

# SHIPPING MARKET REVIEW

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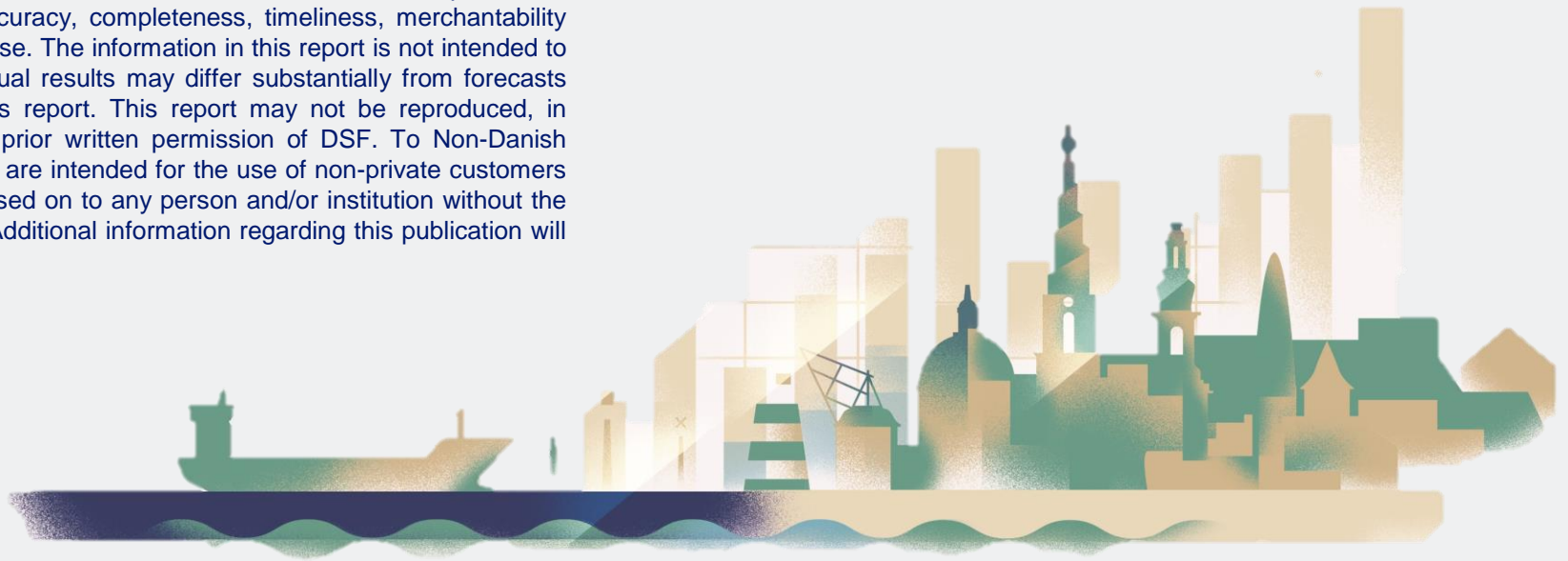
MAY 2018

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*Shipping Market Review – May 2018*

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## HEAD OF RESEARCH

Christopher Rex, [research@shipfinance.dk](mailto:research@shipfinance.dk)

## ANALYTICAL TEAM

Ninna Møller Kristensen

Jonas Munch Stenbjerg

Sara Møller Jensen

Caspar Wergeland



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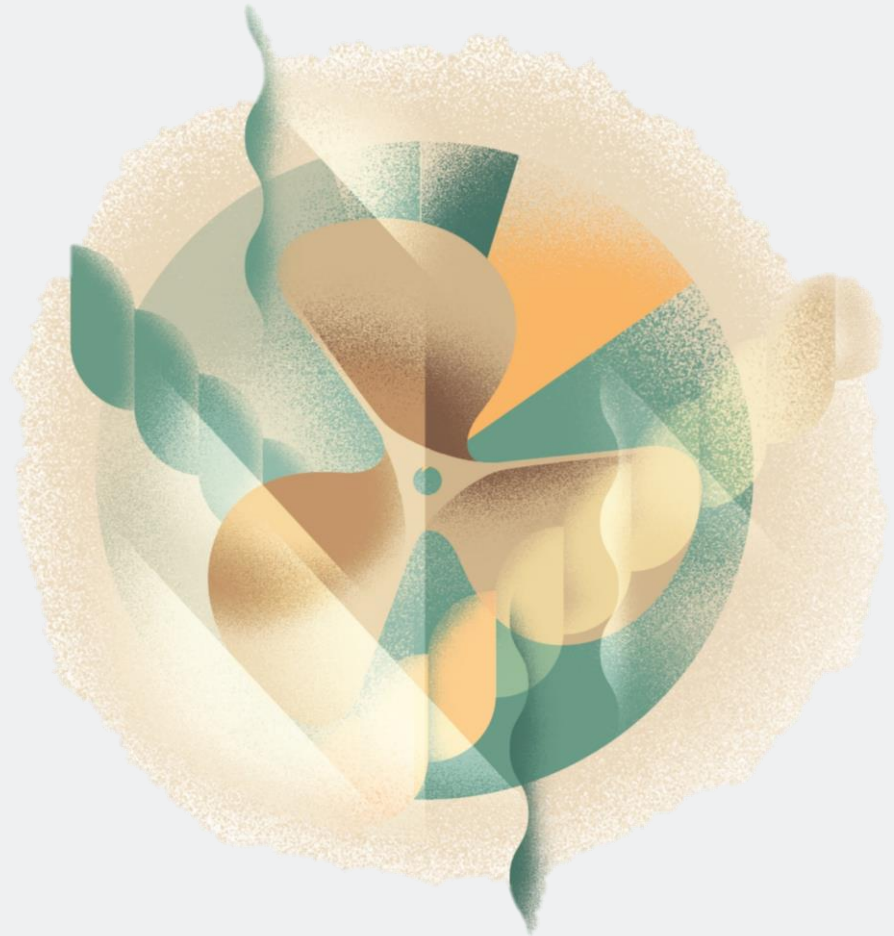
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# PERSPECTIVES AND KEY TAKEAWAYS

*How do we unlock the next level of value in the shipping industry*

**This report reviews key developments in the shipping market and the main shipping segments up until May 2018 and indicates possible future market directions. Please read the disclaimer at the beginning of this report carefully.**

In this edition of our Shipping Market Review, we take a closer look at how digitalisation may impact the long-term outlook for the shipping industry. We highlight some global perspectives that provide a basis for determining the outlook. We present **digitalisation as an opportunity for future value creation**. We certainly believe it represents an opportunity, but one that is not exclusively open to shipowners. Various players from within the current industry as well as players from other industries are already acting to capitalise on this potential.

In the early years, companies that digitalised were at the vanguard of the industry. Today, digitalisation has permeated every level of the competitive landscape in most industries. Digital technologies are not only reshaping customers' expectations but are also redefining boundaries across industries, the role of assets and the types of competitor. The shipping industry cannot avoid being impacted by the digitalisation of the global economy: as traditional industry borders fall away, the future of shipping stands to be greatly influenced by the creation of platforms and ecosystems.

We examine the emergence of new ecosystems and the implications of these for the shipping industry. To succeed in these new ecosystems, most shipping companies will have to reassess their traditional roles and business models. Today, most shipowners make money by trading their vessels while waiting to capitalise on the next upswing in secondhand prices. Digitalisation is likely to introduce a high degree of transparency – if freight rates and secondhand prices become less volatile as a result, serious consideration will have to be given to how value can be created in the shipping industry.

We will all need to learn how the ecosystems will shift value pools and change the nature of risk. We do not have all the answers. The industry needs to embrace this evolving landscape so that it can take

the first steps towards creating new revenue sources. We argue that shipping companies will need to begin to create **value beyond the vessel**. The first step could be to turn shipping data into an asset that can be monetised.

The lesson learned from other industries is clear: players that fail to create value from the data they generate can easily become marginalised. But harnessing value from the data will not be enough. Companies that lack strong customer connections run the risk of disintermediation and perhaps of becoming "back offices" with limited headroom to create or retain profit. For the shipping companies to occupy attractive roles in their ecosystem, they need to offer customers seamless journeys that eliminate the typical pain points by capturing business from other industries.

The shipping industry handles close to 90% of global trade. This should give shipowners a good opportunity to leverage on their core competences and tap into the unexplored value pool available to those who understand this interconnected ecosystem of the global economy.

In this report, we present four steps towards additional value creation in a digital shipping industry but urge our readers to remember that several other players are chasing the same business opportunities. The digital winners may not all be found among today's shipowners.



# GENERAL REVIEW AND OUTLOOK

SHIPPING MARKET REVIEW – MAY 2018

# SHIPPING MARKETS AT A GLANCE

*The shipping industry is on the verge of a paradigm shift*

The shipping industry is a service industry that serves the global economy. The global economy is undergoing a period of transformative change. Many of the dynamics that are working to move the tectonic plates of global demand are still in their infancy, but it seems clear that they are recalibrating the relationship between global economic growth and seaborne trade.

The global economy is becoming less seaborne trade-intensive per dollar growth, since the combined effects of ageing global consumers and emerging technologies (i.e. the fourth industrial revolution) are shifting the global economy towards services. *Please see previous editions of this report for an extensive discussion of these topics.*

Few investments in ships have delivered a risk-adjusted return on invested capital over the past decade. New vessels have been ordered, since most investors seemed to believe that the industry was at a cyclical low and on the brink of a recovery. Today, most ship segments are burdened by surplus capacity, with more vessels on order, low freight rates and low secondhand prices.

Dry Bulk (among a few other (sub)segments) seems to finally be recovering some of the lost territory. We are concerned, though, that much of the current demand picture simply reflects the short-term impact of political measures to stimulate domestic economic growth and job creation. We see a risk that demand volumes will shrink when the stimulus programmes are scaled back and interest rates start rising again. Clearly, that would result in unprecedented overcapacity issues within the larger ship segments.

Take Chinese Dry Bulk demand as an example. To us, it is beyond question that the Chinese economy is transitioning towards a more sustainable growth model. This is likely to involve a smaller contribution to GDP from, for example, the domestic construction sector. Nonetheless, domestic stimuli (including the Belt and Road Initiative) continue to ensure that growth in iron ore import volumes contributes to Dry Bulk demand volumes. However, that does not mean the shipping industry needs more Capesize vessels in the long term. When the stimulus programme comes to an end, construction

activity will begin to reflect the economy's underlying demand, which could reduce current import volumes significantly.

We argue that a structural change to the underlying demand landscape has been taking place, disguised as cyclicity. The market outlook for most of the ship segments is bleak, since the overcapacity seems likely to persist. The new environmental regulations that are about to come into force offer a glimmer of hope if they cause many older vessels to be scrapped.

The introduction of platforms for cargo booking and cargo management is set to challenge the medium-term outlook. The digitalisation of the cargo booking will lead to greater transparency on prices and performance, and competition will ramp up. This should significantly reduce freight rate volatility over time, which is likely to spill over into less volatile pricing of secondhand vessels. We are essentially discussing the likely erosion of central parts of most shipowners' business models. In this scenario, it will be imperative to create value beyond the vessel.

The best shipping companies of the future will be the one that **REINVENT THEIR OPERATING MODELS** or at least introduce additional layers of revenue on top of their existing operations. This is all about digitalising the shipping industry and turning data into an asset that can be monetised.

Initially, digitalisation will work to harness the cost-saving potential and use advanced analytics to discover and quantify trading opportunities. Later stages will work to create value beyond the vessels. On the following pages, we present a four step roadmap for the digitalisation journey.



# DIGITALISATION WILL LEAD TO GREATER TRANSPARENCY

*And reduce volatility in freight rates and secondhand prices*

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, although all ship segments are expected to be affected by digitalisation at some point. Not all cargo types are equally obvious candidates for trading on a digital platform. The more standardised cargo types are set to be digitalised first. As trading platforms demonstrate their potential to cargo owners, more volumes will be included, thereby facilitating broader digital adoption even among the more traditional parts of the industry. It will be a gradual process, but even niche markets are likely to be impacted by these emerging trends, since a digital platform will provide a benchmark for all cargo owners even before the lion's share of a cargo type is handled digitally.

Digitalisation will result in greater transparency on prices and performance, and competition will ramp up. Freight rate volatility could be reduced over time, which is likely to spill over into less volatile pricing of secondhand vessels.

The oil and gas industry is already seeing a digital transition among the top-tier owners of Offshore Support Vessels and Subsea Vessels. The larger Dry Bulk carriers are also starting to undergo a degree of digitalisation, as some mining companies have launched digital platforms on which shippers compete to win the cargo.

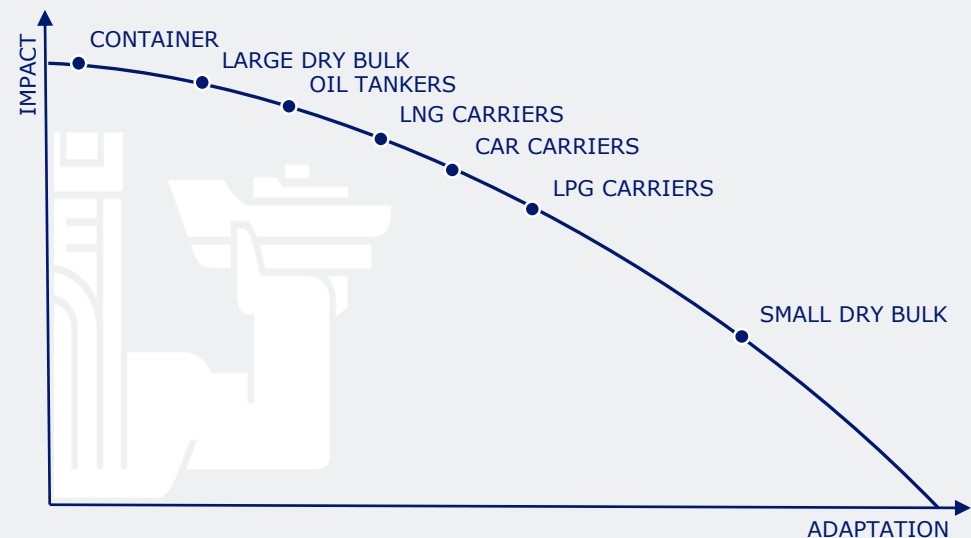
In the Container industry, we are starting to see internal pressure building up, as the industry forerunners aim to integrate the entire supply chain from origin to destination (from trucks to warehouses, ports, vessels and end users) rather than from port to port. But maybe more importantly, we are also seeing that the more digital players have plans to integrate larger parts of their ecosystem by starting to offer additional services such as trade financing.

The lesson learned from other industries seems clear: players that fail to create value from the data they generate could easily become marginalised. The digital shipping companies will develop new sources of revenue and harvest cost savings from their operating data. This is important to bear in mind when we analyse the forces at play in oversupplied markets.

The borders of industries are changing: for example, access to capital could become as important as the vessels, if it enables cross-selling of higher-margin products such as trade financing. In this scenario, rivals will no longer be competing head-to-head. Digital shipping companies that can cross-sell additional services by leveraging on their core competences will earn more per unit moved than traditional shipping companies.

The elephant in the room is clearly **OWNERSHIP OF THE DATA**. In very few other industries that have undergone digitalisation have asset owners managed to create value from the data they generate. Take Uber as an example. Uber drivers benefit from algorithms by securing the next low-priced ride, but they benefit little from the additional value that is generated through the combined data from all Uber drivers contained in these algorithms. Shipowners could likewise find it difficult to monetise their data if players outside the industry end up developing the algorithms of the future.

## DIGITAL ADAPTATION IN THE INDUSTRY



Source: Danish Ship Finance



# THE INDUSTRY NEEDS TO TAP INTO VALUE BEYOND THE VESSEL

*And turn shipping data into an asset that can be monetised*

## THE ROAD TO A NEW DIGITAL INDUSTRY ARCHITECTURE



### PERFORMANCE MANAGEMENT

Performance management is about **COST SAVINGS** and about improving the **PERFORMANCE** of the vessel. Connectivity and artificial intelligence is optimizing the decision making and allows alternative strategies to be evaluated across owners.

### CAPACITY OPTIMIZATION

Capacity optimization is the **CRYSTAL BALL** that allows the industry to adjust supply according to demand. This is about **POSITIONING** but it is likewise about **INVESTMENT DECISIONS** in future tonnage. Volatility in freight rates and secondhand prices will decline. The return on invested capital from operating the vessels is likely to decline accordingly.

### VALUE BEYOND THE VESSEL

The shipping industry represents the best **LEADING INDICATOR FOR THE GLOBAL ECONOMY**. Cargo flows presented in an industry specific context enable regional or local campaigns to be optimised. This is about multi-sided platforms where the value of the data can be harvested multiple times by selling the information to multiple parties in various industries.

### REINVENTING THE OPERATING MODEL

**UNLOCKING VALUE** by delivering a distinct customer experience where journeys and processes have been simplified and streamlined. This is done by adopting multiple levers in sequence and potentially redefining the borders of industries.

# PERFORMANCE MANAGEMENT

## *Changing the nature of risk and creating new markets*

The first step towards value creation in a digital shipping industry is about **PERFORMANCE MANAGEMENT**. At this stage, it is essentially about cost savings. It is about transforming the analogue industry, which comprises multiple disjointed systems, into a smart digital ecosystem. This will be done step-by-step by harnessing the power of data collected through the internet of things. It is about tapping into innovative technologies to improve operational performance.

The aim is to use all available information (e.g. bridge and engine data, navigation, meteorology data, oceanographic data, hydrodynamic performance, traffic planning, port information, etc.) to optimise the operation of the vessel. Artificial intelligence and machine-learning techniques will be applied to optimise, augment and de-risk vessel operation.

Smart performance management systems are still in their infancy in large parts of the shipping industry, as few vessels have many sensors and vessel connectivity is still relatively weak. The next generation of ships will be super-connected assets, with all systems monitored and integrated into unified cloud-based platforms for managing operations in real time across the full breadth of the maritime ecosystem.

Still, a large part of the current fleet could be upgraded to higher digital standards. We have useful examples from other industries. In the rail industry, ageing locomotives are being given extreme digital makeovers to enable significant improvements in their operational performance. Cloud-based services are handling vast quantities of data (e.g. speed, wheel slip, engine health, rail quality and wind effect), helping the mature assets stay competitive for longer by optimising operation, saving fuel, reducing emissions, predicting potential problems and recommending when best to perform maintenance to limit downtime. The refurbished locomotives are modernised to a degree that allows owners to get the most out of their existing assets. These findings are applicable to other industries, including the shipping industry.

With the digital revolution blurring the boundaries between physical products and services, we see a future where the vessels are

connected, contextually aware and even comprehending.

In time, performance management systems will be able to undertake the tasks of a **RELIABLE RATING SYSTEM**. The systems will develop a profound understanding of the operating universe of each individual ship by applying artificial intelligence and machine-learning techniques. This will allow the systems to calculate expected future bunker consumption and engine emissions while also providing accurate risk assessments for any potential causalities, cargo damage or delays.

These systems may begin to rate individual vessels' performance across owners, engines, systems, original equipment manufacturers, suppliers and ultimately operating models. It could even become possible to identify the most competitive vessel under various operating models.

In a world with relatively stable or at least relatively predictable freight rates, it is easy to imagine the creation of a feedback loop that defines a vessel's future earnings potential and hence its secondhand value potential in various scenarios.

# CAPACITY OPTIMISATION

## *Discovering and quantifying trading opportunities*

The second step towards value creation in the digital shipping industry is about **CAPACITY OPTIMISATION**. Cloud-based software will combine and interpret data from the broader shipping industry and other relevant sources to build insights that help shipowners manage their capital and operating expenditure better. By applying artificial intelligence to satellite, AIS and other geospatial data sources, algorithms will seek to **DISCOVER AND QUANTIFY TRADING OPPORTUNITIES** for the shipping industry.

The aim is to provide transparency for the global movement of goods and to understand the evolving context of production and consumption while considering the changes that stem from demographic shifts, supply chain issues and catastrophic events.

By monitoring, tracking and measuring cargo volumes across the world, we can begin to understand how trading patterns and parcel sizes relate to each another. These insights will lead to a greater level of confidence in decision-making. For shipowners, this will initially be about vessel positioning but could quickly turn into a broader quest for value creation.

Technological innovation tends to occur exponentially and ruthlessly; whenever a new technology takes over, an old one becomes obsolete. Investors building these “crystal balls” run the risk of planning and building infrastructure that is outdated even before it is operational. But these bespoke intelligence solutions could turn out to be the superchargers that enable individual shipowners to outperform the market in the age of trading platforms. We expect the trading platforms to form the core digital infrastructure of the digital shipping industry. Still, owners will need digital solutions that help them navigate and optimise their everyday operations, even if they are not ground-breaking superchargers.

