than operational scale in a consolidation.

The early stages of the digital transformation will see a push towards cost leadership. This is about the introduction of remote predictive diagnostics and automated processes powered by big data analytics and artificial intelligence. These new tools will be used to enhance the performance management of the industry, drive down costs and increase the uptime of vessels. Existing vessels will be given digital makeovers to enable significant improvements in their operational performance. The next generation of ships will be super-connected assets, with all systems monitored and integrated on unified platforms in real time.

The next step, or a parallel step, is capacity optimisation, which will lead to trading leadership. By applying artificial intelligence to satellite, AIS and other geospatial data sources, algorithms will seek to discover and quantify trading opportunities, and to optimise vessel



deployment, cargo routing, repositioning and much more. These investments can be made by both shipowners and operators.

Asset owners that simply supply their fleets to the market on long-term contracts have little incentive to invest heavily in digital initiatives that upgrade the performance management of their vessels or optimise capacity, unless they are rewarded by charterers.

Still, there is a clear limit to the potential for both cost and trading leadership, since the journey from port to port can only be optimised up to a certain point. In time, mastering these disciplines will become merely a licence to operate rather than a competitive advantage. When that happens, we will need to turn our attention to what will elevate a well-performing shipowner to an excellent one.

THE NEXT GENERATION

Shipping 2030 – a scenario

The digital transformation of the shipping industry does not necessarily mean a sea change for every company in every part of the industry at the same time. Different business models will be affected in different ways, although all players in all ship segments are expected to be impacted by digitalisation at some point.

MIDDLE MAN AMONG MIDDLE MEN WILL DISAPPEAR

Shipowners that simply play the role of middle man among middle men may eventually disappear, since traditional shipowners and ecosystem players will not be competing on equal terms. Their revenue streams will be significantly different. Traditional shipowners trade cargo from port to port and earn freight rates (asset owners rent out ships). Ecosystem players may operate vessels, but they will view these as little more than the infrastructure enabling them to serve their customers throughout a journey that includes seaborne transportation. Their primary income will not be freight rates, but income generated by the services they offer throughout the entire customer journey – from origin to destination. We acknowledge, though, that traditional shipowners may earn additional profit from a successful asset play.

DIGITALISATION WILL TRANSFORM ALL SHIP SEGMENTS

The more standardised cargo types (e.g. container, iron ore, coal, oil and LNG) are widely considered the most likely to be digitalised first. The more fragmented parts of the industry are then expected to be digitalised as the potential from trading platforms is revealed. In this scenario, the digitalisation process will be gradual, but even niche markets will eventually be impacted, since digital platforms will provide a benchmark for all cargo types even before most of the cargo is handled digitally.

TAKING A NEW APPROACH TO DIGITAL TRANSFORMATION

However, the focus in this scenario is on seaborne trade where cargo is transported from port to port. It fails to consider the journey from origin to destination, which crosses seemingly unrelated industries. The journey spans activities that take place before, during and after the cargo has been shipped, and can be long, stretching across multiple channels and touchpoints, and often lasting days, weeks or even months.

UNLOCKING VALUE BY REDUCING INEFFICIENCIES

The global economy is an interconnected ecosystem that drives global trade. Global trade is likewise an interconnected structure, but we tend to look at it in silos (i.e. Container, Dry Bulk, Crude Tanker, Offshore Supply Vessels, etc.). In a future where the global supply chain has been digitalised, we need to identify and commercialise the value potential. Value can be unlocked by removing inefficiencies across the global supply chain by, for example, reducing the need for inventories, optimising local price campaigns or increasing the transparency of the availability of goods. But it may likewise be possible to create new streams of revenue by understanding how a change in manufacturing location impacts local demand for petrochemicals, energy, trucking and labour, not to mention how these changes impact the trading patterns of feedstocks. These causalities may not evolve in sequence, but it seems clear that there is a close relationship between them that can be identified and commercialised.

WINNER TAKES MOST

The most successful business models will remove costs from the system and simplify the industry. By pooling relevant content and creating 'one-click' solutions (e.g. trading platforms integrating the journey from origin to destination), the ecosystem players will begin to shape next-generation business models.

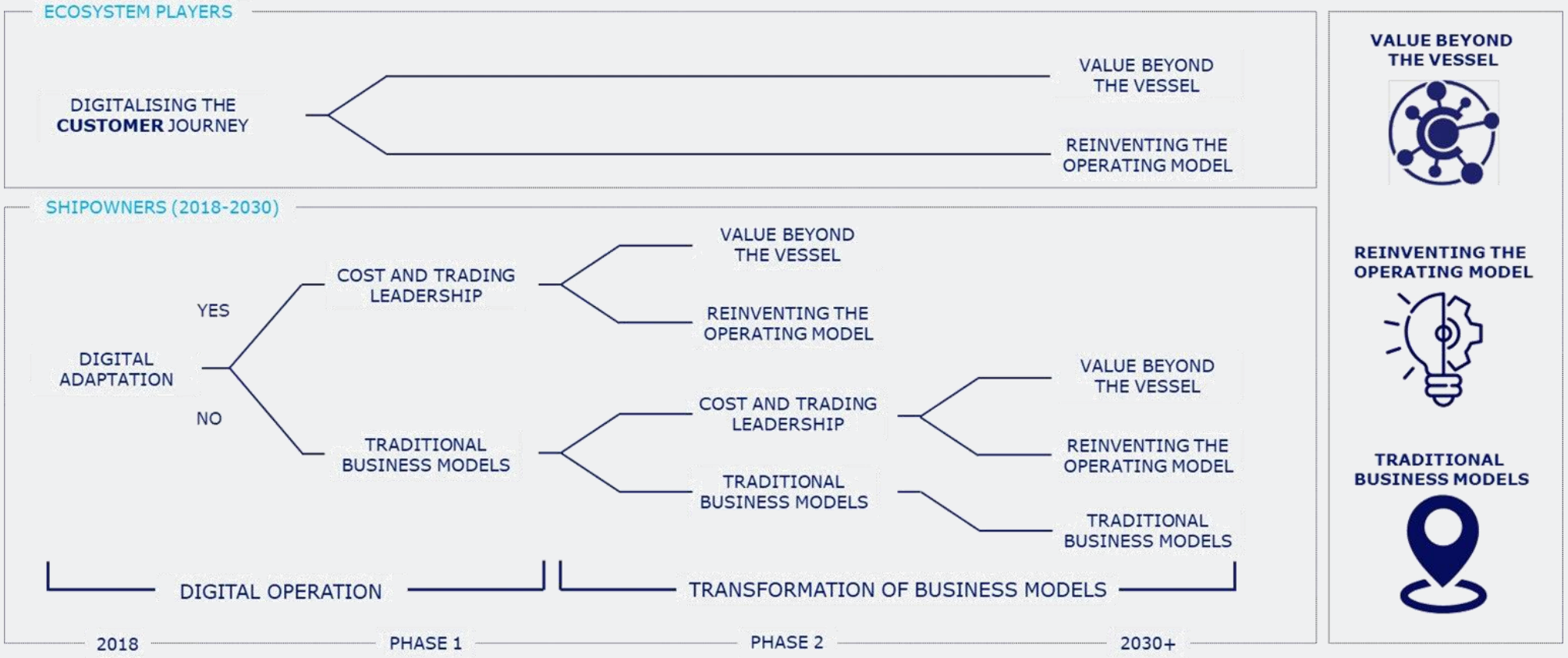
A DIGITAL TRANSFORMATION ROADMAP

Three business models are likely to shape the shipping industry towards 2030

The digitalisation of the shipping industry is about to separate access to data from ownership of vessels. This may introduce a new type of competitor that works to upgrade specific parts of the supply chain. These ecosystem players are unlikely to own any vessels but may begin to change the borders of industries and the sources of value creation in shipping.

We do not know how the shipping industry will adapt to the emerging changes over the next decade. However, we have tried to combine elements in a logical ways and then deduced the implications. Our hope is for this to be a useful thought exercise. We present two scenarios: 'value beyond the vessel' and 'reinventing the operating model'.

These are certainly not the only ones that may transpire, but they illustrate some fundamental changes to the existing business landscape. The future may instead reveal a combination of these or surprise us with something entirely unexpected – or the status quo will prevail for longer.



VALUE BEYOND THE VESSEL

The winners of tomorrow will create and lead an entire digital ecosystem

Digital destroys economic rent – creating more value for customers than for traditional players. It steepens the power curve by creating big winners and losers at the top and bottom, respectively. Digital rewards first movers and some superfast followers, but the top prizes are only available for the few. The behemoths of the future shipping industry (from 2030 onwards) are expected to share key characteristics; each will work to create and lead an entire digital ecosystem.

Digitalisation of supply chains has a more powerful impact on individual companies' performances than any other strategic challenge seen in recent decades. The reason is that a fully digital supply chain often involves the creation of new ecosystems, which leads to a fundamental reshuffle of how value is distributed among industry players. The traditional players' ability to sustain their revenue is under attack, and in time, their business models may be outright disrupted. To stay in operation, they will need to change their business models dramatically.

Digital attackers often combine digital supply chain play with platform-based business models. Companies like Tencent, Alibaba and Google are blurring traditional industry definitions by spanning product categories and customer segments. Owners of such hyperscale platforms enjoy massive operating leverage from process automation, algorithms and network effects created by the interactions of many users, customers and devices.

Vessels will continue to be vital for the global supply chain, but ecosystem players will monetise the data from operations rather than the cargo or the vessels themselves. Or maybe more precisely, some players will reinvent the business models of vessel ownership (e.g. vessel network subscriptions, also known as ship-as-a-service), while others will learn how they can monetise the broader customer journey from origin to destination (value beyond the vessel). These two business models, taking a variety of forms, are likely to shape large parts of the competitive landscape towards 2030, but it is important to recognise that a third alternative may also emerge.

A group of traditional shipowners will continue to operate. Some will invest heavily to challenge the often asset-light ecosystem players, while others could transform into super-large entities that supply ships as network subscriptions to the ecosystem players. We expect only a small group of traditional players to renew their fleets after 2030, as we believe that new and potentially more attractive business model alternatives will be introduced (see example on the next page).

The next battleground for ecosystem players, after they master value beyond the vessel (after 2030), may then be moving offline (e.g. investing in vessels, ports, or other vital infrastructure that facilitates global trade). The aim is to tie more and more businesses into their ever-expanding ecosystem of global trade.

REINVENTING THE OPERATING MODEL

The next generation of vessel ownership?

For all the fundamental change that digital reinvention demands, it is worth emphasising that it does not call for throwing the baby out with the bath water. For example, John Deere created a whole series of online services for farmers even as it continued to sell tractors and farm equipment.

The digital transformation of the shipping industry requires reinvention of the business models for vessel ownership. It makes little sense to speculate in assets that do not generate much direct income, offer few opportunities for differentiation and remain empty for prolonged periods. Vessel ownership needs to be transformed into a utility – a stable, low-risk business that harnesses all the benefits of standardisation, digitalisation and scale. We may see the introduction of a new type of ownership that supplements traditional types of vessel ownership and leasing structure.

We envisage the introduction of a **vessel network subscription** (ship-as-a-service). This will be a new ecosystem play that could fundamentally change how value is distributed among all parties that contribute to the design of a vessel, its construction and equipment, its operation and maintenance, and eventually also its demolition. It can be a new product offered by a few super-large owners. The fleets of new digital vessels will be standardised to the highest levels of excellence possible to supercharge network effects and economics of scales. The vessels will be designed, built, maintained and recycled (i.e. cradle to cradle) by the same owner but could trade for ecosystem players (value beyond the vessel) who create value across the entire supply chain.

A network subscription will have a simplified payment structure and a guaranteed performance, plus benefits such as vessel swapping, peer-to-peer loans and insurance products embedded. The owner of the network subscription will be able to unleash significant cost-of-ownership tailwind throughout the lifetime of the vessel. The owner of the vessel will presumably be an investment-grade entity that will accept a low but stable return on equity.

The introduction of vessel network subscriptions will not revolutionise the shipping industry initially. In the early stages, owners offering vessels to the market through network subscriptions will simply be viewed as a new type of tonnage provider supplying vessel capacity at a low fixed cost and with a guaranteed vessel performance. To a certain extent, a vessel network subscription can be viewed as a new product available for traditional owners working to further optimise their capital structures.

The role of the traditional shipowners will change, since their margins will come under attack from the ecosystem players that generates most of their revenue outside the freight market. The market share of the traditional players will diminish over time, since they will become less able to yield a return on invested capital if they do not innovate their business models.

THE PACE OF CHANGE

Lessons from other industries

We have discussed the emerging digital transformation in the shipping industry and highlighted that shipowners may gain a short-term advantage if they achieve both cost leadership and trading leadership. These capabilities are the prerequisites for serving a truly digital global supply chain, but at some point in time they may prove to be little more than a licence to operate. We argue that additional business model innovation will be necessary to unlock new streams of revenue.

How quickly and on what scale is the digital transformation likely to occur? We do not know. But it seems fair to assume that the potential consolidation of access to customers could happen relatively soon. Take the Chinese mobile payment market as an example. WeChat Pay was launched in 2013, while AliPay was launched back in 2009. These two services have reached a dominant position (a combined market share of more than 90%) in a major market in less than a decade. The same could happen in the shipping industry.

It remains to be seen whether the digital transformation will dominate certain ship segments (e.g. Container ships) before others, but if the industry prepares itself for full-scale penetration, it may only end up with a competitive advantage if some niche markets continue to operate in the shadows for a little longer.

We find it unlikely that regulators would allow any platform to reach a market share close to what has been seen in China. But that does not change our key conclusion that the digital transformation will impact how the industry does business, who gains access to customers and how the industry makes money.

We conclude that some of the basic mechanisms for value creation in the shipping industry will be redefined within the next ten to 15 years, although most of the innovation we are currently seeing is optimising current business models, rather than disrupting existing ones.

SHIPPING MARKETS AT A GLANCE

SHIPPING MARKETS AT A GLANCE

Up to 2030 – Structural changes, changing regulatory landscape and surplus capacity overshadow the outlook

The shipping industry is in the midst of a described digital transition while simultaneously facing a changing regulatory landscape, persistent surplus capacity across several segments, and structural changes that are impacting the demand-side drivers in different ways in different segments. These are all individual challenges with diverse strategic implications for the industry. The increasing complexity this brings makes it almost impossible to simply extrapolate the past to predict the future.

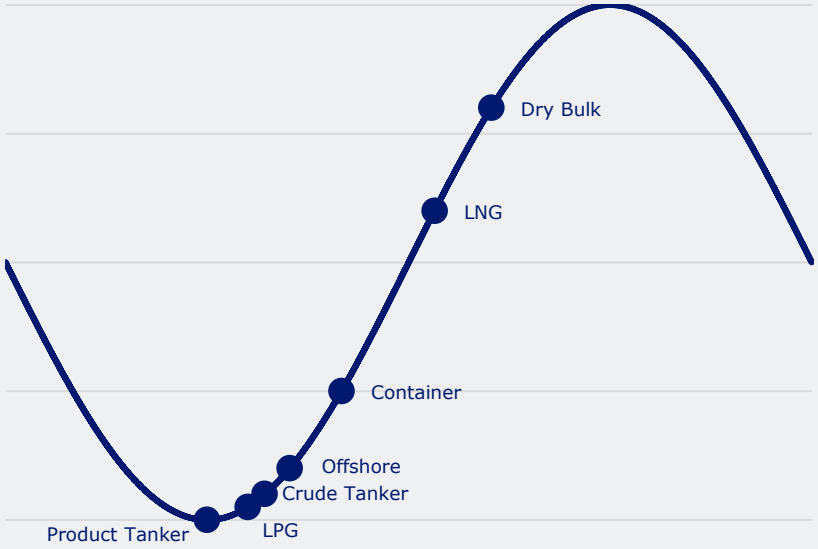
Most of the shipping segments have been burdened by surplus capacity for much of the past decade. Freight rates and ship prices have come down to low levels for most segments, although several have seen volatility and seasonality driven periods of recovery in freight rates and secondhand prices.

This is not a new phenomenon in the shipping industry, even though today's markets are facing the additional challenges of very young fleets and periods of very low demand growth.

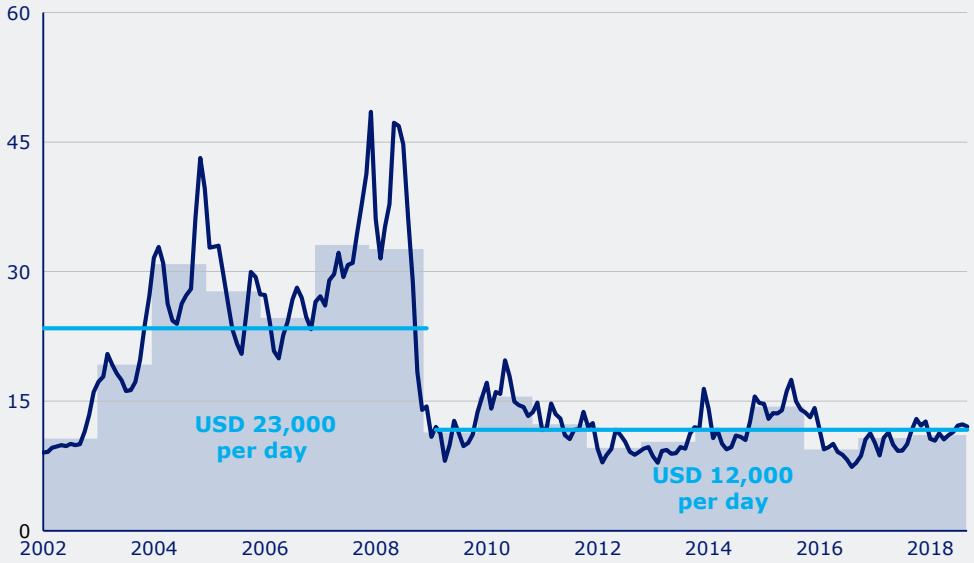
After China's entry into the shipbuilding arena, we are slowly adjusting to a reality of persistent over capacity pressure due to an abundance of shipyard capacity. The shipping cycle adjustment process will no longer be driven by increasing newbuilding prices (historically due to scarce shipyard capacity and increasing lead time), but managed by adjusted expectations of less extreme peaks and shorter cyclicality and underlying true demand. With automation of shipyards and the development of future smart yards, shipyard capacity is no longer expected to be a constraint and as such the importance of this historically important variable has diminished, leading to shorter cycles and less extreme peaks.

A wave of environmentally driven regulations is likewise impacting shipping market dynamics and putting pressure on the economic lifetimes of vessels in most shipping sectors.

SHIPPING CYCLE



FREIGHT RATES AT LOWER LEVELS ('000 USD PER DAY)



Source: Clarksons, Danish Ship Finance

THE GLOBAL ECONOMY AND SEABORNE TRADE

Global economy and trade

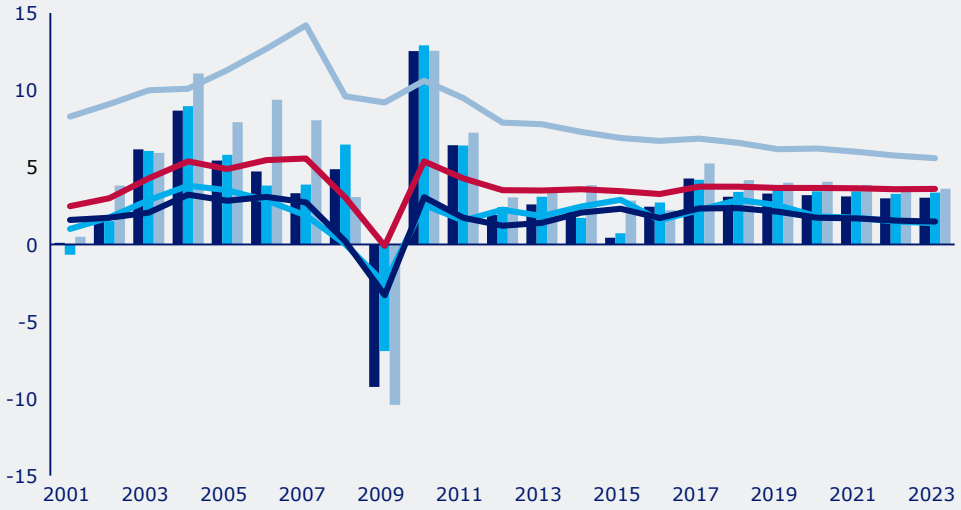
Over the last decade, since the financial crisis in 2008, emerging market and developing countries (EMDC) have seen GDP growth accelerate strongly – and become increasingly decoupled from advanced economies GDP growth (see chart below). Initially, this decoupling was primarily driven by China's GDP growth rates of above 9% until 2012, but in recent years to a lesser extent driven by China and by more even contribution from EMDC. China increased its share of global GDP from 4% in 2000 to 9% in 2010 and its share is estimated at 16% in 2018. In comparison, the USA decreased its share from 30% in 2000 to 23% in 2010 and expected 24% in 2018.

The IMF is arguing that many EMDC's has acted on lessons learned from the historical crisises in the world's 'model markets' – more so than the advanced economies themselves – by taking on inflation targeting, adopting more flexible exchange rate regimes, implementing macroprudential policies, and embracing trade. Thus, they have also become less dependent on inbound foreign direct investments (FDI) as a key driver of growth.

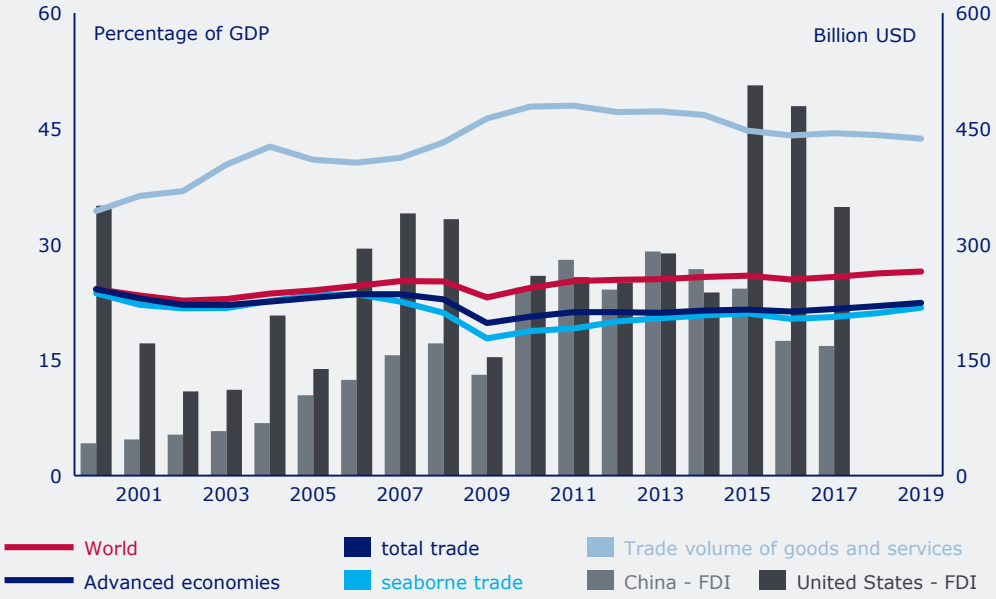
From 2010 to 2017, we experienced strong growth in global trade in goods and services with a CAGR of 5.1%; global seaborne trade grew at a CAGR of 4.3% during the same period. But with reshoring being driven by new technologies and trade increasingly being driven by trade in services, the decoupling is not only restricted to GDP versus global trade but also a decoupling of growth in total global trade in goods and services versus global seaborne trade. Consequently, global trade in goods and services is expected to grow by a expected CAGR for of 3.9% in 2018-2023, while global seaborne trade is expected to increase by a lower CAGR of 3.4%.

National protectionist trade policies and bilateral trade wars has led to uncertainty and recent weakening in global trade, manufacturing and investment. However, the development of existing trade agreements, the establishment of new regional and bilateral trade agreements are expected to continue. Thus, to some extent, the heightened uncertainty will increase regional cooperation and a shift in global trade power.

GDP GROWTH AND TRADE (ANNUAL %-AGE GROWTH)



INVESTMENT SHARE OF GDP AND FDI



Source: OECD, IMF, World Bank, IHS, Danish Ship Finance

THE GLOBAL ECONOMY AND SEABORNE TRADE

Regional trade agreements - One Belt One Road

In the autumn of 2013, Chinese President Xi Jinping presented the initial idea of jointly building the Silk Road Economic Belt, and the 21st Century Maritime Silk Road – also called the One Belt One Road (OBOR). The vision of OBOR is to promote economic prosperity, green development and regional economic cooperation, to strengthen exchanges and mutual learning between different civilisations, and to promote world peace and development via new models of international cooperation and global governance connecting Asian, European and African countries. In 2015, further elaboration was provided, suggesting promotion of policy coordination, connectivity of infrastructure and facilities, unimpeded trade, financial integration and people-to-people bonds.

Thus, OBOR is much more than a trade union. And within Asia, it is perceived as a development programme with far-reaching implications for East Asia and China. If implemented in its full extent, it will provide further momentum for intra-Asia investment and trade flows, secure China access to regional M&A activity within infrastructure, logistics and tourism, and support the use of the RMB internationally via conditioned infrastructure financing, thereby enabling it to become less dependent on the US relations.

A large share of the OBOR financing is expected to continuously come from Chinese financial institutions. Chinese investments related to OBOR totalled USD 60 billion in the years 2013-2017 and are expected to increase to USD 600-800 billion in 2018-2022. With the Asian Development Bank (ADB) estimating an infrastructure investment need in Asia Pacific of USD 1.7 trillion per year to maintain growth momentum, the projected OBOR investments only represent a fraction of the future need. Actual annual spending in the region totals an estimated USD 881 billion, leading to a gap between actual spending and the estimated infrastructure spending requirement of around 2.4% of regional GDP. Various sources that have mapped the current OBOR project list indicate total investments of an estimated USD 1,281 billion. With power, pipelines and other transport projects accounting for around 70% of the current project list, a minimum of an extra 150 million tonnes of steel will be required over a ten-year period, which implies incremental demand growth for steel in OBOR regions of 3-4%. This represents a significant driver of future Dry Bulk demand growth and is expected to some extent to mitigate the environmentally driven trend towards less use of iron ore in steel production. This estimate is only based on the existing project list and not estimations of future projects.

OBOR is being met with significant regional resistance, and whether the full scope of the development programme will be implemented remains to be seen. But the existing project pipeline in infrastructure investments in power, railways, pipelines, ports and other transport projects will continuously drive transport of the raw materials to be used in the actual construction. The expansion of ports and further development of hinterland infrastructure also means that OBOR will continue to drive changes in trading patterns and cascading within shipping sectors.

The ongoing trade disputes between China and the US are not expected to slow OBOR down – on the contrary, global trade and policy disputes are expected to support and further strengthen regional cooperation in various forms and with different targets and visions (below table compares OBOR region and RCEP and TPP regions).

Indicator	TPP	TPP (excl. US)	One Belt, One Road	One Belt, One Road (excl. China)	RCEP[1]	FTAAP[1]
No. of economies	12	11	65	64	16	21
Population	800 million	490 million	4.5 billion	3.2 billion	3.5 billion	2.9 billion
Nominal GDP (USD trillion)	27.5	9.4	29.8	12.0	22.6	43.8
% of global GDP	40	13	40	16	30	60
% Share of global trade	26	15	34	22	29	50

[1] RECP refers Regional Comprehensive Economic Partnership.
FTAAP refers to Free Trade Area of the Asia-Pacific

Source: OECD, IMF, WTO, UOB Bank, The Copenhagen Journal of Asian Studies 35(2), Danish Ship Finance

REGULATORY CHALLENGES

MARPOL Annex VI - IMO 2020

We see scrubbers as a temporary solution for shipowners to secure a competitive advantage when securing employment /utilization of their fleets in some regions and some sectors and subsectors. Refineries speed of adjustment towards supplying low sulphur fuel oil and ultra low sulphur oil will be differentiated between regions.

After the international convention for the prevention of pollution from ships, the MARPOL convention, was signed in 1973 it took ten years and a modification in 1978 (Annex I – prevention of pollution by oil) for the convention – with Annex I and II (the latter specifying regulations for the control of pollution by noxious liquid substances in bulk) – to enter into force in 1983.

Since then, the pace at which amendments have been signed and implemented has increased – a development that is expected to continue well into the future until a true green alternative to fossil fuels is established.

Annex III entered into force in 1992 regulating pollution by harmful substances carried by sea in packaged form. Annex IV was implemented in 2003 regulating pollution by sewage from ships. Annex V came into force in 1988 regulating pollution by garbage from ships.

Finally, Annex VI entered into force in 2005. In its initial form Annex VI regulated air pollution from ships by setting limits on sulphur oxide (SOx) and nitrogen oxide (NOx) emissions from ship exhausts via a a global cap of 4.5% m/m (mass by mass) on the sulphur content of fuel oil (today adjusted to 3.5% m/m), as well as prohibiting deliberate emissions of ozone-depleting substances.

Furthermore, special SOx Emission Control Areas (SECAs) were established, in which more stringent controls on sulphur emissions of 1.5% m/m on the sulphur content of fuel oil (today adjusted to 0.1% m/m) were applicable. Alternatively, ships had to fit an exhaust gas cleaning systems or use any other technological methods to limit SOx emissions to the required level.

Since 2005, Annex VI has been amended several times in order to achieve a further reduction of sulphur oxides (SOx) emissions from ships. The latest amendment, with an enforcement date of 1 January 2020 (IMO 2020), lowers the global cap of sulphur in fuel oil to 0.5% m/m outside SECAs - or requires ships to use any other technological methods to limit SOx emissions accordingly.

The MARPOL annexes impact the various shipping sectors differently and to differing degrees. Annex I had a major impact on the Tanker markets with the phasing out/scrapping of single hull Tankers. Annex VI is affecting shipping market dynamics significantly: with IMO2020 looming, shipowners currently need to consider whether to invest capex for the installation of technical solutions or whether to adopt a wait and see approach and use low sulphur fuel oil/blended fuel.

There are 3 solutions for shipowners to comply with IMO 2020. One solution is to switch to LNG as fuel. Another solution is to install scrubbers in order to continue using high-sulphur fuel oil (HSFO), while a third option is take a wait-and-see approach, using alternative (more expensive) low sulphur fuel oil/blended fuel.

REGULATORY CHALLENGES

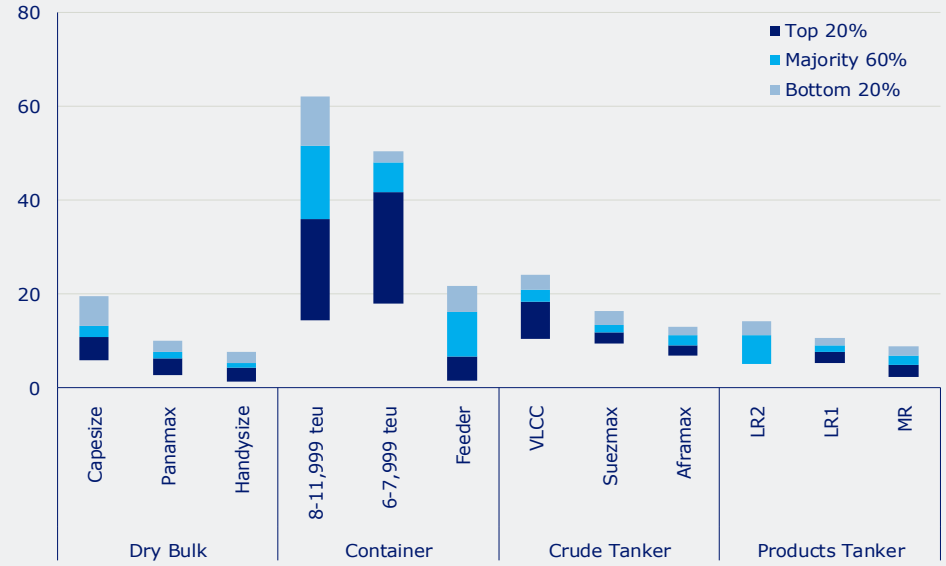
IMO 2020 – compliance solutions

One solution for compliance with IMO 2020 could be to switch to LNG as fuel. However, significant capex is required for a complex retrofitting which ultimately reduces cargo capacity. Moreover there are significant infrastructure limitations as LNG fuel is only available at a limited number of ports. This solution is therefore most suited to vessels with predictable operating patterns throughout their lifetimes (f.ex. the cruise industry, ferries etc).

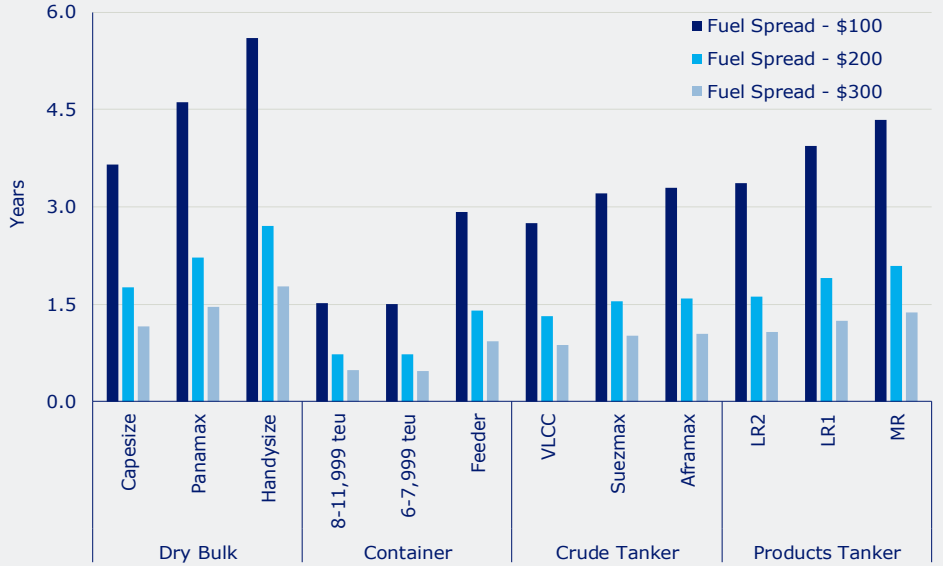
Another option is to install scrubbers. In general, installation of a scrubber solution requires a significant capex for retrofitting ranging between USD 2 million to USD 6 million depending on ship type and scrubber type. In addition, a scrubber installation adds weight, reduces cargo capacity and generates additional operational costs, but it does allow for a continued use of HSFO. Depending on the fuel price spread between HSFO and low sulphur oil/blended fuel (as illustrated), payback period could be relatively short, especially for the larger vessels and those that consume more fuel (as illustrated). Furthermore, there are various types of scrubber installation. While all will comply with IMO 2020 initially, some are expected to require further environmentally driven amendments/adjustments in the near future. For example, the cheaper open-loop scrubbers dispose the waste directly into the ocean, whereas closed loop scrubbers collect the waste for disposal at port.

Given, especially China's increasing environmental focus, we believe it is likely that even stricter regulations than IMO 2020 will be imposed on national levels, for example restricting the disposal of waste directly in the ocean, further Nox regulations and creating new SECAs and expanding/enlarging existing SECAs, in which the current SECA limit of 0.1% m/m would apply.

FUEL CONSUMPTION FOR VESSELS <15 YEARS ('000 TONNES PER YEAR)



SCRUBBER PAYBACK PERIOD – A SOLUTION FOR SOME BUT NOT FOR ALL



Source: Clarksosn, SEB, Jefferies, Danish Ship Finance

REGULATORY CHALLENGES

IMO 2020 – compliance solutions

With R&D investments ongoing, engine producers are also focusing on more advanced and sophisticated integrated solutions. The development of a next generation of vessels to be built at future automated smart yards (see newbuilding chapter) with integrated solutions which ultimately will be preferred over technical add on installations like scrubber installations. This will eventually shorten the expected economic life time of retrofitted vessels with technical solutions added on. It is estimated that approximately 50% of the retrofitting cost for installing a closed-loop scrubber is for its installation; the cost of removing the scrubber is approximately the same.

The third solution is to adopt a wait-and-see approach and use low-sulphur fuel oil/blended fuel. The obvious advantage of this solution is that it does not require any capex, but there is a big question mark over access to low sulphur fuel oil/blended fuel.

From a historical perspective, the IMO first started considering this issue when the MEPC agreed to include the issue of air pollution in its work programme in 1988, and in 1989, it agreed to look at the prevention of air pollution from ships - as well as fuel oil quality - as part of the committee's long-term work program. These discussions resulted in an agreement in 1991 to prepare the new Annex to MARPOL on the prevention of air pollution, the Annex VI, which was then developed and agreed in 1997 to entering into force in 2005.

Since 2005, the limit on sulphur oxides has been progressively tightened and with the IMO 2020 imposing a reduction in the cap on sulphur in fuel oil used onboard ships operating outside designated ECA's from 3.5% to 0.50% m/m, there has been some perception that it has been IMO's intention to put pressure on refineries and force them to switch to production of low sulphur fuel oil and ultra low sulphur fuel oil – a process that seems to be easier for the new refineries in the Middle East and in Asia than for the older refineries in Europe. The relatively high number of announced scrubber installations is expected to postpone the acceleration of this development – especially in Europe. Furthermore, there is an umbrella of attractive 'eco' financing solutions for scrubbers within EU for European flagged vessels, which supports scrubber installations for the European fleet.

Given excess capacity in all shipping segments, securing employment and high utilization of the fleet is crucial. By installing scrubbers on a share of the fleet, shipowners gain a competitive advantage and flexibility when employing the fleet. We see that a large share of shipowners with fleets comprising vessels sufficiently large and in segments where installing scrubbers makes financially sense, have found a two-pronged solution, installing scrubbers on part of their fleets and taking a wait-and-see approach for the rest.

EXCESS CAPACITY

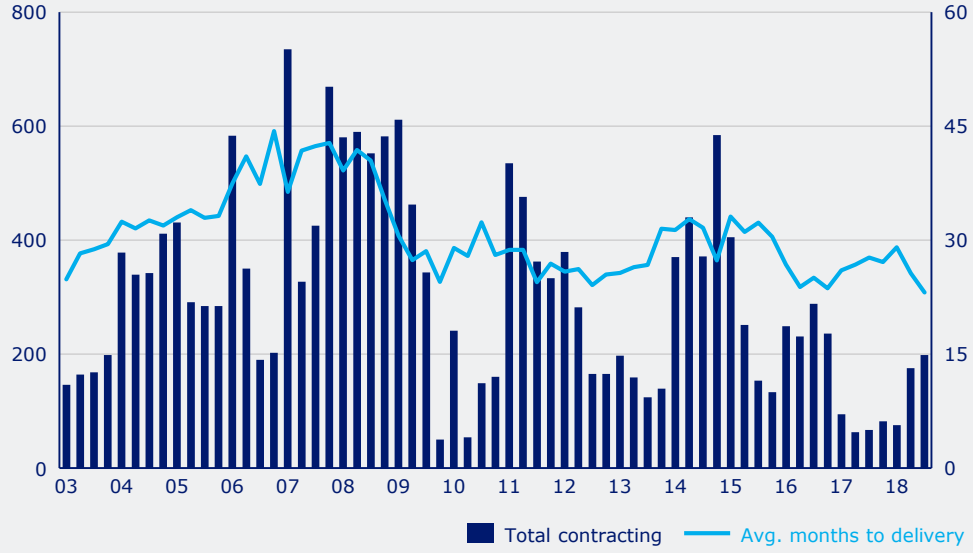
The new normal

The shipping industry continues to be burdened by surplus capacity with most segments facing low freight rates and secondhand prices. Based on the mechanism of the traditional shipping cycle, capacity discipline and higher scrapping activity are required in order to improve the market balance.

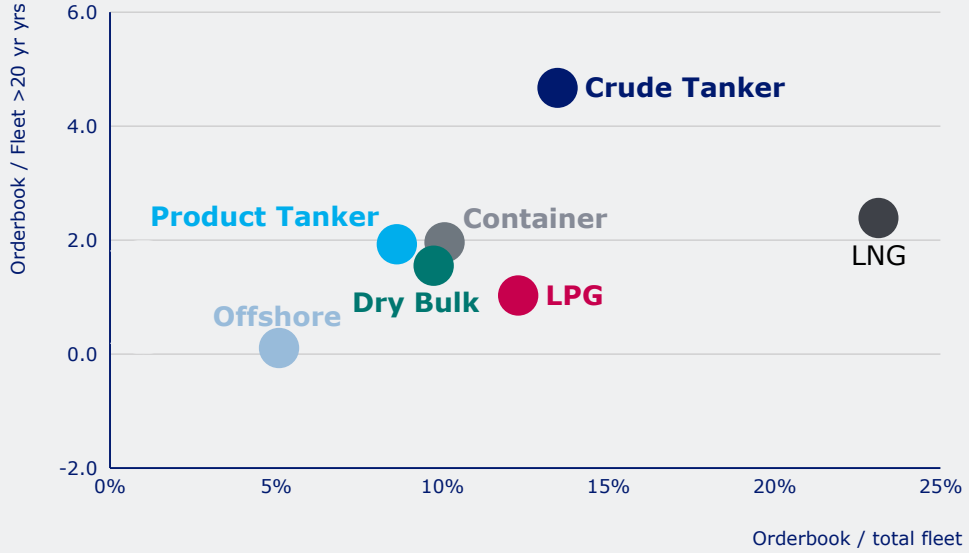
While tightening maritime regulations may provide an opportunity to restrain the fleet growth, the excess yard capacity continues to be a hurdle for the market rebalancing process. Given the significant idle yard capacity, we argue that newbuilding prices will remain at low levels, giving shipowners an incentive to order new vessels, and that the average lead time to build a vessel will to continue to follow a decreasing trend. Hence, any potential uptick on the demand side could be met by additional supply delivered within the next one to two years.

Moreover, shipyards race to become semi-automated and digitalised will enable greater production flexibility and make them better able to adjust short-term yard capacity. With a more responsive supply side, volatility in the freight market is expected to be lower and the duration of the fundamental shipping cycle shorter than in the past. Furthermore, a more responsive supply side is leading to less extreme fundamental peaks and lower/decreasing average levels than historical cycle averages.

SHIPBUILDING – AVERAGE TIME TO DELIVERY FROM CONTRACTING



NOT ALL SEGMENTS ARE EQUALLY EXPOSED TO FUTURE OVERCAPACITY



Source: Clarksons, Danish Ship Finance

THE SHIPBUILDING MARKET

SHIPPING MARKET REVIEW – NOVEMBER 2018

THE SHIPBUILDING MARKET

Perspectives and key takeaways

OUTLOOK SUMMARY

○	POSITIVE
○	NEUTRAL
●	**NEGATIVE**

Yards are reducing capacity or exiting the market helping to restore the market balance. Still, many yards are running out of orders while just a few are attracting the lion's share of new contracts. We expect that the number of active yards to continue to decline, but the active yard capacity remains more resilient. Competition in the industry is intensifying. The shipyards of the future will upgrade production and potentially begin to build smarter ships.

The Shipbuilding industry continues to be burdened by surplus capacity and the yards' orderbooks are thinning quickly. Most of ship segments are facing low freight rates and deteriorating secondhand prices. The outlook for most of the yards remains shrouded in uncertainty. Amid geopolitical tensions, the risk of seaborne demand stalling, new environmental regulations, and new standards for digital ships, shipowners are putting plans to order new vessels on hold. This trend is unlikely to change until freight rates recover and the risk of building vessels that quickly become outdated seems more manageable.

The harsh market conditions are continuing to drive a consolidation process whereby some yards are closing, others are merging and some are simply reducing active capacity. There are currently 590 yards globally with a combined capacity of approximately 45 million cgt, but only 150 yards have received new orders in 2018. These orders have restocked approximately 46% of the active global yard capacity, but they are unevenly distributed, with ten yards accounting for 57% of the orders (cgt). More than 290 yards, representing 28% of global yard capacity, will run out of orders within the next 12 months.

The Shipbuilding industry is scheduled to utilise approximately 79% of its capacity in 2018 but is rapidly losing steam. The orderbook is heavily front-loaded and contains only 3,000 vessels with a combined capacity of 78 million cgt (approximately 10% of the current fleet).

We expect that many shipyards will go out of business in the coming years, while active yard capacity may remain relatively stable. We believe some yards will reactivate idled capacity when smaller or more inefficient yards exit the market. Still, the strong state interests are in many countries reducing the industry's ability to balance the capacity since government support or debt guarantees are allowing local shipyards to stay in operation even if they are loss-making. The Shipbuilding industry will continue to consolidate in the years to come, but we anticipate a bumpy road ahead.

The shipyards of the future will aspire to become 'smart' yards – semi-automated and digitalised yards (beyond welding, robots etc.) – capable of building the next generation of vessels. Digitalisation will not be for everyone, though: many shipyards will be forced to make a decision, since the transformation into a smart yard will require massive investments in a period where many yards are already debt burdened.

The next generation of ships are likely to be highly standardised, not just in terms of vessel and engine design, but equally importantly in terms of connected digital infrastructures. The role of the yards could expand into maintenance with the ambition of becoming a single-point-of-contact for the shipowner. This could allow multiple streams of revenue to be developed. The challenge will be to integrate into a network of third-party players that will allow the creation of value beyond building the vessels. It remains to be seen whether this will happen, but these dynamics will add new dimensions to the competitive landscape in the Shipbuilding industry.

THE SHIPBUILDING MARKET

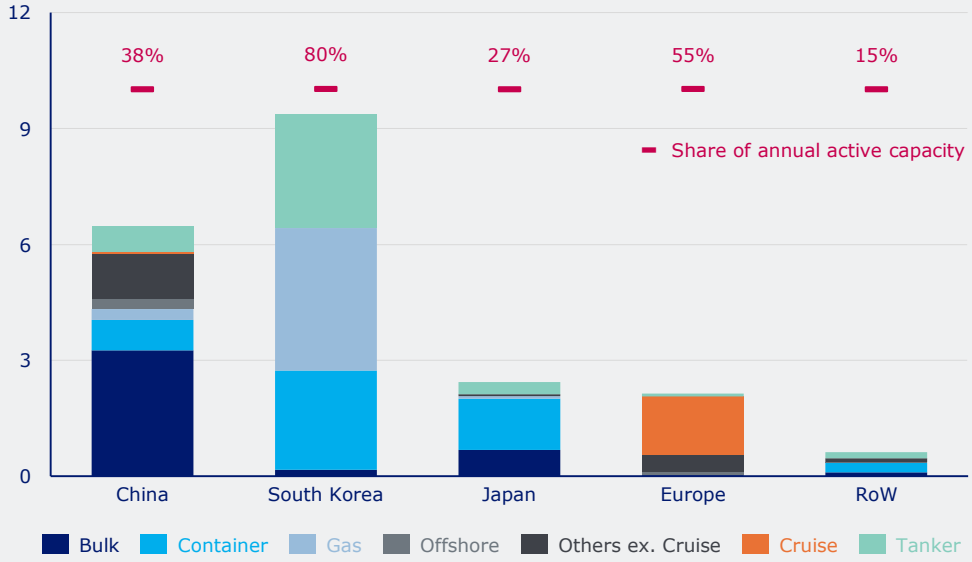
The orderbook and contracting activity

Since the beginning of 2017, **contracting** activity has increased for four consecutive quarters, and it peaked in the first quarter of 2018 with nine million cgt contracted, equivalent to the industry restocking 80% of its quarterly active yard capacity. However, the Shipbuilding industry seems to have harvested most of the positive sentiment from the new environmental regulations, and the appetite for new orders has levelled off since the second quarter of this year. Shipowners have become more cautious amid regulatory uncertainty, trade tensions between the US and China, and the existing overcapacity concerns.

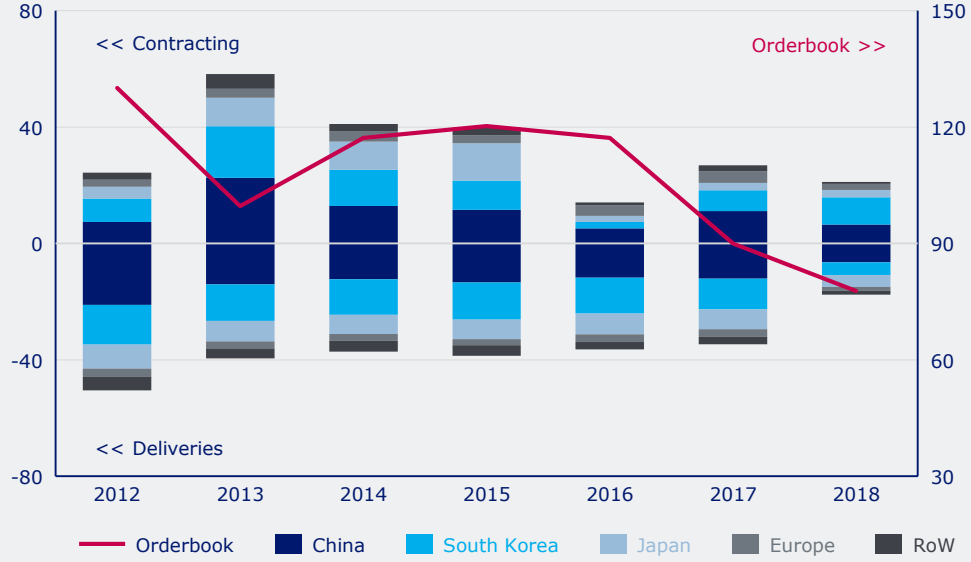
Orders for new vessels continue to be concentrated at fewer yards. The 21 million cgt contracted during the first three quarters of 2018 was distributed among 150 different yards, with 57% of the contracts placed at ten yards across China, Japan and South Korea. While Chinese and Japanese yards have struggled to restock their active yard capacity during 2018, South Korean yards have benefited from the uptick in Gas and Tanker orders and have managed to cover 80% of their active yard capacity. Overall contracting activity continues to be insufficient for the Shipbuilding industry as the aggregated cgt contracted only represents 46% of global active yard capacity.

With a subdued level of new orders and on-time deliveries, the global **orderbook** has continued to show a declining trend. As of October 2018, the orderbook stood close to 78 million cgt, a 3% decrease since the end of 2017. The orderbook remains dominated by the top-three Shipbuilding nations in Asia, which together claim a 80% market share. While South Korean yards have managed to attract more orders than vessels delivered, the aggregated orderbook for Japanese yards has decreased significantly by 3.8 million cgt and stood at 13.5 million cgt as of October 2018, the lowest level recorded since the end of 2002. Should the orderbook for Japanese yards continue to decline, aid initiatives from the government are not out of the question.

CONTRACTING – 2018 Q3 (MILLION CGT)



SHIPBUILDING ORDERBOOK - STOCK AND FLOWS (MILLION CGT)



Source: Clarksons, Danish Ship Finance

THE SHIPBUILDING MARKET

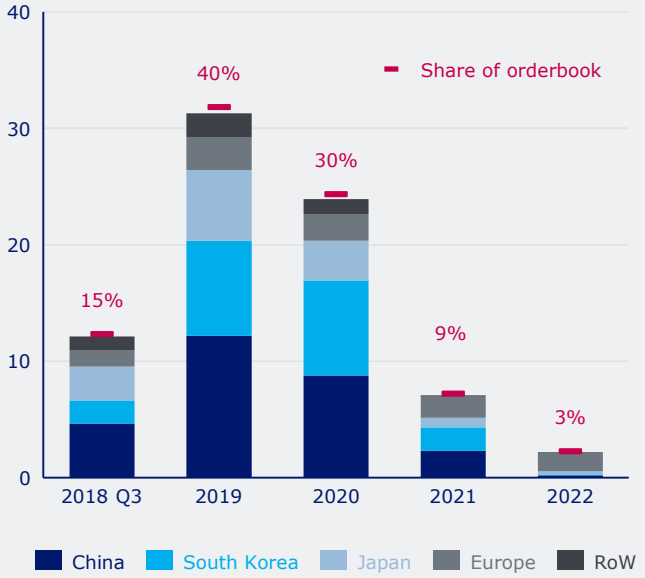
Order cover and yard capacity

The persistent excess capacity in major shipping segments continues to exert a drag on demand for Shipbuilding capacity. Currently, more than 85% of the vessels on order are scheduled to be delivered by 2020. The front-loaded nature of the orderbook presents an inevitable challenge for the sustainability of the global Shipbuilding industry. Over the past six months, average **order cover has** continued to decline for most Shipbuilding nations. South Korea appears to be an exception, with order cover at yards there having increased steadily since the end of 2017. This is explained by a 20% increase in the orderbook combined with a 20% reduction in **active yard capacity**.

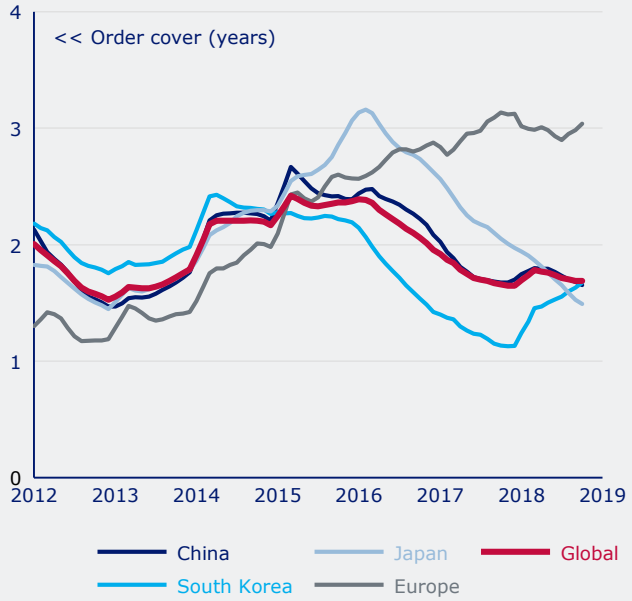
Despite the ongoing consolidation process in both the Chinese and South Korean Shipbuilding industries, total active yard capacity has been more resilient than expected. Since the previous edition of this report, 15 yards with a total capacity of two million cgt have closed. However, the reduction in capacity has been offset by the reactivation of 115 small and insignificant yards, equivalent to 1.4 million cgt or 3% in active yard capacity. Consequently, the number of active yards has increased by 100 units from 490 to 590, while the projected global active yard capacity for 2018 remains close to 45 million cgt. This is in line with our estimate in the May 2018 edition of this report.

With limited capacity discipline, an increasing number of active yards are competing for a subdued level of new orders. As a result, many yards are struggling to restock their active yard capacity. In fact, only 36% of the active yard capacity has order cover of more than two years, while 290 yards, equivalent to 28% of total yard capacity, have less than one year of order cover. Moreover, 140 of these 290 yards are at risk of their business being discontinued, as they have delivered their last recorded orders.

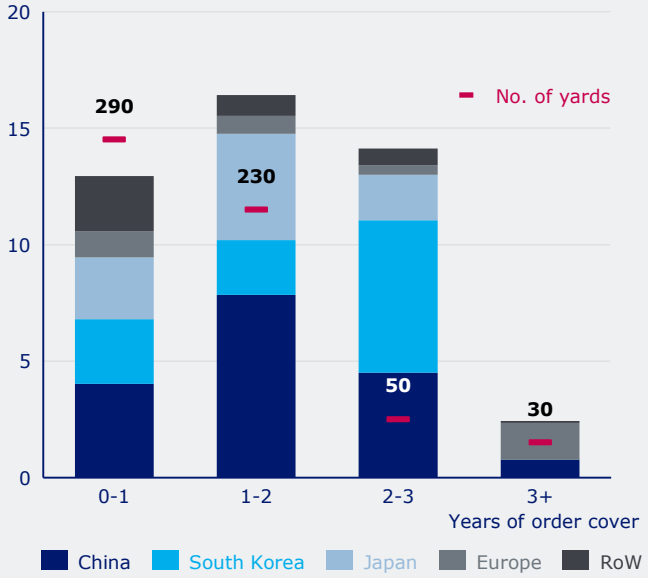
ORDERBOOK BY DELIVERY YEAR (MILLION CGT)



DEVELOPMENT IN ORDER COVERS



ACTIVE YARD CAPACITY IN 2018 (MILLION CGT)



Source: Clarksons, Danish Ship Finance

THE SHIPBUILDING MARKET

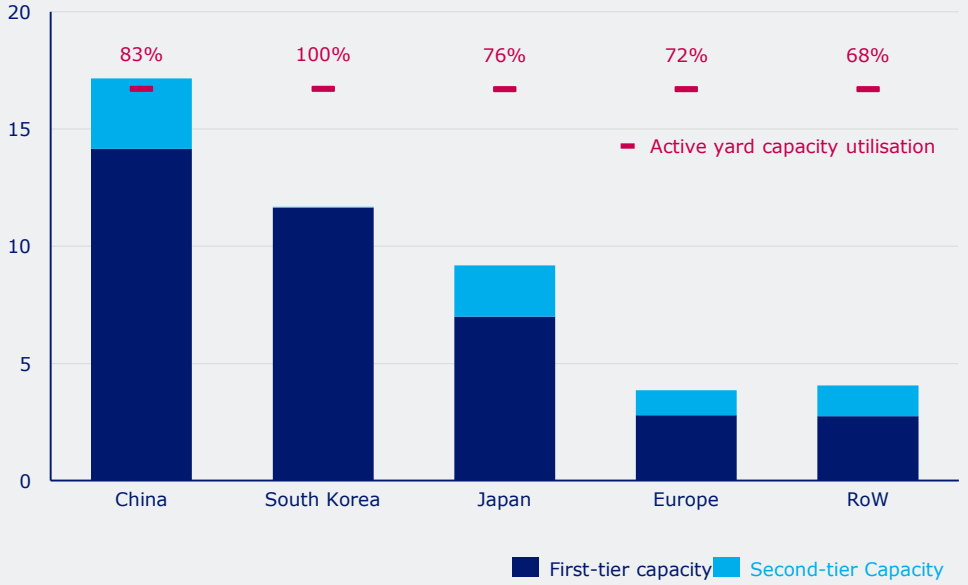
The market outlook

Global active yard capacity in 2018 is projected to decrease by 3% from the 2017 level. This is primarily due to a significant reduction of 4.5 million cgt from second-tier[1] yards, while active capacity at first-tier yards has increased by 2.9 million cgt. Consequently, the two-tier structure is becoming more pronounced, as first-tier yards account for more than 80% of the global active capacity measured in cgt terms.

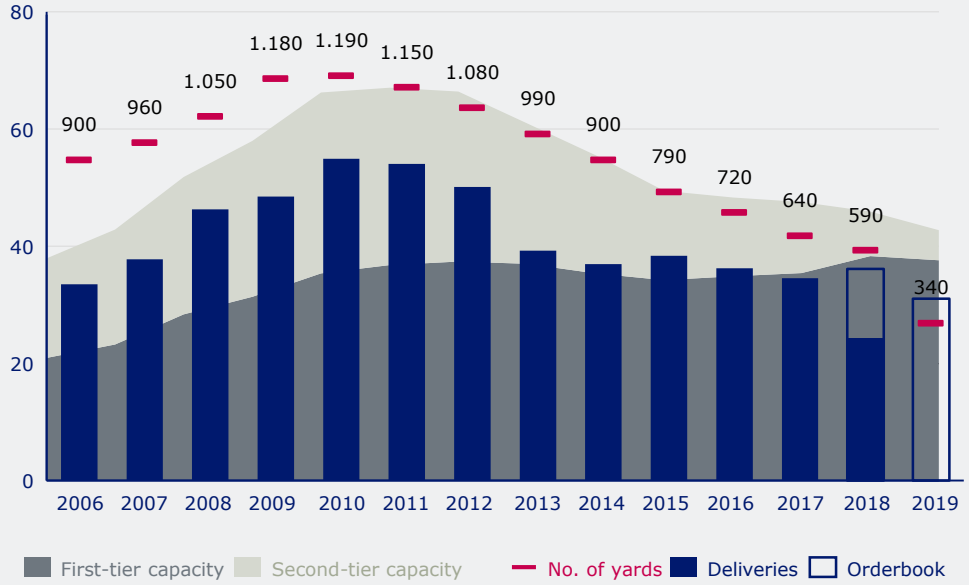
Based on currently scheduled deliveries, global yard utilisation is estimated to reach a five-year high of 79% in 2018 before dropping to 73% in 2019. Moreover, should no new orders be placed at yards with order cover of less than a year, the number of active yards is estimated to shrink by 250 units to 340 by the end of 2019. Despite the significant contraction in the number of active yards, total active capacity is estimated to decrease by 7%, indicating a higher concentration of capacity at fewer and larger yards. This is in line with guidelines issued by China's Ministry of Industry and Information Technology in January 2017, with a target for the top-ten domestic Shipbuilding companies to account for more than 70% of the national output by 2020.

With political interests interfering with market fundamentals, it may take years before the market balance is restored. It will be interesting to monitor how the political agenda will impact the ongoing consolidation process. Hence, in order to survive the prolonged downturn, Shipbuilding companies will have to seek a competitive edge to become tomorrow's leaders.

FIRST AND SECOND-TIER YARD CAPACITY



DEVELOPMENT IN ACTIVE YARD CAPACITY (MILLION CGT)



Source: Clarksons, Danish Ship Finance

SHIPBUILDING DEEP DIVE: EFFICIENCY RACE

The double-edged sword of yard capacity optimisation

Shipbuilding has been classified as a strategically important industry for China, Japan and South Korea. In order to becoming the leading Shipbuilding nation, shipyards in these countries are embracing innovation in the upcoming efficiency race. However, the new technology will not only lead to a potential cost advantage, but also productivity gains, which may result in an increase in yard capacity.

While deleveraging and consolidation of excess yard capacity have been and are still the main focus, the global Shipbuilding industry is simultaneously facing challenges arising from a deterioration in operating profitability. A subdued level of contracting activity and increasing input prices are forcing shipyards to reconsider their current business models.

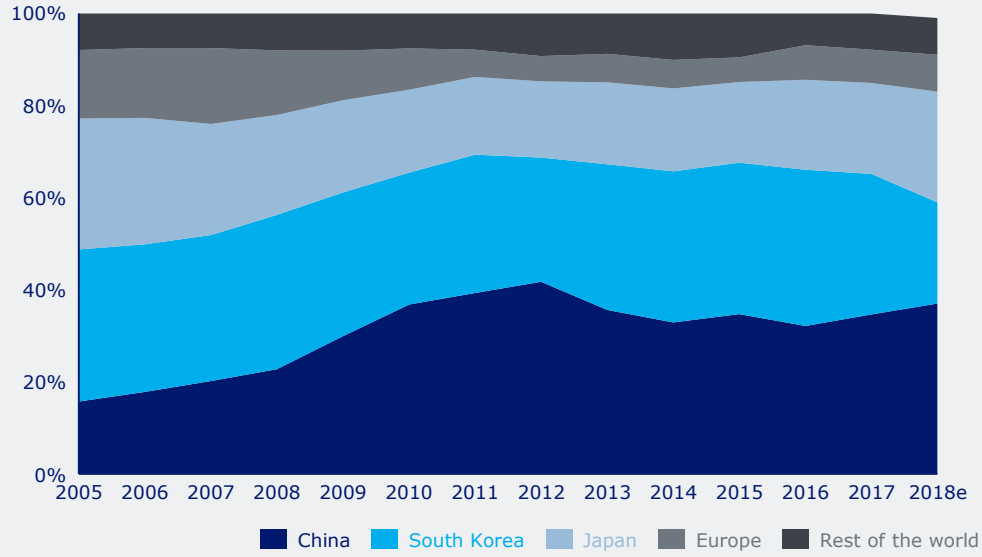
In the search for cost leadership and timely construction, the major shipyards are tackling the profitability equation by further increasing productivity and working towards a "smart yard" model, which entails an increasing degree of collaborative robotics, digitalisation of yard machineries, and automated plants. However, not all yards are at the same stage in their business model transformation. With an average automation rate close to 70%, the largest Japanese and South Korean yards are likely to be the first to approach the smart yard model. In comparison, the average automation rate for Chinese yards is estimated to be significantly lower at 25-30%.

Even though the share of total output delivered from Chinese yards continues to increase, average productivity (measured in hours/cgt produced) at Chinese yards is only one-third of the average level achieved by Japanese and South Korean yards. In the race to become tomorrow's leading Shipbuilding nation, the Chinese government has set a target for white-listed yards to improve their productivity from an average of 30 hours/cgt to 15-20 hours/cgt by 2020, hence moving closer to the standard of South Korean yards of 15 hours/cgt. Currently, the white-listed yards account for 65% of total active yard capacity in China, which is equivalent to 11 million cgt. Should these yards meet the target by 2020, active capacity for Chinese yards could potentially increase by 50% or more.

Not all shipyards will opt for digitalisation, though, since the transformation into a smart yard will require massive investments in a period when many are already debt burdened. Some yards will presumably take a wait-and-see approach, although this runs the risk of being left behind.

The next generation of yards will undoubtedly provide greater production flexibility and a greater ability to adjust short-term yard capacity. Many yards will close, and active yard capacity will most likely be consolidated at just a few yards. Newbuilding prices could stay relatively stable, since additional demand could be met by a short-term increase in yard capacity.

DEVELOPMENT IN DELIVERY ACTIVITY (MILLION CGT)



Source: Clarksons, Danish Ship Finance

THE CONTAINER MARKET

SHIPPING MARKET REVIEW – NOVEMBER 2018

THE CONTAINER MARKET

Perspectives and key takeaways

OUTLOOK SUMMARY

○	POSITIVE
○	NEUTRAL
●	**NEGATIVE**

While the short-term outlook is reliant on the timing of deliveries, the medium-term outlook is clouded by macroeconomic uncertainties. Delivery of large vessels will continue to exert a downward pressure on the midsize segment where reemployment risks are mounting for vessels owned by tonnage providers. Capacity management will remain the focus for liner operators in an oversupplied market, while impending regulatory initiatives are set to increase the complexity of liner business.

Demand in the Container industry is shifting towards more regionalised trading networks, which is expected to have a negative impact on demand growth for large Container vessels, while it could increase demand for the smaller vessels. Nevertheless, the supply side continues to pursue a strategy of cost leadership by ordering larger and more efficient vessels.

The current orderbook is split between 252 small vessels (<4,000 teu) and 144 large units (>8,000 teu). Whereas the orderbook for smaller vessels can be absorbed by scrapping of units older than 20 years, the age profile of the fleet above 8,000 teu includes limited demolition opportunities. Consequently, composition of the Container fleet is projected to remain skewed upon delivery of the orderbook.

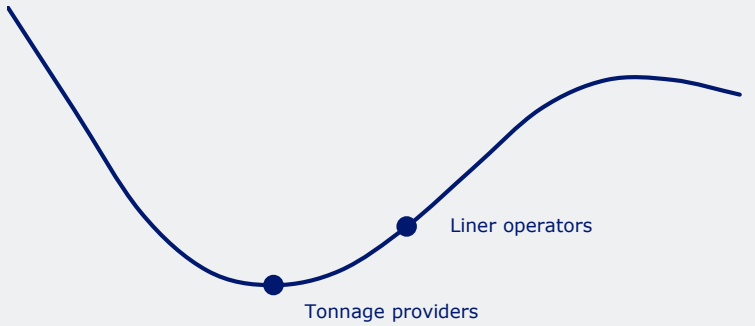
Over the coming years, the Container industry will continue to struggle with overcapacity, notably for the larger vessel segments. The inflow of Ultra Large Container vessels (ULCV) will exert significant downward pressure on the midsize segment (3,000-9,999 teu), while we argue that he Feeder segment will remain protected in the short to medium term due to infrastructural constraints. With tonnage providers owning two-third of the midsize segment currently, they are expected to suffer the most from the cascading pressure, as reemployment risk remains significant due to the growing oversupply.