These new technologies can introduce transparency to a degree that reduce the core elements of many shipowners’ current business models: volatility and asset play. This makes it imperative to create value beyond the vessel.

# VALUE BEYOND THE VESSEL

## *The role of the digital shipping companies*

We believe that the next generation of ships will be super-connected vessels designed to harness the value of a digital shipping industry. The data pool that is generated by moving cargo from A to B and operating the vessels is likely to be the indispensable ingredient that enables an enhanced value proposition. We call it **VALUE BEYOND THE VESSEL**. This is the third step towards value creation in the digital shipping industry. Shipping data will become a currency of the digital ecosystem, especially when it is combined with multiple sources from outside the industry in real time.

To illustrate our argument, let us look at the trends shaping the retail sector. We all know how traditional retailers are struggling to compete with digital players such as Amazon. These players' entry has already changed the retail landscape.

The digital players view transactions as part of a consumer's journey through time, and not simply as one-off purchases. They aim to build multidimensional archetypes by collecting as much information about consumers as possible. They manage to extract value from the accumulation of transactions made from day to day, month to month, year to year, and ultimately the way those interact over a lifetime. Income and wealth certainly have predictive value for future purchases, but behaviour matters even more. The choice to eat more healthily, for example, correlates to a likelihood of higher consumption of physical fitness gear and services, and also to a more attractive profile for health and life insurers (which should result in more affordable insurance cover). The growing ability of data and analytics to transform disparate pieces of information about a consumer's immediate desires and behaviour into insight about the consumer's broader needs is unlocking significant value. That requires innumerable data points to be captured and then turned, within milliseconds, into predictive, actionable opportunities for both sellers and buyers. Advances in big data analytics, processing power and artificial intelligence are making such connections possible.

Imagine how this could look for the shipping industry which handles close to 90% of global trade. The seaborne movements of cargo

represents the best leading indicator for the global economy, in real time.

Shipowners could play multiple roles in a new ecosystem. They could, for example, act as gateways, integrating global trade data across a series of services to leverage network effects.

Today, we build upon the relationships between economic growth and seaborne trade volumes. We look at the journey from raw material to end-user product, the energy it takes to produce it and the final export on a containership, in isolated siloes. We consider most of these cargo movements as one-offs, even though many are interlinked and to a certain extent in sequence, since they all reflect individual parts of the global economy's supply chain.

A vast pool of untapped potential is waiting to be unlocked if we can start to view the supply chains of the global economy as integrated systems that can be optimised further.

First movers will have the opportunity to transition from stakeholders to orchestrators. Shipowners that manage to digitalise and leverage on their core competences could be well-positioned to tap into the unexplored value pool available to those who understand this interconnected ecosystem of the global economy.

# REINVENTING THE OPERATING MODEL

## *Staying relevant for customers*

The fourth step addresses how additional value can be created by reinventing the operating models. We have briefly touched upon this topic but let us elaborate further.

In a digital industry, players from various parts of the ecosystem will simultaneously coexist, actively partner and aggressively move to capture market share from each another. We expect industry borders to become less clear and the role of assets and the types of competitor to change. For traditional shipping companies to succeed in digital marketplaces, they will have to stretch themselves beyond their core capabilities. Competition will ramp up and established players will be faced with more challengers from different directions.

The shipping industry is a service industry and needs to have a greater focus on its end-user customers. Some industries are forerunners in the digital transition. For example, the automotive industry has for a long time considered personal mobility, which encompasses vehicle purchase and maintenance management, ridesharing, carpooling, traffic management, vehicle connectivity and much more. The individual pieces of the mobility puzzle are starting to become familiar, but it is their cumulative impact that truly shows the degree to which industry borders are blurring. We expect a similar development in the shipping industry to emerge within the next decade.

Shipping companies that lack strong customer connections run the risk of disintermediation and perhaps of becoming “back offices” with limited headroom to create or retain economic surplus. For the shipping companies to occupy attractive roles in their ecosystem, they need to create seamless customer journeys.

Take Google’s launch of initiatives such as Chrome and Gmail or Alibaba’s introduction of enterprises such as Alipay and the financial platform Yu’E Bao. These new ventures were not launched just because they wanted to extract additional sources of revenue from their large customer bases (although they did succeed in doing so). They acted to help ensure that they would keep — and expand — those huge customer bases by growing their portfolios of products in

order to increase customer retention.

We are seeing similar initiatives among the forerunners in the new shipping ecosystem. We are seeing players from the class societies launching platforms for digital innovation and industry collaboration. We are beginning to see digital classification of ships. And we are seeing some of the major shipowners working to launch trading platforms that are powered by blockchain technology. Others are working to cross-sell additional services to the customers who own the cargo they are transporting from A to B. One player has joined forces with a technology company to take the next step in autonomous shipping by offering a complete value chain for autonomous ships, from design and development, to control systems, logistics services and vessel operations. These initiatives are examples of how established players in the shipping industry are working to reinvent their operating models and create seamless customer journeys that solve customers’ pain points by capturing business from other industries.

Multiple players ranging from shipowners, engine manufacturers, equipment manufacturers and third parties from outside the industry or the peripheries of the shipping industry’s current ecosystem are working to capture a central part of the future value. New business models are being developed to facilitate this transition. Some players are offering new products with a “pay-as-you-save” approach, while others are offering a more radical and potentially game-changing alternative to the existing industry architecture (e.g. ship-as-a-service). This is all very intriguing, but there is a challenge. When a few but successful digital forerunners (not necessarily shipowners) have established themselves in the marketplace, they will have left a large number of the remaining players behind with few options available to catch up. This could spark a gradual but momentous change to the competitive landscape.

**We invite all customers to contact us to continue the discussion about how these changes may impact their operations.**



# THE SHIPBUILDING MARKET

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MAY 2018

# THE SHIPBUILDING MARKET

## Perspectives and key takeaways

### OUTLOOK SUMMARY

 POSITIVE

 NEUTRAL

 **NEGATIVE**

Despite increased ordering, the global orderbook is still trending downwards and the majority of shipyards are struggling to stay in business. The consolidation process has come a long way, but there is still some way to go. We expect further reductions in both active yard capacity and the number of active yards. Still, newbuilding prices have started to increase, which could continue in the coming years as ordering becomes concentrated at fewer yards.

New ordering increased markedly during 2017 compared with the low levels observed in 2016. Nevertheless, the Shipbuilding industry is still in a difficult situation, as the orderbook for the majority of yards is continuing to decline and many are struggling to turn a profit.

Even though the industry has come a long way in terms of scaling down capacity and becoming more consolidated, it has further to go before it reaches a more balanced level. Yard utilisation is still low at a little more than 70%, and given the size of the orderbook, this will only worsen in the coming years if ordering does not start to increase.

However, we expect ordering to remain subdued in the coming years. Overcapacity still prevails in many of the major shipping markets and several factors are complicating the decision to invest in new ships. Environmental regulations, fuel type considerations and new standards for digital ships are increasing the risk of ordering a new ship with capabilities that will quickly become outdated.

As we have stated in previous editions of this report, we expect the next wave of newbuilding orders to be sparked by the introduction of new standards for digital ships, which could end up intensifying the consolidation process. Not all yards are equipped to build the next generation of ships, and shipyards benefiting from government support could be the winners in this respect. Shipbuilding is in many countries perceived as a strategically important industry, and governments,

especially those in China and South Korea, have made it clear that they will provide their domestic industries with the resources required to stay competitive.

In early 2018, the South Korean government announced an aid initiative to support its ailing shipping and shipbuilding industries. This plan promises to support South Korean shipyards in building 200 ships in the period up to 2020 by guaranteeing funds that cover 15-40% of the newbuilding costs. In many ways, this initiative summarises the problems facing the Shipbuilding market today. Strong state interests are preventing market forces from rebalancing the market and are prolonging the pain for both the shipping and Shipbuilding industries by keeping both in a state of overcapacity.

Competition in the industry has also been intensified by the fact that China's state-owned yards have started to claim larger market shares across a broader range of vessel types. The Chinese government wants its state-owned shipbuilders to become more dominant in the high-end segments, for example Cruise, which is strongly challenging the niche market enjoyed by European shipyards until now.

Some yards could see improved profit margins this year, but there will not be a broad-based recovery. Close to half of active newbuilding yards have not received any new orders during the last 18 months and many will run out of orders this year. We expect large parts of the industry to continue to struggle to secure enough orders to stay in business.

Nevertheless, newbuilding prices could continue to edge up slightly as building material costs increase and contracting becomes concentrated at fewer yards. We expect the difficult market conditions and the consolidation of the industry to continue in the next couple of years.



# THE SHIPBUILDING MARKET

## The orderbook and newbuilding prices

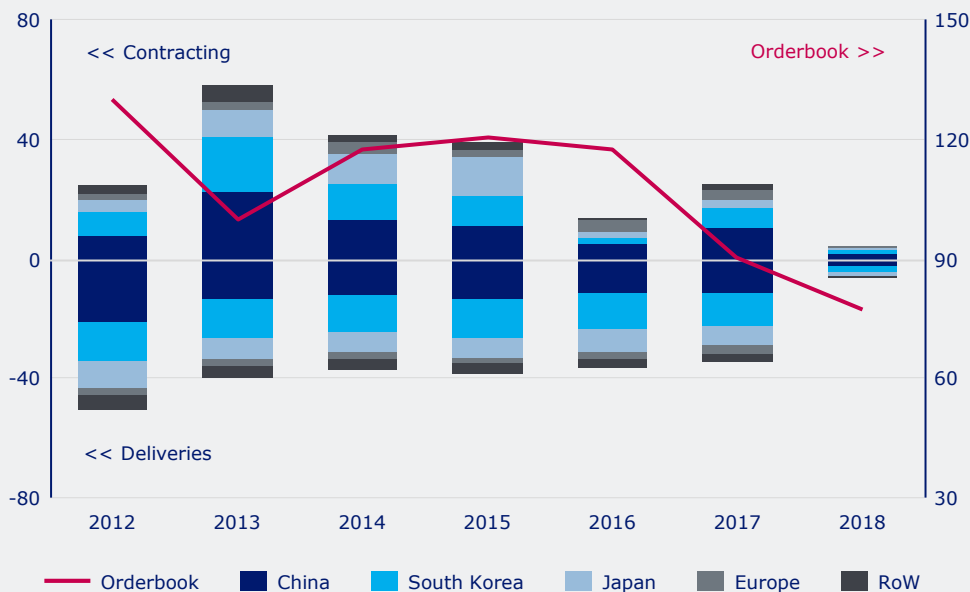
Apart from a short-lived increase towards the end of 2017, the global **orderbook** has continued to shrink. By April 2018, it had dropped 7% year-on-year to just under 77 million cgt and just over 3,000 ships, the lowest level since 2004. The orderbook is split between 460 yards, 150 of them second-tier yards<sup>1</sup> scheduled to deliver their last orders before the end of 2018. Japan's orderbook experienced the biggest drop, declining 20% year-on-year, followed by South Korea which saw its orderbook decline by 9%. China managed to keep its orderbook constant, while Europe's grew by 8%.

The declining orderbook continues to put pressure on global **order cover** which has come down to 1.7 years from 1.9 years at the start of 2017. First-tier yards – those that have received new orders in the last 18 months – have average order cover of 1.8 years and second-tier yards 1.3 years. South Korea and China have experienced a marginal improvement in their average order cover, due to a

combination of higher contracting towards the end of 2017 and a decline in the countries' active yard capacity. Japan's order cover has continued its decline, which has lasted more than two years. Europe's order cover has also experienced a slight decline, but it remains around three years, significantly above any of the other shipbuilding regions, due to the large increase in Cruise ordering.

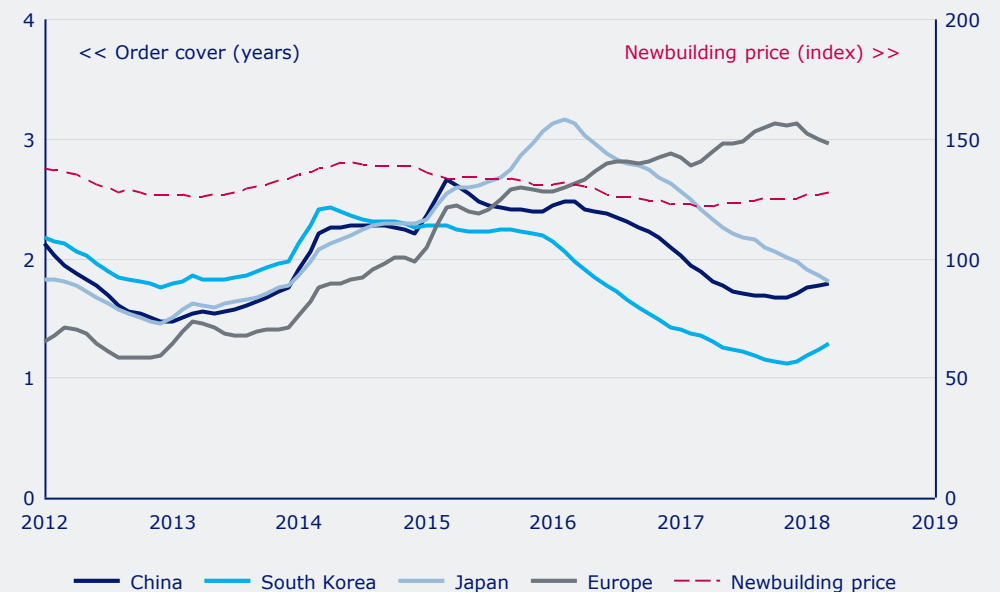
The average **newbuilding price** has continued its upward trend and has risen 5% since April 2017. The largest price increase has occurred in the Bulk segment, followed by the Container and Tanker segments. Gas Carrier prices have continued to decline. The higher prices have been driven by stronger demand, fewer yards attracting orders and a significant increase in raw material prices, which has challenged yard profitability.

SHIPBUILDING ORDERBOOK - STOCK AND FLOWS (MILLION CGT)



<sup>1</sup> Shipyards that have not received any new orders in the last 18 months

DEVELOPMENT IN THE NEWBUILDING PRICE AND ORDER COVERS



Source: Clarksons, Danish Ship Finance

# THE SHIPBUILDING MARKET

## Contracting and yard capacity

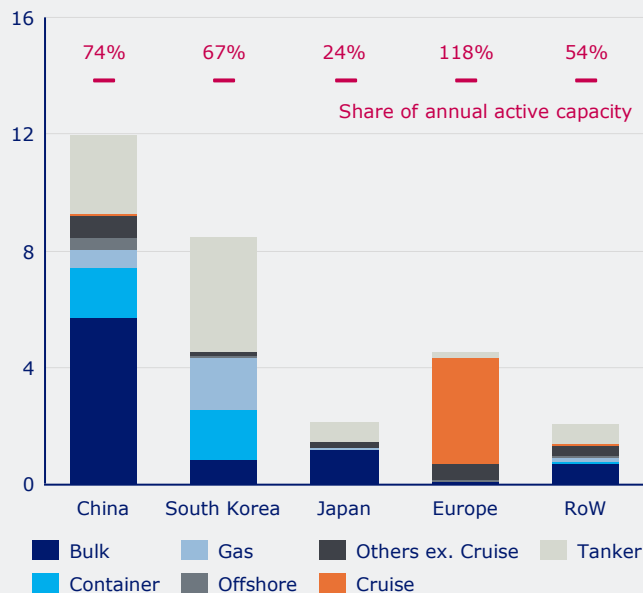
The decline in the orderbook has occurred despite an uptick in **contracting** activity. New orders amounting to 26 million cgt were placed in 2017 and another 6 million cgt in the first quarter of 2018, the majority for Tankers and Bulk vessels. Contracts are still being placed at fewer and fewer yards. Around 210 different yards attracted new orders in 2017, and 55% of total contracting was placed at 15 different yards spread across China, South Korea, Europe and one in Vietnam. No Japanese yard managed to attract enough orders to place it in the top 15.

Aside from Europe, which in 2017 and the first quarter of 2018 attracted new orders equal to 118% of its annual active capacity, China was the best-performing shipbuilding nation. China attracted new orders equal to 74% of its annual active capacity. Japanese yards had a difficult year and only attracted new orders amounting to 24% of its annual active capacity, and a growing share of Japanese yard

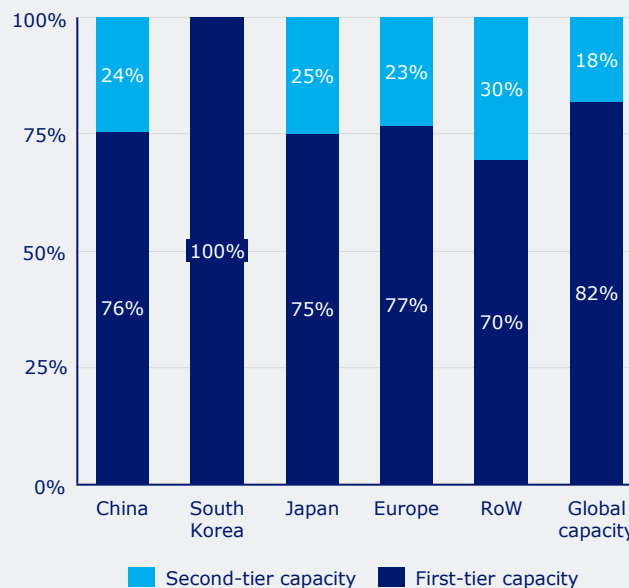
capacity has less than one year of order cover left.

The higher contracting activity has not been sufficient to remove the overcapacity from the industry, and global **active yard capacity** in 2018 is estimated to have declined by around 3% from the 2017 level to 45 million cgt, and the number of active yards has dropped from 580 to 490 yards. While active second-tier yard capacity contracted by around 30%, active first-tier capacity actually expanded by 6%, primarily due to an increase in Chinese first-tier capacity of 13%. Hence, the two-tier structure is becoming more pronounced, and the first-tier yards are now accountable for 82% of active capacity, up from 76% at the end of the third quarter of 2017. The number of second-tier yards is dropping fast and has in 2018 been reduced by 140 to only 230 yards. The group of first-tier yards, on the other hand, has grown by 20 yards in the same period and now accounts for just over half the number of active yards.

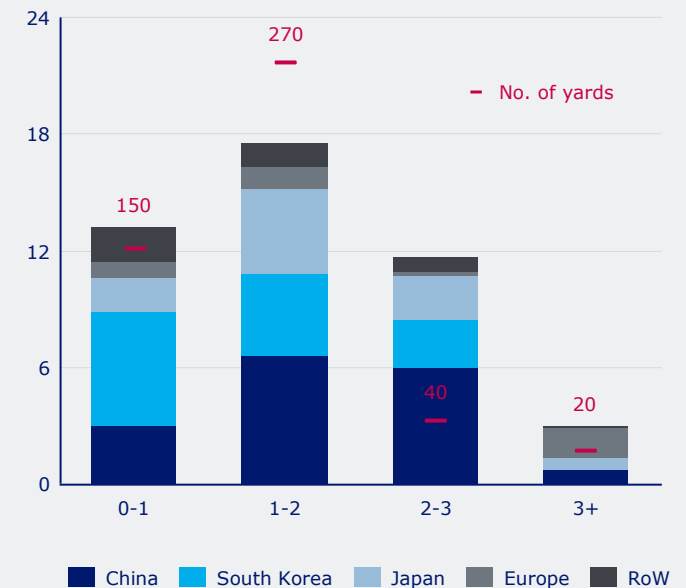
CONTRACTING - 2017 AND Q1 2018 (MILLION CGT)



FIRST AND SECOND-TIER YARD CAPACITY



ACTIVE YARD CAPACITY IN 2018 (MILLION CGT)



Source: Clarksons, Danish Ship Finance

# THE SHIPBUILDING MARKET

## The market outlook

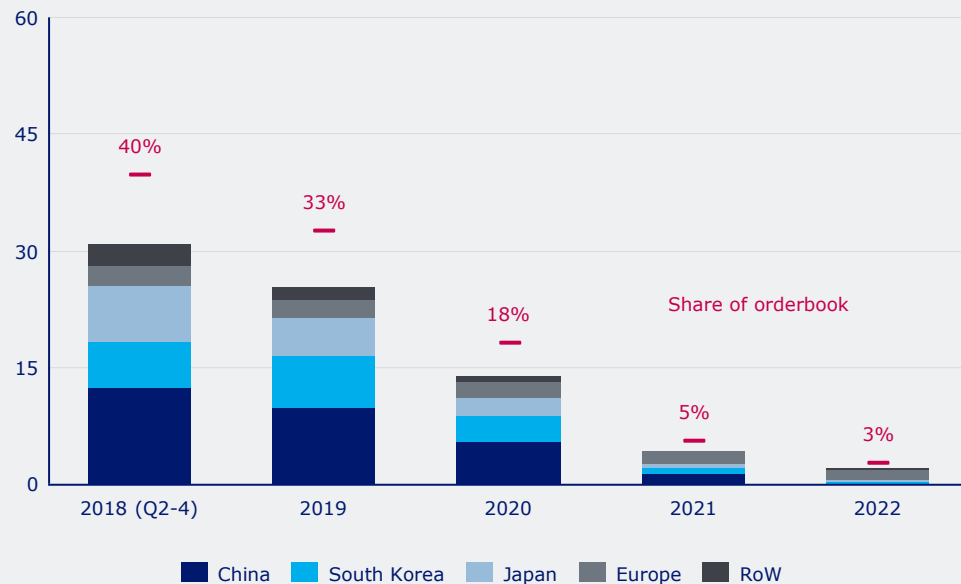
The outlook is still difficult for large parts of the Shipbuilding industry. Even though contracting has increased, it is still not enough to utilise active global yard capacity or to increase profit margins meaningfully. 40% of the orderbook is scheduled to be delivered before the end of 2018, and assuming 80% of orders scheduled for delivery in the remainder of 2018 are actually delivered, global yard utilisation will end up at around 73%, the same level as in 2017. Applying the same assumption to the orderbook for 2019 would push yard utilisation down towards 50%. Hence, there is still significant overcapacity in the industry relative to the current orderbook, and if no new orders are placed or no existing orders are postponed, our estimates suggest that global yard capacity will be reduced by an additional 5% in 2019 and the number of active yards halved.