A combination of overcapacity, low box rates and surging fuel costs is currently depressing the profitability of liner operators significantly. Moreover, the upcoming regulatory initiatives will further add to the uncertainties involved in running a liner business.

Although the deadline to ensure the IMO 2020 compliance is closing in, no uniform strategy has emerged. Owners are considering solutions that each have their pros and cons. Irrespective of which solution is chosen, we expect slow steaming to be a central element of fuel compliance strategies, as past experience suggests that this is an efficient way of achieving lower fuel consumption and emissions rapidly, at the same time as reducing the overall effective fleet capacity. However, the practice of slow steaming remains subject to reversal and will be determined by the supply and demand balance.

The next challenge for the industry could be the upcoming review of the maritime consortia block exemption regulation, which allows liner operators with a combined market share of less than 30% to enter into alliances up to April 2020. Should the exemption not be granted in the upcoming review, additional capacity would be required in order to maintain existing service coverage of liner operators. This could trigger a new wave of newbuilding orders. Consequently, the competitive landscape for liner operators would intensify and the industry could spiral into severe overcapacity.

WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

THE CONTAINER MARKET

Freight rates and ship prices

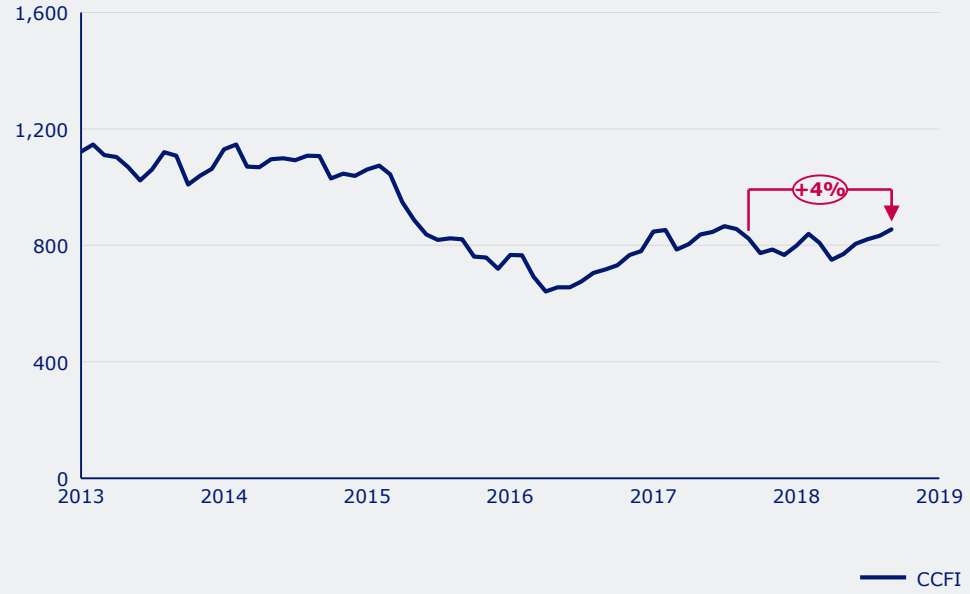
With a broad based recovery in demand and more stringent capacity control, **box rates** exhibited an overall positive performance during 2017, with the CCFI index up by an average of 15% compared with the average 2016 level. However, the rising trend in box rates stalled and rates have become more volatile during 2018, which is explained by supply pressure from deliveries of large vessels.

While box rates have continued to be volatile, **timecharter rates** have maintained the positive momentum from 2017, backed by a firm demand outlook and an idle fleet that remains below 3% across the board. As of September 2018, timecharter rates were up by an average of 20% from the end of 2017. Thanks to the improving supply-demand balance on both North-South and Intra-Asian trade, the short-term timecharter rate for Old Panamax vessels (4,400 teu with narrow beam) showed the most significant uptick of 49%, albeit from a low level of USD 8,000/day by the end of 2017.

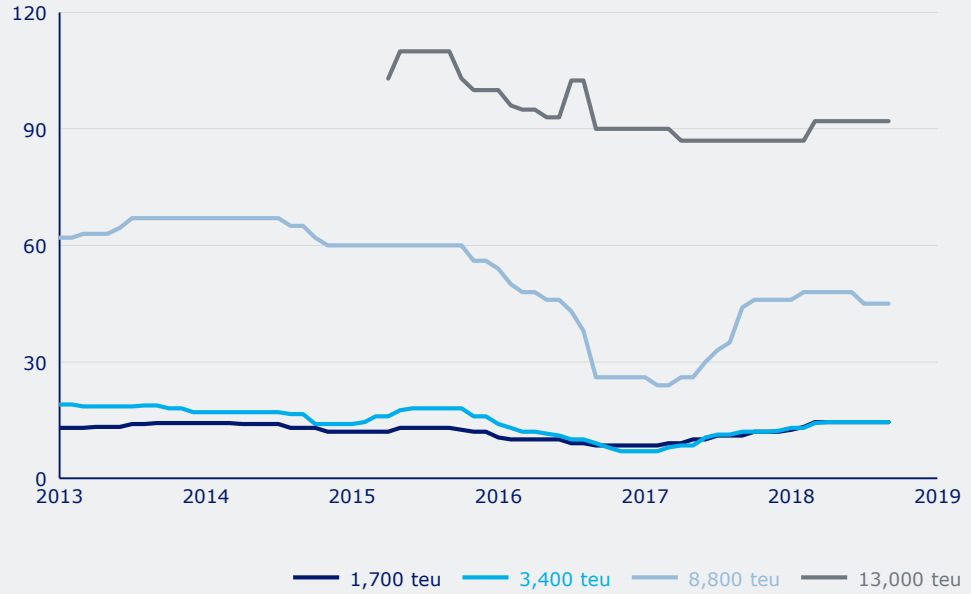
The **newbuilding price** for Feeder containers (<3,000 teu) has risen by 16% since the end of 2017. It continues to be the main contributor to the steady increase in the average Container newbuilding price which rose by 10% during the first three quarters of 2018.

After a record year of secondhand sales in 2017, activity has lost momentum during 2018. With 149 vessels changing hands, the number of transactions declined by 38% year-on-year during the first three quarters of the year. Nevertheless, the average **secondhand price** for a five-year-old Container vessel increased by 16% during the period, reflecting the market optimism. Despite the fact that 66% of the recorded transactions involved Feeder vessels, the largest secondhand price increase, 35% on average, was observed for Old Panamax vessels, albeit from a very low level. The increase in secondhand values is in line with the development in timecharter rates.

AVERAGE BOX RATE OUT OF CHINA (INDEX)



SECONDHAND PRICES – 5 YEARS (USD MILLION)



Source: Clarksons, Danish Ship Finance

THE CONTAINER MARKET

Supply-side development

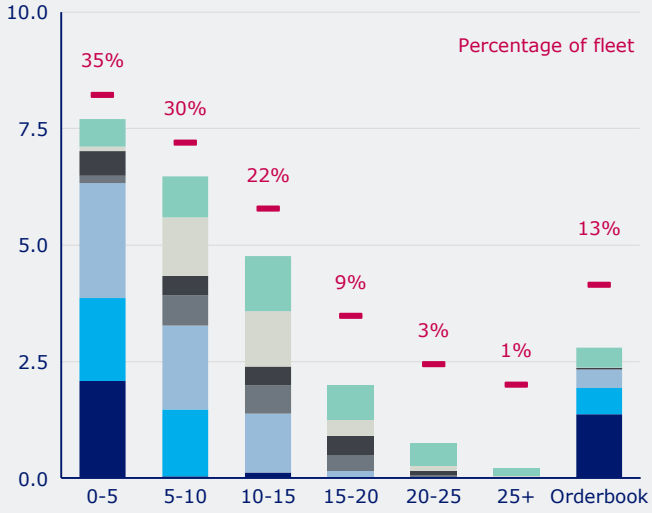
The performance of freight market continues to be determined by changes in the supply-demand balance, notably for the larger units which are currently suffering from overcapacity. Consequently, 0.27 million teu, or 21% of deliveries scheduled for this year, has been postponed into 2019. These are mainly vessels larger than 10,000 teu.

Since the beginning of the year, one million teu has been delivered, equivalent to a **delivery performance** of 79%. Based on this, total **deliveries** in 2018 are expected to amount to 1.2 million teu, similar to the level seen in 2017, and the capacity inflow will continue to be dominated by vessels above 8,000 teu. Assuming no further cancellations, postponements and demolition, the total Container fleet is projected to increase by 6% in 2018. However, fleet growth varies within subsegments: the Feeder fleet and the fleet of vessels above 8,000 teu are expected to expand by 5% and 11%, respectively, while the fleet of vessels between 3,000-8,000 will remain stable.

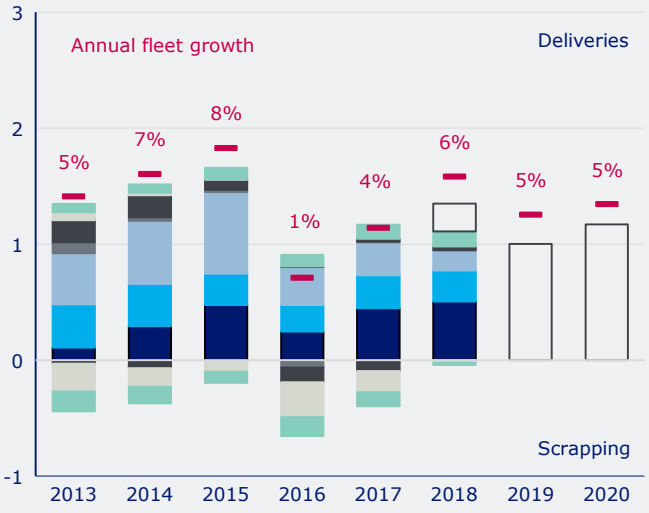
Contracting activity has remained subdued during 2018, with one million teu contracted, split between 20 ULVC (>15,000 teu), 38 large Container vessels (10,000-15,000 teu) and 90 Feeders (below 3,000 teu). Contracting of large Container vessels has been led by tonnage providers, which have ordered 30 vessels to be delivered from 2020 onwards. This is expected to put further cascading pressure on the market for midsize Container vessels even though the current orderbook for this segment is non-existing.

An upward trajectory in the timecharter market has reduced the incentive for owners to retire ageing tonnage. **Scrapping** activity remains insignificant with 0.04 million teu demolished during the first three quarters. The lower scrapping level has caused the **average scrapping age** to rise from 21 years in 2017 to 24 years in 2018.

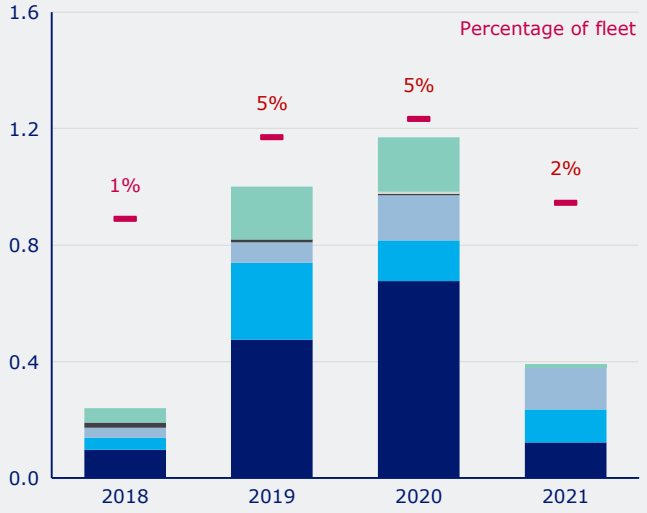
AGE DISTRIBUTION OF FLEET (MILLION TEU)



FLEET DEVELOPMENT (MILLION TEU)



ORDERBOOK BY DELIVERY YEAR (MILLION TEU)



Source: Clarksons, Danish Ship Finance

THE CONTAINER MARKET

The market outlook

Contracting activity continues to highlight the two-tier structure of the Container industry, where larger ships with lower marginals costs remain in focus. The current orderbook stands at 2.8 million teu, which is split between 83% large vessels (>8,000 teu) and 17% smaller units (<4,000 teu). While the orderbook for smaller units can be absorbed by scrapping of vessels older than 20 years, the age profile of the fleet above 8,000 teu means there are a limited number of demolition candidates. As a consequence, the composition of the Container fleet is expected to remain skewed in the coming years.

Given the front-loaded nature of the orderbook, short-term demand is crucial if the supply growth driven by deliveries of large vessels is to be absorbed. Based on the latest projections for global economic growth, Container demand is expected to grow by an average 5% annually in the period of 2017-20. However, growth will not be distributed equally between existing trade routes, as the Container industry is being shaped by forces that are directing trade towards more regionalised networks. Consequently, demand for large Container vessels could be lower than expected, while the smaller vessels could benefit from the change in trade patterns.

In the short to medium term, the Container industry will continue to be burdened by excess capacity. However, implementation of the IMO 2020 regulation has the potential to narrow the gap between supply and demand, as it is expected to trigger a new wave of scrapping for economically obsolete tonnage, notably for smaller subsegments. Moreover, the practice of slow steaming could intensify, as it will be a central means of fuel compliance, as well as leading to a potential reduction in effective supply capacity.

FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

Global economic growth	The global economy has strengthened and growth is expected to remain strong, creating the foundations for strong Container demand.	✓
Interest rate increases	Rising interest rates would lead to a reduction in disposable income, which could have a negative impact on consumer demand and dampen Container demand growth.	✗
Protectionism / Trade war	Protectionism has increased around the world, and the globalisation process is slowly decelerating. With time, this will shorten supply chains and reduce Container demand.	✗
Regionalisation of production, part 1	Robotics and 3D printing minimise the role of labour in the production process, enabling production closer to end-markets, shortening supply chains and reducing Container lifts.	✗
Regionalisation of production, part 2	More regionalised production could strengthen short-sea volumes and support demand for Feeder vessels.	✓

✗ Negative impact ✓ Positive impact

CONTAINER MARKET DEEP DIVE: REGULATORY INTERRUPTIONS

The industry is embattled by regulatory threats

The Container industry is struggling with excess capacity, low freight rates, increasing fuel costs, and the impending IMO 2020 regulation is adding further to the burden. Moreover, the upcoming review of the consortia block exemption regulation could rattle the industry dynamics, notably on the supply side.

Bunker costs constitute a considerable share of expenses for liner companies. Rising bunker costs are only partially compensated for by a surcharge to freight rates. The recent surge in bunker costs is expected to have a negative impact on profit margins for Container operators. Moreover, the IMO 2020 legislation is expected to put a further upward pressure on bunker costs.

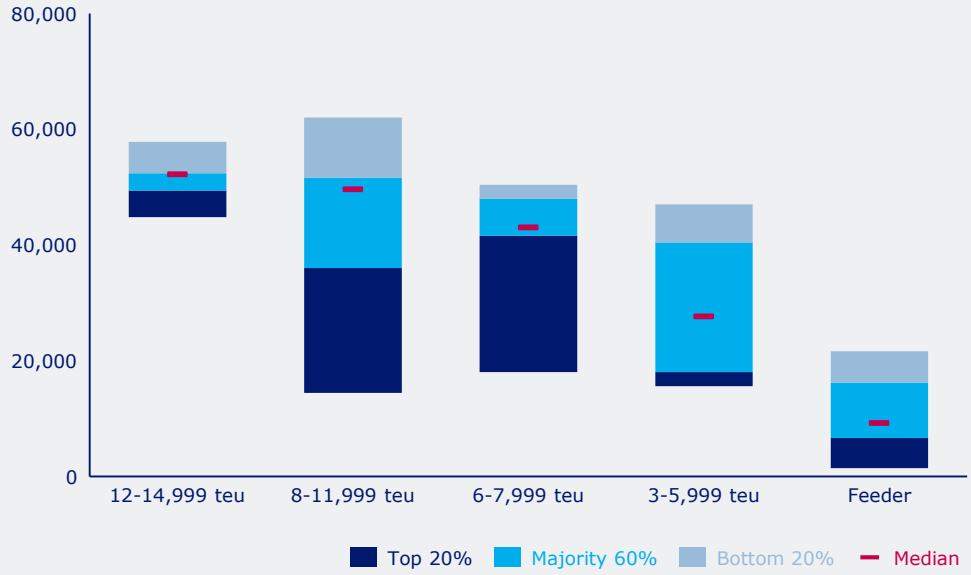
Although the deadline for ensuring compliance is closing in, no uniform strategy has emerged. Owners are considering solutions ranging from newbuilding units equipped with LNG engines, to utilising blended low-sulphur fuel or retrofitting existing vessels with scrubbers. Each option has its pros and cons. While the first two options are applicable for all vessels sizes, retrofitting with scrubbers makes more economic sense for larger and younger vessels, assuming significant fuels price spreads from 2020 onward.

There is no doubt that IMO 2020 sulphur regulation is causing additional operational uncertainty for liner business, but it is simultaneously creating an incentive for owners to demolish ageing and economically obsolete tonnage. However, vessels above 20 years old are predominately Feeders, while vessels larger than 8,000 teu only represent 2% of the one million teu of potential scrapping candidates. Hence, demolition of these units will do little to mitigate the existing overcapacity concerns caused by the inflow of large vessels

While scrapping of ageing units will not do much to help either IMO 2020 fuel compliance or the oversupply in the market, past experience suggests that slow steaming is an efficient way to lower fuel consumption and emissions quickly, while reducing the overall effective fleet capacity at the same time. Hence, the practice of slow steaming is expected to continue and it will bring significant relief for the Container industry. However, we believe that slow steaming remains subject to reversal and will be determined by the supply and demand balance.

As a consequence of the excess capacity, consolidation and network optimisation have been the main themes in the Container industry over the past few years. Consequently, liner operators have merged and established alliances in order to increase utilisation in an oversupplied market. This has been possible under the maritime consortia block exemption regulation, which remains valid until April 2020. The first exemption was adopted in 1995 and has been extended several times. Should the exemption not be granted in the upcoming review, additional capacity would be required in order to maintain existing service coverage of liner operators. This could trigger a new wave of newbuilding orders. As a consequence, the competitive landscape in the Container industry could intensify and liner operators would come under further pressure.

FUEL CONSUMPTION (TONNES PER YEAR)[1]



[1] For vessels younger than 15 years of age

Source: Clarksons, Danish Ship Finance

CONTAINER MARKET DEEP DIVE: SEGMENT DYNAMICS

Cascading pressure leaves the mid-size segment (3-9,999 teu) vulnerable

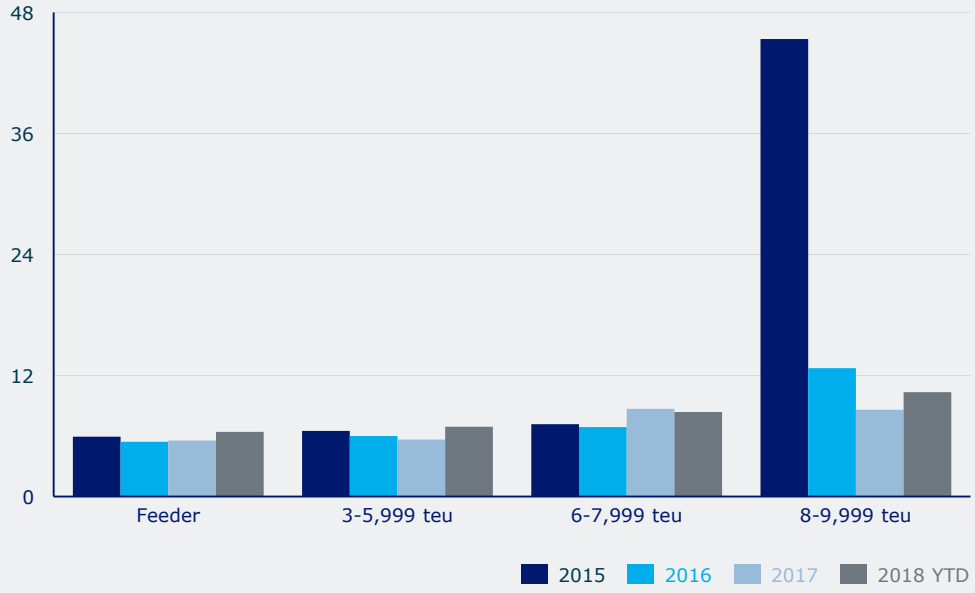
Many liner operators continue to pursue a strategy of cost leadership, ordering larger vessels to cut unit costs. Currently, vessels larger than 10,000 teu account for more than 80% of the orderbook in capacity terms. Half of these newbuilds are Ultra Large Container vessels (ULCVs) of above 15,000 teu, and are scheduled to be delivered by the end of 2020. Delivery of these ULCVs is expected to set off a new wave of cascading, with smaller units (<15,000 teu) on the Asia-Europe trade pushed out and redeployed to other trade routes.

While we argue that the Feeder segment remains protected from the cascading pressure in the short to medium term due to infrastructural constraints, the midsize segment (3,000-9,999 teu) will continue to be exposed to intensified competition due to the inflow of ULCVs and existing vessels coming off long-term charters.

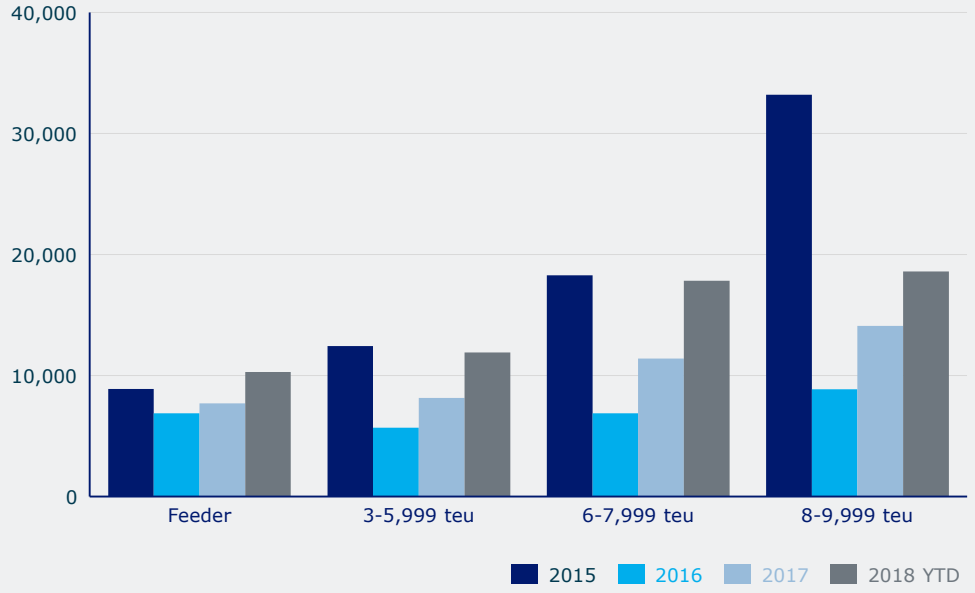
With an uncertain medium-term demand outlook, liner operators are reluctant to employ vessels on long-term charters. This is reflected in fixture activity: the average duration for fixtures concluded during 2018 remains below 12 months. The sharpest decline in charter duration has been seen for the 8,000-9,999 teu segment, where the average decreased from 45 months (based on 28 fixtures reported in 2015) to ten months (based on 54 fixtures recorded in 2018). The trend towards shorter average contract duration for the midsize segment is expected to continue in the coming years.

Given the growing oversupply concerns, we believe that liner operators will favour the flexibility that can be achieved by capacity management, which implies a higher frequency of contract renewals but shorter contract duration, for the midsize segment. With two-thirds of the midsize fleet currently owned by tonnage providers, reemployment risk for these units remains significant in the coming years, as the main priority of liner operators is to optimise the utilisation of owned capacity.

CONTAINER AVERAGE FIXTURE LENGTH (MONTHS)



CONTAINER AVERAGE FIXTURE RATES (USD PER DAY)



Source: Clarksons, Danish Ship Finance

THE DRY BULK MARKET

SHIPPING MARKET REVIEW – NOVEMBER 2018

THE DRY BULK MARKET

Perspectives and key takeaways

OUTLOOK SUMMARY

- ● **POSITIVE**
- ○ NEUTRAL
- ○ NEGATIVE

In the short term, the Dry Bulk market is expected to continue to strengthen thanks to an improving supply and demand balance. However, we stay cautious about the outlook from 2020 and beyond given the Dry Bulk market's dependency on China, notably for the larger segments. The ongoing reform agenda and environmental campaigns will reshape the dynamics of Chinese demand for raw materials, potentially reducing demand growth for Dry Bulk.

The Dry Bulk market continued to strengthen during the first three quarters of 2018, backed by slower fleet growth of 2% and robust demand growth driven by strong Chinese import growth. Consequently, the Baltic Dry Index (BDI) surpassed the long-term median index value of 1,600 and reached a four-year high index value of 1,774 in July 2018, however down to 1,555 in October 2018.

Despite improving market sentiments and relative low newbuilding prices, only 185 new orders had been placed by the end of September 2018, equivalent to a 14% decrease year-on-year. Dry Bulk investors are approaching investments in new vessels with caution due to uncertainty over the IMO's 2020 regulation, escalation trade tensions, and China's economic transition.

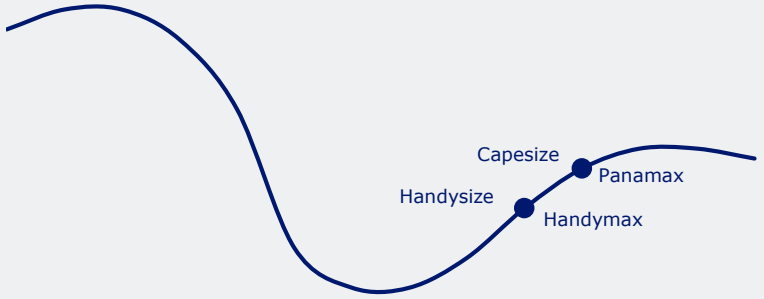
With a relatively small orderbook and realistic demand expectations for the coming years, a fundamentally supported rebound in the Dry Bulk market is expected to continue in the short term. However, the sustainability of the rebound is contingent on a robust demand from China over the medium to long term. Chinese seaborn demand for raw materials remains strong in 2018, but this trend could rapidly change from 2019 onwards.

As part of its ongoing reform agenda, China is attempting to cut idle capacity in the steel and coal industries, for both financial and environmental reasons. The increasing focus on building a greener country is leading to tougher environmental regulations, which are expected to pave the way for circular economic principles, notably in the steel industry. China aims to increase the ratio of steel scrap used in steelmaking from 11% in 2016 to 20% by 2020 and 30% by 2025, could potentially replace 20% of China's iron ore import in 2017.

Steel scrap is essentially a more environmentally friendly substitute for iron ore and coking coal consumed in the steelmaking process, and consumption is determined by the price differential between steel scrap and the raw material basket. From an economic point of view, steel mills should only increase the ratio of steel scrap if it proves to be the most cost-effective raw material. However, we expect government influence to outweigh the economic incentives of domestic steel mills. It is therefore more a question of when rather than if China will reach the targets.

A successful structural shift in the Chinese steel industry will result in lower demand in absolute volume for iron ore and coking coal. This is expected to put further downward pressure on the Dry Bulk market. While we argue that the smaller segments are less vulnerable to lower demand growth owing to their ability to offset the existing orderbook by scrapping ageing units, the same option is not available to the larger segments. The Capesize and Panamax segments remain the most at risk in the event of lower Chinese imports of Dry Bulk.

WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

THE DRY BULK MARKET

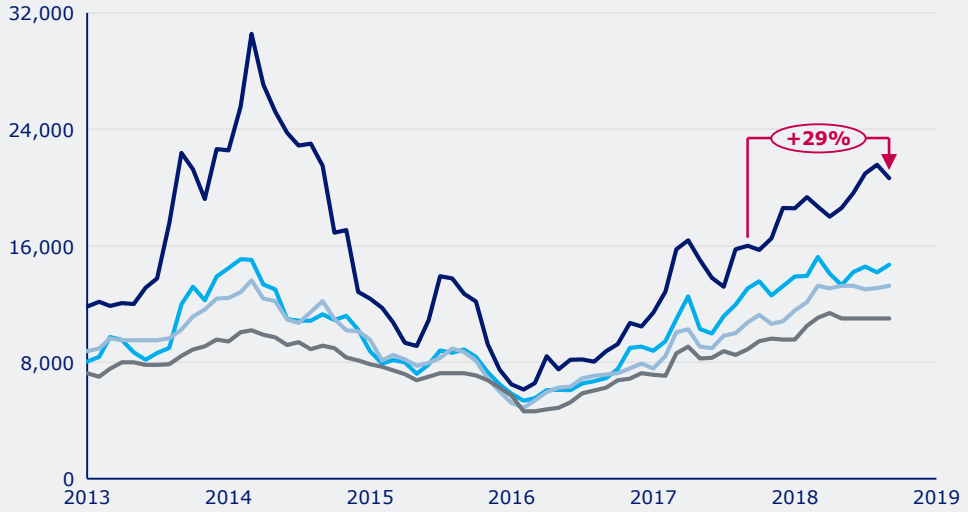
Freight rates and ship prices

After Dry Bulk demand showed signs of weakness in the seasonally low first quarter, **spot rates** continued to follow an upward trend. Backed by a strong Chinese demand for coal and iron ore, the BDI reached its 4-year high at index 1,774 in July 2018, which is 89% above the level seen in July 2017. **Timecharter rates** for most of the segments have remained stable over the past few months, although Capesize rates have continued to increase. As of September 2018, timecharter rates on average were 15% higher than at the end of 2017.

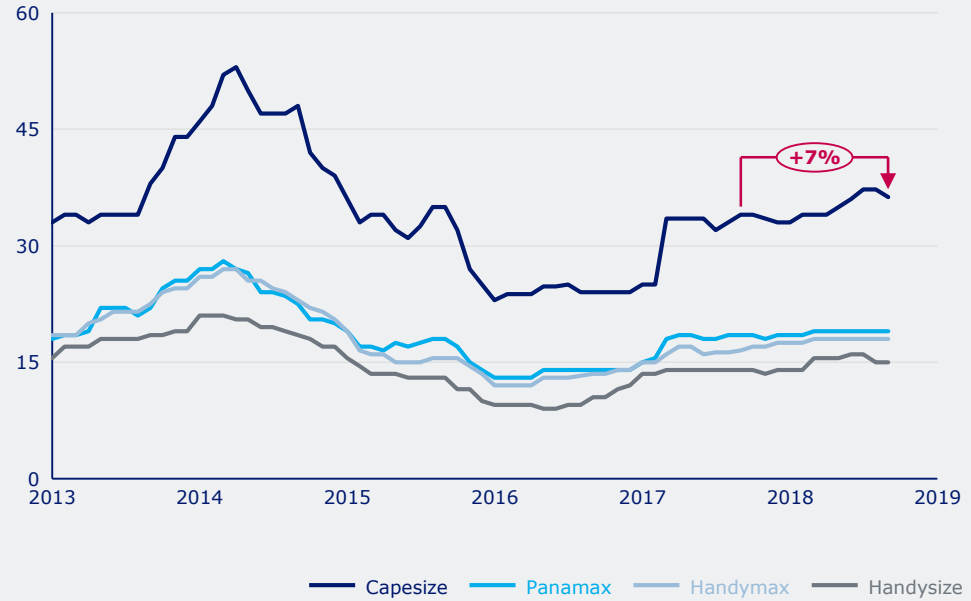
By September 2018, the average **newbuilding price** for Dry Bulk vessels had increased by 11% since end of 2017. The increase in newbuilding prices for the Dry Bulk segments had been more synchronised with the development in **secondhand prices**. The average secondhand price has increased by 9% since start of the year, led by Handysize and Capesize vessels across all age segments, while a moderated decline in secondhand prices have been observed for Handymax and Panamax vessels older than 15 years. For vessels younger than ten years, the Capesize segment has experienced the most significant value appreciation, of an average of 15%, supported by the development in timecharter rates.

Backed by rising freight rates and relatively low secondhand prices, **sales activity** remains firm, with 428 vessels having changed hands during the first three quarters of 2018. Sales activity continues to be dominated by smaller units, as transactions with Handymax and Handysize vessels accounted for 62% of the total number of secondhand sales during the period. Although the secondhand market continues to be active, the flattening prices for younger vessels indicate that Dry Bulk investors remain cautious given the uncertainty over the short- to medium-term market outlook.

1-YEAR TIMECHARTER RATE (USD PER DAY)



SECONDHAND PRICES – 5 YEARS (USD MILLION)



Source: Clarksons, Danish Ship Finance

THE DRY BULK MARKET

Supply-side development

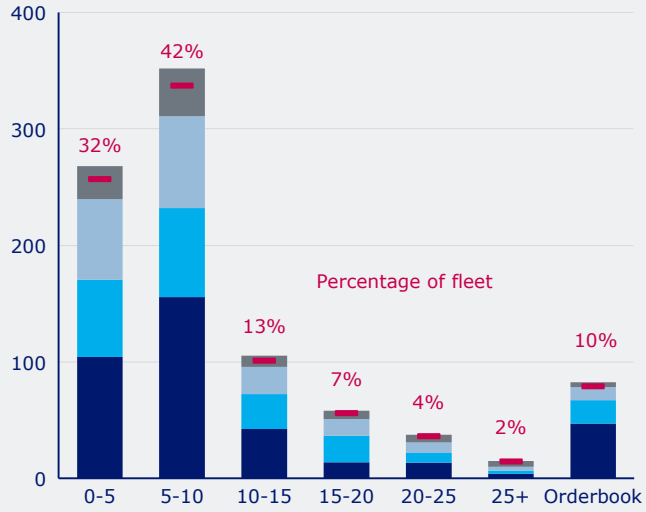
Owing to an improving market balance, only three million dwt was scrapped during the first three quarters of 2018, which is the lowest level of **demolition** recorded for ten years. This has supported an increase in the average demolition age, which has increased from 24.5 years in 2017 to 28.5 years in 2018. The increasing demolition age is to be expected at the current stage of the freight rate cycle.