The South Korean yard industry is especially vulnerable if contracting does not pick up. Even if all South Korean orders scheduled to be

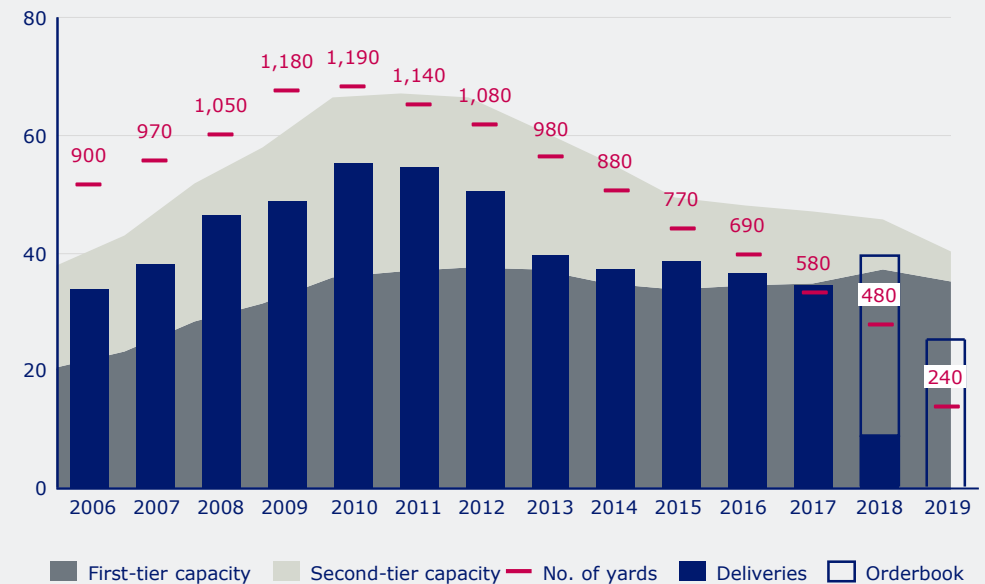
delivered in 2018 are delivered on schedule, yard utilisation will drop to 68% in 2018 and 54% in 2019 – by far the lowest of all the major shipbuilding markets. The Chinese orderbook is currently capable of utilising 94% of its domestic active capacity in 2018 and 70% in 2019. This might explain why the South Korean government has found it necessary to launch its controversial aid initiative.

New ordering and postponement of orders will ensure that the number of yards and yard utilisation do not drop that low, but we expect that more excess capacity will have to be cut before the industry reaches an optimal size. The 150 second-tier yards scheduled to deliver their last orders before the end of 2018 are obvious candidates for closure, as are the 60 first-tier yards also scheduled to empty their orderbooks this year.

### ORDERBOOK BY DELIVERY YEAR (MILLION CGT)



### DEVELOPMENT IN ACTIVE YARD CAPACITY (MILLION CGT)



Source: Clarksons, Danish Ship Finance

# SHIPBUILDING DEEP DIVE: CHINA'S SHIPBUILDING INDUSTRY

*China's state-owned shipyards are climbing the complexity ladder*

**The Shipbuilding industry in China has experienced a rapid development over the last 15 years. Many new shipyards popped up around the time of the financial crisis, focusing on building cheap and simple vessel types, primarily Bulk vessels. Many of these yards have already exited the industry again and a more consolidated and increasingly state-sponsored industry has emerged, with ambitions to build more complex vessel types in the future.**

The severe overcapacity in many of the major shipping markets has taken its toll on the Shipbuilding industry, and competition has increased among shipyards. To make matters worse, China has begun to challenge the status quo by establishing itself as a builder of more complex vessel types, a role previously reserved for Europe, Japan and South Korea. In 2015, the Chinese government launched its "Made in China 2025" plan, aimed at upgrading its domestic industries, including Shipbuilding. By 2025, Chinese yards should be market leaders in building high-tech ships and maritime equipment, and a larger share of components should be produced domestically. Given the oversupply of yard capacity and the relatively low demand for new vessels, this is expected to intensify competition among the major Shipbuilding nations.

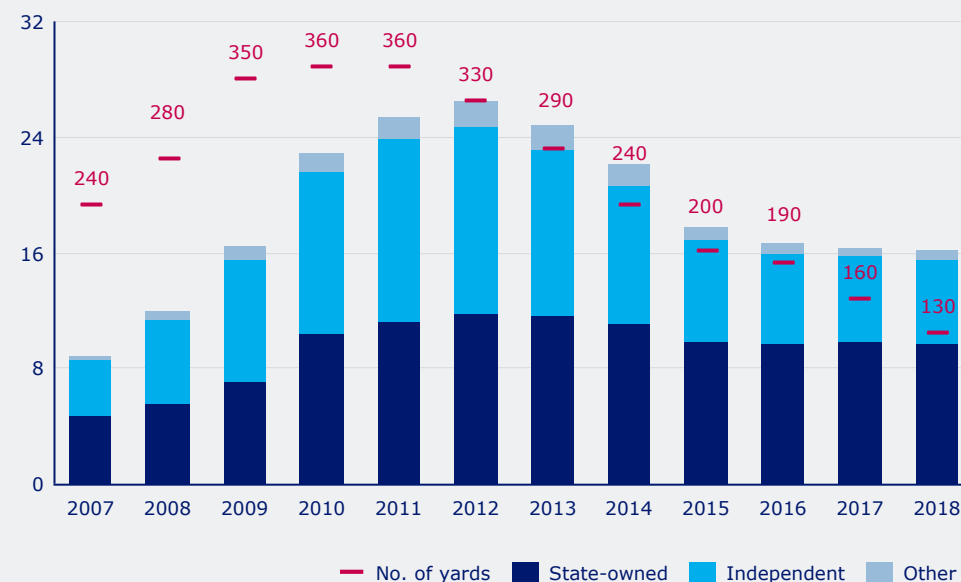
It is still early days, but the Chinese yard industry has already become more consolidated and more dominant across a broader group of vessel types over the last couple of years. In 2017, China attracted 41% of total contracting, measured in cgt, and not just in the form of Bulk orders. Chinese yards surprised by winning high-profile orders for both Cruise and ultra-large Container vessels. It attracted two-thirds of Bulk orders, half of Container orders and one-third of both Tanker and Gas Carrier orders.

That it is a state-mandated task to build more high-tech vessels is evident in the way China's contracts are spread between state-owned and independent shipyards. State-owned yards' share of total contracting has been gradually increasing over the last couple of years. In 2017, these yards attracted 68% of total contracting,

compared with 54% in 2014. Looking at the orders for different vessel types, the simple Bulk orders were almost evenly spread between state-owned and independent yards, while orders for more complex vessel types gravitated towards the state-owned yards. All Gas Carrier orders and around 80% of contracts for Container, Offshore and other niche segments were placed at state-owned yards in 2017.

China is in a good position to continue to gain market share in the coming years. The country has proved across many different industries that it is capable of increasing the complexity and sophistication of its production. Moreover, China is the primary demand driver for many of the major shipping segments, which provides it with a unique opportunity for controlling its own supply chain. If it so chooses, the Chinese government could decide that a larger share of vessels calling at Chinese ports must be built in China or Chinese-flagged, thereby supporting its domestic shipyards further – an option not available to the other shipbuilders.

## CHINA'S ACTIVE YARD CAPACITY (MILLION CGT)



Source: Clarksons and Danish Ship Finance



# THE CONTAINER MARKET

SHIPPING MARKET REVIEW – MAY 2018

# THE CONTAINER MARKET

Perspectives and key takeaways

## OUTLOOK SUMMARY

○ POSITIVE

● NEUTRAL

○ NEGATIVE

Relatively strong demand growth has lifted box rates and secondhand prices. However, the short-term outlook is clouded by a large inflow of new vessels which are likely to add to the current overcapacity among the larger vessels. Liner companies are struggling not to become price takers in an oversupplied market. Some have begun to pioneer a digital transition which may require a reinvention of their operating model.

For a long time, many liner operators have pursued a strategy of cost leadership, which has resulted in larger and more efficient ships being ordered. This has spiralled the industry into severe overcapacity, creating pressure on freight rates. The intense focus on costs has caused the industry to lose sight of its core value proposition.

Despite massive overcapacity, primarily among the bigger vessel sizes, some liner operators are still focusing on building larger vessels and cutting marginal costs. More new orders for Ultra Large Container vessels were placed in 2017. Some of these were replacement orders for older, smaller and less efficient vessels, while others were placed by liners which deemed it necessary in order to stay competitive. We are no experts in liner economics, but we find it difficult to understand these investment decisions. Two critical assumptions must have been made for the calculation of marginal costs to make economic sense: first, that the vessels would have high utilisation, and second, that trade patterns would remain unchanged. Both assumptions are highly uncertain, in our view, and these orders may end up prolonging the low freight rate environment for all market players.

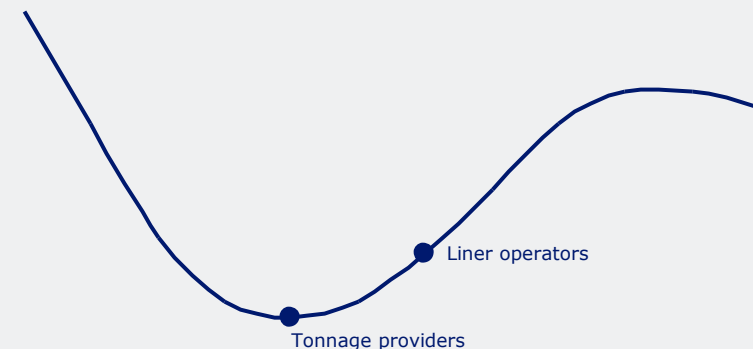
However, there are examples of liner operators that have begun to reassess how value is created in the Container industry. Their focus is shifting from lowering the cost per teu moved to addressing customer pain points, partly by digitalising several aspects of their operations.

Some of the big liner operators are building integrated solutions for their customers, no longer only moving containers from port to port but from origin to destination. Some are even trying to establish themselves as a one-stop shop, handling all customers' needs related to shipping a product from A to B, from trade financing and insurance to transportation.

This is an ambitious strategy that is challenging the traditional mindset of many liner operators by blurring the borders of the industry, the role of assets and the types of competitor. However, if they succeed, it has the potential to increase the liner operators' revenue per teu moved and make them less dependent on box rates.

The consequences for tonnage providers are uncertain. They have suffered the most from the growing oversupply, as liner operators have been able to establish alliances to optimise the use of owned capacity. Even though timecharter rates saw a significant increase in 2017, they are still low and we are not convinced that they will continue to rise. While it is true that the liner operators' new business models could become more asset-light, we expect that the tonnage providers of tomorrow will have to be larger and more flexible with the necessary financial strength to function as reliable counterparts for the liner operators.

## WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

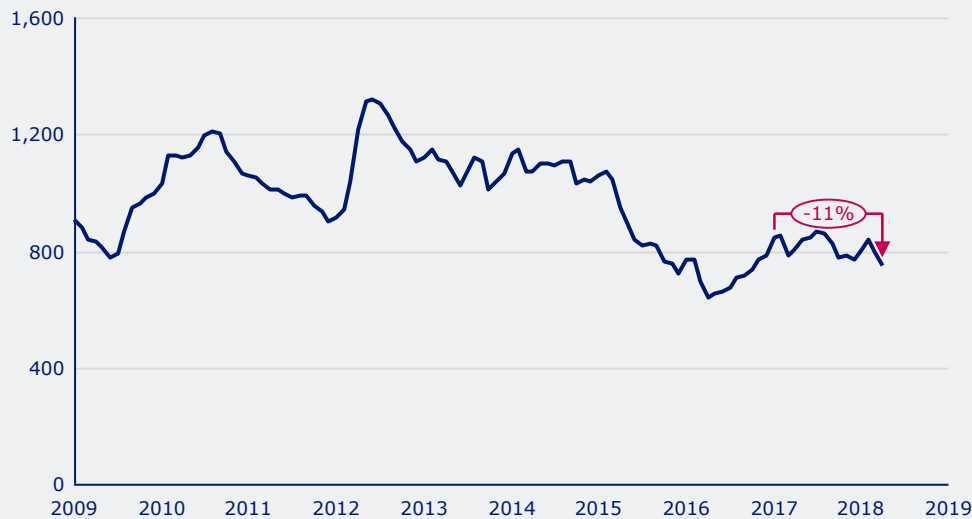
# THE CONTAINER MARKET

## Freight rates and ship prices

After a difficult year in 2016, **box rates** found a higher and more stable level in 2017, owing to a strong rebound in demand and the supply discipline exercised by liner operators last year. Although the fourth quarter saw rates fall back as this discipline faltered, which continued into the first quarter of 2018, the average box rate out of China still ended up at index 820 in 2017 and index 810 in the first quarter of 2018, up from index 713 in 2016. The average index value over the last 15 years has been 1,000, and thus average box rates are still low in a historical context.

**Timecharter rates** experienced a significant increase towards the end of the first quarter of 2017, when liner alliances started to reshuffle their fleets, and they have since continued to trend upwards. By April 2018, the average timecharter rate was up 33% year-on-year. The largest increase was for Feeder vessels of around 1,700 teu, for which the 1-year timecharter rate rose by 58%.

**AVERAGE BOX RATE OUT OF CHINA (INDEX)**

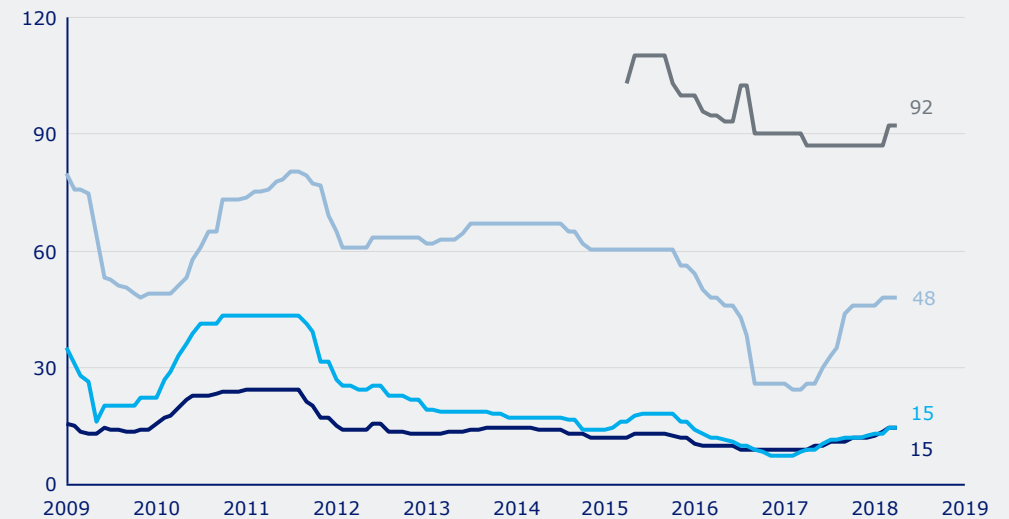


— CCFI

By April 2018, the average Container **newbuilding price** had increased by 12% compared with the start of 2017. This was primarily driven by the Feeder segment, which saw prices grow by more than 15% in the period. Newbuilding prices for vessels over 15,000 teu experienced a small decline.

The secondhand market was very active in 2017 and the average **secondhand price** went up by 69% in the period from the start of 2017 to April 2018, indicating that the market regained some of its optimism. The better sentiment was cemented by strong **sales activity**, which increased markedly in 2017 and reached the highest level ever recorded, both in terms of teu and number of vessels sold. 310 vessels with a combined capacity of 1.1 million teu changed hands during the year, the majority of vessels below 6,000 teu. Sales activity slowed down in the first quarter of 2018, with 65 vessels amounting to 0.13 million teu reported to have been sold.

**SECONDHAND PRICES – 5 YEARS (USD MILLION)**



— 1,700 teu — 3,400 teu — 8,800 teu — 13,000 teu

Source: Clarksons, Danish Ship Finance



# THE CONTAINER MARKET

## Supply-side development

The Container fleet ended up growing by close to 4% in 2017, as the delivery performance increased and scrapping declined. The fleet of vessels over 8,000 teu grew by 11%, while the fleet of vessels below 8,000 teu declined by 3%. The effective fleet growth was higher, however, because the share of vessels lying idle declined significantly from 7% at the start of 2017 to around 2% at the end of the year. The fleet grew another 1.5% in the first quarter of 2018.

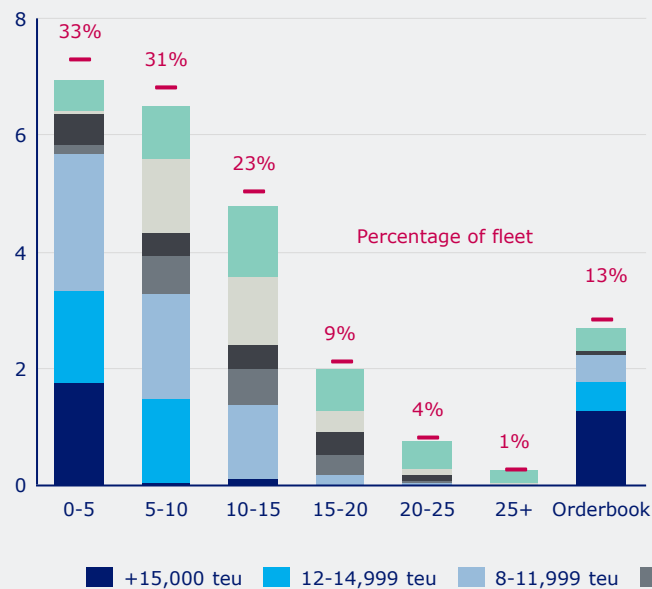
Fewer orders were postponed in 2017, bringing the **delivery performance** to 75%. **Deliveries** reached 1.2 million teu in 2017 and 0.35 million teu in the first quarter of 2018, while **scrapping** dropped to 0.42 million teu and 0.02 million teu, respectively. The Old Panamax segment once again accounted for the majority of the vessels scrapped, followed by the Feeder segment.

The lower scrapping activity led to an increase in the **average scrapping age**, which went up from 18.5 years in 2016 to 21 years in

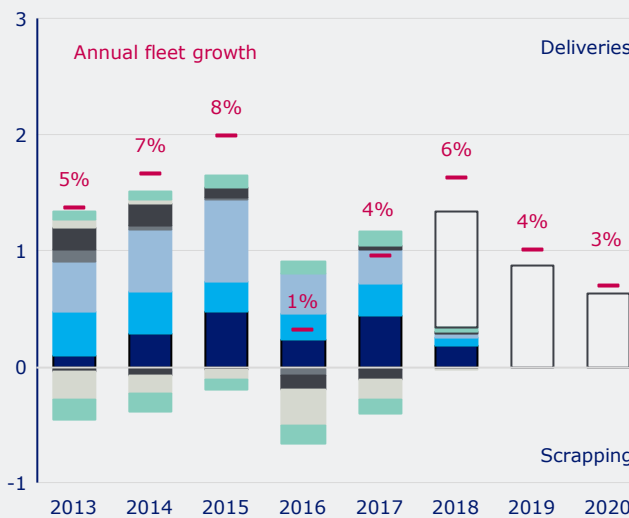
2017. The average scrapping age 3,000-5,999 teu vessels, however, continued to decline, dropping to 16 years in 2017. Hence, the average scrapping age is still well below 25 years and secondhand prices of older vessels in the smaller segments are still being affected by shorter economic lifetimes.