Delivery performance has continued to improve during 2018, with 72% of vessels scheduled for delivery this year actually having been delivered, compared with 67% in 2017. Based on the delivery performance and the remaining orderbook for 2018, total **deliveries** for 2018 are projected to reach 29.7 million dwt, 22% lower than in 2017. Assuming no further cancellations, postponements or scrapping, the Dry Bulk fleet is set to increase by 4% in 2018.

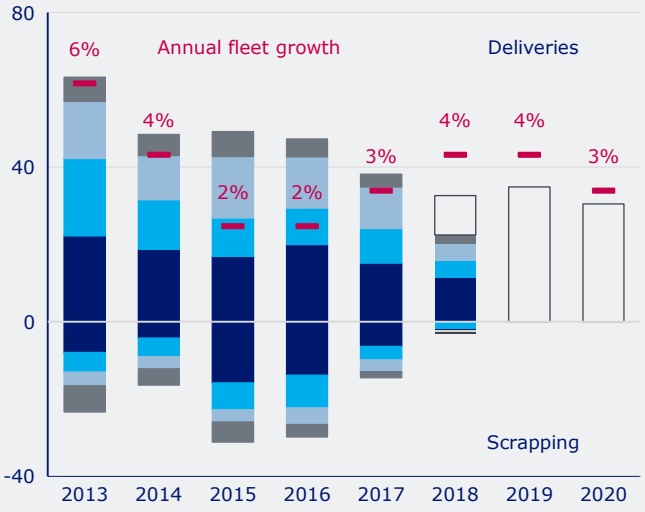
Contracting activity reached 20.9 million dwt during the first nine months of the 2018, with Panamax and Capesize vessels representing 85% of the total contracted capacity. However, contracting activity has slowed down significantly over the past two quarters with only six million dwt ordered, reflecting Dry Bulk investors' caution.

The **fleet renewal potential**, reflecting the relationship between the orderbook and the number of scrapping candidates in the fleet, continues to deteriorate for the Panamax and Capesize segments, as their respective orderbooks are significantly larger than the number of natural scrapping candidates in their fleets. The Capesize segment remains vulnerable to additional contracting, as there are 2.7 vessels on order for each ship in the fleet above 20 years of age. In contrast, the fleet renewal potential has improved in the Handysize and Handymax segments, and their respective orderbook can now be absorbed by scrapping of vessels older than 20 years.

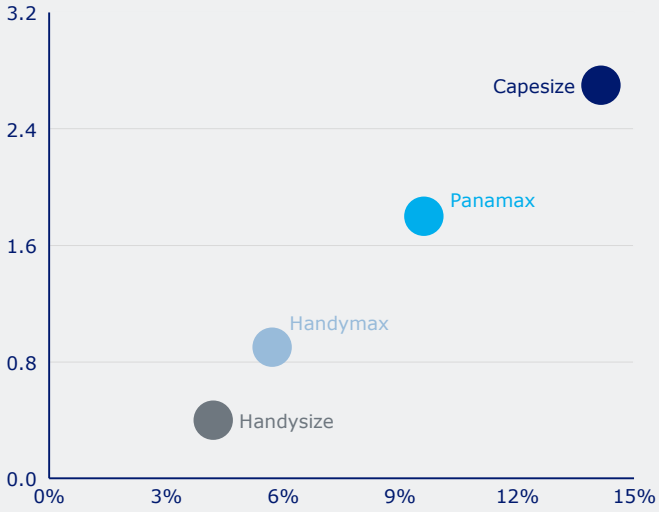
AGE DISTRIBUTION OF FLEET (MILLION DWT)



FLEET DEVELOPMENT (MILLION DWT)



FLEET RENEWAL POTENTIAL (DWT)



Capesize Panamax Handymax Handysize Orderbook

Source: Clarksons, Danish Ship Finance

THE DRY BULK MARKET

The market outlook

With a subdued level of contracting activity over the past six months, the orderbook-to-fleet ratio is fluctuating around 10%, a relatively low level compared with those recorded during the past five years. Based on the existing orderbook and taking into account scrapping candidates older than 25 years, the Dry Bulk fleet is projected to grow by a CAGR of 2% during 2018-21. In the same period, nominal demand is estimated to increase by 3% annually, suggesting a rebound in the Dry Bulk market supported by fundamentals.

While we expect the Dry Bulk market to strengthen in the next 12 months, we remain cautiously optimistic about the outlook beyond 2019, as we see several factors that could exert downward pressure.

On the supply side, we argue that the current significant excess yard capacity remains a threat for a sustainable rebound, as the market could be flooded by additional supply that could offset the increasing demand. Hence, Dry Bulk owners will need to continue to demonstrate capacity discipline in the coming years.

On the demand side, the outlook is undoubtedly dependent on China, as the country represents almost half of global seaborne demand for iron ore and coal. In July 2018, a new plan for air pollution control during 2018-20 (a three-year action plan for to win the battle for bluer skies) was published by the Chinese government. The aim is to intensify the ongoing deleveraging process of outdated industrial overcapacity and reduce coal's share of total energy consumption to 58% by 2020 from 60.4% in 2017.

China's ongoing economic transition, the gradual reduction of fossil fuels in the energy mix, and the increasing focus on environmental concerns are potential risk factors that could reduce seaborne trade volume for dry cargos. Should this scenario materialise, rates and values for larger segments will come under pressure, as they are the most exposed to changes in China's demand patterns.

FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

China's reform agenda	The attempt to cut industrial overcapacity while strengthening domestic industries could lower import demand from China's heavy industries (i.e. iron ore, coal and minor bulk demand).	✘
The Belt and Road Initiative	China's plan to support infrastructure development along the "new Silk Road" could counterbalance some of the effects of lower domestic infrastructure development.	✓
The clean energy transition	The growing focus on lowering carbon emissions could create resistance to burning coal and lower seaborne demand.	✘
Electrification of the global economy	Increasing use of batteries for vehicles and energy storage could create stronger demand for various metals (lithium, copper, etc.), which would support minor bulk demand.	✓
Circular economic principles	If an increasing share of materials is recycled, reused or remanufactured, demand for raw materials will decline, affecting Dry Bulk demand negatively.	✘

✘ Negative impact ✓ Positive impact

DRY BULK MARKET DEEP DIVE: CHINESE IRON ORE DEMAND

Environmental focus is reshaping the Chinese steel industry

China's introduction of tougher environmental regulations is paving the way for circular economic principles. The supply-side structural reform (SSSR) combined with the plan for the "battle for bluer skies" is expected to change steelmaking dynamics and push for a greener steel industry in China. This is expected to have a negative impact on iron ore demand, with lower-grade iron ore producers being the most exposed.

China's steelmaking capacity utilisation deteriorated from 79% to 70% in the period 2010-2015, reflecting severe industry overcapacity. Consequently, capacity reduction in the steel industry became one of the main targets under SSSR due to both financial and environmental concerns. In China's 13th five-year plan (2016-20), the government aims to reduce total production capacity from 1.13 billion tonnes to less than one billion tonnes, while lifting capacity utilisation to 80% by 2020.

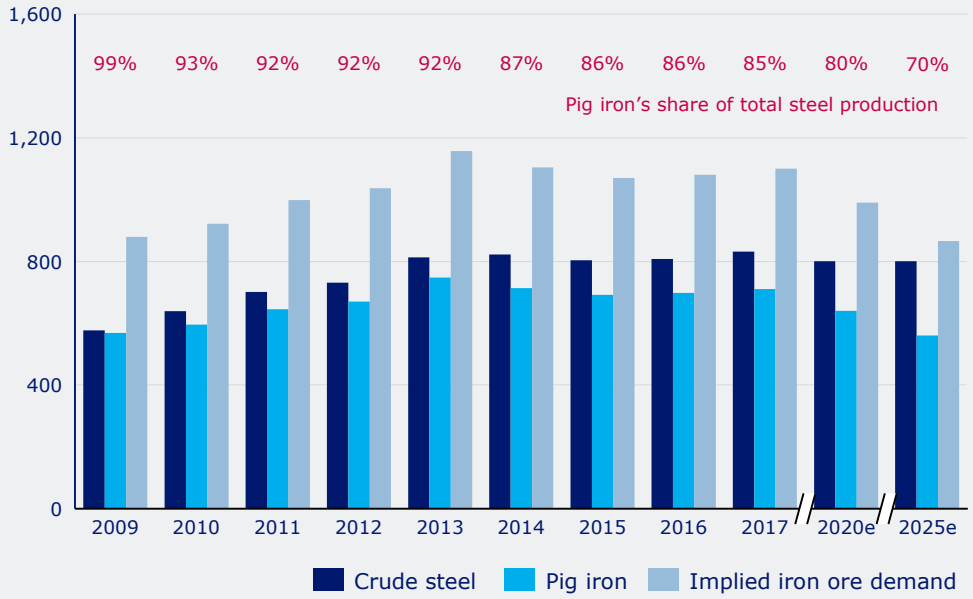
Alongside the capacity reduction process, the growing focus on building a cleaner economy is promoting recycling as part of the government's push to improve the quality and efficiency of steel production. In fact, the government is aiming to increase the usage of steel scrap in the steelmaking process from 11% in 2016 to 20% by 2020 and 30% by 2025.

Steel scrap is the primary input to steel production based on electric arc furnace (EAF) technology, which offers energy saving and emission reduction compared to the basic oxygen furnace (BOF) technology, where pig iron is the main input. Based on market estimates, production of one tonnes pig iron requires on average 1.5-1.6 tonnes of iron ore and 0.5-0.6 tonnes of coking coal. As a raw material, steel scrap is essentially a substitute for iron ore and coking coal in the steelmaking process. With government incentives pushing for a higher ratio of steel scrap usage in the manufacturing process, downward pressure on pig iron production is expected over the coming years.

Although the nominal output of pig iron increased in both 2016 and 2017, its share of total crude steel output continues to follow a declining trend, reflecting the fact that a growing share of steelmaking uses steel scrap. If the Chinese government manages to reach the target set for steel scrap usage, and assuming available steel production capacity of one billion tonnes operating with an 80% utilisation rate, pig iron demand in 2025 is estimated to be 21% lower than in 2017. This implies that more than 230 million tonnes of iron ore will be substituted by steel scrap, equivalent to one-fifth of China's seaborne imports of iron ore in 2017.

While producers with lower-grade ore will come under pressure in the event of a successful structural shift in the Chinese steel industry, we expect higher-grade ore producers to continue to benefit from an upgraded Chinese steel industry due to both environmental and efficiency factors. Nevertheless, it is clear that China's increasing focus on building a greener country will reshape the demand dynamics for iron ore.

CHINESE CRUDE STEEL AND PIG IRON OUTPUT (MILLION TONNES)



Source: Worldsteel, MIIT, Danish Ship Finance

GLOBAL OIL MARKETS

SHIPPING MARKET REVIEW – NOVEMBER 2018

GLOBAL OIL MARKETS

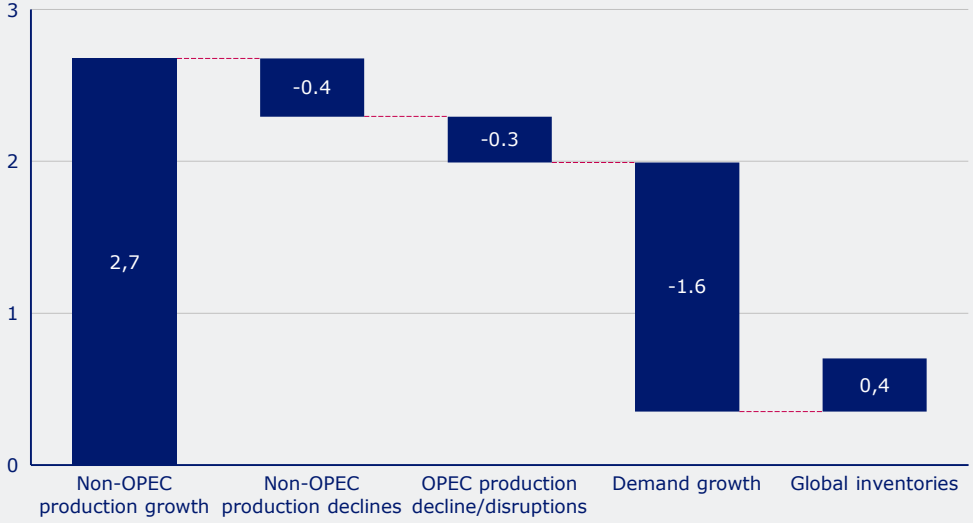
No shortage of oil in the medium term

Geopolitical risk is on the rise in oil markets, but the glut of US shale has inoculated the oil market against instability and unrest for the time being. The geopolitical flashpoints – including an escalating trade war between China and the US, and the newly imposed sanctions on Iran –could provoke future supply problems, but actual production outages have remained minor, except for in Venezuela. Iranian oil exports could be reduced by approximately 1.3 million barrels per day over the next year, and Venezuelan production is forecast to decline by 800,000 barrels by the end of 2019. OPEC is expected to partially bridge the gap in the short term, with an increase in production of 700,000 barrels from Saudi Arabia offsetting the production cut. Total estimated output from OPEC will be 300,000 barrels lower at year-end, and 500,000 barrels lower in 2019. Still, it is projected that OPEC spare capacity could be larger than the expected two million barrels.

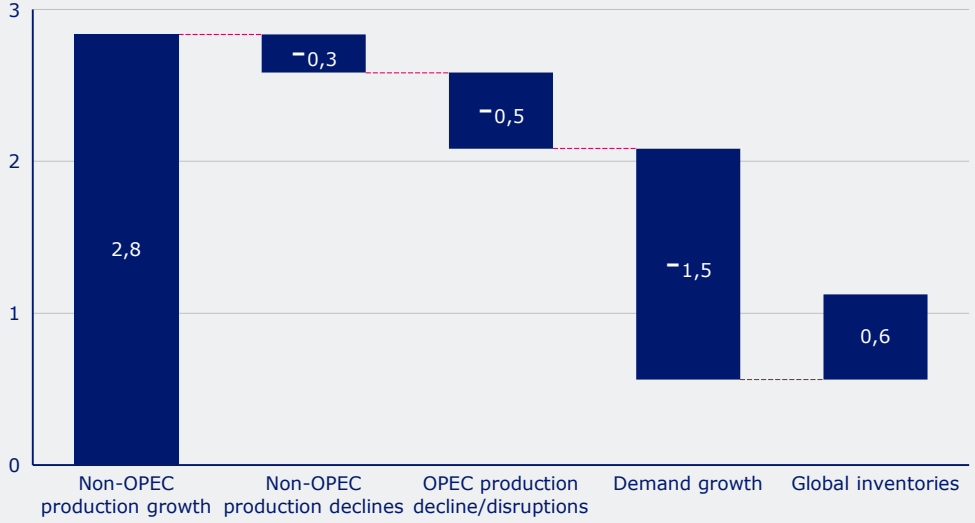
Expansion of US and Canadian unconventional production is likely to ensure that global oil markets stay sufficiently supplied in the next two years, despite temporarily infrastructure constraints. Growth is likely to exceed two million barrels in 2018 and 2019, thus outpacing growth in demand by more than 100%. Oil produced in North America is for the most part light sweet oil, and is expected to be exported to Asian markets, for reasons of refinery capacity and domestic demand.

Net production growth outside OPEC will be 2.3 and 2.5 million barrels per day, and the US accounts for roughly 90% of this growth for both years. Offshore production will increase marginally over the course of 2018 and 2019. Declining production in Mexico and China will be offset by increased production from mainly Brazil, Canada and Norway. Offshore is expected to maintain its market share of one-third of global oil supply in the coming years.

GLOBAL SUPPLY AND DEMAND OUTLOOK CRUDE OIL 2018 (MMBD)



GLOBAL SUPPLY AND DEMAND OUTLOOK CRUDE OIL 2019 (MMBD)



Source: IHS Markit, Danish Ship Finance

GLOBAL OIL MARKETS

Cost pressure and adoption of new technologies are keeping E&P spending in check

The continuous focus on cost optimisation and higher oil prices continue to push oil companies into profitability, both onshore and offshore. Oil companies still have the choice whether to invest in short-cycle projects onshore or longer-cycle, potentially more profitable, offshore projects. In the US unconventional sector, the process of drilling is becoming commoditised. Every drilling process is repeated and improved, resembling a factory production line. Because unconventional oil is not resource constrained, infrastructure and organisational limitations are the main factors holding back new growth. New pipelines under construction will add four to six million barrels per day of capacity by 2020, and support the US in becoming one of the world's largest oil exporters. The US is expected to treble export volumes to three to four million barrels per day within the next two years.

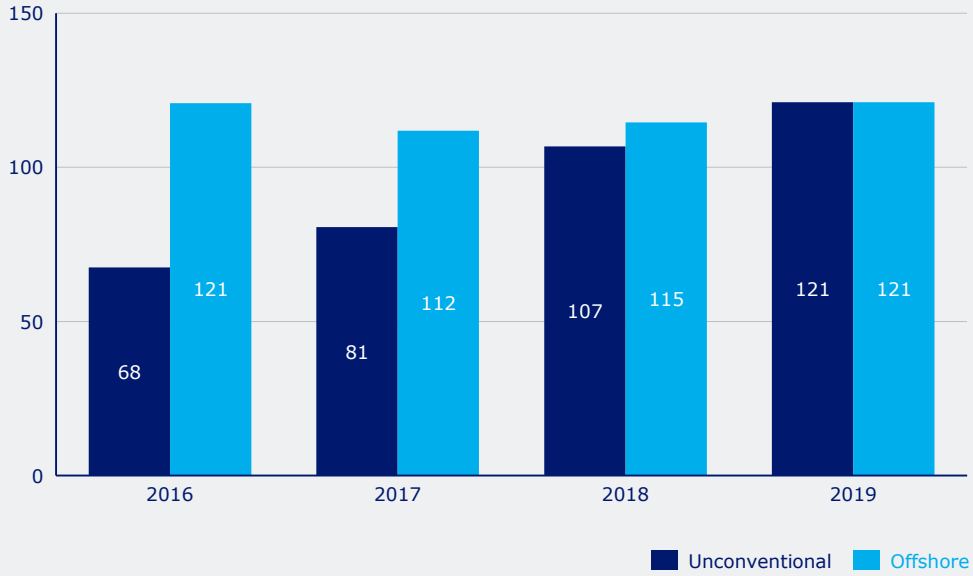
The continuous focus on cost reductions and fast payback in the offshore sector means that most projects being sanctioned are near-field developments and tie-back projects. This trend is likely to continue, with the exception of some large-scale projects mainly in Brazil and Guyana, which also have very favourable break-even rates. Brazil, in particular, is becoming an international hotspot for deepwater large-scale operations, thanks to new regulations that allow international oil companies (NOCs) to have operatorship on its fields. Brazil has large proven reserves of oil (90 billion barrels), which has led several of the largest deepwater companies to make Brazil their core growth area. The pre-salt area in Brazil consists predominantly of ultra-deepwater fields with large reservoirs. Depending on the level of success for foreign companies in Brazil in the coming years, the country could once again become the premier location for offshore and ultra-deepwater drilling.

Despite the positive developments in Brazil, offshore E&P spending is expected to rise moderately in the years to come. The oil price has limited short-term effects on E&P spending. Oil companies are pushing themselves and their supply chains to extract more oil for less capital.

Technology is one of the largest drivers of the cost reductions and is a key factor for companies to achieve enhanced recovery rates (EOR). Digitalisation in the oil and gas industry is not a distant dream; oil companies have come a long way in digitalising their operations. Predictive analytics have made huge strides in predictive maintenance.

For instance, one company is using algorithms to predict valve failures. In both the onshore and offshore sectors, automated drilling operations and the introduction of artificial intelligence are making the production of oil less labour-intensive. For example, in Norway, an unmanned production platform, which will be controlled remotely, is being constructed. This will reduce operating expenses significantly. This shift in operations will likely accelerate in the future. The new oil industry is leaner and more efficient than a few years ago. Competition between offshore and onshore will likely intensify in the coming years, as oil companies will continue to target projects with the highest returns and shortest payback times.

GLOBAL E&P SPENDING CAPEX FORECAST (USD BILLION)



Source: Danish Ship Finance, Clarksons

THE OSV MARKET

SHIPPING MARKET REVIEW – NOVEMBER 2018

THE OFFSHORE SUPPORT VESSEL MARKET

Perspectives and key takeaways

OUTLOOK SUMMARY

- ○ POSITIVE
- ○ NEUTRAL
- ● **NEGATIVE**

The Offshore Support Vessel market continues to be burdened by overcapacity and low earnings. E&P spending is at a structurally low level, and is expected to increase moderately in the next few years. We reiterate our view that we could be past the bottom of the cycle, but a recovery will likely be very slow, and many vessels will have to exit the market if market equilibrium is to be reinstated.

The strong growth in production and capital spending in the unconventional sector is keeping investments in the offshore sector under constant pressure. The option to invest in shorter-cycle projects onshore is clouding the demand outlook for OSV vessels.

Offshore Support Vessels (OSVs) continue to struggle with overcapacity, as owners faced mediocre day rates over the summer after positive sentiment led to too many vessels being reactivated. This has resulted in a situation where shipowners are unable to get returns above their opex over time. The large number of laid-up vessels will keep a lid on earnings in the medium term. The industry is still trying to find solutions for how to handle the oversupply.

Some owners are upgrading their vessels to a higher digital standard, while others are focusing solely on cost leadership and operating performance. The large debt loads in the sector continue to pressure most shipowners. This is in stark contrast to their counterparts in the US, who have undergone major restructuring and cleared their balance sheets. European owners are somewhat shielded, though, because much of US tonnage is of a lower standard than the majority of European vessels.

It is becoming clear that many vessels in lay-up will not return to the competitive fleet. In the large OSV segments (PSV >3,000 dwt, AHTS >12,000 bhp), 26% of the fleet is laid up, but 9% of vessels (117) are more than 15 years old. These vessels are unlikely to return to the sector. Still, given the severity of the overcapacity, even if vessels in lay-up will not return to the competitive market it may not be enough to push rates up.

Offshore exploration and drilling is becoming ever more competitive, with declining break-even rates. The increased competitiveness of offshore projects comes at the expense of the profitability of the entire supply chain, including OSV vessels. It is still very profitable to produce offshore oil, but further down the value chain it is still lower profit margins.

WHERE WE ARE IN THE FREIGHT RATE CYCLE

Source: Danish Ship Finance

THE OFFSHORE SUPPORT VESSEL MARKET

Freight rates and ship prices

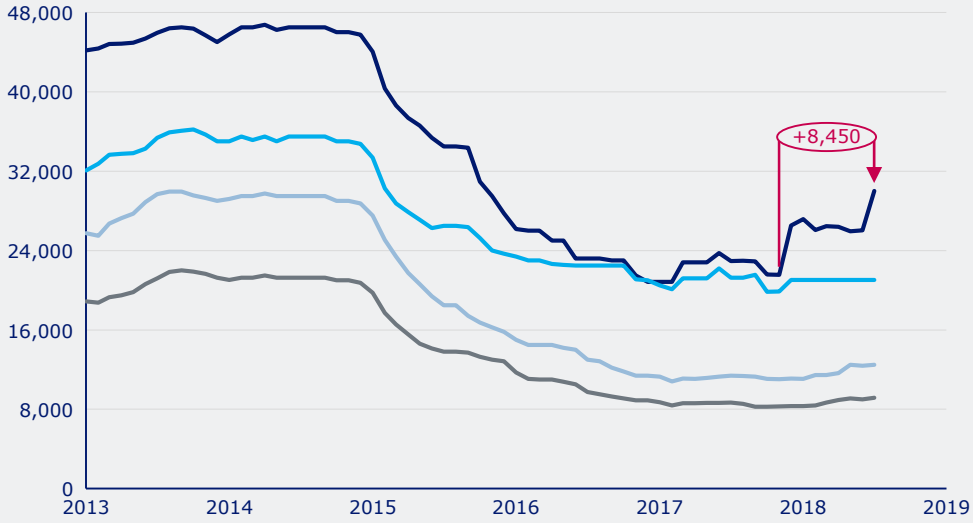
Charter rates continue to be challenged, but there are signs of improvement. For long-term charters, there have been PSV fixtures at NOK 150,000 per day, approximately NOK 75,000 per day above opex. And for AHTS vessels in particular, there have been periodic spikes in rates in the spot market, but there are too many idle days for earnings to be meaningful in the longer run. Large AHTS vessels (12,000 bhp-plus) are more expensive to operate, and there is little demand outside the oil and gas sector for these vessels.

Consolidation could lead to increased scrapping of vessels, as we have seen some of the larger shipowners do. The OSV market is still too fragmented to give shipowners any meaningful pricing power. We believe this is unlikely to change in the foreseeable future, even with more M&A activity.

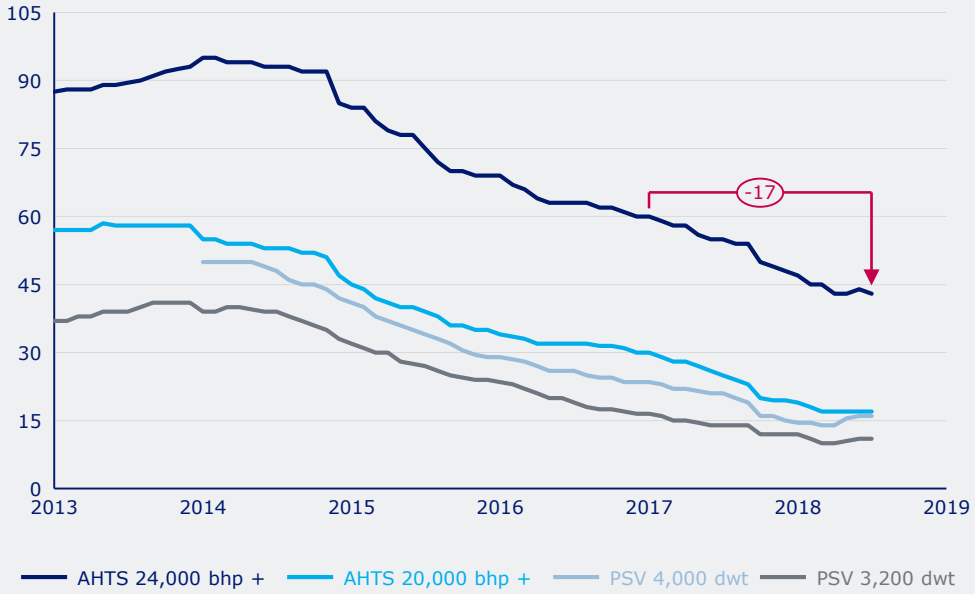
Secondhand prices remain under pressure, but most vessels being put up for sale are ten years or older. Owners continue to reduce their fleets of non-core assets; values for these vessels are in the USD 1-5 million range. Prices for newer and more advanced tonnage continue to be relatively untested, as few vessels are being sold, and are mainly being held up by the low level of market liquidity.

Newbuilding prices for OSV vessels are highly uncertain, as only nine OSV vessels have been ordered since 2014. The current overcapacity in the market and the fact that owners are cash-strapped will likely keep contracting low in the coming years. Newbuilding prices do not reflect vessels' earnings potential currently, which means no vessels are likely to be ordered on speculation.

TIMECHARTER RATES OSV VESSELS – GLOBAL INDICATOR (USD PER DAY)



SECONDHAND PRICES LARGE OSV VESSELS – 5 YEARS (USD MILLION)



Source: Clarksons, Danish Ship Finance

THE OFFSHORE SUPPORT VESSEL MARKET

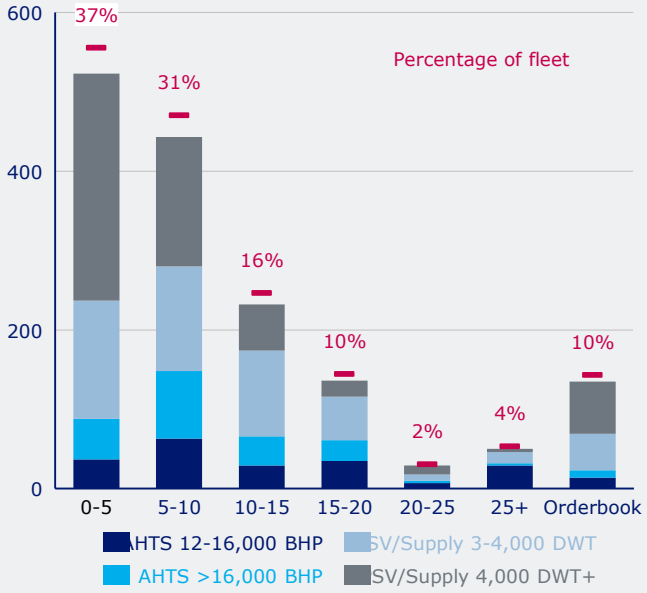
Supply-side development

The OSV market is still characterised by oversupply of vessels, in every segment. Globally, one-third of the fleet is laid up, but the larger segments are faring better, with only one out of four vessels in lay-up. A recovery still hinges on a reduction in supply. Of the large vessels (PSV >3,000 dwt and AHTS >12,000 bhp), 47 are out of class, older than 15 years old and have been laid up since 2016 or earlier. In total, there are 117 large vessels (9% of the fleet) laid up and older than 15 years. These vessels are unlikely to return to active duty.

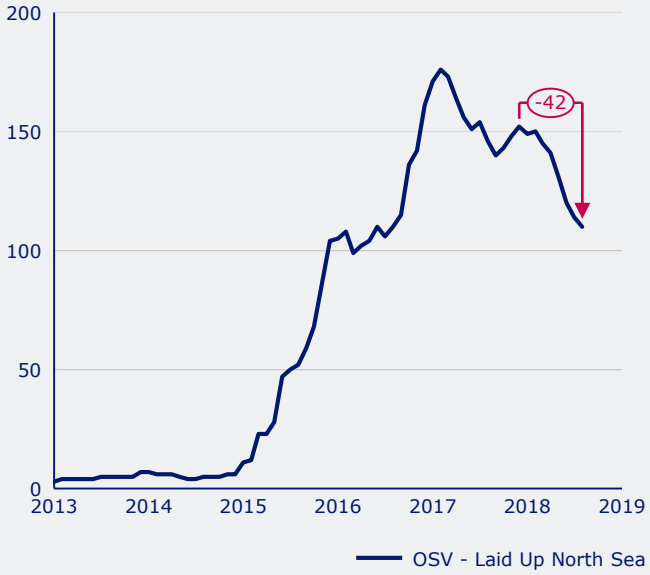
The **orderbook** contains 135 vessels. Of these, 96 are ordered at Chinese yards, and 127 have been on order since 2014. It is uncertain how many of these vessels will be delivered. Several vessels are thought to be sitting in yards either completed or nearly completed, primarily in Chinese yards. Since the start of the year, 25 vessels have been delivered. Still, only eight new orders for OSV vessels have been placed since 2015.

Since the start of 2018, 48 vessels have been **scrapped**, an increase of 12 since our last report. The real number could be significantly higher, as vessels in lay-up with no maintenance or those with their transmitters turned off could have been demolished in situ. So far this is estimated to be 1,000 vessels globally. The oversupply of vessels has resulted in a few larger OSV players opting to scrap vessels instead of selling them, to keep them from returning to the active market. This trend is mainly being seen among the larger players, which have the capacity to dispose of vessels. Reactivation costs are difficult to pin down; vessels laid up in a cold, northern climate often only cost USD 50-100,000 to reactivate if they are in class, while reactivation costs for vessels out of class are likely in the region of USD 1-4 million, depending on maintenance. It is very difficult to estimate precisely how many vessels will return to the market if charter rates increase, the variables are just too many.

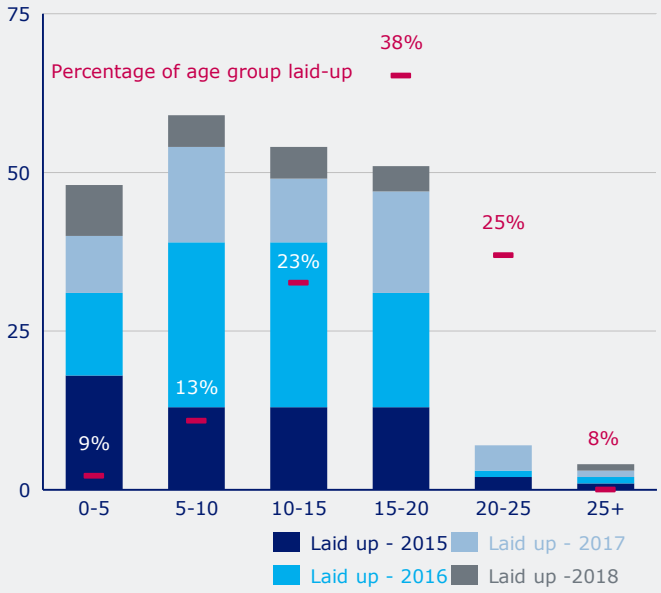
AGE DISTRIBUTION FLEET (NO. OF VESSELS)



LAID-UP OSV VESSELS – NORTH SEA



PSV >3,000 DWT AND AHTS >12,000 BHP



Source: Clarksons, Danish Ship Finance

THE OFFSHORE SUPPORT VESSEL MARKET

Market outlook

The Offshore Support Vessel market is still very challenged. While it is positive that offshore activity levels are increasing, this will not be sufficient to employ the OSV fleet. There are still too many owners who believe the market will turn in their favour. However, those holding out for a rapid recovery are likely to be disappointed. Increased E&P spending is not a guarantee of higher day rates; much depends on how this capital is spent and how much of it is relevant for vessels. Increased tie-back spending and near-field development do not require as many vessel days as exploration drilling in distant waters, because vessels have shorter sailing distances. This trend has become apparent for many projects. The forces currently at work are challenging the expected economic lifetime of vessels and the traditional OSV business model. A new business model being proposed is to make OSV vessels trade in a similar way to Container vessels. Fixed routes offered by OSV companies could service several companies on the same route, lowering costs and possibly increasing their market shares. Still, a model such as this would likely be adopted by one of the larger OSV companies with a significant fleet size.