**Contracting** activity also increased, especially in the second half of 2017 and into the first quarter of 2018. New orders amounted to 0.74 million teu in 2017 and 0.24 million teu in Q1 2018. Measured by vessel size, these were primarily for ships larger than 15,000 teu, while Feeder vessels accounted for the highest number of vessels ordered. However, this was not enough to stop the orderbook from declining and the orderbook-to-fleet ratio for the Container fleet dropped to 13% in April 2018, from 16% at the beginning of 2017. Tonnage providers' share of the orderbook has declined significantly over the last two years, and is now one-third of the total orderbook.

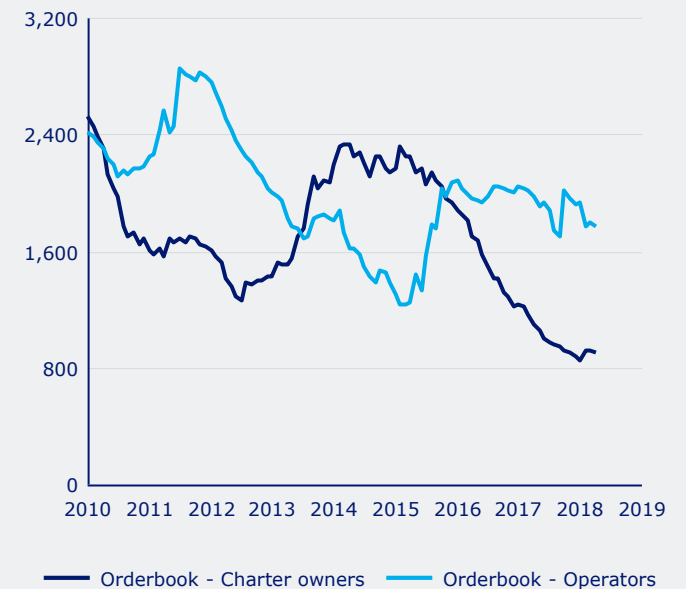
AGE DISTRIBUTION OF FLEET (MILLION TEU)



FLEET DEVELOPMENT (MILLION TEU)



ORDERBOOK BY OWNER TYPE (THOUSAND TEU)



Source: Clarksons, Danish Ship Finance

# THE CONTAINER MARKET

## The market outlook

The short to medium-term outlook for the Container industry will continue to be characterised by oversupply and will be contingent on the delivery schedule of the orderbook.

The orderbook is front-loaded and many orders for large vessels are scheduled to be delivered in the first half of 2018, which is expected to put downward pressure on freight rates. The outlook for 2018 has improved over the last three months, however, as the delivery dates for a significant share of orders have been postponed. At the end of 2017, nominal fleet growth for 2018 was scheduled to reach 8%. By April 2018, this had been reduced to 6%.

Nevertheless, many vessels are still due to be delivered over the next two years and more vessels are expected to come off-hire as charter contracts run out. Some of the new vessels being delivered are expected to be replacements for older and less efficient vessels. Combined with the implementation of the IMO 2020 regulation, this

could keep scrapping activity relatively strong in the coming years. However, it does not change the fact that the vessels on order are significantly larger, on average, than those they are likely to replace.

Stronger global economic growth is expected to keep demand growth at around 4-5% per year in the next couple of years, even though some of the effects driving demand in 2017, such as restocking, are not expected to be repeated.

Hence, despite the large orderbook, the oversupply could begin to decline from 2019 onwards, provided that contracting stays relatively muted. This will support box rates and potentially also gradually improve the outlook for the tonnage providers, although the new digital initiatives being introduced by liner operators could slowly start to change the structure of the industry and create demand for a new type of tonnage provider.

### FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

<b>Global economic growth</b>	The global economy has strengthened and growth is expected to remain robust, creating the foundations for strong Container demand.	✓
<b>Interest rate increases</b>	As interest rates begin to rise, consumer demand could be affected negatively by a reduction in disposable income, which could dampen Container demand growth.	✗
<b>Protectionism</b>	Protectionism has increased around the world, and the globalisation process is slowly decelerating. With time, this could shorten supply chains and lower Container demand.	✗
<b>Regionalisation of production, part 1</b>	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.	✗
<b>Regionalisation of production, part 2</b>	More regionalised production could strengthen short-sea volumes and support demand for Feeder vessels.	✓

✗ Negative ✓ Positive

# CONTAINER MARKET DEEP DIVE: IS THE GAME CHANGING?

*The digital transformation of the liner business*

**Consolidation and network optimisation have been the main themes in the Container industry during the last couple of years. Liner operators have merged and established alliances in order to increase utilisation in an oversupplied market. This is likely to continue in the coming years, but emerging digital business models may begin to change the industry dynamics.**

Many of the liner operators are struggling not to become low-cost providers of commoditised Container services. To avoid this, leading liner operators have changed their approach, from being cost leaders to becoming digital forerunners in the Container industry. These digitalisation efforts have the potential to create cost savings and, combined with advanced analytics, to discover and quantify trading opportunities, optimise capacity utilisation and possibly create opportunities for generating value beyond the vessel.

There has been a lot of interest around this the last couple of years – and it is not only liner operators chasing these opportunities. We are also seeing players from outside the shipping industry, from freight forwarders to digital players and start-ups, racing to obtain their share of these value creators.

It will not be an easy transition and they all need to overcome the same barriers: few of the core activities of a liner company are currently digitalised. Some activities are in the process of being digitalised, such as box tracking, empty container repositioning, document management, network design and dynamic pricing, but more work needs to be done.

The goal is to identify the pain points of the current operations and to leverage on the inherent capabilities of the Container industry. This could be done by adopting an ecosystem approach rather than the traditional industry perspective. For liner operators, this would require a significant change in how they define their role in the economy. Currently, many liner operators act primarily as a utility, transporting goods from port to port. Many have a passive and limited relationship with end-user customers and are at risk of becoming “back offices” with limited scope to create value.

We believe that the digital forerunners will gradually reinvent their operating models in order to develop an edge in this highly competitive market. In a world of digital ecosystems, where the borders of industries are less clearly defined, the role of assets is less important and the types of competitor have changed, digitalisation is expected to create opportunities for further cost reductions, stronger customer relationships and eventually additional revenue streams. In time, these additional sources of revenue may actually become the key drivers of value, since low freight rates create little, if any, value for asset owners.

Take trade financing as an example. If a liner operator decides to offer trade financing to all its customers, thereby leveraging on a strong capital market access, it may actually generate higher revenues per unit moved than its competitors.

In the competitive Container market, we believe it will be mission-critical for players to defend their position while simultaneously pursuing opportunities across other sectors before others get there. Within a decade, companies could define their business models not by how they play against traditional industry peers but by how effective they are in competing within rapidly emerging ecosystems comprising a variety of businesses from dimensionally different sectors.

In this scenario, consolidation and owning the largest vessels with the lowest cost per teu moved become less important. If the role of assets starts to diminish in terms of revenue generation, it might lead liner operators to pursue a more asset-light business model. However, that does not change the fact that the industry still needs the ships. The question is, though, who will own them. Many of the traditional tonnage providers have suffered huge losses over the last ten years, and few have the scale or the financial resources to transition into a digital future as reliable counterparts for the liner operators. This may call for an updated business model, where the ships (and the data they generate) are offered as a service.



# THE DRY BULK MARKET

SHIPPING MARKET REVIEW – MAY 2018

# THE DRY BULK MARKET

Perspectives and key takeaways

## OUTLOOK SUMMARY

● POSITIVE

The relatively small orderbook combined with healthy demand expectations for the next few years could ensure that the Dry Bulk market continues to strengthen in the short term. However, we have not changed our view on the unsustainable nature of the Dry Bulk demand drivers. Significant changes in China's demand could happen any time in the next three years, potentially reducing Dry Bulk volumes.

○ NEUTRAL

○ NEGATIVE

The Dry Bulk market is still being influenced by an oversupply of vessels, but the surplus is shrinking, as demand has rebounded and the orderbook is at one of the lowest levels in 12 years.

A broad global economic upswing, cemented by stronger industrial production, supported the Dry Bulk market in 2017. Relatively high fleet growth of 3% was more than offset by an increase in distance-adjusted demand of 5%, driven by growth across most commodity groups but primarily iron ore and steam coal volumes.

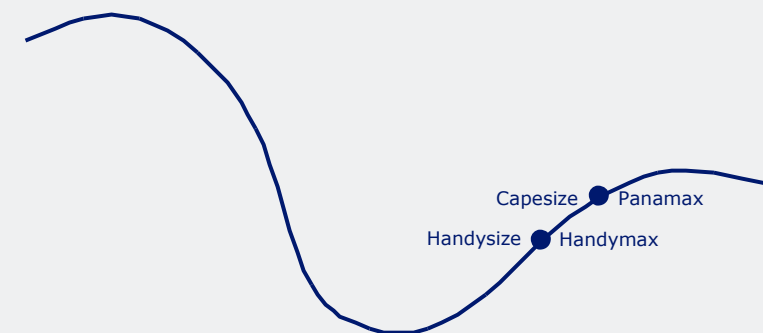
In April 2018, the Baltic Dry Index (BDI) reached index 1,350, still below the long-term median index value of 1,600 but markedly above the all-time low from early 2016 of index 300.

Stronger market sentiment was accompanied by increasing interest in buying new vessels. Dry Bulk investors placed more than 300 new orders in 2017, up from around 60 in 2016, even though the gap between newbuilding prices and secondhand prices remained substantial. The increased ordering activity does not necessarily mean that the general market regained its confidence, though. A closer look at the orders placed in 2017 and Q1 2018 shows that 36% were from Chinese, South Korean or Japanese owners at domestic shipyards. Hence, some of the orders might reflect an attempt to support the countries' struggling shipbuilding industries rather than growing demand among shipowners for new vessels.

The flat development in secondhand prices of younger vessels over the last 12 months might indicate that Dry Bulk investors have become apprehensive about the future market, and that they are unwilling to drive prices up until the market upswing has taken root more solidly. Older vessels, on the other hand, have experienced bigger price increases, driven by higher scrap prices and lower scrapping activity, which has reversed the declining trend in the vessels' economic lifetimes.

It seems as though the freight market is moving in the right direction and could continue to do so in the coming years, not least because market players have begun to apply more caution to their future market expectations. It goes without saying that stable Chinese demand is a prerequisite for this improvement to be sustained. We still believe the reform agenda in China could make a dent in Dry Bulk volumes at some point, but the timing is difficult to determine. In our view, this could happen any time within the next one to three years, and given the oversupply still present in the market, it limits how much higher the current cycle can go. Thus, we do not necessarily expect freight rates to rise much further from the current levels – especially not in the larger segments.

## WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

# THE DRY BULK MARKET

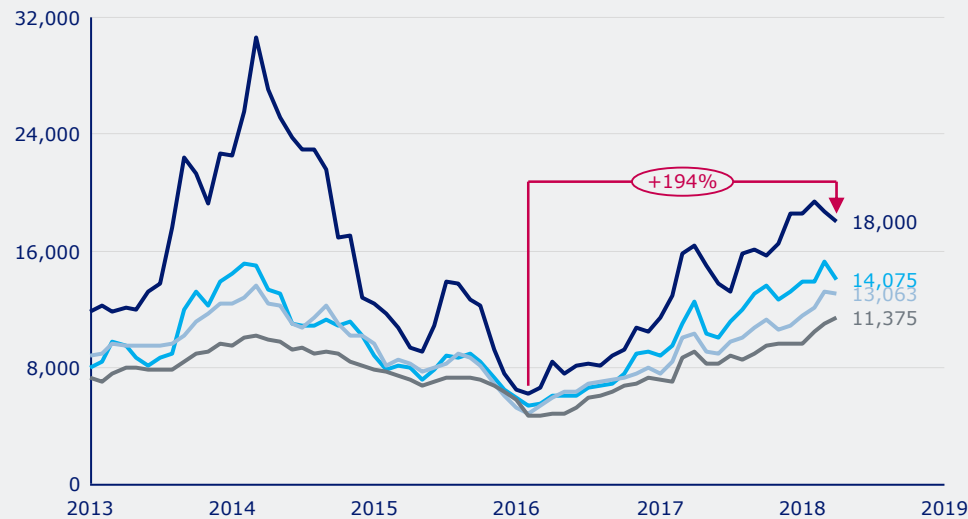
## Freight rates and ship prices

**Spot rates** experienced a relatively strong start to 2018 despite the seasonal first-quarter lull in activity. The BDI bottomed at index 1,125 in February 2018, compared to index 759 in February 2017. By the end of April, the BDI was at index 1,350. Strong Chinese demand for coal and iron ore, supplemented by a general strengthening of global economic activity, has supported freight rates. **Timecharter rates** have continued to gradually improve, and by April, all segments except Capesize were close to the peak levels from 2014.

**Newbuilding prices** started to rise during 2017 as ordering activity and prices of input materials increased. By April 2018, the average newbuilding price was up by 10% compared with at the start of 2017.

**Secondhand prices** have remained relatively stable since the second quarter of 2017. Nevertheless, by April 2018, the average secondhand price was up by 13% year-on-year, led by increases in the prices of older vessels, which were supported by higher scrap prices and an increase in vessels' economic lifetimes. The average price of a five-

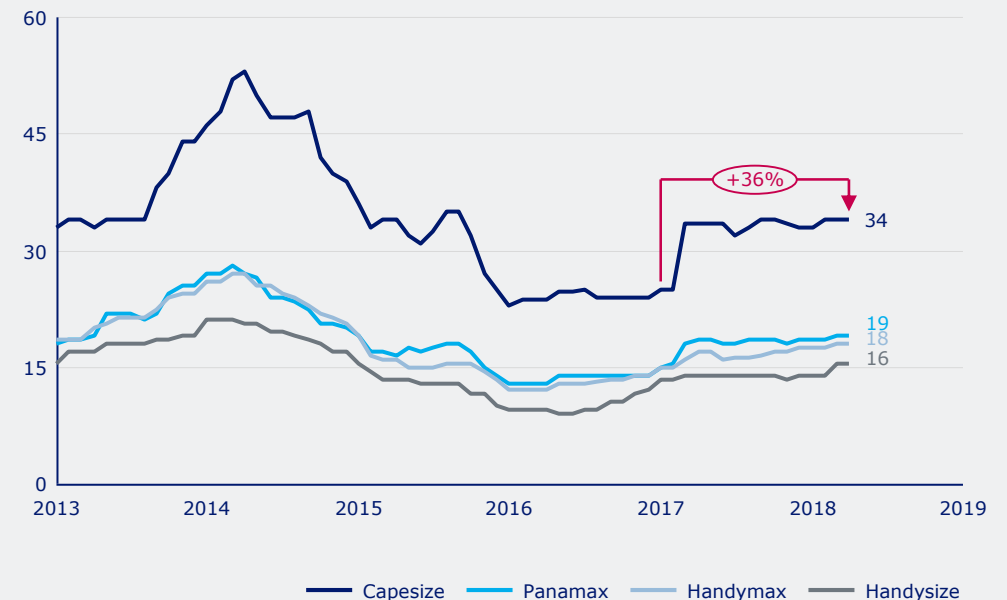
**1-YEAR TIMECHARTER RATE (USD PER DAY)**



year-old Dry Bulk vessels increased 8% during the period.

The relatively low secondhand prices have kept **sales activity** strong, and around 580 vessels changed hands during 2017, 170 of them in the Handymax segment. One-third of sales occurred in the first quarter of 2017, when secondhand prices experienced rapid increases. As prices started to plateau, sales activity slowed down somewhat. Activity continued at a healthy pace in the first quarter of 2018, with 110 vessels changing hands. The active secondhand market could suggest that Dry Bulk investors have regained confidence in the market and believe the market has passed the bottom. However, the flat development in secondhand prices of younger vessels indicates that investors remain unsure how high the market will go in the coming years.

**SECONDHAND PRICES – 5 YEARS (USD MILLION)**



Source: Clarksons, Danish Ship Finance

# THE DRY BULK MARKET

## Supply-side development

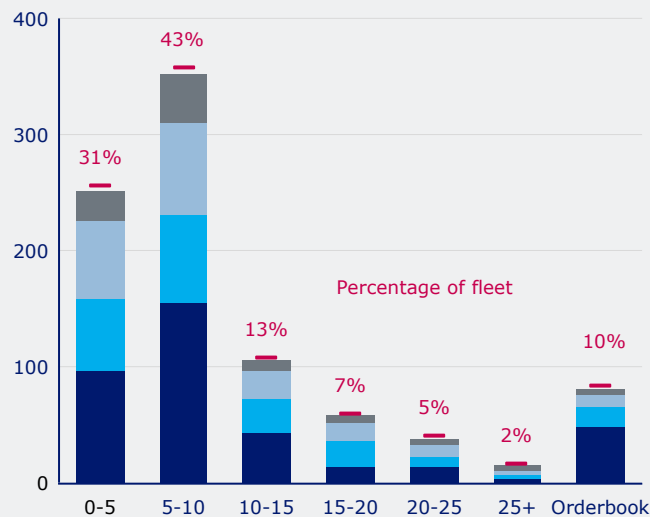
**Contracting** increased in 2017 as market sentiment strengthened, with Capesize, Panamax and Handymax vessels in particular attracting interest. Contracting for the year reached 37.3 million dwt, split between 325 vessels, which was significantly more than the volumes contracted in 2015 and 2016. In the first quarter of 2018, another 7.4 million dwt was contracted, primarily Capesize vessels.

**Deliveries** dropped to 38 million dwt in 2017, the lowest level since 2008, reflecting a markedly lower orderbook. Fewer orders were postponed or cancelled, and 67% of orders scheduled for delivery in 2017 were actually delivered, compared to 53% in 2016. **Demolition** activity stayed subdued, and hence even though fewer new vessels were delivered, the Dry Bulk fleet still grew by 3%. Only 14 million dwt, or 220 vessels, were scrapped during 2017 and activity waned as we approached the end of the year. This supported an increase in the average scrapping age, which grew by 1.5 years from around 23 years

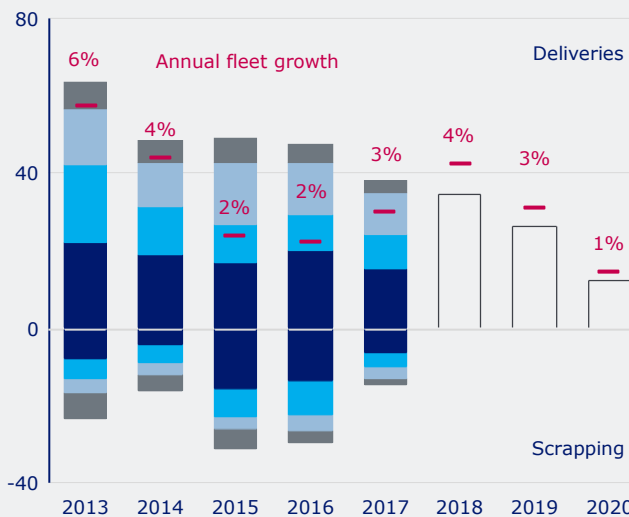
in 2016 to 24.5 years in 2017. The only segment in which the average scrapping age continued to decline was the Handymax segment, which saw a drop of around one year to 21.5 years in 2017, despite fewer vessels being scrapped.

The **fleet renewal potential**, reflecting the relationship between the orderbook and the number of scrapping candidates in the fleet, has improved in the Handysize and Handymax segments over the last year, making them more resistant should demand growth be disrupted at some point in the coming years. The increased contracting activity in the Panamax and Capesize segments has, however, caused the fleet renewal potential in these segments to deteriorate, and there are too many ships on order compared to the number of natural scrapping candidates in the fleets. The Capesize segment is especially vulnerable with an orderbook-to-fleet ratio of 15% and 2.6 ships on order for every ship in the fleet older than 20 years.