Most OSV markets are expected to recover slowly over time. Brazil stands out as the market with the greatest potential for employment of the largest vessels.

Brazil has taken major steps to reform its offshore sector, making it easier for foreign companies to operate. In July 2016, Petrobras sold its operatorship in the Carcará field, which is the first time it has ceded operatorship to a foreign company. Field developments in mainly pre-salt areas must be successful, both in an operational and a political context, if demand for OSV vessels are to increase. Petrobras has deleveraged by 6% in recent years, and its partnerships have so far proved successful. Local content requirements have been reduced significantly, and range from 18% to 40%. This summer, the partner outlined plans to invest USD 15 billion in the country over the next ten years. This is a big shift: as well as signalling that Petrobras needs to deleverage further, it also lays the foundations for other foreign companies to enter the Brazilian market.

Still, due to political reasons there is uncertainty over how the next sanctioning rounds will unfold. Principally, Brazil needs to offer good terms and avoid political turmoil in the years to come. If oil production becomes as profitable as oil companies expect, a large part of the OSV fleet could over time find itself in Brazilian waters. In the rest of the world, there are also positive signs. West Africa is looking more promising, and drilling activity is expected to increase over the next couple of years. We are seeing similar trends in other markets, but these surges in activity are from very low levels and are unlikely to employ the entire fleet of OSV vessels.

FORCES AT WORK IMPACTING THE LONG-TERM DEMAND OUTLOOK

Exploration spending	Exploration spending is determined by oil companies but is only based on estimates. If large oil companies increase spending, this could boost demand.	✓
US unconventional sector	The US unconventional industry is competing with the offshore industry for capital investments. For oil companies with the option to invest in either onshore or offshore, projects must have very high returns to compensate for longer payback times.	✗
Peak oil demand	With some projections putting it as early as 2023, peak oil demand will change how oil investments are made, and is likely to shift the focus to short-term investments.	✓ ✗

✗ Negative impact ✓ Positive impact

OSV MARKET DEEP DIVE: OSV FLEET REDUCTION

The large number of owners and low scrap values continue to stand in the way of a market recovery

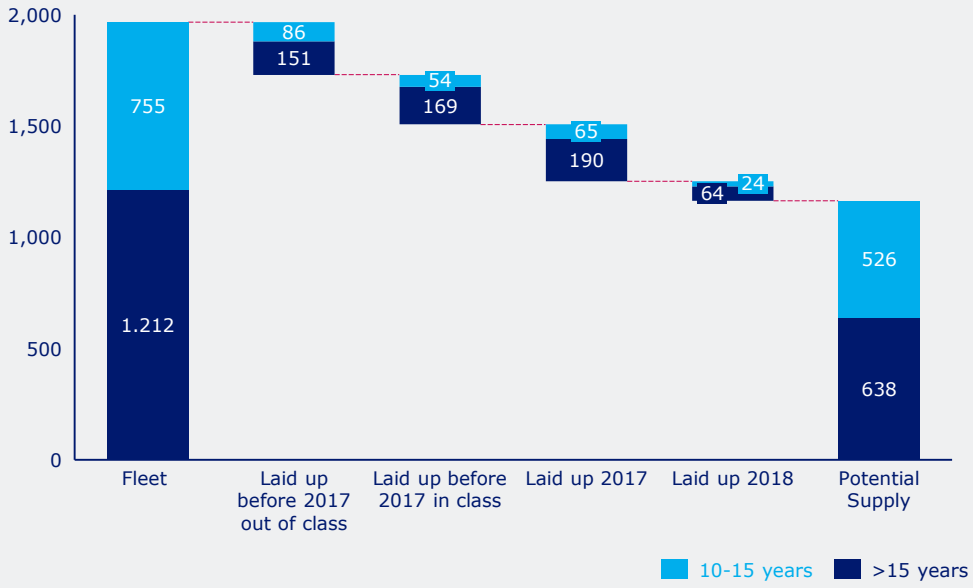
With one-third of the worldwide OSV fleet in lay-up, the situation is clearly not sustainable. The question for the industry is how many vessels will exit the sector. In other shipping segments, such a degree of oversupply would likely warrant increased scrapping of older tonnage, at the expense of the economic lifetime of vessels. Because there are almost 900 owners worldwide, each with an average of five vessels, many are unlikely to be willing to scrap their last vessels. Additionally, the vessels have very little steel value, making it economically unfeasible to scrap them. Scrap values can even be negative if transportation costs are factored into the calculation.

Every market participant knows that there must be a significant reduction in supply if day rates are to exceed the cost of capital. Still, shipping is not a charity and owners are reluctant to sacrifice their vessels when they can instead opt to keep them in lay-up and hope for a market improvement until the vessel is effectively scrapped in situ. Approximately 1,000 vessels have already been scrapped in situ, but there is need for more. This scenario is dependent on shipowners having the capital and/or intention to maintain their vessels combined with possible new regulations from state authorities and oil companies. We have looked at the entire fleet of OSV vessels, which numbers 4,600 vessels globally. We identify 1,212 vessels older than 15 years (26% of the fleet) as being at risk of reaching the end of their economic lifetimes. Depending on the condition of the assets and the status of their class certificates, many of these could be scrapped. Costs for class renewals of vessels are high and typically range from USD 500,000 to USD 3,000,000.

It is therefore unlikely that owners will reactivate vessels without contracts being in place. And contracts long enough to justify reactivation costs are presently not existing. As the graph shows, 237 vessels older than ten years have been laid up for more than two years and are out of class. In total, we identify 803 vessels (17% of the entire fleet) as likely scrapping candidates.

If day rates do not improve in the next couple of years, vessels will require a higher premium to reactivate. Owners with few vessels operating in regional markets, where there are no stringent environmental regulations, could potentially find other employment for their vessels. In the high-end sector, shipowners will likely scrap or sell non-core vessels out of the market. Even though many vessels were state-of-the-art when they were built, in today's market they are considered "over-engineered", meaning that their capabilities far exceed their work scope. However, we believe the more sophisticated units are more likely to return, as scrapping these vessels would make little economic sense.

OSV FLEET OLDER THAN 10 YEARS



Source: Clarksons, Danish Ship Finance

THE SUBSEA VESSEL MARKET

SHIPPING MARKET REVIEW – NOVEMBER 2018

DANISH SHIP FINANCE

THE SUBSEA VESSEL MARKET

Perspectives and key takeaways

OUTLOOK SUMMARY

○	POSITIVE
○	NEUTRAL
●	**NEGATIVE**

The Subsea industry continues to head slowly but surely towards a recovery. Marginally higher E&P spending in the coming years, combined with significant efficiency gains, has resulted in more projects receiving FIDs (final investment decisions). The largest companies continue to take market share, and tonnage providers' pricing power is under pressure. Still, we believe the market is recovering, but it will be a slow process.

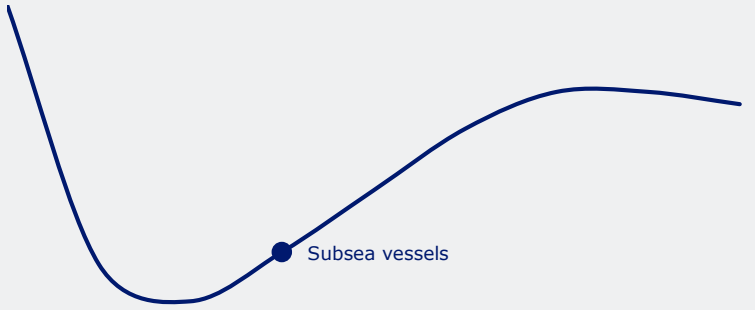
The Subsea market is still challenged, but prospects have improved throughout 2018. Because offshore projects have become leaner and more standardised, offshore sanctioning has picked up. Yet the industry is still not employing its vessels, and contracts are for the most part restricted to the largest players; for the majority, they will remain at low levels in the short term.

The extensive ordering activity in the period 2010-14 is still weighing heavily on the industry, with many shipowners unable to find employment for their vessels. The reduction in E&P spending, combined with delivery of several large Subsea vessels, has left the market struggling with overcapacity. Smaller shipowners are caught in a negative spiral: pricing power in the sector is restricted to larger companies, and they are bidding for projects under significant margin pressure. The largest share of projects being sanctioned are still smaller projects, tie-backs and other forms of near-field development. As there is a relatively short time between project sanctioning (FID) and first production of oil, payback for these projects is shorter. Looking at conventional standalone projects that have been sanctioned, these have been significantly scaled back in terms of cost and size. The most obvious example is Johan Sverdrup full field development, for which the estimated investment has been reduced by more than NOK 80 billion.

It now has a break-even price of less than USD 20 per barrel, compared with USD 40-plus previously. Offshore has thus become a much more competitive industry. This is partially due to Subsea owners and engineering companies teaming up with oil companies and other suppliers to find new solutions. All the largest companies in the Subsea sector have either merged or entered into alliances with other companies. Alliances have proved fruitful, and have been a major contributing factor to contract awards, as they offer oil companies significant value.

Still, the Subsea industry is a backlog industry, and backlogs are starting to increase. This means that companies' book-to-bill ratios of orders received to the amount billed are now above 1. This is resulting in more vessel days for Subsea owners and higher utilisation for vessel owners. The backlog increases are still not high enough to provide tonnage providers with significant pricing power, but things are moving in the right direction.

WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

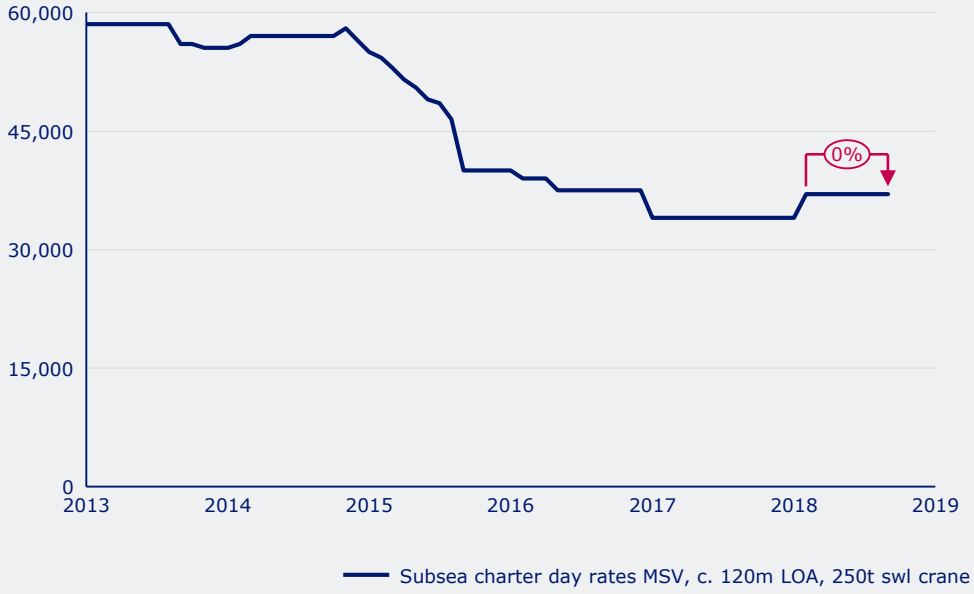
THE SUBSEA VESSEL MARKET

Freight rates and ship prices

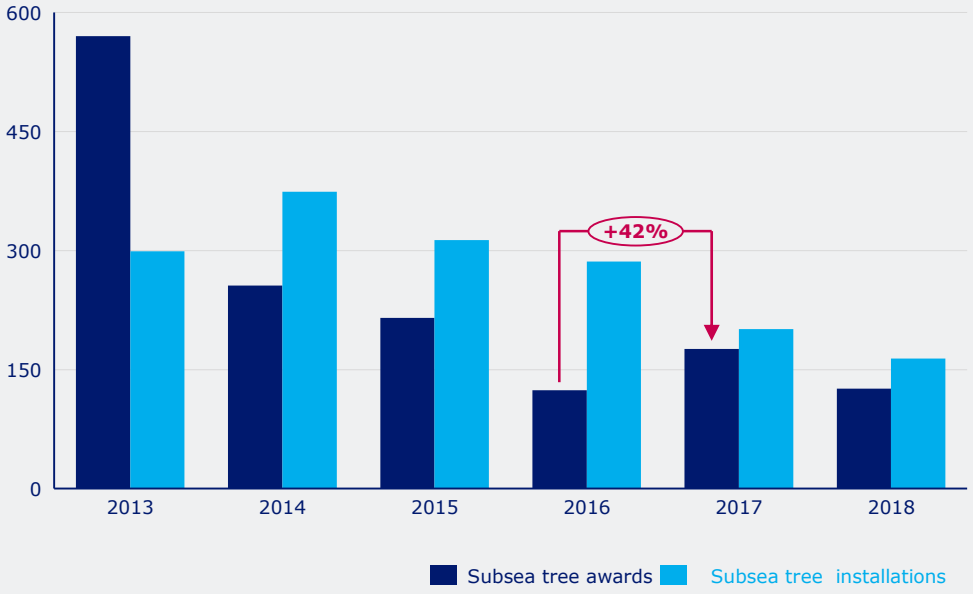
Ship prices and freight rates continue to be under pressure. Projects in the Subsea industry have relatively long lead times, so changes in charter rates occur over longer periods of time. As the Subsea vessel market does not have traditional charter rates, these are interpreted as part of lump-sum contracts. Contract values for projects have been under pressure for years now. Several of the largest companies have had higher profit margins, as some of their projects were awarded before 2014, when margins were significantly higher. While we acknowledge that this is mostly a reflection of the largest players' earnings power, the Subsea market has still stabilised this year, although there could still be downside to asset prices. Owners are not selling their most advanced tonnage, even though we argue that it is the largest companies that could unlock the real value these vessels offer. Advanced vessels can be valuable for some, but not all.

With little liquidity in the market, secondhand values are hard to assess. The few transactions that are made often reflect the outstanding debt on vessels. In the less specialised segments, values are yet to be recalibrated to reflect the vessels' earning power. These are typically construction support vessels with a 250 tonne crane, heavily overrepresented in many tonnage providers' fleets. This means there is intense bidding for relatively small IMR (inspection, maintenance and repair) contracts. The largest companies have also started to bid for these smaller contracts, further reducing the profitability of contracts. Some shipowners are looking to other niches for employment of their vessels, primarily offshore wind but also deep-sea mining. Still, as shown in the chart below, Subsea tree awards in 2017 should translate into more work over the next years.

SUBSEA VESSELS' CHARTER DAY RATES (USD PER DAY)



SUBSEA TREE AWARDS AND INSTALLATIONS



Source: Clarksons, Danish Ship Finance

THE SUBSEA VESSEL MARKET

Supply-side development

The Subsea fleet comprises many different types of vessels, all with many different purposes. Thus, the level of supply depends on which segment we are looking at. The industry as a whole is characterised by oversupply, but the multi-functional support segment and pipe layers have the most excess capacity. Pipe layers were ordered in anticipation of several ultra-deepwater projects being sanctioned in West Africa and Brazil, but this has only partially materialised.

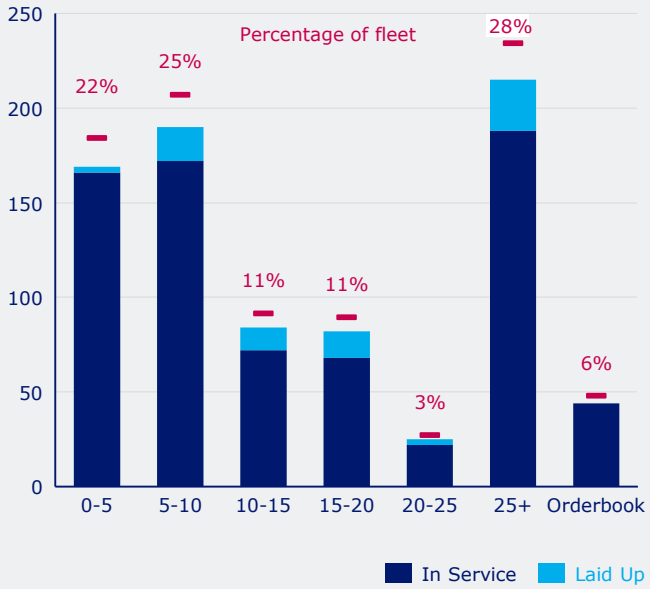
Nine vessels have been delivered since our last report, and seven of these were contracted after 2014, for a very specific scope of work. For example, one advanced pipe-layer has been ordered, similar to one ordered in 2017, built specifically for very long tie-backs, highlighting the need for specialised vessels for select owners.

Only six vessels have been scrapped in 2018. The reason for this low level is that owners have very little economic incentive to demolish vessels, and if they do so, it is often for strategic reasons. This is reflected in the high average age of the scrapped vessels of 40 years.

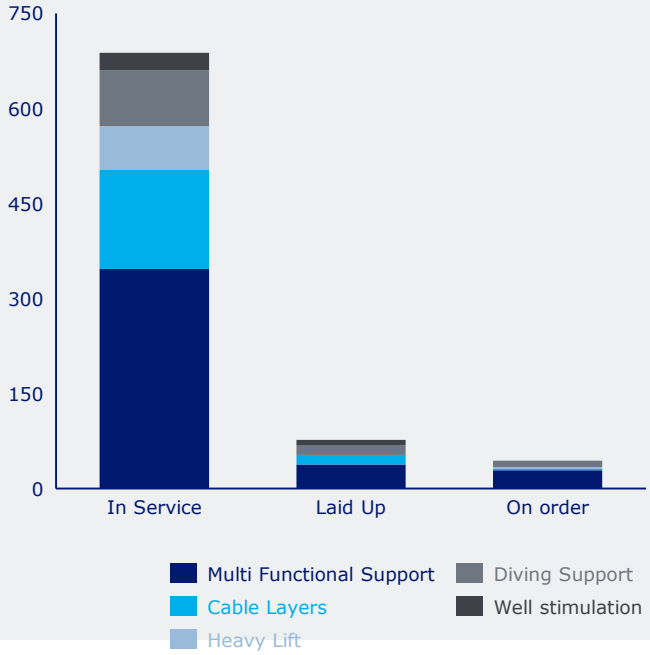
As Subsea vessels are expensive, they offer relatively little scrap value compared with other ship segments. They are often either used for parts, or sold out of the sector.

The orderbook consists of 44 vessels, but more than 50% of the orders are at Asian yards. More than half of the orderbook dates back to 2014 or earlier, and thus vessels are awaiting delivery in yards. One high-specification Norwegian-built vessel has reportedly been sold to one of the large integrated Subsea companies. Still, both the orderbook and the fleet are significantly oversupplied with multi-functional support vessels, and we do not see this changing for the time being.

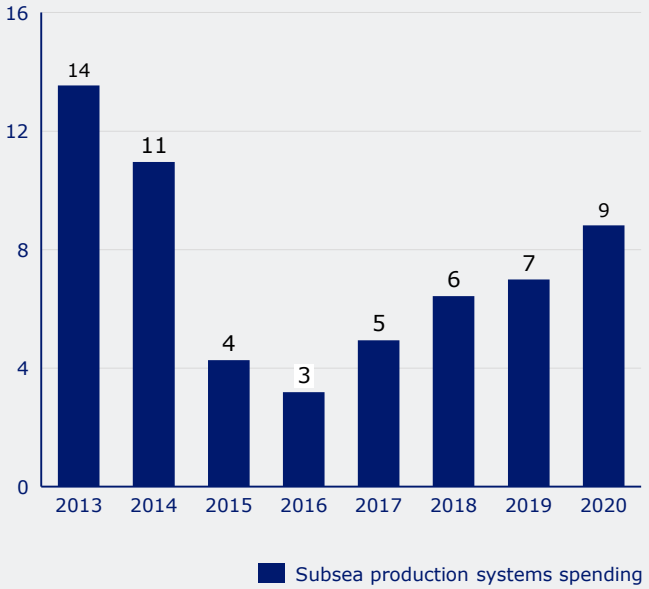
AGE DISTRIBUTION OF FLEET (NO. OF VESSELS)



STATUS OF SUBSEA FLEET



SUBSEA PRODUCTION SPENDING (USD BILLION)



Source: Clarksons, Danish Ship Finance

THE SUBSEA VESSEL MARKET

The market outlook

The Subsea market will remain challenging, but we believe it has passed the bottom of the cycle. As we expect offshore E&P spending to stabilise and become more Subsea intensive, Subsea owners should see a larger share of capital spending coming their way. In tandem with this, we expect demand for renewables and decommissioning services to increase over time. We continue to believe that those that will be the first to reap the benefits of a recovery will be the largest integrated companies with engineering services. When they have achieved full utilisation of their own vessels, they will once again start chartering vessels from tonnage providers on longer-term contracts. As the addressable market is now smaller, and will likely remain so in the coming years, it is to be expected that some owners will leave the industry. There have been several failed attempts by owners to penetrate the tier one group of players; the entry barriers have proved too large, due to the highly complex nature of the industry.

Despite the improving market outlook, the Subsea industry needs to improve its operational models further in order to get projects sanctioned. As we discussed in the previous edition of this report, digitalisation will play an even greater role in the oil and gas industry in the future. Integrated alliances will reduce costs and potentially increase profitability for all parties involved. Reduced time to first oil, through widespread use of standardised components, early involvement in front-end design, and a leaner approach to every part of the project will be key elements in this. As testament to this, book-to-bill ratios (orders received to the amount billed for a period) have started to exceed 1, and thus the largest companies are finally increasing their backlogs. This is a very positive signal, because it secures utilisation of vessels typically for two to four years. The oversupply of vessels is still expected to persist for some years, however, as is the trend whereby the largest companies with engineering capabilities are using their own vessels at the expense of tonnage providers.

FORCES AT WORK IMPACTING THE LONG-TERM DEMAND OUTLOOK

Oil demand	There is high uncertainty as to when oil demand will peak. Oil and gas investments will likely still be needed even the peak, due to depleting production, but the uncertainty could potentially cause large oil and gas projects with longer payback to be postponed.	✓ ✘
Offshore wind	Offshore wind is expected to grow in the coming years. This segment is not as profitable as offshore oil, but it could employ many Subsea vessels.	✓
US conventional oil	The onshore plays in the US continue to attract capital that otherwise would have been directed offshore. How large oil majors choose to invest their capital in the coming years will dictate the pace of growth offshore.	✘ ✓
Robotics and automation	Automated ROVs are in the process of being developed, and pose a threat to the entire IMR market for Subsea vessels.	✘
Decommissioning of older assets	Decommissioning of non-producing oil and gas assets is expected to increase significantly in the next ten years. This represents a cost for oil companies and governments, but worldwide this market is estimated to be worth over USD 32 billion in the period 2018-23.	✓

✘ Negative impact ✓ Positive impact

SUBSEA MARKET DEEP DIVE: PROFITABILITY THROUGH COMPLEXITY

Tier-one companies have gained a sustained competitive advantage

The three largest players have a combined backlog of USD 17 billion, down sharply from a peak of USD 35 billion in 2014. With a smaller addressable market, many companies have either exited the industry or restructured. The average lead time for a Subsea project from award to execution is approximately 3.5 years, which means we have relatively strong visibility into Subsea projects for the coming years. There are fewer complex projects, thus there is less demand for chartering vessels from second and third tier clients. These companies are therefore competing intensively for IMR contracts and other more simple engineering contracts.

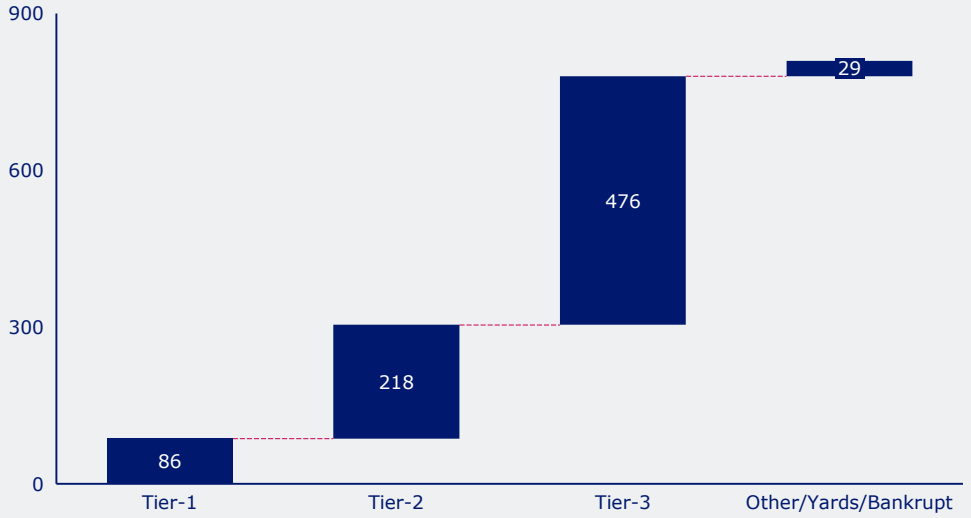
We define tier one contractors as fully-integrated companies with advanced engineering capabilities. They are leaders in the SURF and engineering, procurement, construction and installation (EPCI) segment, as well as construction specialists. What these tier one players have in common is that their organisations are complex, and it is difficult to replicate their business models. We classify tier two companies as owners with IMR capabilities and other forms of light construction and engineering work.

Tier two companies charter in vessels from tier three companies, as well as owning vessels themselves. Entry barriers are low, which means that these players are often competing with smaller local players for contracts. The last group is tier three companies. These are companies with no or very limited engineering experience. They can own very advanced assets, but these are chartered out to tier one or tier two companies. There are too many owners competing for the same IMR contracts globally. Capital investments in offshore have remained relatively flat and are expected to increase modestly next year. Tier one and two owners are relying on a surge in IMR spending. While IMR spending is widely expected to increase, as maintenance work is resumed, this has yet to be realised. Maintenance spending has remained stable at USD 53 billion since 2015.

We believe there are several reasons for this. Firstly, shipowners operating at the high end of the market work with oil companies, which have stringent regulations to follow, postponing maintenance work entails high financial and reputational risk. It is therefore unlikely that oil companies risks-this over time. Secondly, new digital initiatives such as predictive maintenance (discussed in the previous edition of this report) are reducing costs further. Adding to this, there are approximately 10% (400) fewer offshore wells online today than in 2014, implying fewer wells that needs maintenance.

Finally, efficiency gains have been substantial across the value chain, and oil companies are adamant they will keep these in place. The Subsea market is therefore left with a small group of advanced companies that have gained a sustained competitive advantage over the rest. Tier one and two companies will continue to face heavy competition for contracts in the next years.

NUMBER OF VESSELS IN DIFFERENT TIER GROUPS



Source: Clarksons, Danish Ship Finance

THE CRUDE TANKER MARKET

SHIPPING MARKET REVIEW – NOVEMBER 2018

DANISH SHIP FINANCE

THE CRUDE TANKER MARKET

Perspectives and key takeaways

OUTLOOK SUMMARY

- ○ POSITIVE
- ○ NEUTRAL
- ● **NEGATIVE**

Oversupply continues to burden the market, despite a significant increase in demolition. Freight rates remain low, in spite of seasonal gains. Secondhand prices for younger vessels are stabilising, but prices of older vessels are starting to see the impact of a reduced average scrapping age. The long-term outlook for the smaller segments is clouded by structurally declining demand in key regions. The outlook for VLCCs is robust but highly reliant on sustained growth in US crude oil exports.

The Crude Tanker market continues to be burdened by surplus capacity and freight rates are declining. Shipowners have kept the fleet stable, since a strong inflow of new vessels has been counterbalanced by very high demolition activity. The average age of vessels scrapped has declined by two years to 19 years. The orderbook remains front-loaded and accounts for 14% of the fleet, while only 3% of the fleet is older than 20 years. There is little indication that fleet utilisation will improve much before 2020, unless travel speeds are reduced significantly and many vessels are demolished prematurely.

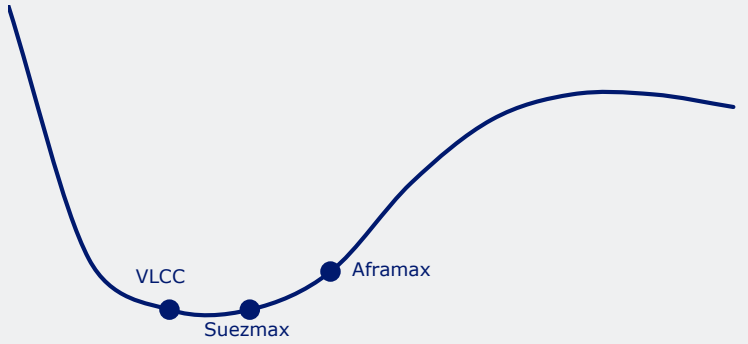
Inventory drawdowns have lowered short-term demand for Crude Tankers, but distance-adjusted demand is expected to increase from approximately 1% this year to 2.5% in 2019. That said, the escalating trade tensions between the US and China are creating uncertainty in the global economy, which could ultimately dampen growth in global oil demand.

In the long-term, the VLCC demand outlook seems relatively robust, while the outlook for Suezmax and Aframax demand looks more difficult. Asia-bound exports are mainly traded on VLCCs, while European imports from West Africa and US imports from South America are Suezmax and Aframax trades. Due to structurally declining import demand in these regions, demand for the smaller ship types is expected to become increasingly squeezed.

The imbalance between supply and demand seems unlikely to narrow in the short term without further premature scrapping of older vessels. But the young age profile of the fleet means that further demolition will inevitably lower the economic lifetime of vessels. Today, the VLCC fleet only has 20 vessels older than 20 years, while 112 are on order. This indicates that there is a significant risk of further reductions in the secondhand prices of vessels during the next year or two.

We expect that many shipowners will begin to slow steam vessels without scrubbers installed after the implementation of the IMO 2020 regulation in order to reduce fuel consumption and lower costs. This will reduce the supply of available tonnage, increase overall fleet utilisation and help freight rates towards a recovery. However, there is a risk that the market may become increasingly divided until the fuel spread narrows. More and more owners are voicing plans to equip their fleets with scrubbers, and estimates suggest that 59% of the current VLCC orderbook will be fitted with scrubbers by 2020. These vessels are more likely to continue to sail at full speed, and thus counterbalance the effects of stow steaming.

WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

THE CRUDE TANKER MARKET

Freight rates and ship prices

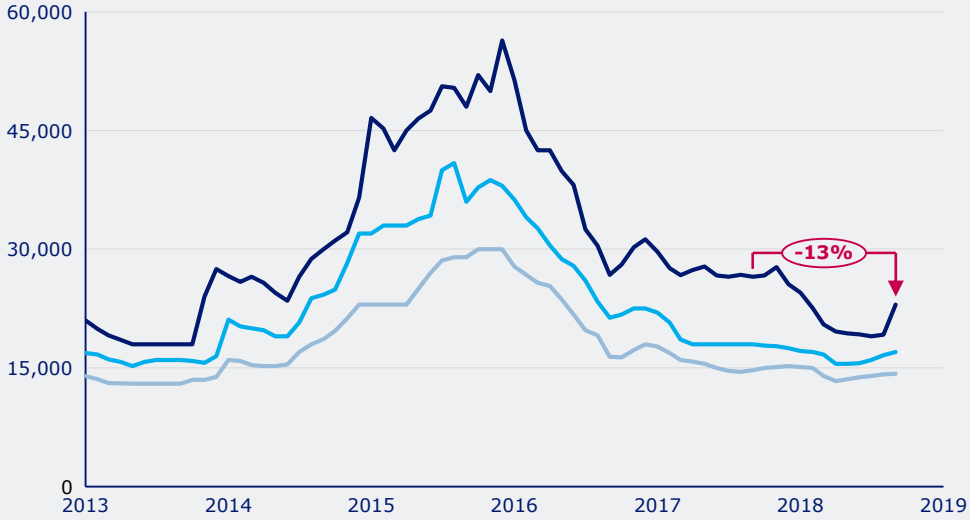
Spot rates remain very low, but for Suezmax and Aframax vessels the downward pressure seems to have eased somewhat since the beginning of 2018. For VLCCs, however, the headwind remains strong and the market reached a new historical low of USD 3,185 per day in May 2018. The same trend can be seen for **timecharter rates**: Suezmax and Aframax freight rates have stabilised since the second quarter, yet despite a net fleet reduction, VLCC timecharter rates have dropped a further 13% the last 12 months year. We note that few vessels have been fixed on timecharters in 2018, which means the timecharter rates shown below may not be entirely representative. There are typically few fixtures when freight rates are low, but the impending IMO 2020 regulation could be exacerbating the situation, as charterers are reluctant to fix vessels without scrubbers.

Newbuilding prices continue to inch upwards and have increased by 11% on average year-to-date, as owners' appetite for newbuilds does not seem to be abating. Shipowners are concentrating orders to fewer yards and this appears to be pushing prices upwards.

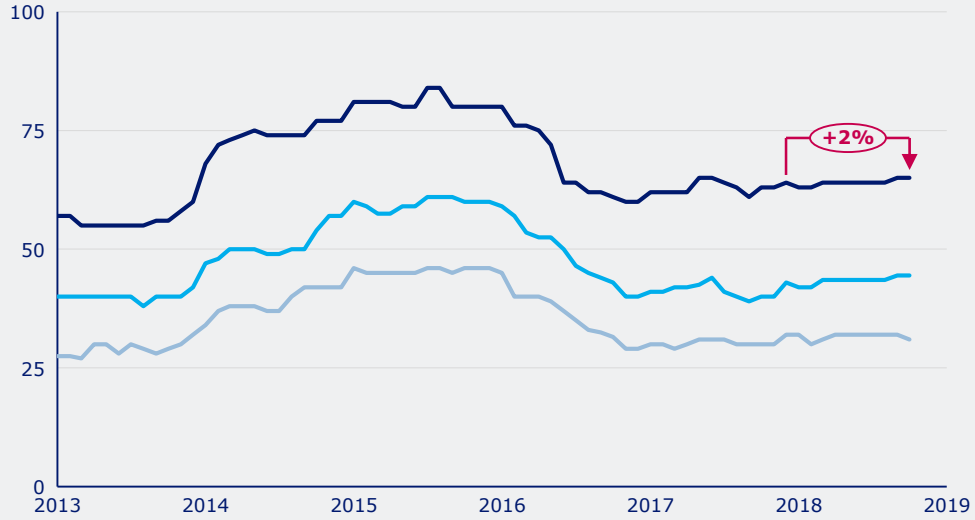
Secondhand prices for five-year-old vessels have been more or less constant since the beginning of the second quarter of 2018. In light of the depressed freight rate market, this suggest to us that demand for modern tonnage that can be retrofitted with scrubbers is currently relatively high, but few sales candidates meet these criteria. For older vessels, average secondhand prices have decreased at the same rate as scrap prices have increased. This indicates that the subdued interest in older tonnage along with reduced economic lifetimes of vessels has started to impact prices.

The VLCC and Aframax segments remain the most active in terms of **sales** in the secondhand market. During the first nine months of 2018, 3% of each of these fleets changed hands, equivalent to 27 VLCCs and 16 Aframaxes, while only three Suezmax vessel was sold.

1-YEAR TIMECHARTER RATE (USD PER DAY)



SECONDHAND PRICES – 5 YEARS (USD MILLION)



Source: Clarksons, Danish Ship Finance

THE CRUDE TANKER MARKET

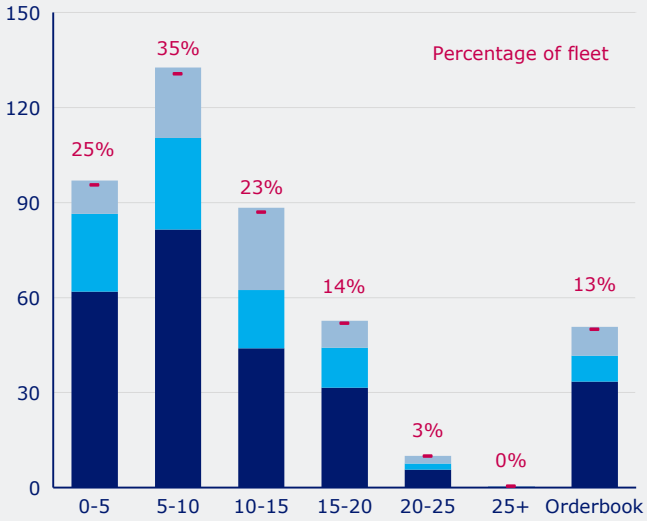
Supply-side development

Contracting continues unabated in 2018, as newbuild prices are still low and owners' confidence in a market recovery is still strong. Interest in VLCCs remains dominant. In the first nine months of 2018, 15.7 million dwt was contracted, equivalent to 73 vessels, which is 1.8 million dwt less than in the same period in 2017. VLCCs account for approximately three out of four new orders.

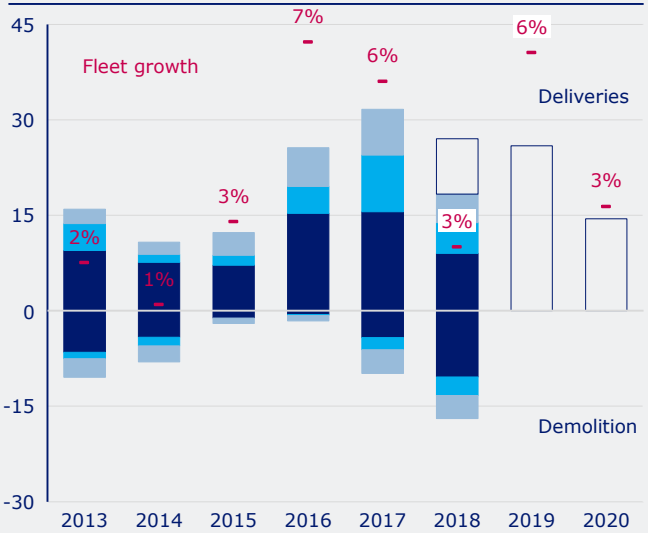
Deliveries have remained high with 16.1 million dwt, equivalent to 82 vessels, delivered in the first nine months of 2018. Of these, 29 were VLCCs. However, this was 7 million dwt less than in the same period in 2017. Order postponements have increased compared to 2017, possibly due to uncertainty about whether newbuilds should be fitted with scrubbers or not, and amounted to 4.7 million dwt in the first nine months of this year. This seems to partly explain the slowdown in deliveries. It is **demolition** that have stolen the limelight in 2018, however. In the first nine months of 2018, 16.9 million dwt, equivalent to 89 vessels, was demolished. This is 88% more, in dwt terms, than in the whole of 2017. VLCCs are leading the charge with 36 vessels scrapped in the first eight months of 2018. The significant increase in demolition for the second year in a row brought fleet growth down to -0.2% in the first nine months of the year. The particularly aggressive scrapping of VLCCs caused the VLCC fleet to contract by -0.7%.

A counter effect of the aggressive scrapping is that the **fleet renewal potential** has worsened in all segments. The number of available scrapping candidates continues to decrease in tandem with demolition. The VLCC orderbook has grown to 15% of the fleet and there are now almost six VLCCs on order for every vessel in the fleet older than 20 years – 12 months ago, this number was 3.5. In short, VLCC owners continue to up the stakes, making the market more vulnerable if demand fails to employ the new vessels entering the fleet.

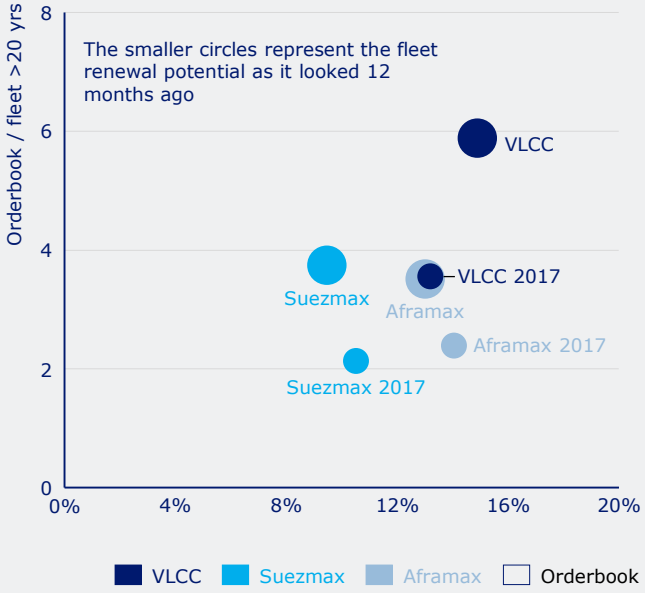
AGE DISTRIBUTION OF FLEET (MILLION DWT)



FLEET DEVELOPMENT (MILLION DWT)



FLEET RENEWAL POTENTIAL (DWT)



Source: Clarksons, Danish Ship Finance

THE CRUDE TANKER MARKET

The market outlook

The significant demolition activity in the first seven months of the year brought fleet growth down to -0.2% and improved market fundamentals. There are several factors that could curb scrapping and cause fleet growth to increase during the rest of the year, however: the dearth of older vessels left in the fleet, the Indian and Pakistani rupees weakening against the dollar, the usual slowdown caused by monsoon season, severe economic difficulties in Turkey, and upcoming restrictions on imported vessels in China. Despite this, demolition activity remains substantial, which is positive for the short- to medium-term outlook, and we believe freight rates could begin to improve going into 2020. After 2019, many shipowners may begin slow steaming to reduce fuel consumption, which will shrink the trading fleet and improve utilisation, further boosting freight rates.

The outlook for Crude Tanker demand remains challenging, however. Tonne-mile demand is expected to grow by around 1% in 2018 and 2.5% in 2019, but is then expected to begin decelerating. Therefore, anything more than a brief recovery in freight rates while the market transitions to the new normal after 2020 and the price spread between bunker and low-sulphur fuel oil narrows, is contingent on shipowners' ability to control ordering.

The long-term deceleration in seaborne crude oil demand growth will be driven by an expected slowdown in seaborne imports in all regions except Asia. The vast majority of trade growth is expected to be on long-haul routes, which are dominated by VLCCs. This means the long-term outlook for Suezmax and Aframax vessels is relatively bleak, with a few bright spots such as the newly developed US-Europe trade and intra-Asia trade as a result of increased pipeline exports from Russia to East Asian markets. However, by and large, we expect any market recovery in the Suezmax and Aframax segments to be dependent on fleet growth being very controlled. For VLCCs, the downside risks appear to be material when trade growth on the US-Asia route eventually – or quite quickly due to the US-China trade war – subsides.

FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

Geopolitical tensions	The worsening conditions for free trade globally and the ongoing US and China trade war could impact the global economy and eventually crude oil demand negatively.	✘
US oil exports	A continued increase in US oil exports to growth markets east of Suez could create stronger demand for large Crude Tankers, which would support tonne-mile demand.	✓
Refinery capacity growth in the Middle East and Africa	Nearly half of new refinery capacity added up to 2023 will be in the Middle East and Africa. More capacity near the wellheads could reduce crude oil exports and Crude Tanker demand.	✘
The clean energy transition	Substitution of crude oil, gas oil and fuel oil with natural gas and renewable energy in the power generation and transport sectors is likely to affect Crude Tanker demand negatively.	✘
Economic growth in emerging markets	Growth in manufacturing and industry and increased living standards could mitigate the impact of structurally declining oil demand in OECD and thus seaborne demand for crude oil.	✓

✘ Negative impact ✓ Positive impact

CRUDE TANKER MARKET DEEP DIVE: VLCC SECONDHAND PRICES

Expectations about the effects of IMO 2020 implementation are running high

Investors in the oversupplied VLCC market seem to believe that market fundamentals are about to bottom out. The newbuilding price of a VLCC has increased by 12% during the past 12 months, while the secondhand prices of five-, ten- and 15-year-old vessels have risen by approximately 10%, or USD 4 million each. The scrap price is relatively high at USD 18 million, having increased by USD 1.25 million during the past 12 months.

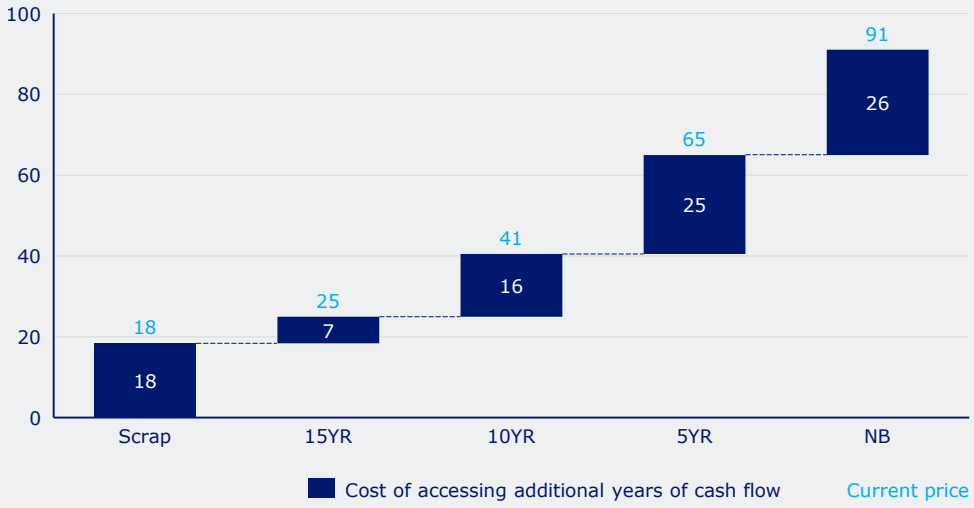
Yet, the balance between supply and demand continues to deteriorate. Owners have scrapped a large number of older vessels, but for each vessel scrapped, 1.2 have been ordered, and thus the fleet remains set to grow. The value of a one-year timecharter contract (equivalent) has declined by approximately 30% (USD 2.5 million) over the past 12 months and is now only USD 2,500 per day above the all-time low. This indicates that the increase in secondhand prices reflects investors' expectations rather than a fundamental market recovery.

To try to understand investors' expectations for future earnings, we have constructed a staircase graph, where each step represents the price of buying access to an additional five years of cash flow. At current prices, a ten-year-old vessel costs USD 16 million more than a 15-year-old vessel. This indicates that investors expect to earn at least USD 16 million between 2023 and 2028.

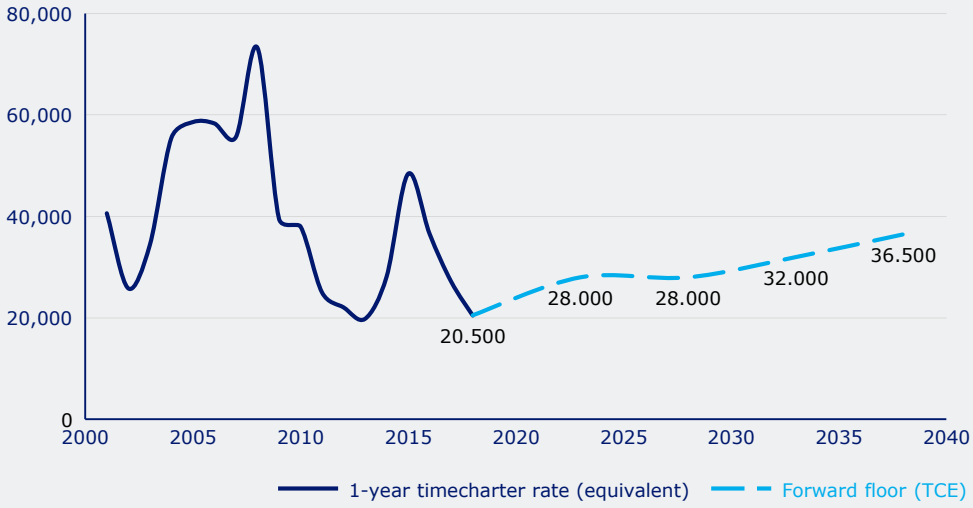
We have translated these findings into a forward curve (a floor), based on secondhand prices and an expected economic lifetime of 20 years. We find that investors currently expect the VLCC market to recover from today's level of an approximate timecharter rate equivalent of USD 20,500 per day to USD 36,500 per day in 2038. Most of this growth, USD 8,000 per day, is expected to materialise before 2023, which we attribute to be due to the implementation of the IMO 2020 regulation. While vessels may slow steam and remove some capacity from the market, we find a USD 8,000 per day premium hard to justify.

We see additional downside risk to secondhand prices from an expected reduction in the economic lifetime of vessels, vessels not slow steaming as expected, or demand failing to meet investors' current expectations.

VLCC SECONDHAND PRICES (USD MILLION)



1-YEAR TIMECHARTER RATE AND FORWARD CURVE (USD PER DAY)



Sources: Clarksons, Danish Ship Finance

THE PRODUCT TANKER MARKET

SHIPPING MARKET REVIEW – NOVEMBER 2018

THE PRODUCT TANKER MARKET

Perspectives and key takeaways

OUTLOOK SUMMARY

- ○ POSITIVE
- ● **NEUTRAL**
- ○ NEGATIVE

Oversupply is keeping the Product Tanker market depressed with low freight rates and secondhand prices. Supply-side pressure is easing, but downside risk to the demand outlook is building. Implementation of the IMO 2020 regulation may spark a temporary recovery in freight rates, but the age profile of the fleet continues to hold back secondhand prices of older vessels. The MR segment is better positioned than the LRs, as it contains more older vessels.

The Product Tanker market remains burdened by overcapacity. Freight rates are under pressure and have dropped to the lowest levels for almost ten years. Some excess capacity in the similarly depressed Crude Tanker market is gravitating into the Product Tanker market and reducing employment opportunities for the latter. Shipowners are working to dampen fleet growth with increased demolition activity and less contracting activity. The orderbook, at 9% of the fleet currently, is slimming down, but it is very front-loaded: more than 70% of orders are expected to be delivered before the end of 2019.

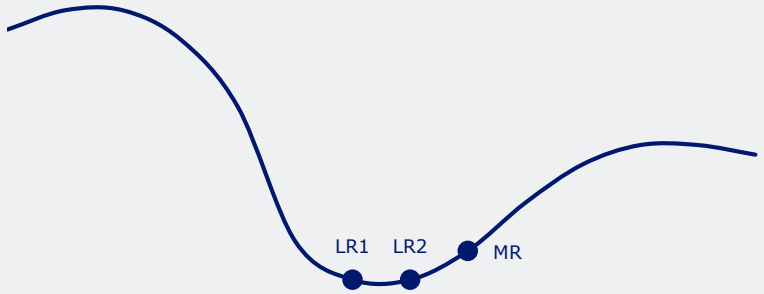
The firming global economy has supported consumption of oil products in 2018, and demand for Product Tankers is expected to show growth of around 2% this year, a deceleration from the last few years. Most analysts are currently expecting Product Tanker demand to grow by 3-4% in 2019 and 2020, but downside risk is building. We are more cautious, as we believe the combination of rising oil prices, a strengthening US dollar, higher interest rates and escalating geopolitical risks pose a growing challenge for steady growth, particularly in emerging markets.

We expect the IMO 2020 regulation to boost Product Tanker demand in the short term and improve fleet utilisation. Freight rates may rise accordingly. However, we expect the uptick in demand to be temporary.

The surplus capacity may begin to shrink in 2020, but much will depend on the high level of demolition activity continuing. In the LR2 segment, only 11 vessels are 20 years or older and in the LR1 segment there is only one vessel left in fleet older than 20 years. Most, if not all, of these older vessels can be expected to be scrapped rather than upgraded for compliance with the upcoming regulation. This would bring the economic lifetime of LRs under significant pressure. It appears that some of this pressure is already being felt in secondhand prices of older vessels, which have seen a significant decline of 20% in 2018.

The MR segment remains much more robust. The large number of older vessels in the MR fleet means that its orderbook can be almost fully absorbed if these older vessels are scrapped accordingly. Furthermore, the smaller vessels are enjoying more employment opportunities, which makes them more flexible. The average scrapping age has also declined for MRs but has settled at around 25 years, which means that there has been little structural pressure on secondhand values.

WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

THE PRODUCT TANKER MARKET

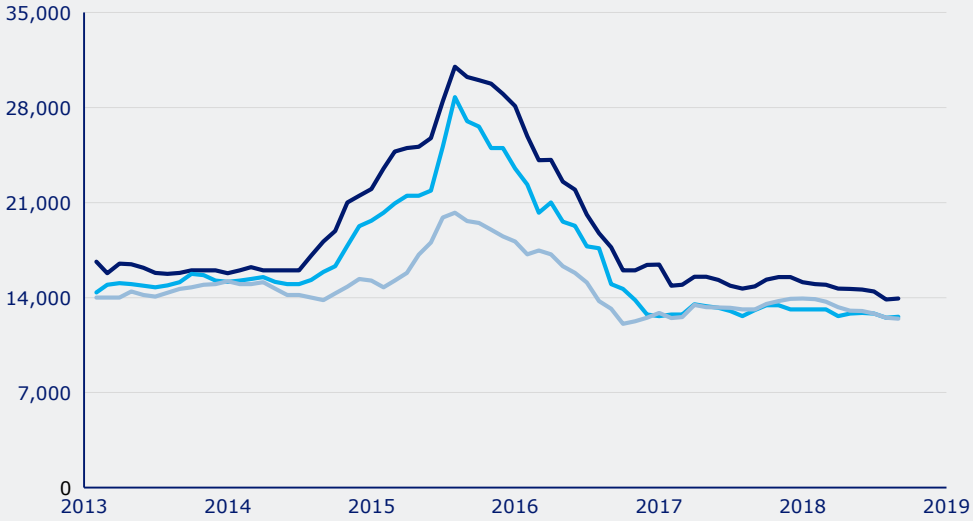
Freight rates and ship prices

Surplus capacity in the Product Tanker market has grown further in 2018. A decline in import volumes to Brazil and a number of South East Asian countries have increased vessel availability. Moreover, a number of Crude Tankers are diverting to the Product Tanker market on their maiden voyages and taking cargoes from the Product Tanker fleet. A VLCC is equivalent to about six MRs, and hence this has a relatively large impact on the employment opportunities for Product Tankers. The downward trajectory of **spot rates** continued in the first nine months of 2018, with a 60% decline from USD 11,800 per day to USD 4,500 per day on average. The market has not seen spot rates this low since August 2009. **Timecharter rates** also remain low but have been more stable, declining by an average of 8% in the first nine months of 2018.

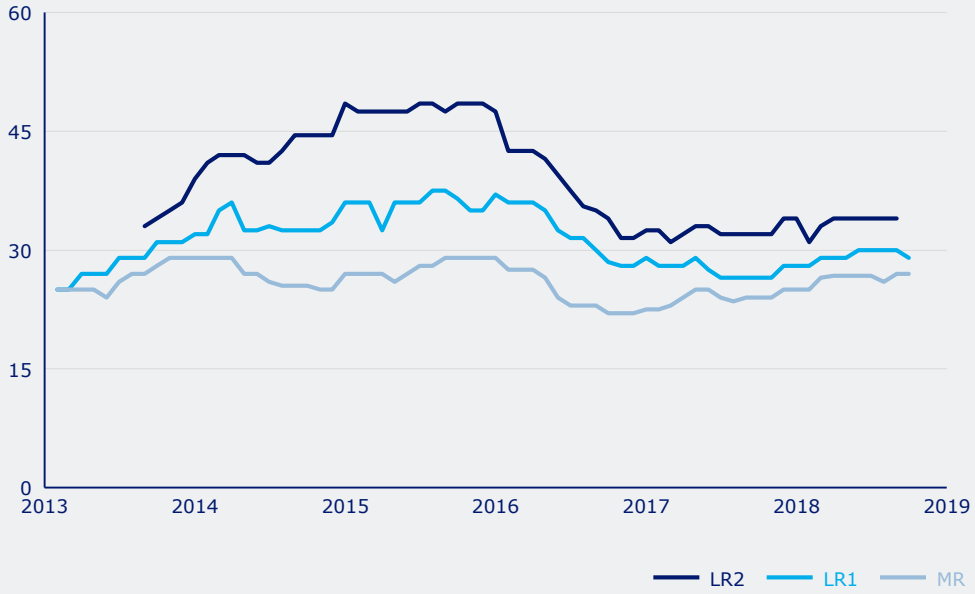
As we have emphasised previously, modern tonnage is more attractive than older vessels, and this trend appears to have become entrenched in secondhand prices. Despite the low freight rates, the price for a five-year-old vessel has increased by an average of 5% in 2018. In contrast, the secondhand price for a ten-year-old vessel has come down by 20%. This is a reflection of the increased costs associated with making older vessels compliant with upcoming regulations, their lower fuel efficiency and their declining economic lifetimes being taken into account. **Newbuilding prices** have risen by an average of 5% in 2018, but of the 62 orders placed in the first nine months of 2018, 66% in dwt terms were placed at only four shipyards. The price development is therefore more an indication of the bargaining power of these yards than of a fundamental market improvement.

Sales activity has been high, with nearly the same amount of vessels changing hands in the first nine months of 2018 as in the whole of 2017. In line with the market preference for newer ships, we see that 60% of tonnage sold so far in 2018 has been vessels younger than ten years old. In 2017, only 43% of vessels sold in the secondhand market were younger than ten years.

1-YEAR TIMECHARTER RATE (USD PER DAY)



SECONDHAND PRICES – 5 YEARS (USD MILLION)



Source: Clarksons, Danish Ship Finance

THE PRODUCT TANKER MARKET

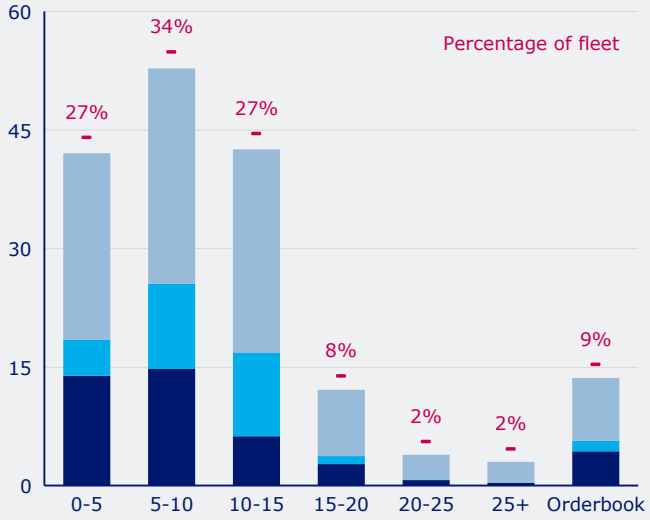
Supply-side development

In 2018, appetite for newbuilds has waned again from last year's high, but **contracting** is still above the low levels from 2016. In the first nine months of 2018, 3.2 million dwt, or 62 new vessels, was contracted, which is 38% less than in the same period in 2017. The reduced contracting activity has had a positive impact on the orderbook, which has shrunk in dwt terms to a low not seen since the beginning of 2013.

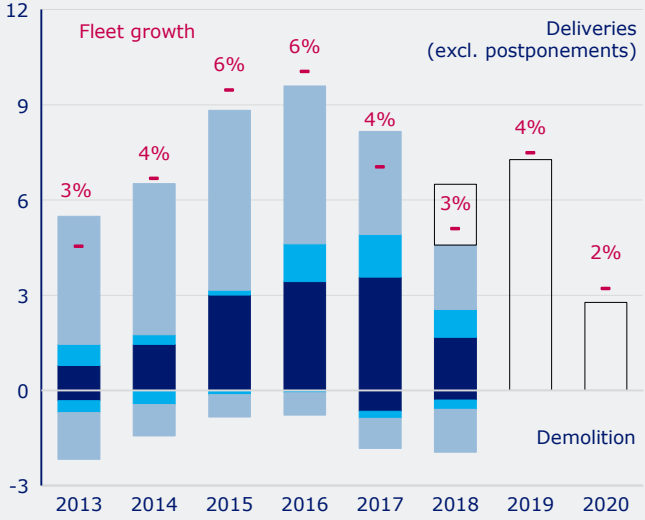
In line with contracting, **deliveries** have also declined this year. In the first nine months, 4.5 millions dwt was delivered, a 34% decline compared with the 6.7 million dwt delivered in the same period last year. Thus, for the second year in a row, deliveries are declining. In 2017, only MR deliveries slowed down, but in the first nine months of this year, deliveries are down in all three segments, most notably for LR2s with a 46% drop. **Demolition** continues at a rapid pace. In the first nine months of this year, 2.0 million dwt was demolished, a little more than in the whole of 2017. This resulted in net fleet growth of 1.6% in the period. The MR segment accounted for the majority of scrapped vessels, with 1.4 million dwt demolished in the first nine months of the year. However, this segment also had the largest number of candidates for scrapping.

The **fleet renewal potential** graph, which shows the relationship between the orderbook and the number of available scrapping candidates, clearly illustrates the shrinking orderbook in the LR segments. The MR segment is looking robust, as there are only 1.3 vessels on order for every vessel over 20 years in the fleet. At the other extreme, the LR1 segment has 22 vessels on order for every vessel over 20 years in the fleet. This indicates that if trade routes shorten or demand is otherwise adversely affected, the LR1 fleet will be unable to address the potentially massive oversupply through scrapping, without reducing the economic life of the fleet when vessels younger than 20 years become natural scrapping candidates.

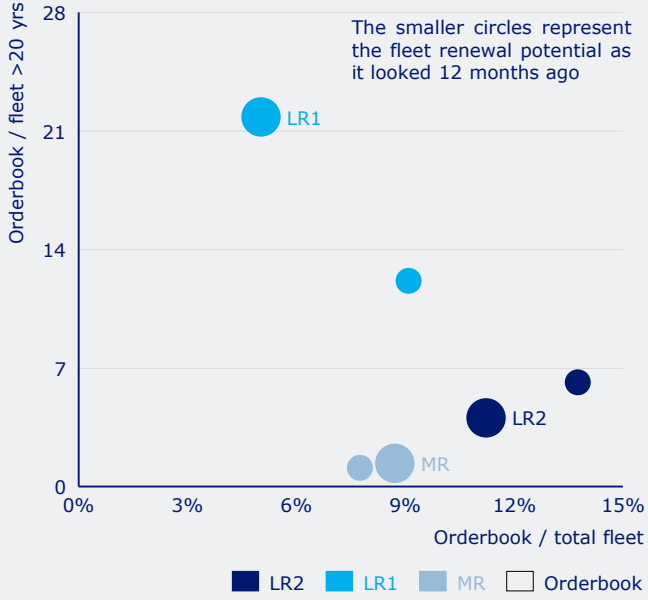
AGE DISTRIBUTION OF FLEET (MILLION DWT)



FLEET DEVELOPMENT (MILLION DWT)



FLEET RENEWAL POTENTIAL (DWT)



Source: Clarksons, Danish Ship Finance

THE PRODUCT TANKER MARKET

Market outlook

The thinning orderbook and continued strong demolition activity indicates that fleet growth will slow down in the coming years. Demand growth is expected to decelerate from the higher levels seen in recent years to around 2% in 2018, but then increase some to around 3-4% in 2019 and 2020. This means that the vessel surplus could begin to narrow.

In the short term, the biggest uncertainty surrounding Product Tanker demand is the approaching IMO 2020 sulphur cap regulation. We expect demand for Product Tankers to accelerate in the run-up to implementation of the regulation and to stay at an elevated level in the ensuing period, but eventually we expect demand growth to normalise, although how long this will take is uncertain. Thus, in the short term, we expect the IMO 2020 regulation to be positive for demand for Product Tankers, and not just add costs for owners.

End-user demand is projected to remain strong in the medium term, but Product Tanker tonnes-mile demand may face challenges. Asian refinery capacity continues to increase, and refineries are being upgraded, which means that they will begin to cater for a larger share of domestic demand. Hence, travel distances are likely to shorten and fewer long-haul cargoes will be moved across regions.

Intra-Asian short-haul trades are supporting MR demand, but trans-Atlantic and intra-regional trades in Europe are also contributing. Petrochemical demand in Asia is supporting LR1 trade on the benchmark Arabian Gulf-Far East routes. Firm oil product demand in West Africa is underpinning imports from European refineries, as no major refinery capacity additions are planned in West Africa. Diesel exports to Europe from the Middle East are also likely to continue to support LR1 trade. Asian imports of naphtha and jet fuel, from the expanded refinery capacity in the Middle East, are driving demand growth in the LR2 segment. Furthermore, high refinery runs in China should support inter-regional trade in Asia for LR2 tankers.

FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

Growth in domestic refinery capacity in Latin America	In Latin America, particularly Mexico and Brazil, governments have voiced plans to expand the domestic refinery industries. Oil product imports from the US could decline as a result.	✘
IMO 2020 low-sulphur fuel regulation	Low-sulphur fuel will be transported to various bunkering ports by Product Tankers, which could create new trading routes and increase demand.	✓
Strong growth in the petrochemical sector	Seaborne demand will be positively impacted if the petrochemical sector continues to increase its demand for naphtha as a feedstock, as is currently expected.	✓
Vehicle fuel efficiency gains	Rapid advances in fuel efficiency gains are expected to curb the pace of growth in demand for oil products, which will also curb growth in seaborne demand for Product Tankers.	✘
Decarbonisation of the economy	Decarbonisation of the global economy as cost competitiveness of green technologies, energy storage and infrastructure improves will affect demand negatively in the long run.	✘

✘ Negative impact ✓ Positive impact

PRODUCT TANKER MARKET DEEP DIVE: JET FUEL DEMAND

Jet fuel demand is expected to continue to grow as global living standards improve

The global middle class is expanding fast, a trend that is expected to continue as the global economy keeps growing. Each year up to 2025, 160 million people are projected to join the middle class, the vast majority from developing economies. The expanding middle class will, among other things, drive steady growth in demand for jet fuel in the 2020s.

According to IHS Markit, air passenger traffic in developing economies will be larger than in developed economies by 2022. Asian air travel, in particular, is ramping up, mainly due to growing competition from low-cost carriers, which are increasingly challenging legacy operators. The largest low-cost carrier markets in the world are now India, Indonesia and China.