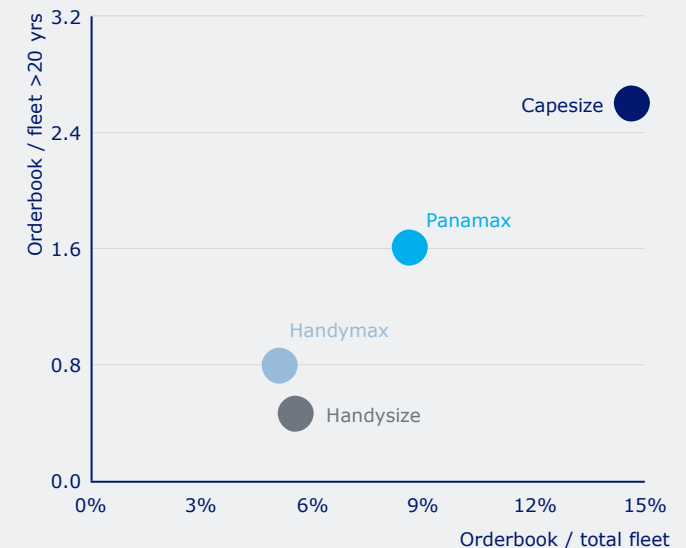
AGE DISTRIBUTION OF FLEET (MILLION DWT)



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

The conditions for a continued improvement in Dry Bulk market fundamentals are in place, and we are cautiously optimistic about the short-term outlook (one to three years). Even though the orderbook-to-fleet ratio has increased by a couple of percentage points during the last 12 months, it is still relatively low at 10%. Consequently, we expect annual fleet growth to stay below 2% during the next three years after taking into account scrapping, postponements and cancellations of orders. Meanwhile, consensus is for nominal demand to grow by around 3% annually in the same period, creating the foundations for the overcapacity in the market to be reduced even further.

There are, however, some warnings signs that the demand outlook could change, potentially even reducing seaborne trade volumes. In the short term, the joker for Dry Bulk demand is China, which, within a relatively short space of time, could change the market dynamics,

bringing freight rates under pressure, for example if the country chooses to reimpose restrictions on coal imports or lower infrastructure investments. Our primary concern in this regard is the fact that Dry Bulk contracting activity has accelerated primarily in the larger ship segments, which are most vulnerable to changes in China's demand pattern. We have to remember that around 75% of global seaborne iron ore demand stems from China.

There are most likely rational explanations for most of the ordering we saw in 2017 and at the start of 2018, but in our view, the uncertainty over the demand outlook, new environmental regulations and the future requirements for ships makes it a very risky time to order new vessels. Fortunately, the way the market has developed over the last 12 months suggests that investors have become more cautious in their assessment of the market outlook.

### FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

<b>China's reform agenda</b>	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).	x
<b>The Belt and Road Initiative</b>	China's plan to support infrastructure development along the "new Silk Road" could counterbalance some of the effects of lower domestic infrastructure development.	✓
<b>The clean energy transition</b>	The growing focus on lowering carbon emissions could create resistance to burning coal and lower seaborne demand.	x
<b>Electrification of the global economy</b>	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.	✓
<b>Circular economic principles</b>	If an increasing share of materials is recycled, reused or remanufactured, demand for raw materials will decline, affecting Dry Bulk demand negatively.	x

x Negative ✓ Positive

# DRY BULK MARKET DEEP DIVE: COAL MARKET PERSPECTIVES

*A cautious approach to future seaborne steam coal demand*

**After three years of falling demand, seaborne steam coal trade returned to growth in 2017, sparking market optimism and a large increase in Panamax ordering. The main reasons for this were the return of Chinese imports and South Korea's growing demand. Despite this rebound and a number of optimistic forecasts, our stance on future seaborne steam coal demand has not changed and we still see substantial downside risk.**

Despite the resurgence in 2017, the main drivers behind seaborne steam coal demand have begun to lose pace. This has created growing uncertainty over the outlook for the coal trade. For many years, demand has been driven by five regions: China, India, Japan, South Korea and the EU, which together accounted for 72% of seaborne steam coal imports in 2017. Attitudes towards burning coal have begun to change in these regions, and in addition, both China and India, the two largest seaborne steam coal importers, have intensified their focus on strengthening domestic coal production. Over the next five years, the market share of these five regions is expected to gradually decline from 72% in 2017 to 63% in 2022. China and the EU are expected to reduce steam coal imports the most going forward, while India is the only country expected to continue to increase its imports. In the period up to 2022, the combined imports of these regions are expected to decline by around 60 million tonnes, equal to 800 Panamax cargoes.

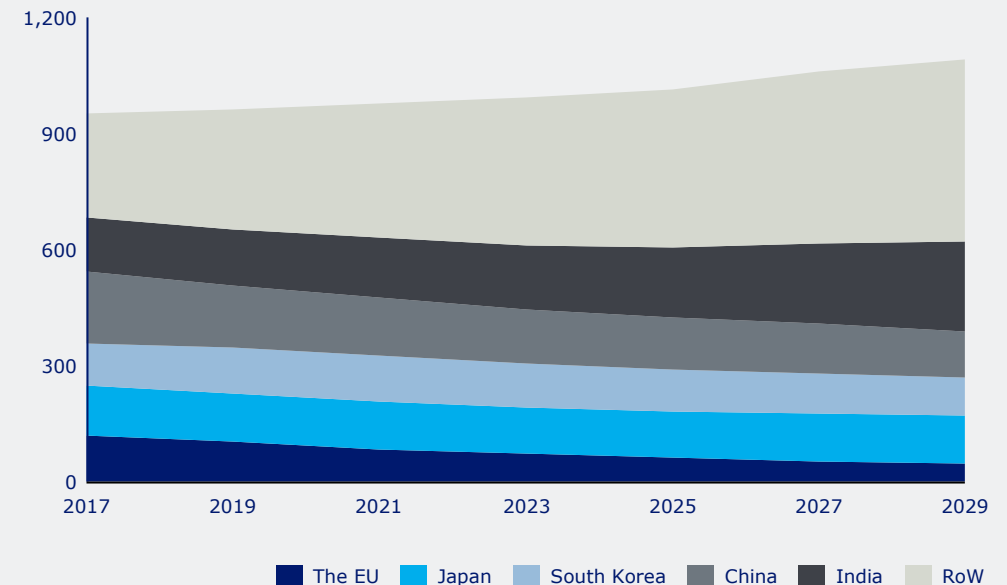
Nevertheless, it is still widely believed that seaborne steam coal demand will continue to increase in the years ahead, based on expectations of a new group of countries increasing their coal-fired power capacity, and consequently steam coal imports, in the coming years. Allegedly, this should more than offset the projected 60 million tonne decline and ensure a compounded annual growth rate in seaborne steam coal demand of just under 1% for the next five years and beyond.

According to IHS Markit, 300 GW of new coal-fired capacity will come online in Asia over the next five years, equal to the combined capacity of Germany and Spain. Vietnam, Pakistan, Malaysia and a handful of

other Asian countries have announced plans for increasing their coal-fired capacity markedly in the coming years as their populations and demand for power grow. Hence, much of the optimism for future seaborne coal demand is tied to this capacity coming online – with good reason. The new capacity will almost certainly generate some demand for seaborne steam coal. However, we are always a little reticent to equate capacity with demand. It is not a given that the new capacity will be fully utilised, nor is it a given that all the planned projects will be completed. We cannot help but draw a parallel with the time when mining output was equated with Dry Bulk demand.

We are not necessarily arguing that the Dry Bulk market should not be optimistic about coal demand going forward, but we would caution against ordering *new* vessels solely based on prospects of new coal-fired power capacity coming online. The uncertainty related to growing environmental concerns and steady declines in prices of alternative energy sources could quickly change the outlook.

## SEABORNE STEAM COAL DEMAND (MILLION TONNES)



Source: IHS Markit, Danish Ship Finance



# GLOBAL OIL MARKETS

SHIPPING MARKET REVIEW – MAY 2018

# GLOBAL OIL MARKETS

## Oil supply is running ahead of demand

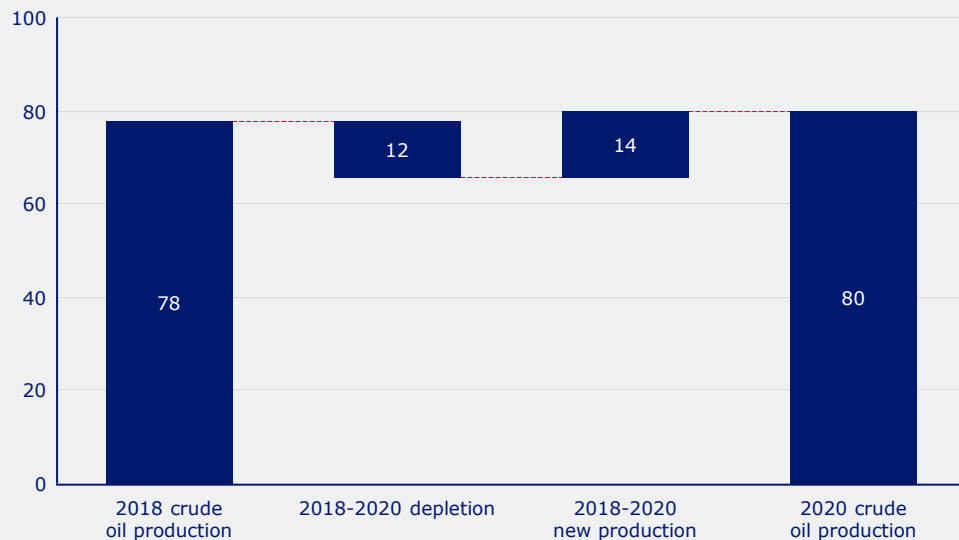
The global oil market seems to be in balance. The current OPEC production cut, coupled with geopolitical scuffles, has caused oil prices to increase. Higher oil prices could trigger production increases but may also hurt the surprisingly strong oil demand.

OPEC and ten producers outside the oil cartel, including Russia, have been holding back production by 1.8 million barrels per day. The production cut is working to stabilise oil prices but is at the same time benefiting the unconventional US oil production.

Global oil production is expected to increase by 2 million barrels per day up to 2020. A total of 14 million barrels per day will be added to the global oil supply while existing production will deplete by approximately 12 million barrels per day.

The conventional onshore oil industry produces roughly 60% of the world's oil. Production is declining, though. By 2020, conventional

**GLOBAL BASE OIL PRODUCTION (MILLION BARRELS PER DAY)**

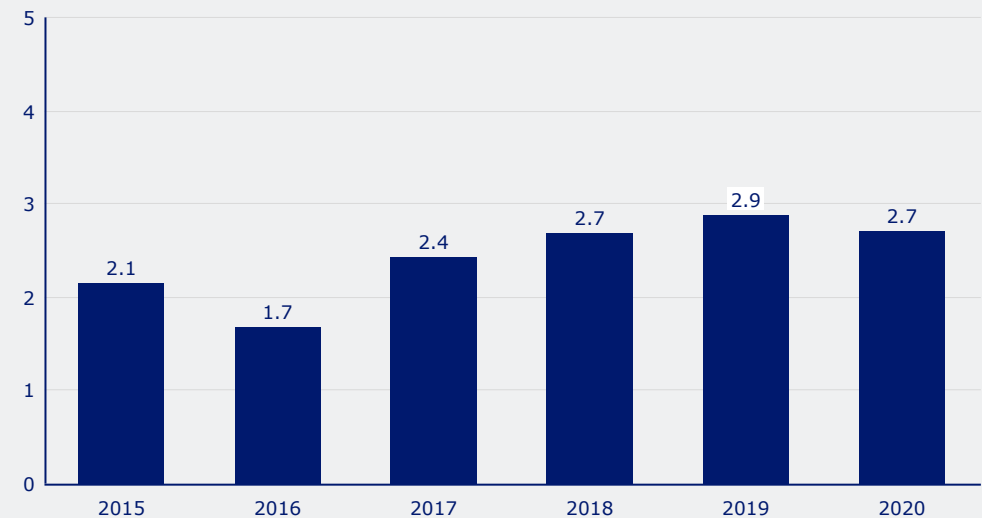


onshore oil production is expected to be 0.54 million barrels per day lower than the current level. Still, OPEC is expected to have spare capacity of approximately 2.7 million barrels per day in 2020.

The unconventional oil industry, which currently produces some 8.5% of the world's oil, is expected to deliver 100% - 2 million barrels per day (excluding condensate and NGLs) - of the growth in global oil supply up to 2020. This is primarily a US shale story.

The offshore sector, which currently accounts for about one-third of global oil supply, is expected to deliver 20% - 450,000 barrels per day - of the increase in global oil supply up to 2020. This is primarily a Brazilian story.

**OPEC CRUDE SPARE PRODUCTION CAPACITY (MILLION BARRELS PER DAY)**



Source: IHS Markit, Danish Ship Finance

# NEW OIL MARKET DYNAMICS

*The unconventional oil industry has fundamentally challenged offshore oil producers*

The relentless focus on cost optimisation combined with deferred capital spending has helped many operators return to profitability and conserve cash. At the same time, there have been concerns that these measures have created a real risk for reserve replacement and future growth in global oil production.

Some industry players see the problem as a choice between investing in large, complex, long-cycle (offshore) projects on the one hand or investing in higher-operating-expense, short-cycle unconventional projects on the other. To some extent, it might be. However, we truly believe that the introduction of more digital technologies could help more oil to be produced at a lower cost with less risk, both onshore and offshore. Let us take a closer look at this.

The US has become one of the three largest oil producers globally with output of more than 10 million barrels per day. The unconventional onshore shale play has turned into a flexible, scalable, low-cost and short-cycle alternative to offshore oil production.

The unconventional resource potential in the US is vast. It is estimated that more than 100 billion barrels of unconventional oil could be produced at a break-even level of less than USD 50 per barrel. This indicates significant potential to increase unconventional production from the current level of more than 5 million barrels per day.

There is more to the shale potential than the size of the reservoirs, though. With current production methods, 10% of the reservoirs is typically recovered, compared with an average of 30% for conventional reservoirs. Some of the top-performing offshore projects have a recovery target of 70% on their best facilities.

Maximising the recovery of oil from all resources is a primary concern for all oil companies. But the potential is particularly high in the field of unconventional oil production. Imagine the impact if oil companies could increase the recovery rate significantly by developing better enhanced oil recovery methods (EOR).

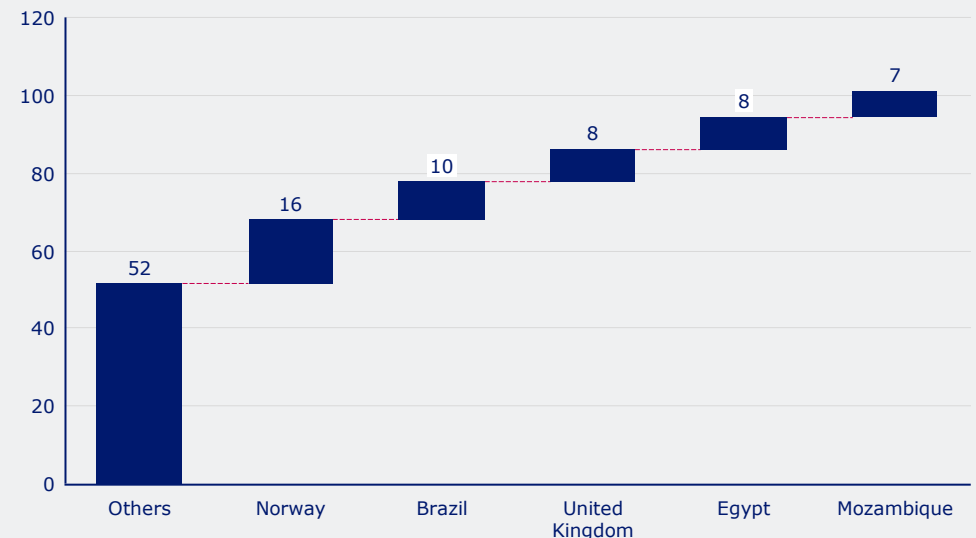
We have begun to see a change in the competitive landscape, since some of the supermajors are increasing their presence in the US shale

oil industry. Some of these players are applying a more analytical approach to maximising reservoir potential. Some are pioneering the digitalisation of the oil and gas industry and are applying big data analytics and machine-learning techniques to optimise production, lower costs and ultimately increase oil recovery.

The unconventional shale play has fundamentally changed the dynamics in the oil market. We have seen a structural shift in focus towards onshore oil production that seems unlikely to be reversed in short-term. The potential size of the offshore exploration market has contracted accordingly. Offshore oil production is expected to increase marginally in the years to come.

Many new offshore projects are likely to be tie-back projects on existing operations. Still, some large-scale and highly profitable projects are being planned in Norway, Brazil and elsewhere, but they may not be sufficient to employ the fleets of Offshore Support vessels or Subsea vessels.

**CUMULATIVE OFFSHORE CAPEX FIDS 2017-2018 (USD BILLION)**



Source: Clarksons, Danish Ship Finance



# THE OSV MARKET

SHIPPING MARKET REVIEW – MAY 2018

# THE OFFSHORE SUPPORT VESSEL MARKET

Perspectives and key takeaways

## OUTLOOK SUMMARY



POSITIVE

The market for Offshore Support Vessels is oversupplied since the strong production growth in the unconventional oil industry has lowered investors appetite for offshore investments. Many vessels will need to exit the market. We could be past the bottom of the cycle, but the overcapacity remains large. Any market recovery will therefore be slow and will most likely not occur within the next year or two.



NEUTRAL



NEGATIVE

The strong production growth in the unconventional oil industry has lowered investors appetite for new offshore investments. The active offshore market has been scaled back accordingly. Many vessels are unemployed and seem unlikely to return to service.

Today, offshore operators are working to upgrade the already advanced market to the highest standards available. Operations are rapidly being digitalised to improve the already high oil recovery rates further and to reduce costs.

This process is creating a two-tier market, and sub-standard vessels are expected to leave the market. But even the largest high-standard vessels remain subject to oversupply and approximately one out of four vessels is currently laid up (one out of three in the overall OSV fleet). Charter rates are low for obvious reasons but has increased marginally in the past six months.

A large part of the advanced tonnage needs to be upgraded to a higher digital standard during the next few years. Owners that are unable to upgrade their vessels may find it increasingly difficult to secure employment for them.

Secondhand prices have remained weak, but newer more advanced tonnage is less exposed as owners are unwilling to sell their best assets. The bid-ask spread is large and prices are therefore relatively

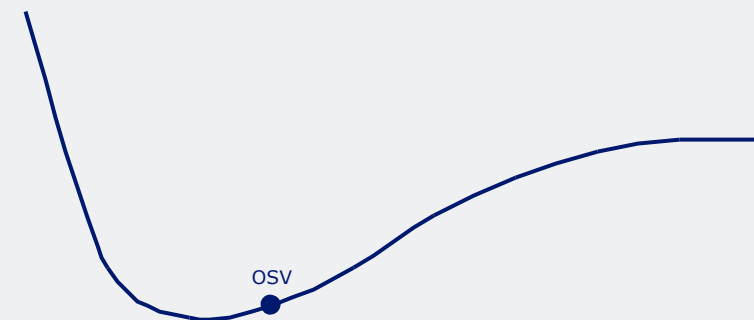
untested.

Demolition activity has increased significantly and 2018 could end up being a year of record-high scrapping activity. Scrapping of PSV vessels have increased, with 36 vessels scrapped since November. In the AHTS sector smaller vessels continue to be heavily exposed to oversupply.

We could be past the bottom of the cycle, but the overcapacity remains large. Any recovery in charter rates will therefore be slow and will most likely not occur within the next year or two.

Still the very short-term market outlook for the second and third quarter of 2018 looks relatively promising. The rig fleet for the Norwegian Continental Shelf is virtually sold out for the summer which indicate that demand for very larger AHTS vessels (20,000 bhp+) should be good. Should Russian Arctic activities materialise it could end up utilising large parts of the North Sea fleet over the summer.

## WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance



# THE OFFSHORE SUPPORT VESSEL MARKET

## Freight rates and ship prices

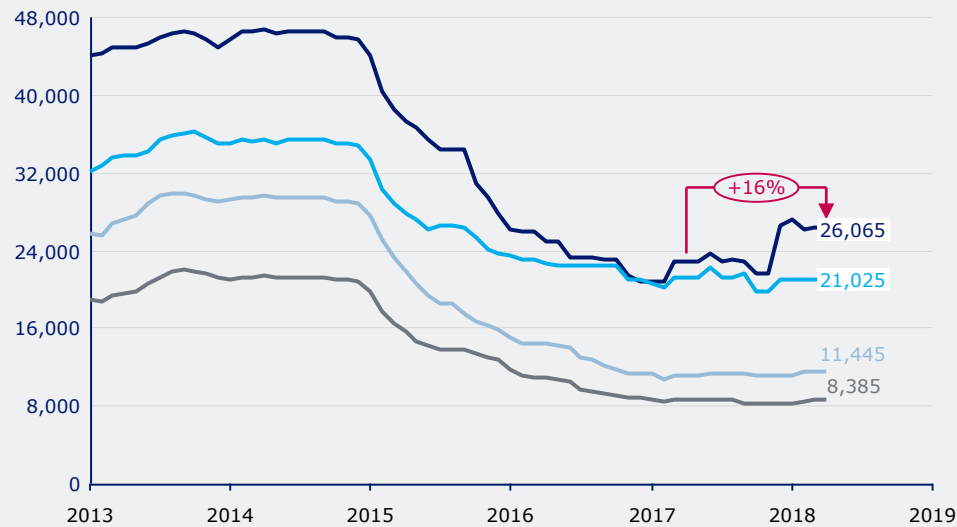
**Charter rates** continue to be challenged but are improving slightly. For long-term charters, there have been PSV fixtures at NOK 125,000 per day, approximately NOK 75,000 per day above OPEX. The spot market has seen periodic spikes, but these have not been substantial enough to have a significant impact on earnings. Since our last report, several US-based OSV companies have exited Chapter 11 proceedings. Most of these companies are now back in operation but with significantly lower debt levels, enabling them to compete with considerably lower break-even rates.