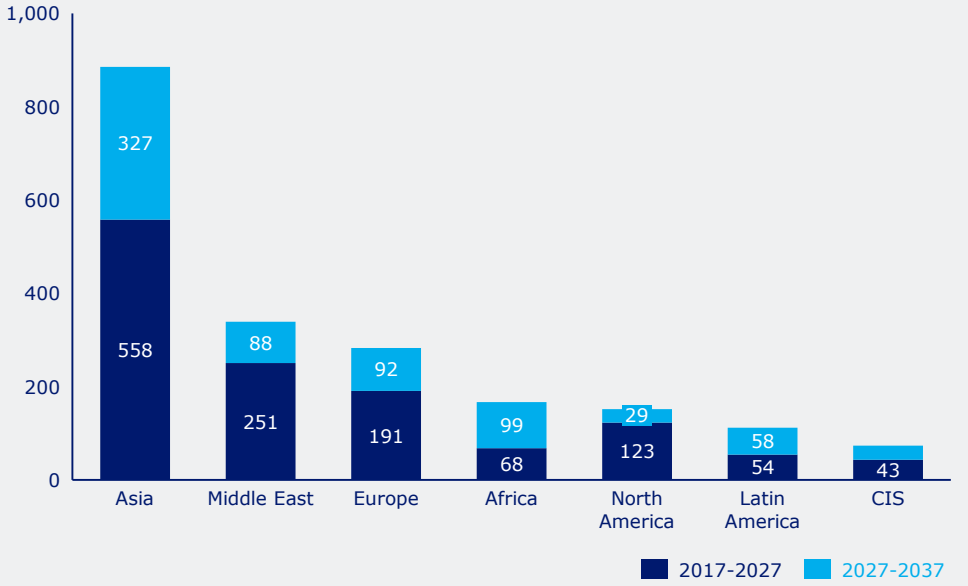
As the global economy grows and the global middle class expands further, jet fuel demand is projected to continue to increase, by over 2% annually up to 2025. Over the next five years this means that growth in seaborne jet fuel is expected to grow by 80 billion tonne-miles, and account for 25% of total expected growth in seaborne trade of oil products.

Even in the longer term, jet fuel demand will continue to grow. However, the pace of growth is expected to begin subsiding from the mid-2020s onwards to a level closer to 1% growth annually due to efficiency gains. Overall, fuel efficiency gains pose the biggest risk for demand growth, together with higher oil prices, as jet fuel demand is highly price elastic. Eventually, new fuel and engine technologies could threaten demand for jet fuel, but unlike for road transport, this does not appear to be imminent.

Growing refinery capacity in Northeast Asia means that this region will remain a key exporter, as excess supply of jet fuel is likely to bring prices down and support arbitrage trade. The biggest demand growth is also expected to be seen in this region, and intra-Asia trade is expected to be boosted, supporting demand for MR vessels. Northeast Asian exports to North America, a long-distance trade, are forecast to remain the biggest trade for jet fuel, in terms of volumes transported, which will support tonne-mile demand and demand for LRs. The Middle East is also expanding its domestic refinery capacity to capture a higher share of the lucrative downstream refining market. This means that jet fuel demand growth in the Middle East is unlikely to contribute much to seaborne trade growth. However, Europe is increasingly expected to source its jet fuel demand from the Middle East, at the expense of longer-distance imports from Asia. Meanwhile, Australian demand is also growing and the additional volumes are expected to be sourced primarily from Northeast Asia.

Today, jet fuel only represents about 8% of total oil product demand, but the expected strong growth in jet fuel demand in the short term and the steady increase expected in the longer term will ensure it is a steady factor underpinning growth in Product Tanker demand.

JET FUEL DEMAND GROWTH (THOUSAND BARRELS PER DAY)



Source: IHS Markit, Danish Ship Finance

THE LPG TANKER MARKET

SHIPPING MARKET REVIEW – NOVEMBER 2018

THE LPG TANKER MARKET

Perspective and key takeaways

OUTLOOK SUMMARY

- ○ POSITIVE
- ● **NEUTRAL**
- ○ NEGATIVE

The LPG market is at a cyclical low, with freight rates, newbuilding and secondhand prices close to all-time low levels. Market fundamentals are expected to improve in 2019, driven by demolition activity and increasing Asian LPG demand powered by China and India. However, the current oversupply is likely to mute the positive effects on freight rates in 2019. Shorter travel distances could further dampen the market upswing as the US-China trade war limits long-haul US exports to Asia.

In the first nine months of 2018, seaborne LPG demand increased more strongly than supply. Demand expanded by 2-4%, while the fleet only grew by around 0.5%. However, the positive effect of this was subdued by the oversupply of vessels.

Only VLGCs benefited from the positive market development in the first nine months of the year. Increasing vessel demand was driven by long-haul spot trade from the Middle East and the US to Asia region, which supported VLGC utilisation and boosted freight rates. In spite of this, the VLGC market remains oversupplied. In the MGC and SGC segments, freight rates and secondhand values are still close to all-time low levels. For conditions to improve in these segments, competition from the oversupplied VLGC market needs to subside. In the Coastal Carrier segment, freight rates remain high due to low fleet growth and steady demand.

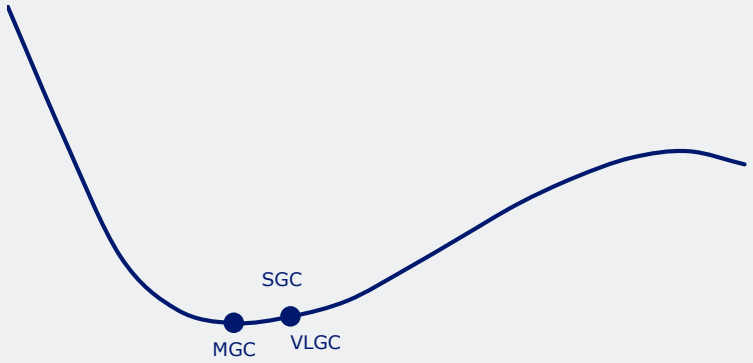
The general interpretation of the LPG market seems to be that it is heading for a recovery in 2019 and 2020, propelled by a slowdown in deliveries, high demolition activity, longer travel distances and robust demand growth. Despite the positive development in the supply and demand balance during the first nine months of 2018, we believe any market recovery will be slow. We do not expect conditions in the LPG market to change markedly before 2021.

Although deliveries slowed in 2018, they are set to increase in 2019 and to outpace demand in 2020. One way for fleet growth to be kept in check over the next two years is demolition. Shipowners' willingness to scrap older vessels did increase significantly in the first eight months of 2018. However, sustaining this level of demolition activity would likely lower secondhand prices, specifically for older vessels, as the economic lifetime of vessels would continue to decline. Another way for the market to absorb deliveries is increasing travel distances. Yet, longer travel distances are primarily driven by US exports to Asia, and the US-China trade war is expected to limit long-haul US exports to Asia. Declining volumes of US LPG to the Asian market will raise Asian LPG prices, which could result in lower than expected demand growth in 2019 and 2020.

In our view, these challenges, coupled with the current oversupply of vessels, are likely to delay the recovery.

The outlook for seaborne LPG over the lifetime of a newbuild vessel (20-plus years) remains challenging. Competition from solar power and natural gas is expected to lower demand growth from households in the long term. This is already happening in Europe and some Asian countries. The growing focus on reducing the use of plastic and on plastic recycling could likewise reduce long term LPG demand growth from the petrochemical sector. The household and petrochemical sectors together account for around 70% of global LPG consumption.

WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

THE LPG TANKER MARKET

Freight rates and ship prices

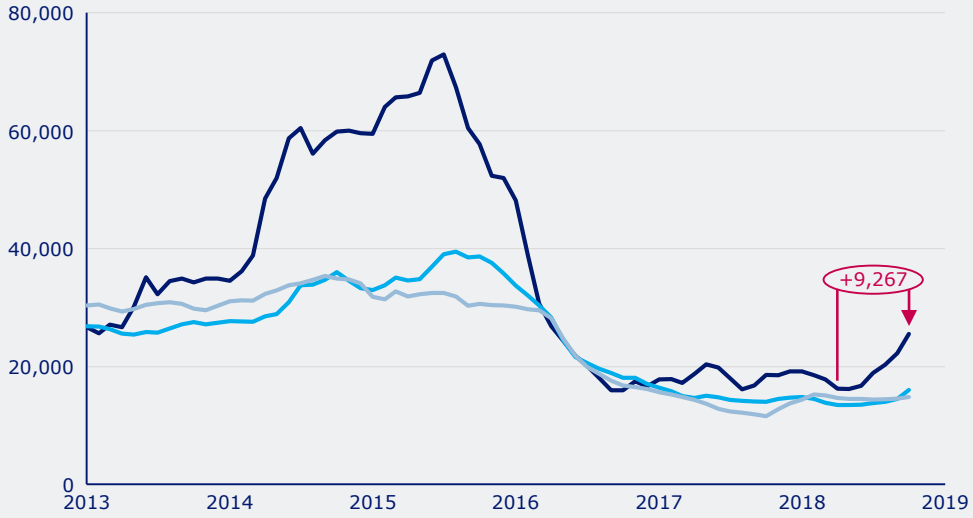
The VLGC timecharter rate reached round USD 25,500 per day in September 2018 following an increase around 60% from its May 2018 value of around USD 16,100 per day, which was close to an all-time low. The uptick in the VLGC rate was driven by increasing vessel demand in the spot market and an early start to winter stockpiling.

The slump in the MGC segment continues, as the timecharter rate hit a new all-time low in April 2018 of around USD 13,500 per day. The MGC rate has since recovered to around USD 16,000 per day at end October. The segment remains oversupplied as competition from the larger VLGC ships limits demand growth for MGC ships. The SGC timecharter rate was stable during the first ten months of 2018 at around USD 14,600 per day. Even though SGC fleet growth was just below zero in the period, this did not translate into increasing rates. Competition for SGC cargoes has intensified, as an increasing number of vessels from the oversupplied MGC market are operating in the SGC market. Clarksons spot fixture data shows a decline in the average SGC LPG spot cargo size of around 12% from 2016 to 2018 year-to-date.

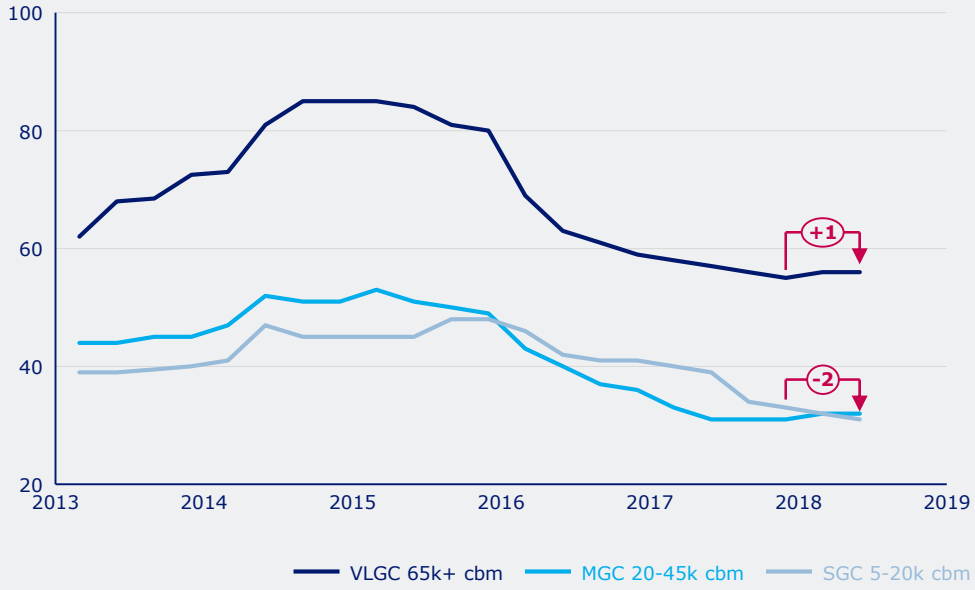
Newbuilding and **secondhand prices** remain close to all-time low levels, although some segments have seen marginal improvements. Secondhand prices for five-year-old VLGCs and MGCs increased by USD 1 million each during the first half of 2018, to USD 56 million and USD 32 million, respectively. In the same period, the SGC price declined by USD 2 million to USD 31 million.

Activity in the **secondhand market** reached a five-year high in the first eight months of 2018. A total of 23 ships changed hands – 14 VLGCs, three MGCs and six SGCs – indicating a turnover rate of around 3%, measured by number of vessels. The increased activity indicates that some shipowners believe a market recovery is relatively close and are positioning themselves for the next upswing in freight rates.

1-YEAR TIMECHARTER RATE (USD PER DAY)



SECONDHAND PRICES – 5 YEARS (USD MILLION)



Source: Clarksons, Danish Ship Finance

THE LPG TANKER MARKET

Supply-side development

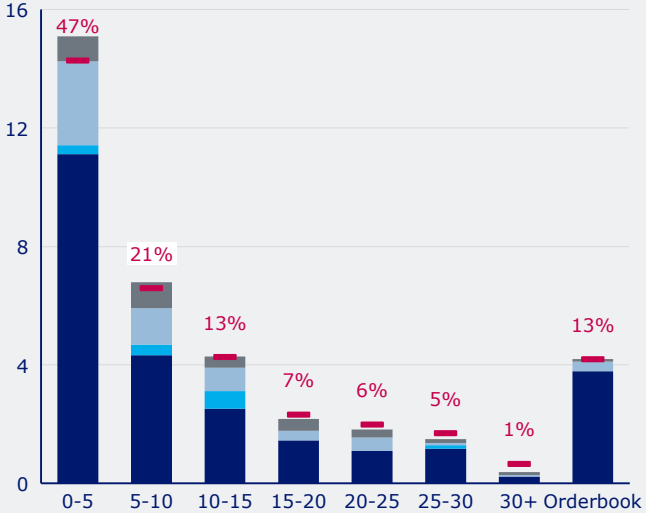
The LPG **fleet** consists of 267 VLGCs, 23 LGCs, 193 MGCs and 361 SGCs, of which 28 MGCs and 124 SGCs make up the ethylene niche segment. The huge number of deliveries from 2015 to 2017 had a significant impact on the age distribution of the fleet, and around 70% of the fleet is ten years or younger. The **orderbook** contains 62 ships: 39 VLGCs, 11 MGCs and 12 SGCs, with a combined cargo capacity of 3.5 million cubic metres, equalling 11% of the fleet. The LPG fleet has limited scrapping potential, as only 6% of the fleet is older than 25 years. The capacity in the orderbook cannot be absorbed by older ships exiting the fleet without the economic lifetime of the vessels being lowered to at least 24 years by 2020.

In the first eight months of 2018, **contracting** kept pace with **deliveries** and the orderbook did not decline, measured by capacity. A total of six VLGCs, 13 MGCs and nine SGCs were delivered during the period and 17 VLGCs, three MGCs and six SGCs were ordered.

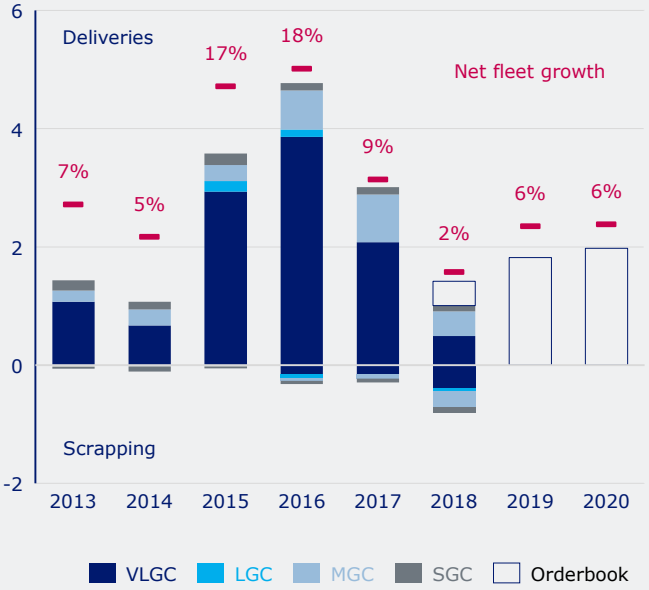
Accelerated **demolition** activity significantly lowered fleet growth in the first eight months of 2018, with five VLGCs, one LGC, eight MGCs and nine SGCs, corresponding to around 2.5% of the fleet, scrapped. The increasing number of vessels exiting the fleet has lowered expected net fleet growth for 2018 to around 2%. However, it has also pushed the average demolition age below 30 years and left the fleet with very few remaining scrapping candidates. Only 23 VLGCs, two LGCs, seven MGCs and 20 SGCs are 25 years or older. In 2017, the average scrapping age was around 31 years.

The **fleet renewal potential** chart below illustrates that both the MGC and SGC segments will be able to absorb the capacity in the orderbook without the vessels' economic lifetime dipping below 25 years. Yet, the VLGC and the ethylene segments only have around one ship over 25 years for every two ships in the orderbook. For these segments, absorbing the orderbook will result in value destruction as the vessels' economic lifetime would be reduced to around 20 years.

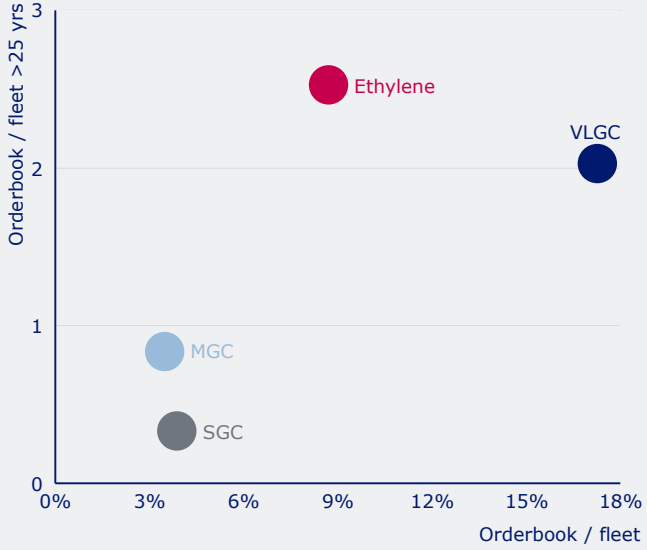
AGE DISTRIBUTION OF FLEET (MILLION CBM)



FLEET DEVELOPMENT (MILLION CBM)



FLEET RENEWAL POTENTIAL (CBM)



Source: Clarksons, Danish Ship Finance

THE LPG TANKER MARKET

Market outlook

The **short-term outlook** (one to two years) for the LPG market is being depressed by the US-China trade war. In June 2018, China imposed a 25% tariff on LPG imports from the US, a move which immediately caused a change in trade patterns. China has shifted towards Middle Eastern supply and US exports have been diverted to other Asian countries. A prolonged trade war between China and the US would be damaging for the LPG market. Without access to the fast-growing Chinese market, US LPG exports would expand at a slower rate and the added demand for Middle Eastern LPG could increase Asian LPG prices and lower demand growth.

Low growth in US exports, specifically long-haul exports to Asia, would prolong the recovery period for the LPG market. Long-haul trade is the main driver for the VLGC segment, and without increased utilisation the large ships will continue to compete against smaller segments on shorter routes. This will sustain the intense competition among the segments.

Not accounting for demolition, we expect both supply and demand to grow by roughly 6% in 2019. Demand should to be boosted by new capacity coming online in the Chinese petrochemical sector in 2019. In 2020, supply is expected to continue to grow by around 6%, while growth in demand is expected to decline to around 4%. From 2021, the current orderbook runs out and we expect market conditions to change markedly if the pace of future newbuild orders stays below demand growth.

Over **the next five-year period**, we expect demand growth to average around 4% per year. Growth will continue to be driven by the Asian region, with China and India expected to be the main growth markets. Currently, China and India account for around 24% and 14% of global LPG imports, respectively, and imports are expected to grow at a CAGR of around 9% over the next five years. Given this growth rate, the two countries will account for around 50% of the global market by 2023.

FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

US-China trade war	Trade flows are changing. A prolonged trade war could increase Asian LPG prices and lower global demand growth.	✘
Asian demand	In the long run, Asian demand is expected to continue to drive long-haul US supply, boosting distance-adjusted demand.	✓
Emerging economics	Replacing dirty-burning fuels like charcoal with LPG in households could spark higher LPG demand. However, the downside risk from solar-powered cooking stoves persists.	✓
Changing consumer habits	Governments are banning plastic products like straws, cutlery and cotton buds and adding taxes to plastic bags. This will lower consumer demand for petrochemical products.	✘
Circular economy	Applying circular economy principles to the plastics industry could reduce the growth rate of new plastic production.	✘

✘ Negative impact ✓ Positive impact

LPG DEEP DIVE: THE ETHYLENE TANKER MARKET

Perspectives and key takeaways

The seaborne ethylene market is set for a boom, driven by massive expansion of US ethylene production, although the upswing could be muted by the accelerating use of ethylene in the US petrochemical industry and by the current oversupply of ethylene vessels. However, US ethylene exports are almost guaranteed to increase, as a new facility currently under construction will expand US seaborne export capacity from 0.3 to 1.3 million tonnes per year around 2020.

Ethylene is a niche segment in the LPG market. There are 179 ethylene ships, divided into three segments: 27 Very Small Gas Carriers (VSGC, <5,000 cbm), 124 Small Gas Carriers (SGC, 5,000-20,000 cbm) and 28 Medium Gas Carriers (MGC, 20,000-40,000 cbm). Ethylene ships are the most sophisticated and diverse ships in the LPG market, capable of handling all cargo types in LPG market.

Ethylene can be produced from the crude oil derivative naphtha and from ethane gas[1]. Of the two feedstocks, ethane has the lowest cost and yields the highest quantity of ethylene. Ethylene is used as feedstock for polyethylene (PE) production. PE is the most widely used plastic in the world. In its raw state, PE takes the form of small plastic pellets, which are shipped on Container ships. Seaborne ethylene trade is driven by relatively small imbalances in supply and demand. Only around 3% of global ethylene production enters the seaborne market.

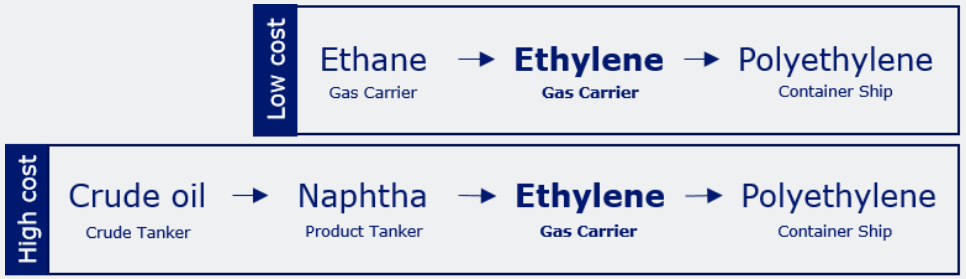
The seaborne ethylene market is centred around short and medium-haul trade in Asia. The Asian region accounts for around 90% of imports and around 65% of exports. Asia is a high-cost ethylene production region, which creates long-haul arbitrage opportunities, as imports from low-cost ethylene regions like the Middle East and the US can compete with regional production in Asia.

The enabler of long-haul arbitrage trade is a regional surplus of low-cost ethylene resulting from an expansion of regional ethylene capacity typically in the Middle East. However, arbitrage opportunities can be short-lived, as surplus ethylene usually stimulates an expansion of polyethylene (PE) production. Once new PE capacity comes online, the supply of ethylene shrinks and seaborne arbitrage volumes decline significantly. New PE capacity takes around one to two years to install and PE capacity can be expanded more quickly than ethylene capacity.

The current expansion of ethylene capacity in the US follows this pattern. The construction of a new seaborne export facility has begun and two more facilities are awaiting final investment decisions. The new facilities could potentially increase seaborne ethylene volumes by 20-50% and consume up to 7% of US ethylene in 2021. However, US PE capacity has already started to expand and is expected to continue growing over the next three years. The increasing demand for ethylene could potentially limit the volumes available for export and increase US prices. This could make US ethylene exports unable to compete with domestic ethylene production in places like Asia and Europe. The outlook for US ethylene exports is therefore highly uncertain and the effect on seaborne trade is far from clear.

The current seaborne ethylene market is struggling with an oversupply of ships and the market is at a periodic low. From 2013 to 2018, the fleet expanded at a CAGR of 6.5% – driven by the purpose-built long-haul MGC ships – while demand grew at a CAGR of 4%. A market recovery depends on whether long-haul trade can increase sufficiently to absorb the surplus vessel capacity. Over the next three-year period, seaborne supply and demand is expected to increase at roughly the same rate of around 3-4% per year. If long-haul US exports to Asia increase, travel distances will increase too, which will support fleet utilisation beyond growth in cargo volumes and could push demand beyond supply.

PRODUCTION LINE AND SHIPPING SEGMENT



[1] Ethylene can also be produced from other feedstocks.

Source: Danish Ship Finance

LPG DEEP DIVE: THE ETHYLENE TANKER MARKET

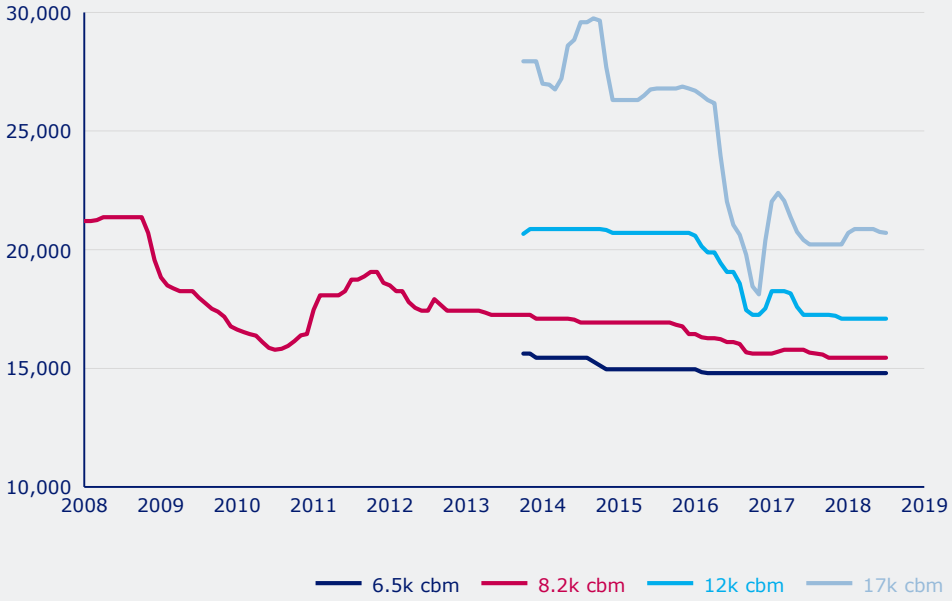
Freight rates and ship prices

One-year timecharter rates for ethylene ships have been under pressure since 2016 due to vessel oversupply. Nevertheless, rates have been relatively stable over the past 12 months. In September 2018, the rate for a 8,200 cbm ship was around USD 15,500 per day and for a 12,000 cbm ship around USD 17,000 per day. Compared to 2016, the 8,200 and 12,000 rates have declined around 6% and 17%, respectively. Ethylene timecharter rates have been under pressure, as vessel supply has been outpacing demand since 2014. The 17,000 cbm rate has seen the steepest decline, as fleet growth has been driven by the MGC (>20,000 cbm) segment. Rates for the larger segments are also more volatile because these vessels are more exposed to long-haul arbitrage trade.

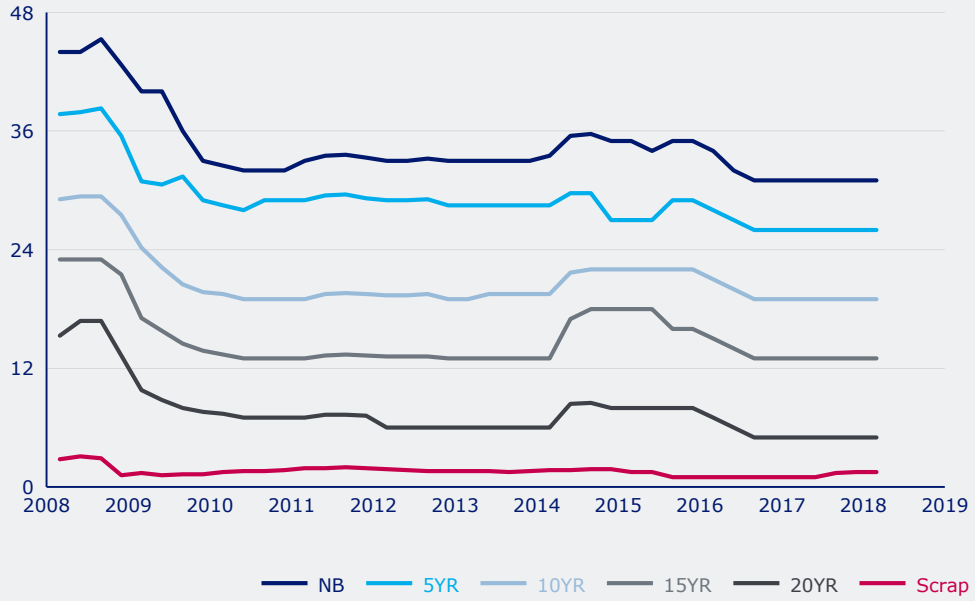
Secondhand and **newbuilding prices** for a 7,500 cbm ship are at a cyclical low. Prices have been at their cyclical low for almost two years and we believe newbuilding prices could be close to shipyard production costs.

The **secondhand market** for ethylene vessels is illiquid. In 2017, three MGCs and two SGCs changed hands, indicating a turnover rate of around 3%, measured by number of vessels. The secondhand market reached a periodic high in 2013, when nine ships changed hands, representing turnover of around 6%, measured by number of vessels. From 2013 to 2017, the average turnover rate for the ethylene fleet was around 3%. With an unknown number of undisclosed sales, however, the turnover rate could be higher.

1-YEAR TIMECHARTER RATE (USD PER DAY)



PRICES FOR A 7,500 CBM VESSEL (USD MILLION)



Source: Clarksons, Danish Ship Finance

LPG DEEP DIVE: THE ETHYLENE TANKER MARKET

Supply-side development

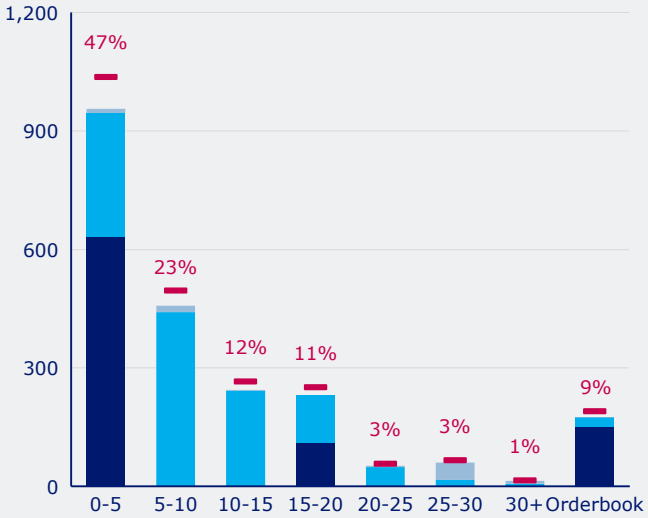
The ethylene **fleet** consists of 179 ships with a combined cargo capacity of just over two million cubic metres. The fleet has an average age of around ten years. The age distribution, measured in capacity, is dominated by the high growth in the MGC segment over the past five years. The **orderbook** contains ten ships: seven MGCs, two SGCs and one VSGC with a combined cargo capacity of 175,000 cubic metres, equalling 9% of the fleet. The current orderbook is expected to be delivered by the end of 2020. The ethylene fleet has limited scrapping potential, as only 7% of the fleet is older than 20 years. The capacity in the orderbook cannot be absorbed by older ships exiting the fleet without economic lifetime being lowered to around 20 years. If we look just at the SGC segment, the average age of the fleet is around 12 years, the orderbook is at 2% of the fleet, and the orderbook being absorbed by premature scrapping would reduce the economic lifetime of the SGC fleet to around 23 years.

Over the past five years, **deliveries** have been dominated by the MGC segment. These large ethylene vessels are built for long-haul trade, and some of them were constructed as part of newbuild programmes backed by long-term charter contracts. In the same period, SGC fleet growth has also been relatively strong at around a 4% CAGR. Deliveries and subsequently fleet growth have been driven by the relatively high freight rates during 2013-16, especially for larger ships.

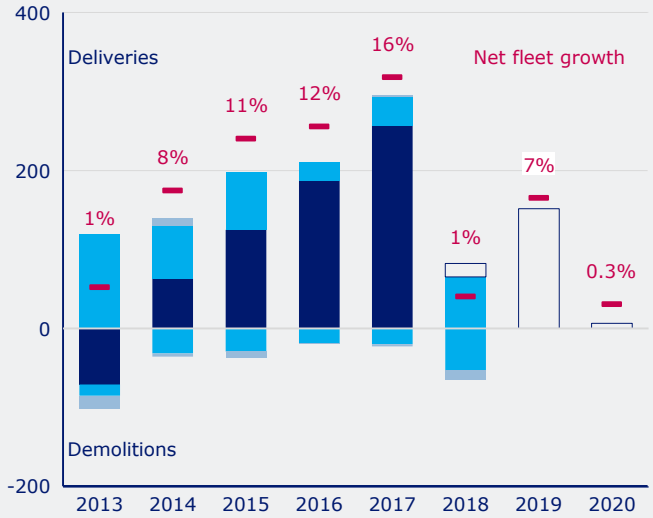
A consequence of the strong fleet growth has been an increase in cascading. The large MGC ships are increasingly competing against the smaller SGC ships for small-volume long-haul trades.