**Secondhand prices** continue to be under pressure, although market liquidity has increased marginally. The increased transaction activity has predominantly been from players trying to enter the market at a low point for short-term profits. We are beginning to see a clear difference between high-end tonnage and less advanced vessels. Most North Sea owners are selling non-core vessels for often negligible

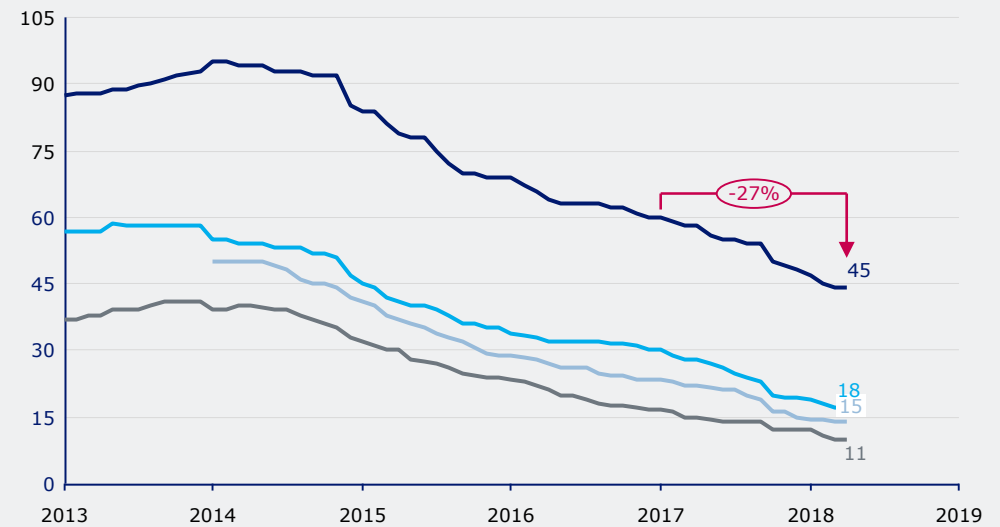
values. In general, vessels older than ten years – representing one-third of the fleet – are at risk of substantial value reduction. Shipowners only seem willing to upgrade younger vessels that are candidates for long-term contracts. While this is completely logical in oversupplied markets, it jeopardises the values of all vessels that have not been upgraded.

**Newbuilding prices** for OSV vessels are relatively untested but are unlikely to reflect their current earnings potential. For large AHTS vessels (12,000 bhp+), no newbuilding orders at all have been placed since 2016. In the PSV segment, only one Brazilian-built PSV and two medium-sized PSVs for the Indian market have been ordered for a combined USD 24 million.

**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 developments

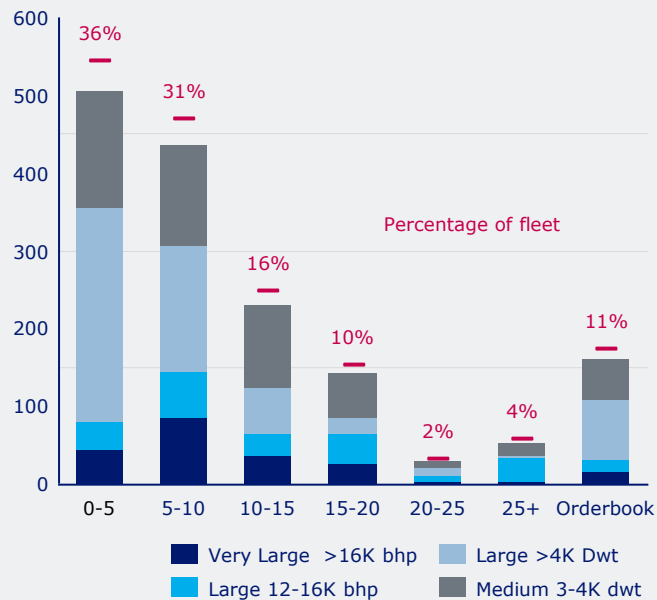
The pace of recovery for the OSV market will be determined by the pace of **fleet reduction**. One out of four vessels in the larger segments is laid up, and many of these vessels do not have an active class certificate. Out of the total OSV fleet, 25% of vessels are stacked. The orderbook stands at more than 260 units, and a large proportion of these are vessels being built on speculation. The orderbook is dominated by large PSV vessels and smaller AHTS vessels. It is estimated that 200 vessels are at an advanced stage of construction.

The massive surplus capacity combined with the young age profile of the fleet gives oil companies the option only to employ young vessels at low rates. The situation is even more complicated, since a Clarksons study among E&P companies found that 69% of respondents would not accept vessels that had been laid up for more than a year. In today's market, 66% of the laid-up vessels within the larger segments have been stacked for more than a year.

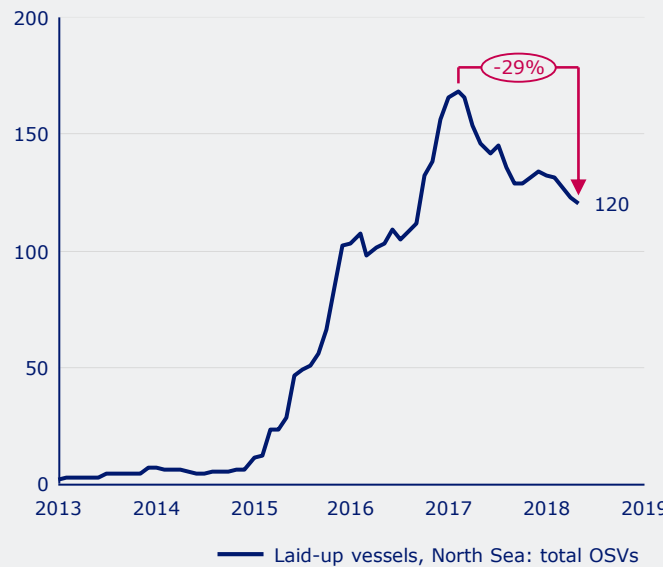
For some time, it has been a rule of thumb that it costs at least USD 1.5 million to reactivate a laid-up offshore support vessel that has no active class certificate. Thus, these vessels, which account for 10% of the fleet, seem unlikely to come back into service. In comparison, several owners of high-quality North Sea tonnage have quoted reactivation costs in the region of USD 50,000 for vessels with an active class certificate. These vessels are likely to be reactivated when they find new employment but are thereby also keeping charter rates low for longer.

**Scrapping** has increased significantly since the fourth quarter of 2017, and 2018 could end up seeing the highest level of scrapping for two decades. Some owners have even opted to scrap vessels instead of selling them, as a way of limiting vessel supply. Vessels as young as 12 years old have been scrapped, but more vessels need to exit the market before it can recover.

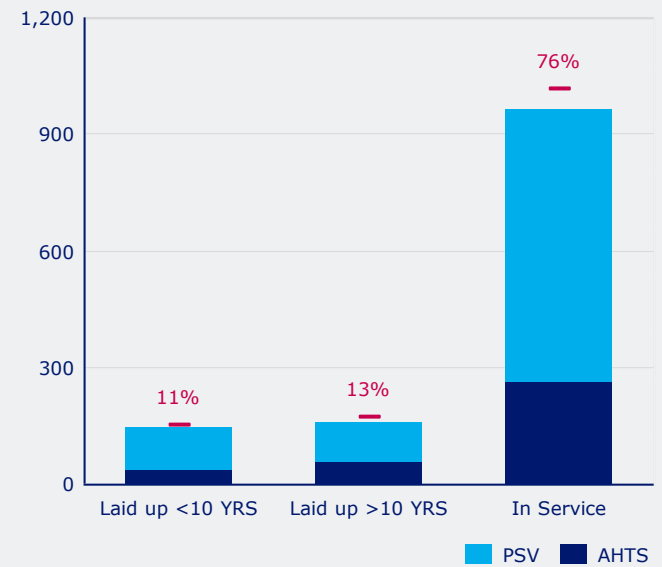
AGE DISTRIBUTION FLEET



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

## The market outlook

The outlook for offshore support vessels needs to be seen from the broader perspective of **E&P spending**. For offshore E&P spending to grow, the break-even rates of an offshore project must be competitive with, for example, that for a shale oil field. Competition from onshore production has led to the active offshore market being significantly scaled back and has reduced the need for support vessels. Many of the new offshore developments are (subsea) tie-back activities or activities that are aimed at improving the enhanced oil recovery (EOR) of existing facilities. These projects require fewer support vessels per barrel produced than new projects.

Innovation has flourished in the offshore oil and gas industry over the last three years, and virtually every part of the supply chain has been upgraded and digitalised. The vessels of tomorrow likewise need to be upgraded and many owners may need to find alternative employment for some of their vessels. The offshore wind industry is able to provide alternative employment for several types of offshore support vessels. Subsea vessels were the first to enter this market, but with day rates rarely exceeding USD 20,000 per day, they do not cover the capital costs of these expensive vessels. As the subsea market is slowly recovering, it is expected that some PSV vessels will be retrofitted and migrate over to the offshore wind industry.

Despite the massive oversupply of vessels, there is light at the end of

the tunnel. Offshore project sanctioning has increased, drilling activity is expected to pick up in the short term, and the fleet is expected to slowly shrink. We do not expect charter rates to grow rapidly any time soon, however, and we see major downside risk to the value of older vessels. For OSV owners with younger modern vessels, it is paramount to keep the vessels employed and they can only hope that enough vessels will be scrapped in order to arrive at more acceptable rates.

### FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

<b>The unconventional oil industry</b>	The capacity and future growth of the unconventional oil industry will impact how much spending is directed towards offshore E&P. The competitiveness of deepwater projects will be tested in the coming years.	
<b>Brazil pre-salt fields</b>	Brazil's estimated 90 billion barrels of pre-salt resources could be fast-tracked as foreign companies are allowed to gain operatorship in the country.	
<b>Digitalisation</b>	Digitalisation will change how shipowners operate, and likely reduce the total number of vessels in the industry. Players investing in digitalisation now will likely be the winners of tomorrow.	 

 Negative  Positive

# OSV MARKET DEEP DIVE

*The OSV industry will become greener and more digitalised*

**After three years of very challenging market conditions, the oil and gas industry has undergone a turnaround process. Innovation has also flourished in the OSV industry. The OSV fleet of the future will likely be more digitalised and environmentally friendly. Those shipowners looking for a competitive advantage likely need a digital strategy that put their vessels in pole position when bidding for contracts.**

Over the last three years, oil companies have invested significant resources in digital systems that can provide real-time data, from drilling performance to inventory levels, and they now expect the same capabilities in the OSV value chain. Some of the larger OSV owners are investing substantially in converting their younger vessels to so-called “smart vessels”, which communicate with the logistics network. As these vessels better integrate with their operations, they will likely be preferred by oil majors.

New technologies are also being developed. Remote-controlled vessels have been tested successfully in the North Sea with the control room based in California. One oil company increased the utilisation of its vessels by 22% by applying machine learning and big data analytics to its OSV operations. The development of the first autonomous OSV vessel, while currently only at an early stage, sends a strong signal to the industry. On the Norwegian continental shelf, vessel operators and oil companies are making joint efforts to cut emissions from logistics operations. This involves operating battery- and LNG-powered vessels. Battery packs replace the “spinning reserve” that is used when GPS and satellites keep the vessel in position, and also absorb the variations in power when a vessel is sailing. Dual engines make operations safer and more efficient, which is of importance to oil companies. Fuel consumption has been cut by 28% for vessels in dynamic positioning mode, and by 16-17% during sailing. Some vessel owners are aiming to cut fuel consumption by 50% by 2020. Every dollar saved on fuel consumption is shared between vessel owners and oil companies in order to align their incentives. We have seen this model in other parts of the offshore value chain and it may become the new norm.

It seems likely that only those shipowners willing to invest in new technologies will gain a competitive advantage over time. OSV vessels are among the more standardised asset classes in the offshore industry. Entry barriers have been low, which has meant there are a large number of vessel owners. We expect the consolidation process to continue in the years to come, since the digital transition of the industry requires new competences and supplementary skillsets.



# THE SUBSEA VESSEL MARKET

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SHIPPING MARKET REVIEW – MAY 2018

# THE SUBSEA VESSEL MARKET

Perspectives and key takeaways

## OUTLOOK SUMMARY

○ POSITIVE

○ NEUTRAL

● NEGATIVE

The Subsea vessel market is still up against tough conditions but seems to have passed the bottom. Offshore project sanctioning increased in 2017 and is expected to continue recovering. Short-cycle projects, often tie-backs, continue to be in favour. The largest companies seem best-positioned to upgrade their operations and gain market share. Future demand is likely to require fewer vessels per project, which may result in older vessels exiting the market prematurely.

The success of the unconventional **onshore shale play** in turning into a flexible and scalable, low-cost and short-cycle alternative to offshore oil production took the offshore oil industry by surprise.

Today, the offshore oil industry is attempting to reinvent itself by pioneering the digitalisation of the oil and gas industry. It aims to optimise recovery rates, optimise lifetime performance, lower costs and reduce risk.

The introduction of digital twin technology is an important element in the efforts to increase productivity and cut costs. Digital twin is a technology used by NASA, Formula 1 racing and many others, and acts as a virtual real-time version of the installation. Instead of making drawings that become outdated, sensors make it easy to update the model in real time.

A digital twin allows the operator to maintain an up-to-date overview of each individual field. Most players see enormous potential in powering digital twins with artificial intelligence and machine-learning techniques. The aim is to lower costs and improve productivity by upgrading more parts of the operation to a higher digital standard. One day, this technology may enable operations to be remote-controlled or even outright automated.

One player has developed subsea robots which may revolutionise the

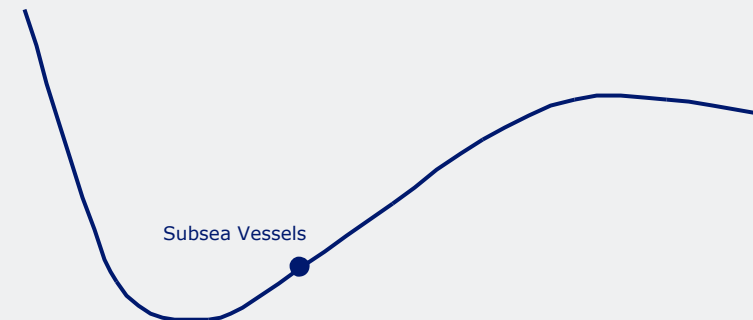
maintenance of equipment on the seabed, enabling this work to be carried out remotely. In this case, the subsea robot is intended to replace submarine vessels and can arrive at locations faster when problems arise. It aims to identify and resolve several problems more quickly while improving safety and costs.

The entire supply chain is being reworked. The largest companies in the Subsea sector are partnering with technology players, oil companies and other third parties that can help them enhance their capabilities. The old operating model is being upgraded. The Subsea industry is working to develop projects that are leaner, more technologically advanced and more competitive.

This development is likely to mean fewer subsea vessels are required per project, but over time it could increase the competitiveness of offshore oil production and therefore lead to more projects receiving final investment decisions.

Today, the larger and more advanced operators seem best-positioned, but tonnage providers may also benefit, since we expect additional Subsea activity in the years to come.

## WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

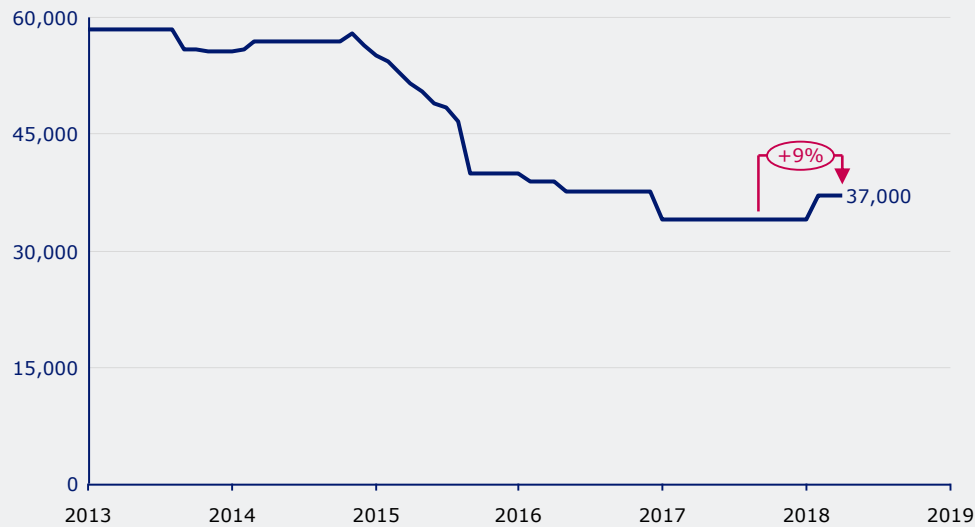
# THE SUBSEA VESSEL MARKET

## Freight rates and ship prices

**Charter rates** in the Subsea industry remain low, as surplus capacity continues to weigh on the market. Activity has picked up but primarily for the largest players. Charter rates are often embedded in larger contracts for Engineering, Procurement, Construction and Installation, which makes the price development less transparent. Still, charter rates for construction vessels have increased approximately 8% to USD 37,000 per day since November 2017. We have also seen several large Subsea construction contracts, particularly on the Norwegian Continental Shelf (NCS). The **Offshore wind industry** has offered alternative employment for some Subsea vessels, but with day rates rarely exceeding USD 20,000 per day, this kind of work is not very attractive.

**Secondhand prices** are hard to assess, as there are few high-end assets for sale. Those sales that have been registered have been at very low prices compared with the cost of building a new vessel,

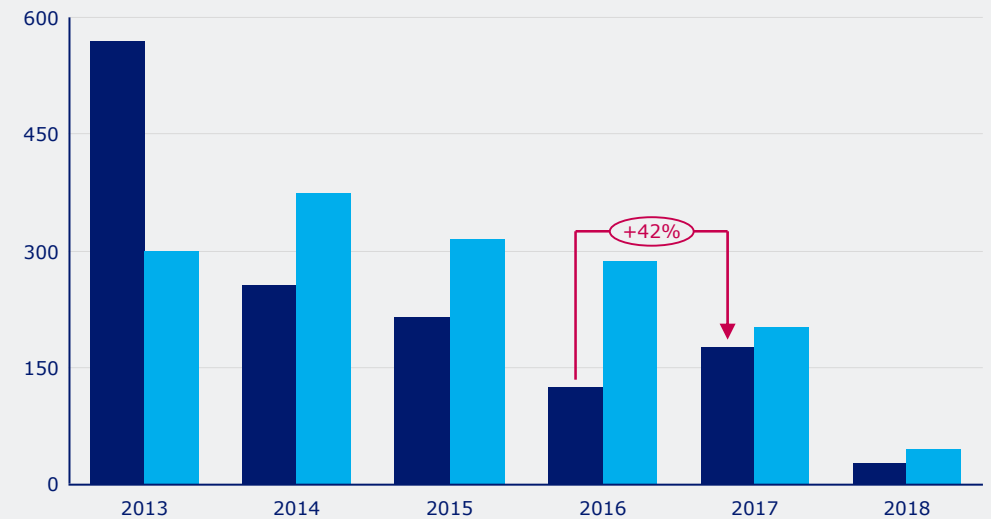
**SUBSEA VESSELS CHARTER DAY RATES (USD PER DAY)**



— Subsea charter day rates MSV, c. 120m LOA, 250t swl crane

although the newbuilding price remains untested. Most sales have been encouraged by banks as parts of restructurings. Shipowners with advanced newer tonnage are **reluctant to sell vessels**, as they see them as enablers for technically advanced projects. Some owners have bought vessels partly to ensure that competitors do not enter their sector. These are typically cable vessels for longer tie-back projects. Demand for these vessels is expected to grow in the longer term due to the increased number of tie-back projects. There has been some interest from new industrial players looking to enter the market at a low point. This could alter the competitive landscape, similar to the development seen in the OSV industry, since new players, with young but “cheap” vessels, can pressure margins for longer. Still, counter-cyclical investments could prove very profitable in a few years’ time.