Demolition has increased markedly in 2018. In the first eight months of the year, six SGCs and three VSGCs, corresponding to around 3% of the fleet were demolished. However, the increase in demolition has left the fleet with very few scrapping candidates. Only nine SGCs and 19 VSGCs are 20 years or older. If we include demolition in the turnover rate, the average turnover rate for 2013 to 2017 was 5%.

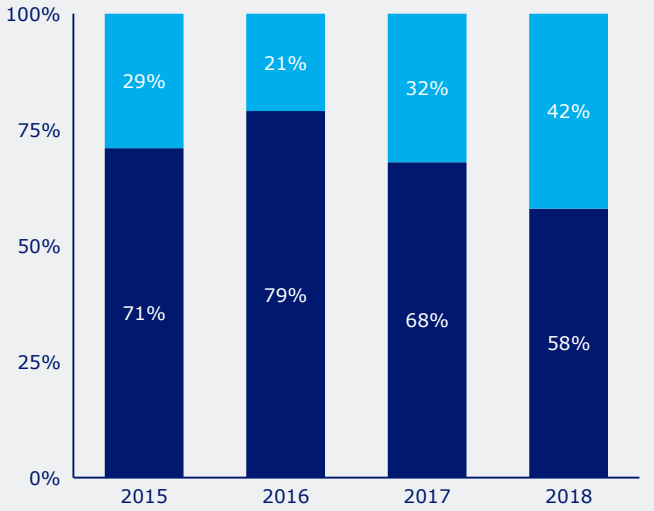
AGE DISTRIBUTION OF FLEET (THOUSAND CBM)



FLEET DEVELOPMENT (THOUSAND CBM)



ETHYLENE SGC PETCHEM GAS SPOT TRADES



An average number of 180 spot trades per year were available for analysis.

MGC > 20k cbm | SGC 5-20k cbm | VSGC < 5k cbm | Orderbook

Long haul | Short haul

Source: Clarksons, Danish Ship Finance

LPG DEEP DIVE: THE ETHYLENE TANKER MARKET

Demand side development

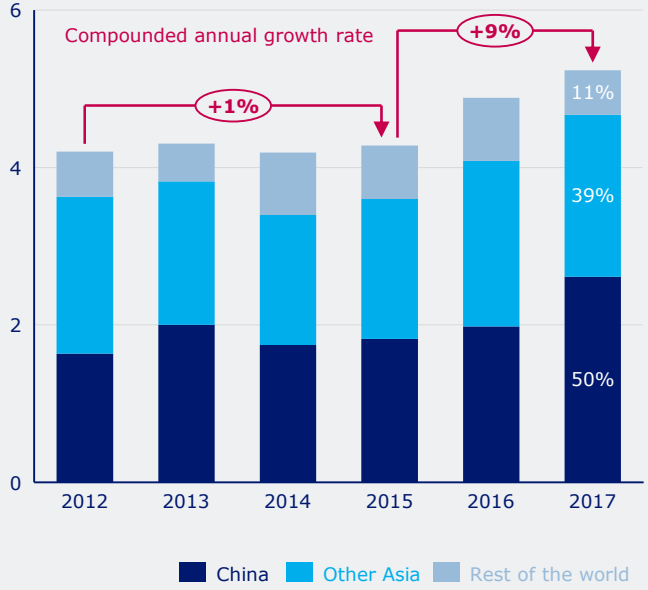
Seaborne ethylene trade reached around five million tonnes in 2017, following strong growth in 2016 and 2017 powered by Asia.

Asia accounts for around 90% of imports and around 65% of exports. Imports are being driven by China, which accounted for 50% of global imports in 2017. China is expected to increase domestic ethylene supply by around eight million tonnes per year by 2022. Nevertheless, Chinese ethylene demand is expected to increase even more strongly throughout the period, and hence China should continue to drive global seaborne ethylene demand. The region's main exporters are Japan and South Korea, accounting for around 25% of global exports. Other Asian countries, like Malaysia and Thailand, are planning to expand their ethylene production, adding to the region's export capacity. Asian ethylene is produced from crude oil and production costs are high compared to ethylene produced from ethane gas. Asian demand is therefore expected to continue creating arbitrage opportunities from low-cost regions such as the Middle East, the US and Russia.

The US is expected to increase its seaborne export capacity by as much as 2.6 million tonnes per year by 2021. Russia and Iran are expected to increase ethylene production by around two million tonnes and 1.5 million tonnes per year, respectively, although it is still uncertain how much of these countries' new capacity will be exported. Given the current US sanctions, it is unlikely that Iran will be able to increase ethylene exports significantly. In 2017, Iranian ethylene comprised around 6% of the total seaborne market.

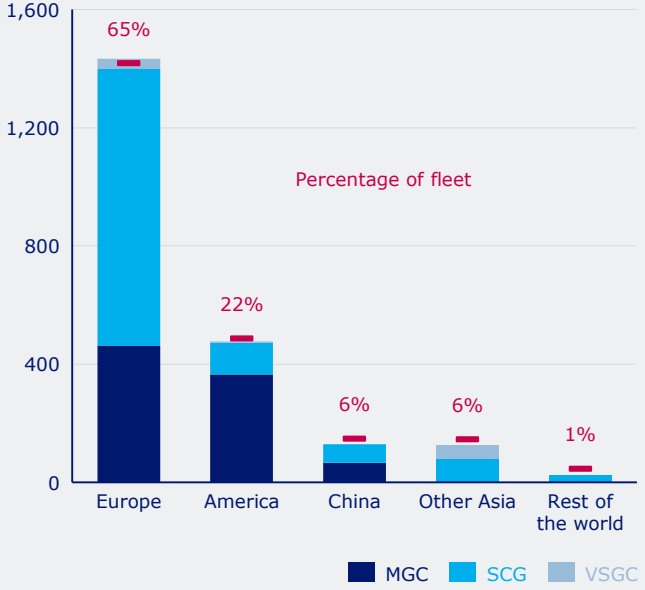
Chinese owners control 6% of the global ethylene fleet. This could enable China to profit from US sanctions against Iran by accessing stranded volumes of Iranian ethylene. If most of the Chinese fleet is employed in this trade, Iran could potentially cover around 12% of Chinese imports. This means that in order to meet import requirements, China will dependent on the global ethylene market.

ETHYLENE IMPORTS (MILLION TONNES)



ETHYLENE EXPORTS (MILLION TONNES)

FLEET OWNERSHIP (THOUSAND CBM)



Source: Drewry, IHS Markit, Clarksons, Danish Ship Finance

LPG DEEP DIVE: THE ETHYLENE TANKER MARKET

China-US trade war

The trade war between China and the US is not expected to impact the seaborne ethylene market significantly. Ethylene is not yet among the products targeted by the Chinese tariffs, but, specific grades of the ethylene derivative polyethylene are. This could have a secondary effect on the seaborne ethylene market. If demand for US polyethylene products decline US ethylene prices will decline too, making US ethylene more competitive compared with domestic ethylene production in regions like Asia and Europe. However, Chinese trade tariffs on US polyethylene are most likely to cause changes to polyethylene trade flows and the impact on the ethylene market is expected to be minimal.

LPG DEEP DIVE: THE ETHYLENE TANKER MARKET

US ethylene

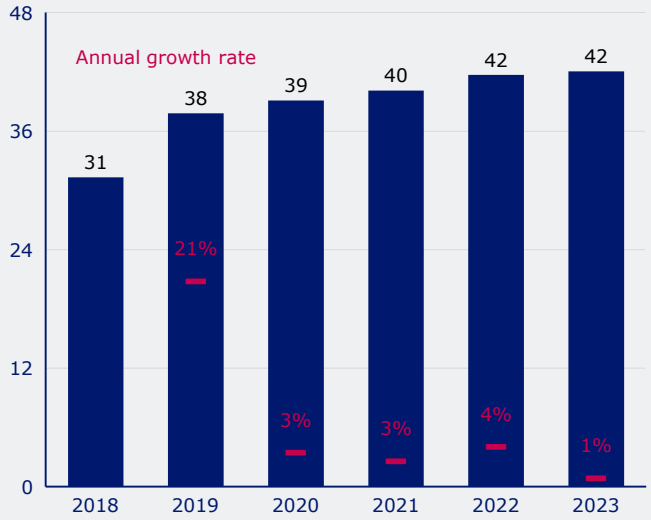
At the start of 2018, US ethylene production capacity was around 31 million tonnes per year. Over the next five years, production capacity is expected to increase by 34% to around 42 million tonnes per year in 2023. Most US ethylene is consumed by the domestic downstream petrochemical sector in the production of polyethylene (PE). The US currently has only one seaborne ethylene export facility with a capacity of 0.3 million tonnes per year, but export capacity is set to increase to 1.3 million tonnes per year by 2020 as one new facility comes online. Capacity could potentially increase to 2.1 million tonnes per year by 2020 and 2.9 million tonnes per year by 2021 if proposed capacity is build. When the new export capacity comes online, it is expected to create added demand for ships and boost travel distances, as US exports to Asia are expected to increase. The new export capacity could potentially increase seaborne trade by 20-50%.

However, cost economics currently favour exports of polyethylene (PE), rather than ethylene, and the US downstream petrochemical sector is investing heavily in new PE capacity. The increasing ethylene demand from PE producers could limit the volumes of ethylene available for export and increase domestic ethylene prices. This could in turn lower global demand for US ethylene if ethylene imports from the US become too expensive to compete with domestic production.

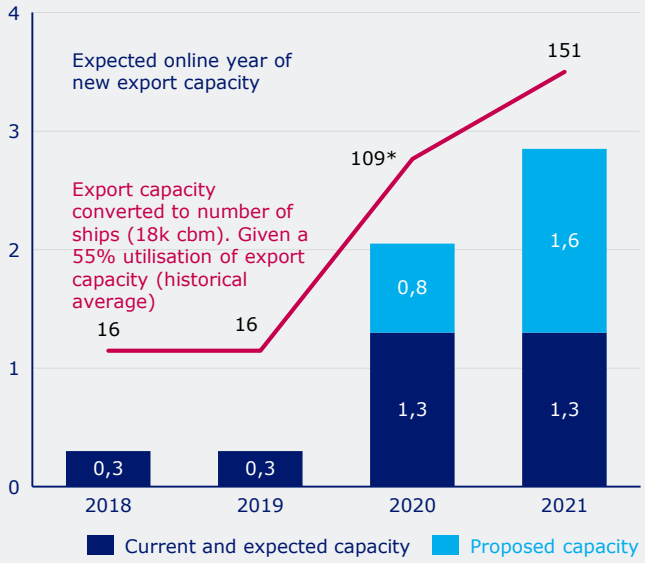
Furthermore, the domestic US PE market is already saturated and all incremental PE capacity will have to be exported. Increasing global PE volumes could erode some of the global demand for US ethylene. Building or expanding a petrochemical industry in order to increase production of ethylene and polyethylene is expensive. One alternative would be to take advantage of the rising global PE volumes to increase plastic production without expanding the petrochemical industry.

A positive scenario for US ethylene exports could be declining US PE prices. This would soften domestic US ethylene demand and lower prices, ensuring the competitiveness of US ethylene exports.

US ETHYLENE CAPACITY (MILLION TONNES)

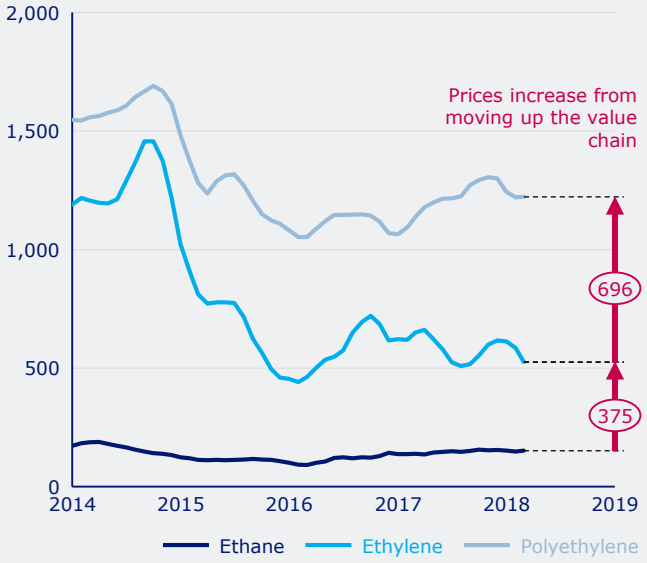


US EXPORT CAPACITY (MILLION TONNES)



*If proposed capacity is not build, the estimated number of cargos in 2020 will be around 70

US PRICES (USD PER TONNE)



Source: Clarksons, Drewry, Danish Ship Finance

THE LNG TANKER MARKET

SHIPPING MARKET REVIEW – NOVEMBER 2018

THE LNG TANKER MARKET

Perspectives and key takeaways

OUTLOOK SUMMARY

- ● **POSITIVE**
- ○ NEUTRAL
- ○ NEGATIVE

The short-term outlook for the LNG market is positive. Massive expansion in liquefaction capacity in 2019 is expected to support vessel demand and could push freight rates higher. Demand is set to remain relatively strong in 2020, but growth in LNG supply will stagnate and could decline to 1% in 2021. Unless new liquefaction projects are sanctioned within the next few years, the LNG market will experience a major slowdown in the first half of the 2020s.

Market fundamentals remain strong for LNG. Current spot rates are at a five-year high, driven by a surge in Asian demand. Strong heating demand in the northern hemisphere during the winter months could push freight rates even higher.

In the first nine months of 2018, market fundamentals were supported by stronger-than-expected demand growth from China, India and South Korea. At the same time, new liquefaction capacity coming online in Australia, the US and Russia boosted LNG supply. Seaborne volumes increased by around 8% in the first nine months of 2018 and strong growth in long-haul exports from the US and Trinidad & Tobago boosted distance-adjusted demand by around 14%.

The majority of LNG volumes are still traded on long-term contracts. However, spot trade continues to increase and the number of new long-term contracts is steadily declining. In the first nine months of this year, 26% of LNG volumes were spot purchases and 15 million tonnes per annum (mtpa) of long-term contracts were signed compared with an average of 34 mtpa from 2011 to 2015. This shows that flexibility is taking priority in the LNG market.

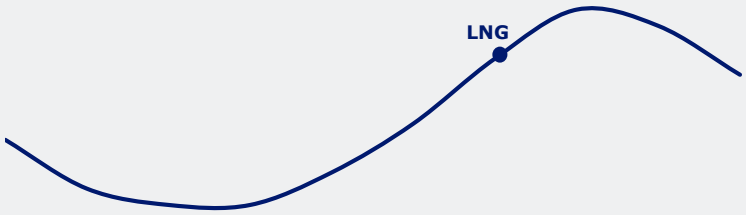
This shift towards greater flexibility in the vessel market has led the average timecharter contract to decline from around 12 years to around seven since 2014. More vessels are expected to enter the spot market, as the number of newbuild orders without long-term contract is growing. This development increases the investment risk, as vessel earnings become more exposed to freight rate volatility.

The outlook from 2019 and 2020 remains positive. In 2021, however, demand growth could slow significantly due to stagnating LNG supply. In 2019, 2020 and 2021, liquefaction capacity is expected to grow by 12%, 3% and 1%, respectively. The majority of the new capacity will be added in the US, which should increase travel distances. There could be periods of vessel oversupply if liquefaction projects are delayed.

The outlook after 2021 is weakening, as there are no liquefaction projects with startup dates beyond 2021 under construction currently. Unless several new projects are sanctioned within the next few years, growth in cargo volumes will decline significantly and the LNG market will experience a major slowdown in the first half of the 2020s.

The long-term outlook is weighed down by growing investment risk and competition from renewable energy. A large portion of future growth in the LNG market is expected to be driven by emerging economies with high credit risk. It is uncertain whether these countries can reach their demand potential, as massive investment is needed to develop the markets. Furthermore, we remain convinced that renewable energy will impact the growth potential of the LNG market more than most of the current long-term forecasts suggest.

WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

THE LNG TANKER MARKET

Freight rates and ship prices

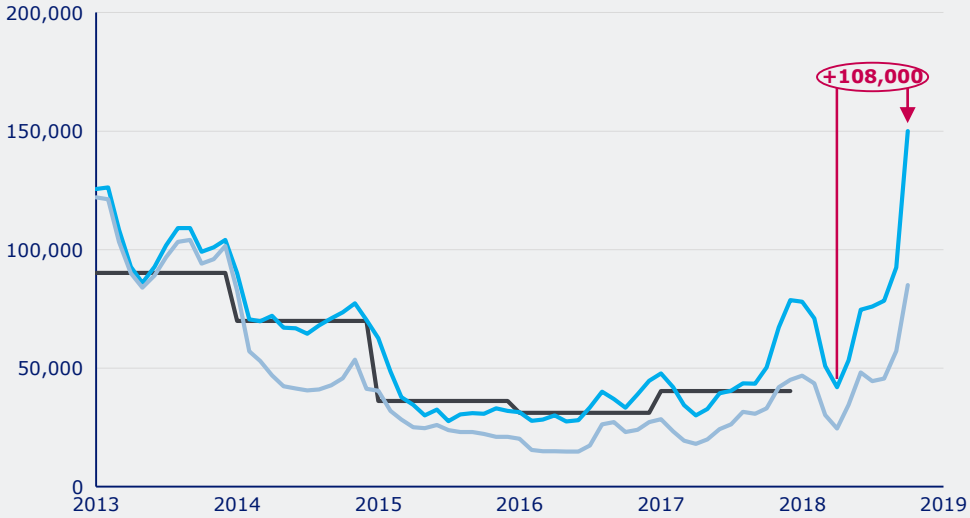
Freight rates in the LNG market follow a seasonal pattern. In winter, rates are driven by heating demand and in summer by the need for cooling. In December 2017 and January 2018, cold winter weather, specifically in China, drove LNG spot rates to a three-year high. After the slowdown in the spring months, spot rates rebounded to this level again in July and increased further to a six-year high in September. The rate for a 140,000 cbm Steam Turbine (ST) vessel reached USD 85,000 per day, while the rate for a 160,000 cbm Tri-Fuel Diesel Electric (TFDE) vessel reached USD 150,000 per day. From July, freight rates were supported by Atlantic-Pacific arbitrage and by September the start of winter stockpiling further increased rates.

The spread between TFDE and ST spot rates is not only related to vessel size. The TFDE engine has better fuel consumption and vessels with TFDE engines are generally younger with better isolated cargo tanks. This lowers the amount of fuel used for propulsion and to re-cool the cargo, allowing for longer and cheaper transportation. The most modern newbuild vessels (ME-GI and XDF) consume even less fuel.

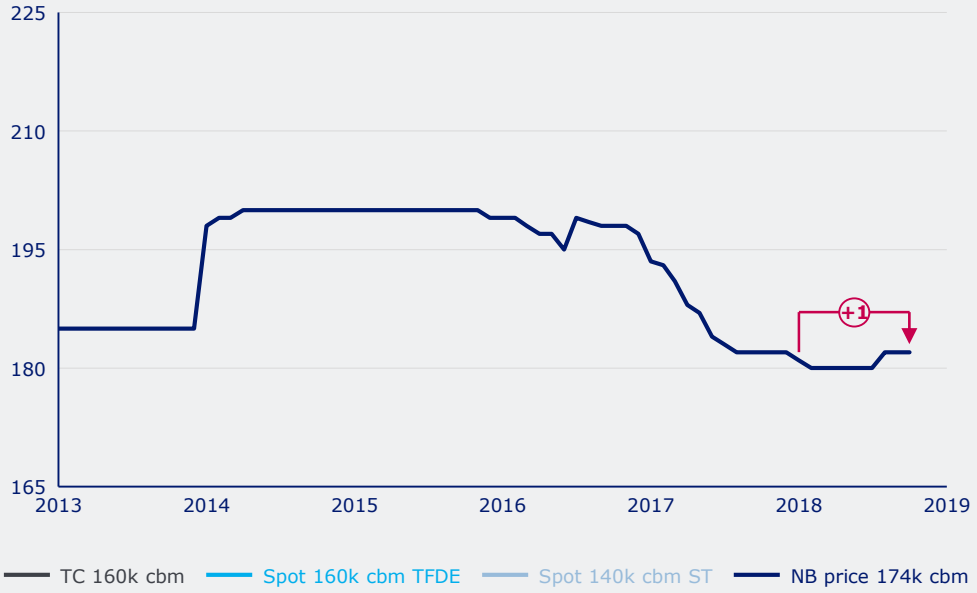
Even though most LNG vessels trade on long-term charter contracts, commodity traders and oil companies are increasingly fixing vessels for spot voyages. According to the IGU, there were around 370 spot fixtures in 2017, a 36% increase from 2016, and according to IHS Markit, around 10% of the fleet operated in the spot market in August 2018. The growing spot activity underlines the shift towards greater flexibility in the LNG market.

On the back of the positive sentiment in the freight rate market, activity in the newbuild market picked up during the first nine months of 2018. The renewed interest in the market lifted the **newbuild price** of a 170,000 cbm vessel to around USD 182 million, USD 1 million higher than in January 2018. The **secondhand market** is illiquid, and only two vessels have changed hands so far in 2018.

FREIGHT RATES (USD PER DAY)



NEWBUILDING PRICES (USD MILLION)



Source: Clarksons, Danish Ship Finance

THE LNG TANKER MARKET

Supply-side development

The LNG **fleet** consists of around 500 vessels with a combined capacity of around 75 million cubic metres. The fleet is relatively young with around 65% of capacity younger than ten years. As of September 2018, the orderbook contained 123 vessels equalling 24% of the fleet, measured in capacity.

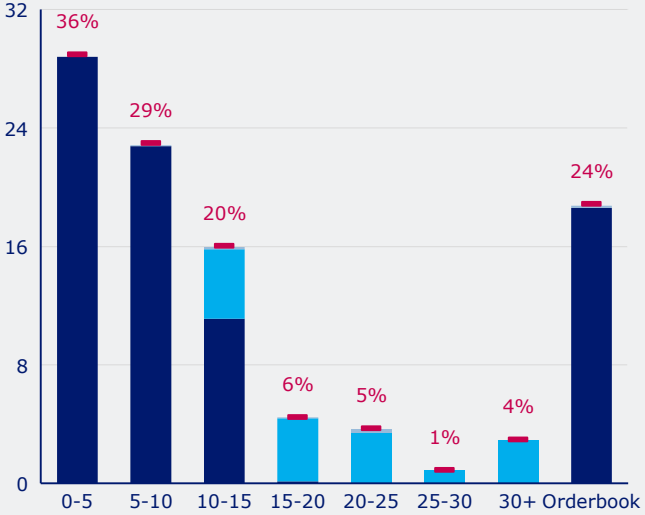
Contracting has picked up this year, driven by a rise in speculative ordering from new entrants and existing small shipowners in the LNG Carrier market. A total of 43 vessels were ordered in the first nine months of 2018. This compares with 13 vessels in the whole of 2017. In total, 16 vessels were ordered by new entrants and 12 by existing shipowners with fewer then ten ships.

In the first nine months of the year, **deliveries** reached a five-year high and the fleet grew by around 8%. Around 70% of all scheduled deliveries entered the market in the period. Most of those that were postponed in 2017 due to poor market conditions entered the fleet during the spring. If all deliveries scheduled for 2018 enter the market, fleet growth is set to reach around 13% for the year. Given a 70% delivery ratio, fleet growth will be around 11%.

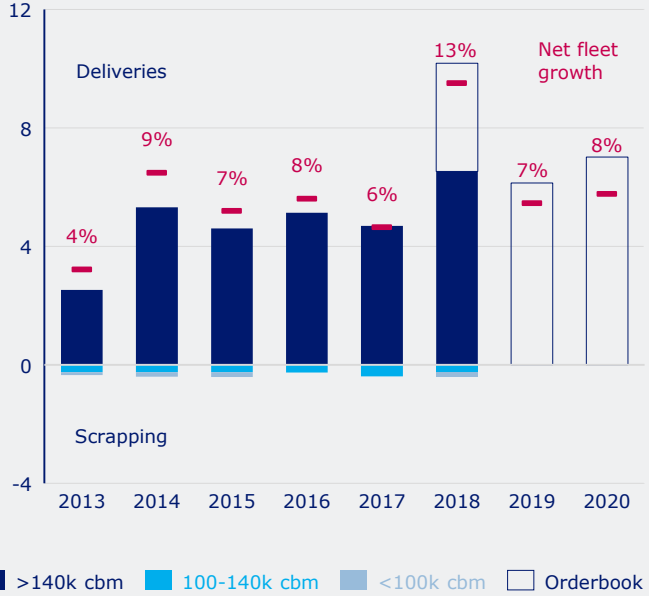
Demolition remains limited in the LNG market. Only four vessels have been demolished so far in 2018.

The **orderbook** by delivery year chart below shows the number of vessels in the orderbook with and without long-term charter contracts (term contracts). Even though some of the available vessels will secure term contracts before joining the fleet, an increasing number of newbuild vessels will enter the spot market in the coming years. This will intensify competition for both spot and term charters. Older, less efficient vessels will gradually be pushed out of the long-term charter market as their current contracts end.

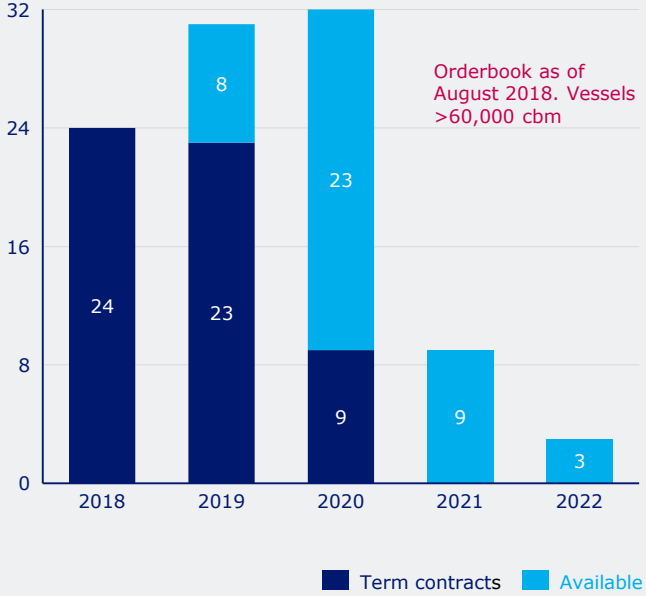
AGE DISTRIBUTION (MILLION CBM)



FLEET DEVELOPMENT (MILLION CBM)



ORDERBOOK BY DELIVERY YEAR (# OF VESSELS)



Source: Clarksons, IHS Markit, Danish Ship Finance

THE LNG TANKER MARKET

Market outlook

The short-term outlook (two years) for the LNG market is positive. LNG trade is expected to grow by around 10% in 2018, depending on demand from the northern hemisphere in the winter months. In 2019 and 2020, the market will be supported by liquefaction projects currently under construction coming online. Capacity is set to expand by around 12% in 2019 and 3% in 2020. In 2021, projected growth declines to 1%, as any new liquefaction projects for which construction has not yet begun will not be finished by then. Around 110 vessels will be required to service the new liquefaction capacity. Given that 118 vessels are expected to enter the fleet, utilisation should be fairly balanced until the end of 2021. There could be periods of oversupply if liquefaction projects are delayed, although any project slippage will help smooth the growth rate by pushing liquefaction startup from 2019 to 2020 and 2021.

From 2019 to 2021, growth in liquefaction capacity will be driven by the US (62%), Russia (18%), Australia (18%) and others (2%).

Asia is expected to be the main demand driver, while Europe is expected to absorb any excess LNG supply. However, Asian demand is expanding ahead of expectations, propelled by China's coal-to-gas switch, and so far no excess LNG volumes have accumulated. In the period, US and Russian LNG volumes heading for Asia are expected to increase, which will result in longer travel distances creating employment for many of the vessels in the current orderbook.

Growth in liquefaction capacity from 2022 to 2025 is contingent on sanctioning of new liquefaction projects over the next three years. However, project sanctioning has slowed significantly since 2016 following general cutbacks of capacity expenditure in the oil industry. Project sanctioning will be further limited by the massive expansion of liquefaction capacity expected in 2019. LNG buyers are reluctant to enter into new long-term contracts amid prospects of plentiful supply in the coming years. If project sanctioning does not increase in the coming years, the LNG market will experience a major slowdown in the first half of the 2020s.

FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

Short-term demand	Strong Asian demand, driven by the Chinese coal-to-gas switch, is expected to power short-term growth. US and Russia supply is expected to lead to longer travel distances.	✓
Speculation	If speculative newbuild orders continue to increase, the market could be pushed into oversupply when growth in liquefaction capacity starts to decline in 2020 and 2021.	✘
Optimisation	Vessel demand could be structurally reduced. Laden vessels cross each other going from one basin to another. Rethinking trade flows could optimise supply.	✘
Energy transition	Decarbonisation of power generation will generate increasing gas demand. However, by 2040 power generation from gas will be limited by the climate goals of the Paris Agreement.	✓
Cost of energy	Accelerating cost reductions for renewable energy mean there will be less room for LNG in the future energy mix.	✘

✘ Negative impact ✓ Positive impact

LNG TANKER MARKET DEEP DIVE: THE FSRU MARKET

Floating Storage Regasification Units are unlocking new demand, but investment risk will increase as the market expands

The market for Floating Storage Regasification Units is enticing shipowners with long-term charter contracts and impressive growth rates. However, the risks associated with investing in these vessels is higher than for a conventional LNG Carrier. Furthermore, as the market expends, investment risk is expected to increase.

A Floating Storage Regasification Unit (FSRU) is a LNG vessel that functions as an import terminal. The FSRU receives LNG from a conventional LNG Carrier via ship-to-ship transfer. The LNG is stored in the FSRU's cargo tanks and is then supplied to the shore as gas. A FSRU has two major advantages over onshore import terminals. It can be brought online faster and an FSRU on a long-term charter contract is less capital-intensive than an onshore terminal.

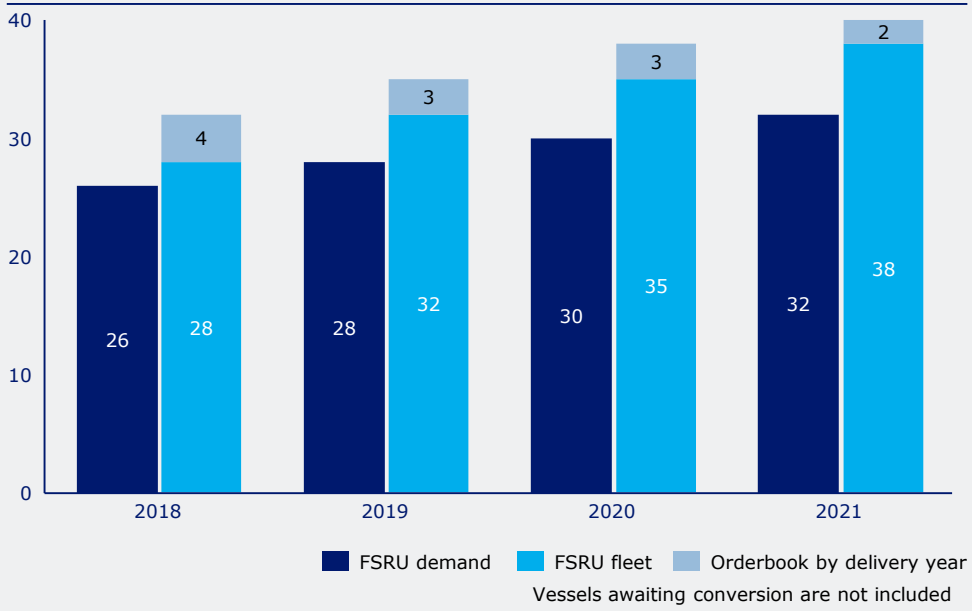
Over the past five years, operating FSRU capacity has grown at a CAGR of around 19%. In the same period, seaborne LNG trade has increased at a CAGR of around 4%. A total of 16 countries import LNG via FSRUs. However, ten of these countries, representing around 75% of operating FSRU capacity, are developing economies in Asia, South America, the Middle East and Europe.

The large share of developing economies in the FSRU market raises the investment risk. The lower credit quality of utility companies and other end-users makes the probability of credit default higher than in the LNG Carrier market. Even though the FSRU market is growing rapidly, liquidity in long-term charter contracts is low, which means the likelihood of a vessel securing a new contract quickly if its existing charterer defaults is low. On top of this, capital expenditure for an FSRU is higher than for an LNG Carrier. This risk can partly be mitigated by looking to the LNG Carrier market for alternative employment. However, this would expose the FSRU to the volatility in the LNG Carrier market, which could result in markedly lower rates. Moreover, this option is only applicable to purpose-built FSRUs.

FSRUs will to continue to play an important role in bringing LNG imports to new countries. The market is expected to grow at a CAGR of around 8% until 2021. In this period, market growth will largely be achieved by utilising existing downstream gas infrastructure in import countries, i.e. pipelines and power plants. However, long-term growth needs to be underpinned by new investment in downstream infrastructure. Many of the potential future markets are in low-income, high-credit-risk countries. These countries may struggle to secure financing for the investments needed to support gas demand. Furthermore, the increase in capital expenditure across the gas supply chain will cause the level of investment risk to rise if the FSRU market is to reach its future potential.

The FSRU fleet consists of 28 vessels with a combined import capacity of around 100 million tonnes per year. The orderbook holds a total of 11 vessels and three old LNG Carriers are awaiting FSRU conversion. The average charter length is around eight years. Currently, around 80% of the fleet have charter contracts. However, this number is expected to decline, as fleet growth is set to outpace demand.

FSRU DEMAND, FLEET AND ORDERBOOK (NUMBER OF VESSELS)



Vessels awaiting conversion are not included

Source: IHS Markit, Danish Ship Finance

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FOR FURTHER INFORMATION

PLEASE VISIT WWW.SHIPFINANCE.DK