**SUBSEA TREE AWARDS AND INSTALLATIONS**



■ Subsea tree awards ■ Subsea tree installations

Source: Clarksons, Danish Ship Finance



# THE SUBSEA VESSEL MARKET

## Supply-side developments

The Subsea vessel industry is highly diversified, so the degree of oversupply depends on the vessel segment. Also, it is less common to lay up vessels, and currently only 7% of the fleet (54 vessels) are laid up. Excluding vessels that are 25 years or older, this number comes down to 3.5%.

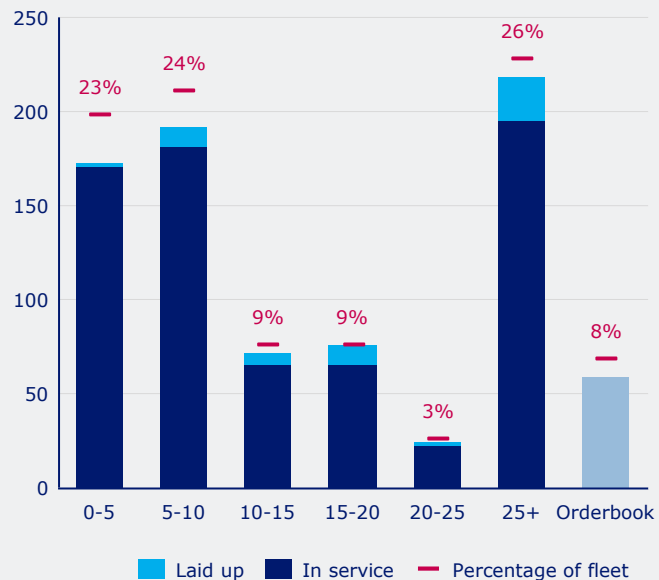
There are currently 58 Subsea vessels in the **orderbook**. Most of these are multi-functional support vessels to be built at Chinese yards. It appears that few of these apparent orders have actual owners waiting to take delivery of the vessels. Most of the orders were placed in 2014 or earlier, and we believe that very few of these vessels will actually be delivered.

**Scrapping** has increased, but still only four vessels have been scrapped over the past six months. Subsea vessels have limited scrap value due to their limited quantities of steel. It has primarily been the

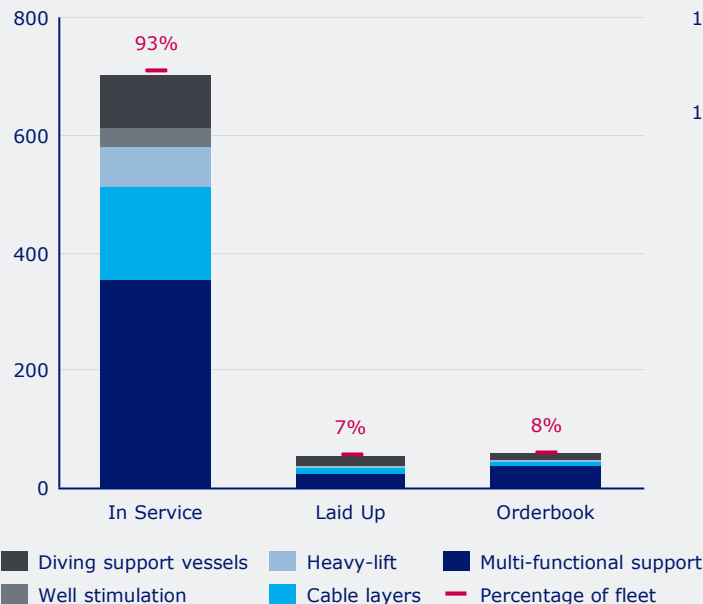
larger players that have begun to scrap vessels in their non-core fleets. Scrapping volumes are far too low to impact the supply and demand balance. One out of four vessels is older than 25 years old, and large numbers of these vessels need to be scrapped in the coming years for the balance to be restored.

**Contracting** is very low with only two units ordered since November. Most notable was the newbuilding contract for one large pipe-laying vessel in late 2017.

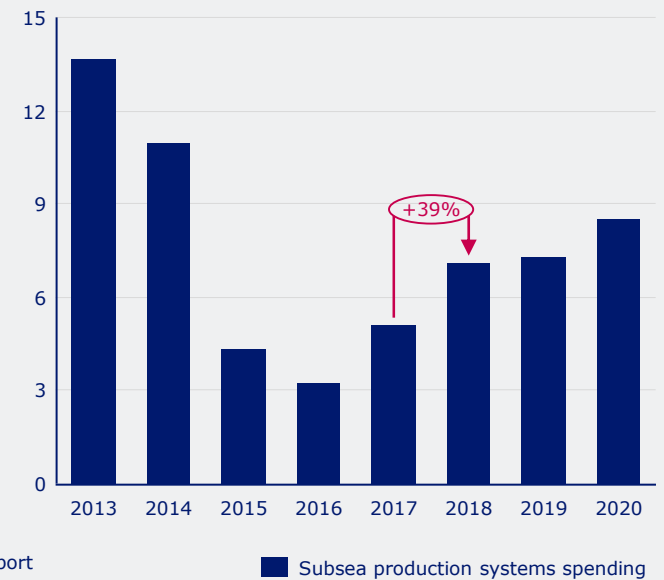
AGE DISTRIBUTION OF SUBSEA VESSELS



STATUS OF SUBSEA FLEET



SUBSEA PRODUCTION SPENDING (USD BILLION)



Source: Clarksons, IHS Markit, Danish Ship Finance

# THE SUBSEA VESSEL MARKET

## The market outlook

We expect the largest Subsea operators to leverage their technological capabilities and increase their market shares in the coming years. The industry is in the early stages of adopting new technologies which are raising the barriers to operate. We are uncertain whether smaller vessel owners, many with debt-laden balance sheets, will have much opportunity to participate at the higher end of the market.

The biggest driver for Subsea vessels in the medium term is subsea tree installations. A **subsea tree** monitors and controls the production of a subsea well. In 2017, awards for subsea trees increased by 42%. Many of these awards were for projects that were sanctioned at the end of 2017 on the Norwegian Continental Shelf. This is a positive market development, but it will take some time before these awards lead to more employment for Subsea vessels.

Even though the industry is pushing forwards with new initiatives, the

next few years will be difficult. The Subsea market continues to be dependent on offshore E&P spending which appear unlikely to increase enough to stop the ongoing consolidation process. Much of the expected future activity relates to tie-backs which are Subsea service-intensive but may employ fewer ships than a complete new production facility. We expect the fleet to remain oversupplied in the coming years and the largest operators to secure the lion's share of future employment. Still, postponed IMR services may provide some employment for the smaller owners.

The Subsea market seems to have passed the bottom, but a true market recovery may not be seen for another two to three years. Many ships will need to exit the market before rates and secondhand prices recover significantly.

### FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

<b>The price of oil</b>	In the short-term the oil price have little effect on Subsea vessel demand. In the longer-term this dynamic changes. If oil companies believe oil prices will remain high they are more inclined to sanction offshore projects.	✓
<b>Tie-back projects</b>	Tie-back projects create employment only for the short term, in contrast to conventional platform projects, but are nonetheless employing some vessels.	✓
<b>Alternative employment</b>	Offshore wind projects are employing some Subsea vessels but at low charter rates. Conventional infrastructure projects could also contribute to utilisation in the future.	✓
<b>E&amp;P spending</b>	Digitalisation of the supply chain is expected to increase the competitiveness of offshore oil projects, enabling more subsea installations in the years to come.	✓
<b>Decommissioning</b>	Decommissioning of oil and gas fields could increase demand for Subsea vessels. The Gulf of Mexico and North West Europe account for 80% of visible demand going forward.	✓

✗ Negative ✓ Positive

# SUBSEA MARKET DEEP DIVE: UNLOCKING ADDITIONAL VALUE

*Smaller oil discoveries could reinvent the Subsea industry*

**The key to increased long-term demand in the Subsea industry is the ability to challenge onshore investments on profitability, payback and quality. A leaner, faster and more innovation-led industry could succeed in this in the years to come.**

In the UK, there are more than 3.4 billion barrels of oil situated in smaller oil fields that are currently deemed not economical to develop. A recent study by Wood Mackenzie and the Oil & Gas Technology Centre suggests that 400 million barrels of oil equivalents could be unlocked by applying new Subsea technology on the UK Continental Shelf's smaller oil fields. This initiative, which is called the "Tie-Back of the Future", aims to halve the costs required and time taken to develop marginal oil fields. There are 27 billion barrels of oil in smaller fields globally, so the potential is large.

This could be the start of a market where oil companies still engage in large projects but also have a sizeable portfolio of smaller projects that they execute swiftly and efficiently. If smaller pools were to become profitable, it would also allow smaller oil companies to enter the sector. For smaller companies, exploration for oil is considered a high-risk activity. It is capital-intensive with a low probability of success. If smaller companies get lower-risk returns, this could lead to more capital directed offshore, and an increased number of final investment decisions (FIDs).

At the current rate of exploration, it would take 14 years and 500 wells to find the equivalent amounts of oil that already is situated in smaller identified fields in the UK. Despite fewer mega-projects sanctioned, it is still possible that the Subsea market could return to its previous highs but with a larger share of smaller projects in the portfolio.

The Subsea industry will be instrumental in developing new solutions to enhance the attractiveness of offshore projects. As we discuss in the OSV section, digitalisation of the industry is ramping up rapidly. The largest Subsea companies undertake complex operations, which potentially indicates even larger upside for them when adopting advanced technologies. In 2014, a joint programme was launched by

three of the largest oil majors in the world and one technology company. Their goal is to create a "Subsea factory" by 2020, a production unit enabling oil and gas processing plants to be situated on the seabed regardless of the distance from shore, water depth and temperature. This would eliminate the need for floating structures, and operations would be remotely controlled. The aim is to create a reliable, economical "factory" that would only need maintenance every couple of years. Significant resources are being invested in this: development is complex and involves everything from subsea water treatment systems to the Internet of Things (IoT). In theory, such a "factory" could make production platforms obsolete, and with no production platforms, the offshore market would change dramatically. Much of the value chain we see today would be obsolete, but Subsea companies and their vessels would be in high demand.

This will clearly not happen overnight, but it may signal a future direction for the industry.



# THE CRUDE TANKER MARKET

SHIPPING MARKET REVIEW – MAY 2018

# THE CRUDE TANKER MARKET

Perspectives and key takeaways

## OUTLOOK SUMMARY

○ POSITIVE

○ NEUTRAL

● NEGATIVE

Low freight rates are weighing down the oversupplied Crude Tanker market. Many older vessels are expected to be scrapped over the next two years and freight rates may improve by the end of the period. Travelling distances will remain a key demand driver, yet demand growth is expected to slow in 2018 and supply is likely to outpace tonne-mile demand. Strong demolition activity will lower the average age of vessels scrapped and could structurally reduce secondhand prices.

The Crude Tanker market has continued to deteriorate over the past year and remains heavily affected by oversupply. Despite robust demand, high fleet growth for the third consecutive year has caused the surplus to expand further. A very welcome strong increase in demolition activity was a bright spot in the second half of 2017.

Last year, a strengthening of the global economy and low oil prices stimulated oil consumption, supporting Crude Tanker demand which grew by 4%. In particular, Chinese crude oil imports and US crude oil exports showed strong growth.

Thus, even though demand was robust, yet another year of strong supply growth (+6%) meant that freight rates stayed at low levels in 2017. By February 2018, spot rates had declined to their lowest level in five years, and average timecharter rates were down 59% from their most recent peak in December 2015.

In terms of market sentiment in 2017 and the first quarter of 2018, Crude Tanker owners seemed to follow different paths. Low freight rates and rising scrap prices encouraged many owners to exchange equity for cash and send ageing tonnage to the scrapyards. Others, however, seemed to be afraid of missing out on newbuilding prices bottoming out. Of the 36 known owners who placed orders at the shipyards, only nine of them also sent vessels for demolition during the period.

Crude Tanker investors seem to be starting to align their efforts, though. This year, owners have been more reluctant to place orders, and at the same time have been increasingly willing to scrap vessels. If this trend becomes entrenched in the market in 2018 and 2019, freight rates could begin to improve by the end of the period.

This is a double-edged sword, however, as intensified demolition has drastically reduced the average age of vessels scrapped in just three years from 24 years in 2016 to 18 years in the first quarter of 2018. We have addressed the risk of structurally reduced secondhand prices as a consequence of declining economic lifetimes of vessels in past reports. We maintain our stance and argue that what currently look like cheap newbuilds are at risk of turning into depreciating assets unlikely to yield the expected return on invested capital. The risk is biggest for VLCCs which have the largest orderbook and the youngest fleet. If demolition remains high, the average scrapping age will continue to decrease in the coming years and could soon approach 15 years.

To sum up, the short-term outlook for freight rates is strengthening with more vessels being scrapped, but the same driver is weakening the outlook for secondhand prices.

## WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

# THE CRUDE TANKER MARKET

## Freight rates and ship prices

**Spot rates** tumbled going into the new year, as the seasonal fourth-quarter uptick did not materialise despite robust demand and high demolition activity. In February 2018, average spot rates had come down to a five-year low, with the VLCC segment the most subdued at USD 5,700 per day compared to USD 27,900 per day at the same point last year. **Timecharter rates** in all segments were similarly weak but steady from the first quarter of 2017 onwards, until VLCCs resumed a downward trajectory, approaching the lows of 2013 by the end of 2017.

**Newbuilding prices** increased slightly during 2017 but not enough to deter owners from continuing to place orders. By March 2018, the average newbuilding price was up 4% compared with at the start of 2017 but is expected to be capped by low utilisation at shipyards.

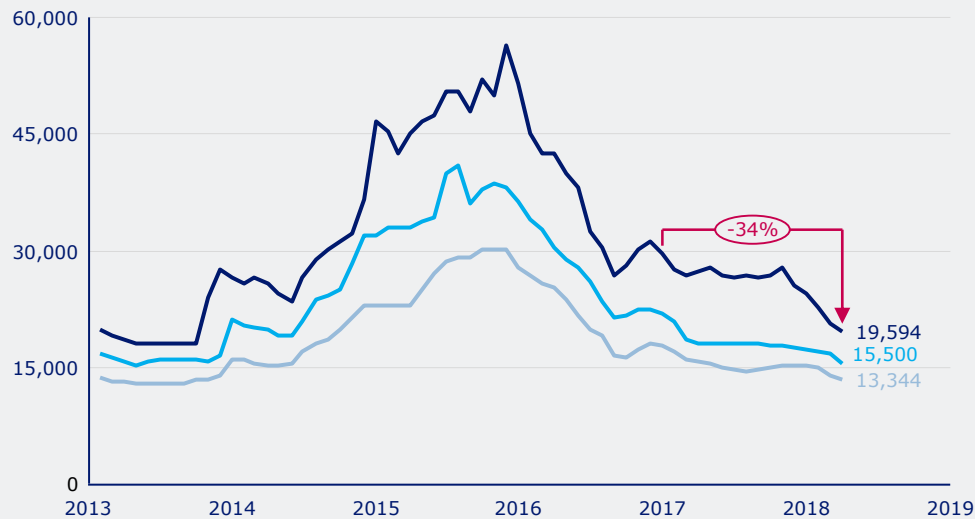
**Secondhand prices** for 5-year old vessels has improved marginally (4%) since a reduction in the economic lifetime and lower

timecharter income was counterbalanced by a strong increase in the scrap price. Prices of older vessels are lagging behind.

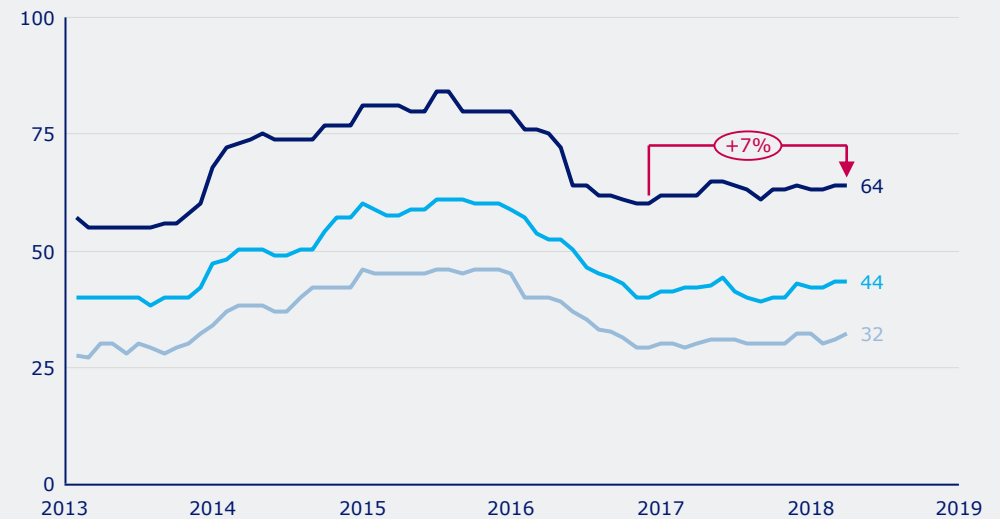
The low secondhand prices and increasing demand for modern tonnage meant that **sales activity** was fairly strong in 2017, and 78 vessels changed hands, 41 of them VLCCs. Sales activity slowed down somewhat in the first quarter of 2018, with only 13 vessels changing hands, none of them Suezmaxes.

The modest price development despite healthy activity in the secondhand market in 2017 compared to 2016 indicates that Crude Tanker owners are not overly confident that the tide will turn in the coming years. Any improvement in the market is still pending.

1-YEAR TIMECHARTER RATE (USD PER DAY)



SECONDHAND PRICES – 5 YEARS (USD MILLION)



— VLCC — Suezmax — Aframax

Source: Clarksons, Danish Ship Finance

# THE CRUDE TANKER MARKET

## Supply-side development

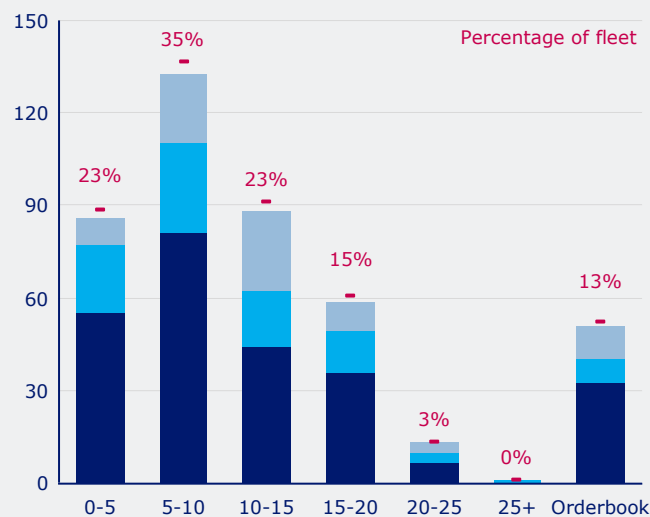
**Contracting** grew significantly in 2017 as owners regained their appetite for newbuild vessels despite the low freight rates, with interest in VLCC newbuilds particularly strong. Contracting reached 24 million dwt in 2017, corresponding to 109 vessels, of which 54 were VLCCs. In the first quarter of 2018, contracting has lost some pace with 4.4 million dwt or 17 vessels, 13 of them VLCCs.

**Deliveries** surged to 31.6 million dwt in 2017, the highest level since 2011, reflecting intense contracting activity in 2015. A considerable decline in postponements and cancellations also helped, as 83% of orders scheduled for delivery in 2017 materialised, compared to 71% in 2016. A hefty increase in **demolition** activity was not enough to balance net fleet growth with demand. The Crude Tanker fleet grew strongly for the third year in a row in 2017. Demolition reached 9.8 million dwt, or 63 vessels, in 2017, around 80% of vessels were scrapped in the second half of the year. Demolition remains very high in 2018, with 7.2 million dwt, or 35 vessels, scrapped in the first

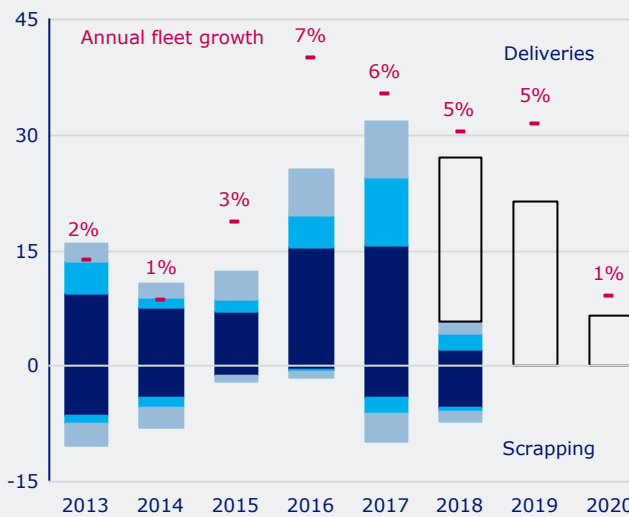
quarter of 2018, the majority VLCCs. Few older vessels available for scrapping has brought the average age of vessels scrapped down to 18 years in 2018, from 21 years in 2017 and 23 years in 2016. The high scrap prices have made it increasingly uneconomical to upgrade older vessels to comply with new regulations. Instead, many owners are opting to exchange equity for cash in the demolition market.

The **fleet renewal potential**, reflecting the relationship between the orderbook and the number of available scrapping candidates, has deteriorated for Aframax and VLCCs due to the simultaneous increase in contracting and demolition activity. VLCC owners in particular appear to be participating in an increasingly high-stakes game that could end up being very expensive. With an orderbook-to-fleet ratio of 14% and 4.9 vessels on order for every vessel in the fleet older than 20 years, the VLCC segment is very vulnerable if demand fails to employ the fleet.

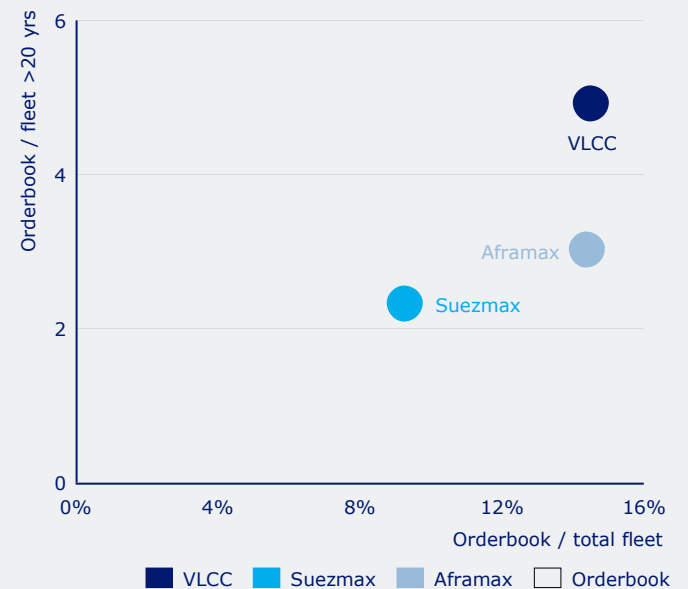
AGE DISTRIBUTION OF FLEET (MILLION DWT)



FLEET DEVELOPMENT (MILLION DWT)



FLEET RENEWAL POTENTIAL (DWT)



Source: Clarksons, Danish Ship Finance



# THE CRUDE TANKER MARKET

## The market outlook

Indications of an imminent improvement in market fundamentals are still difficult to spot, and we remain fairly cautious about the short-term outlook for the Crude Tanker market (one to three years). After three years of high fleet growth, the market is severely oversupplied. Many owners seem to expect that older vessels will be scrapped, whereafter market balance should be restored. But the orderbook remains high and fleet growth is expected to outpace demand in 2018 and 2019. Crude Tanker demand growth is expected to slow to just over 2% in 2018 and decelerate further in the coming years. Consequently, the conditions necessary for the oversupply in the Crude Tanker market to be reduced do not appear to be present yet.

The short-term demand outlook, however, is highly susceptible to the development of some key events: most importantly, how much US oil exports grow, when and to what degree OPEC and its peers let the oil flow again, and to what extent Chinese demand will be affected if the

deceleration in stocking activity continues. Our primary concern is that owners might be tempted to step up Crude Tanker contracting. This could happen if, for example, US oil exports overshoot expectations in the short term, with the result that freight rates improve. In our assessment, rising contracting activity is working to postpone recovery for the Crude Tanker market at the expense of older vessels. Further contracting could leave the market even more vulnerable than today, considering the accompanying downside scenarios in which average travelling distances are likely to shorten again when OPEC and its peers abandon the output cut and if Chinese import demand growth slows substantially as a consequence of a return to “normal” stocking activity.

### FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

<b>US oil exports</b>	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.	✓
<b>Reduced global oil stocking activity</b>	Global oil stocks have been filling since 2014 and have strengthened Crude Tanker demand, but reduced stocking activity could negatively impact future demand growth.	✗
<b>Fuel efficiency gains and electric vehicle penetration</b>	Rapid advances in fuel efficiency and a continued increase in electric vehicle uptake could displace a significant amount of oil demand and reduce seaborne demand.	✗
<b>The clean energy transition</b>	Substitution of fuel oil, gas oil and crude oil with natural gas and renewable energy sources in the power generation sector is likely to affect Crude Tanker demand negatively.	✗
<b>Economic growth in emerging markets</b>	Growth in manufacturing and industry and rising living standards in emerging markets could mitigate the impact of decreasing oil demand in OECD countries on seaborne demand.	✓

✗ Negative ✓ Positive

# CRUDE TANKER MARKET DEEP DIVE: US CRUDE EXPORTS

## *Downside risks to the expected Crude Tanker market recovery*

**Confident Crude Tanker investors have high expectations for future freight rates and asset prices, believing that increased demolition and further US crude export growth will continue to support Crude Tanker tonne-mile demand. But downside risks are lurking and could curb growth in US crude exports.**

In spite of the current oversupply and low earnings, investor interest in the Crude Tanker market remains strong. We acknowledge that many older vessels are likely to leave the fleet in the coming years, but we see at least three challenges that need to be overcome before the rapid US export growth that seems to be widely expected can materialise.

First, infrastructure bottlenecks in the US are likely to be the main challenge for further US crude export growth in the short term. Exports can only grow if infrastructure can keep up. A shortage of truck drivers and pipeline utilisation inching closer to maximum takeaway capacity as oil output increases are already concerns. Natural gas takeaway capacity could also be a limiting factor for crude production. Additionally, when the crude oil does reach the Gulf, almost all ports are too shallow to load vessels any larger than Aframax-sized. This necessitates reverse lightering, which reduces the cost competitiveness of US crude as the chain of logistics becomes more complicated. New pipeline capacity is being constructed and port deepening and expansion projects are underway, but it will take years to obtain approval and raise funding for these, and for construction to finish. Until infrastructure can be adjusted, US crude export growth appears to have an upper limit.

The second potential barrier for US export volumes is the refining industry. Most new complex refineries in the Middle East and Asia are designed to process heavier crude grades. The light shale oil might not be what the refineries demand and would likely need to be blended with heavier crude grades to meet the designs of most of the world's refineries. The heavier grades needed for blending are not growing at the same pace as shale oil and may not be available in sufficient amounts. In terms of demand, shale oil yields more light distillates

than middle distillates, and although LPG and naphtha are feedstocks for the fast-growing petrochemical industry, in the transport sector, which is still by far the largest end-consumer of oil, it is diesel and jet fuel demand that is projected to increase most.

The third potential barrier for US export volumes is the dependence on Chinese imports. US oil exports to China showed the strongest growth of any in 2017, and the associated tonne-mile demand increase supported the Crude Tanker market in the wake of production cuts from OPEC and peers. But the US-China oil trade did not exist just a few years ago, and if OPEC increases production or the incipient trade war is allowed to develop, the ultimate consequence for the Crude Tanker market could be that this trade disappears again. In today's challenging geopolitical environment, we need to consider whether China will be willing to rely on US crude exports to satisfy its incremental demand growth. Moreover, the newly expanded pipeline capacity from Russia to China reduces China's reliance on seaborne imports. Even if the trade war does not escalate further, growth in Chinese crude oil imports is expected to slow substantially from 2018 due to reduced stockbuilding activity and the country's general transition away from being an oil-intensive economy. This could limit further growth in Chinese crude imports from the US and curb tonne-mile demand growth.

In short, US crude oil exports may end up utilising the growing Crude Tanker fleet, but the outlook is far less certain than many seem to believe. And even if US exports do utilise the fleet, the upswing could turn out to be short-lived if OPEC decides to increase production with the result that many long-haul barrels from the US are exchanged for shorter-haul barrels from the Middle East, lowering tonne-mile demand growth and Crude Tanker fleet utilisation.



# THE PRODUCT TANKER MARKET

SHIPPING MARKET REVIEW – MAY 2018

# THE PRODUCT TANKER MARKET

Perspectives and key takeaways

## OUTLOOK SUMMARY

○ POSITIVE

● NEUTRAL

○ NEGATIVE

Low freight rates and secondhand prices are depressing the Product Tanker market. Fleet growth is set to slow in the next two years, which may ease the pressure on freight rates by the end of the period. However, demand growth is also expected to slow and the surplus supply is unlikely to shrink. With very few scrapping candidates, the outlook is tough for the LR segments. The MR segment is far better positioned to handle surplus capacity, due to the large number of older vessels.

The Product Tanker market is burdened by overcapacity. Freight rates and secondhand prices are close to their lowest levels since 2000. Still, new environmental regulations and high scrap prices are encouraging owners to demolish more vessels. This is expected to reduce future fleet growth.

A stronger global economy supported consumption of oil products in 2017, and demand for Product Tankers is estimated to have grown by 3% last year. The primary drivers were increased industrial activity and higher demand from the petrochemical industry, resulting in a strengthening of diesel and naphtha consumption. However, high inventory levels capped demand growth in 2017 and may continue to do so in 2018.

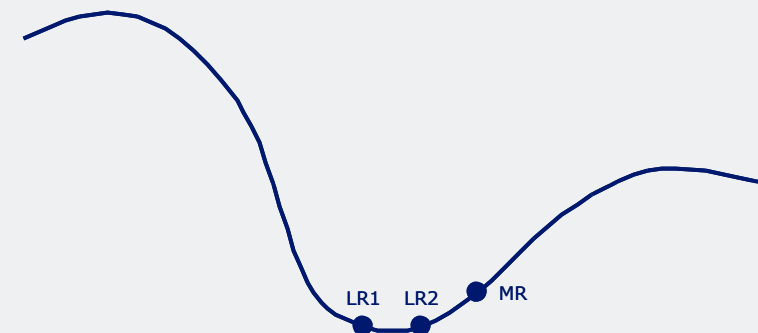
As the pace of deliveries slowed and demolition increased significantly, optimism about a near-term recovery started to emerge in the Product Tanker market in 2017. This, combined with expectations of further scrapping, prompted owners to order a large number of new vessels in 2017. Contracting eased somewhat in the first quarter of 2018. We share the opinion that many vessels will be demolished up to 2020, but the young age profile of the fleet will make it costly to maintain a high level of scrapping in the larger segments should demand fail to employ the incoming vessels.

The fleet renewal potential for the LR segments is almost non-existent. As of March 2018, there are 64 vessels in the orderbook, but only 56 LRs in the fleet that are 15 years or older (of these just 12 are older than 20 years). This leaves the LR segments very vulnerable to oversupply building further if owners do not manage to scrap enough vessels. If LR scrapping does keep up, the pressure on freight rates could begin to ease, but this would be at the expense of even relatively young secondhand vessels, as it would shorten their economic lifetimes.

The MR segment is significantly better-positioned to handle surplus capacity, since more than 200 vessels in the fleet are 20 years or older, which compares with an orderbook of 172 vessels. We therefore maintain a positive outlook for the MR segment, although we recognise that the oldest vessels could see unexpected secondhand price depreciations.

The outlook remains bleak, since peak oil demand continues to be a long-term risk. Faster proliferation of electric vehicles could begin to reduce seaborne demand for gasoline and diesel more quickly than currently anticipated. This is likely to happen within the lifetime of vessels currently trading. In the event of this, the Product Tanker fleet could be left oversupplied for longer.

## WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

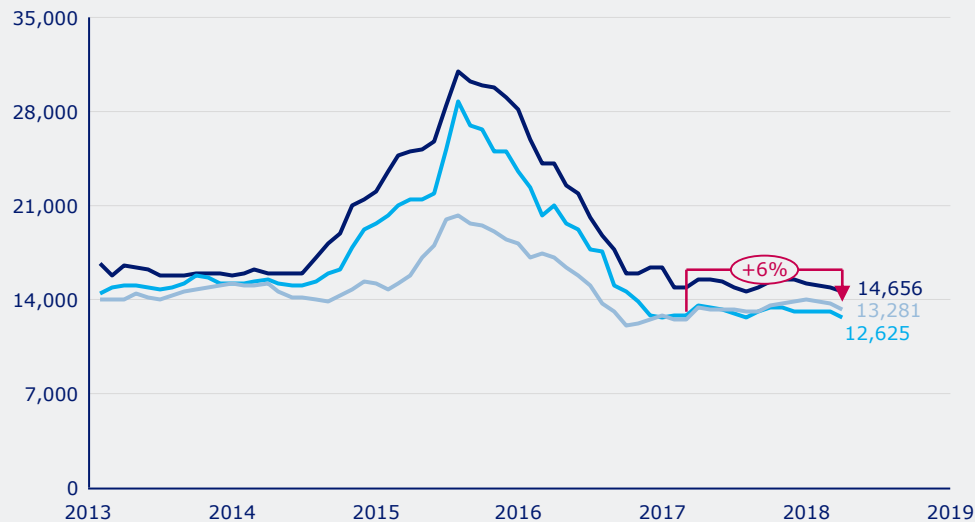
# THE PRODUCT TANKER MARKET

## Freight rates and ship prices

**Spot rates** are low, which reflects the fact that the market is still struggling to cope with excess capacity. The average Product Tanker spot rate ended 2017 as it started, at approximately USD 11,700 per day. Stronger intra-regional trade, driven by US Gulf exports to Latin America and a surplus of Chinese oil products boosting trade within Asia, supported MR spot rates which proved more resilient than LR rates. Strong product demand was increasingly supplied from inventories, as demand outgrew refinery runs, which removed potential seaborne arbitrage trades. **Timecharter rates** remain low, especially for LR1 tankers. MRs remain most robust with the 1-year timecharter rate at USD 13,300 per day in March 2018, 6% higher than at the same time last year.

**Secondhand prices** remain low but have increased steadily since the beginning of 2017 and continued the positive trend during the first three months of 2018. The price of a five-year-old LR has improved by approximately USD 1.25 million which is almost the same as the

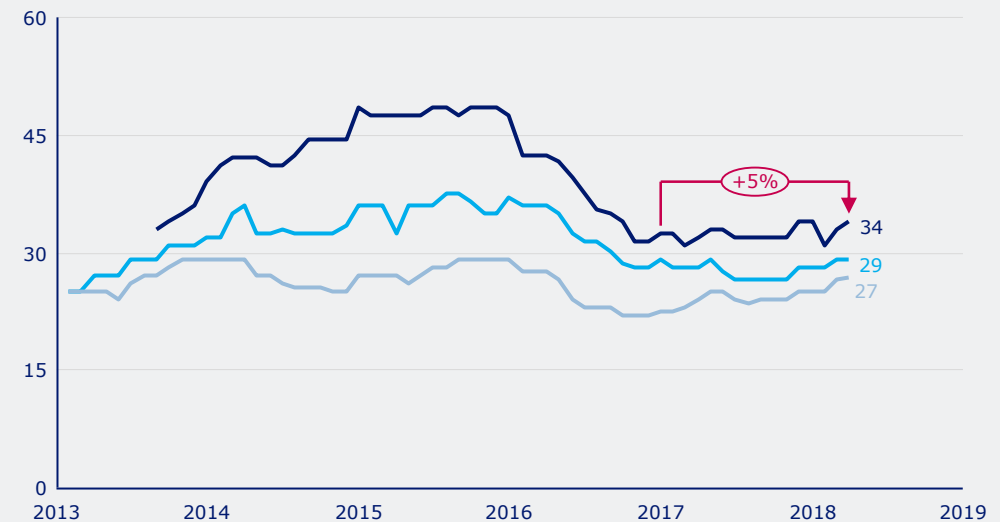
### 1-YEAR TIMECHARTER RATE (USD PER DAY)



increase in its scrap value over the period. That is to say, the increase does not reflect higher market expectations for future earnings. MR prices have risen almost USD 4.5 million in the same period. That corresponds to five times the increase in the scrap price and does therefore reflect an increase in the market's future earnings expectations. **Newbuilding prices** remain low but have also been impacted by higher steel prices, and on average prices increased by 3.5% in the first quarter of 2018.

The low, but slowly increasing, secondhand prices attracted investors who were eager not to miss the bottom of the market. This meant **sales activity** was relatively strong in 2017 with 5.5 million dwt changing hands compared with 3 million dwt in 2016. Investors' enthusiasm seemed to wane in the first quarter of 2018, as sales activity decreased almost 60% compared with the first quarter of 2017.

### SECONDHAND PRICES – 5 YEARS (USD MILLION)



— LR2 — LR1 — MR

Source: Clarksons, Danish Ship Finance

# THE PRODUCT TANKER MARKET

## Supply-side development

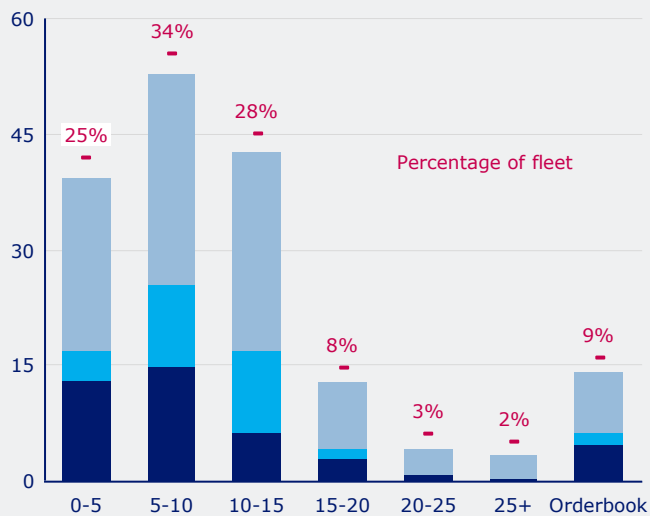
Firming market sentiment caused **contracting** to more than quadruple in 2017 from its low 2016 level. It seems that many ship owners ordered new vessels based on the presumption that asset prices bottomed out last year. Shipowners ordered 7.6 million dwt or 122 new vessels in 2017. On a positive note, the orderbook is at its lowest level since 2013. In the first quarter of 2018, owners appeared to take a more cautious approach to ordering, as only 0.5 million dwt or 13 vessels were ordered, 11 of them MR vessels.

**Deliveries** declined by 15% in 2017 to 8.1 million dwt compared with 9.5 million dwt in 2016. Thus, the trend of continuously increasing deliveries since 2013 came to a halt. A sharp decline in MR deliveries was the reason for this, since deliveries increased in both LR segments. On the other hand, **demolitions** soared and grew by 140% in 2017 to 1.9 million dwt demolished from the record-low 0.8 million dwt in 2016. The majority of scrapped vessels were MRs, as this segment had the largest amount of natural scrapping candidates

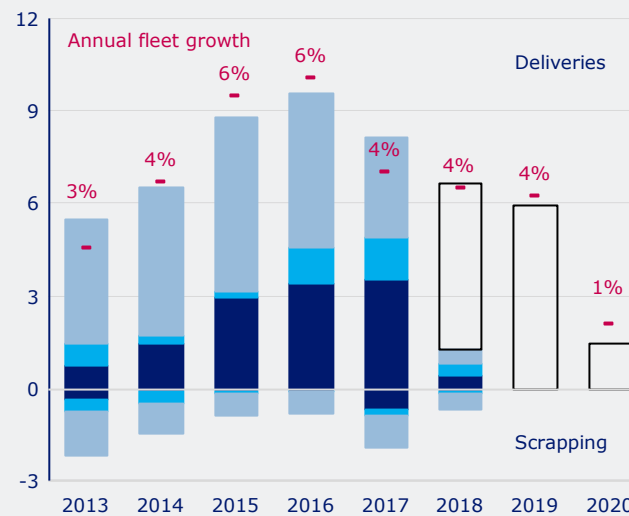
available. Scrapping of LR vessels finally began after three years with very modest activity, and nine LRs were scrapped in 2017. This resulted in net fleet growth of 4%. The first quarter of 2018 saw 1.8 million dwt of deliveries and 0.8 million dwt of demolitions.

The **fleet renewal potential**, reflecting the relationship between the orderbook and the number of available scrapping candidates, indicates that the Product Tanker market is increasingly divided. Even though the MR orderbook-to-fleet ratio has increased over the past year, MRs remain the most robust segment, with a fleet largely capable of absorbing the orderbook should demand falter. The LR segments have very few older vessels, which leave them very vulnerable should demand fail to employ the newbuilds once they are delivered. The extremely young LR1 fleet is the best example of this imbalance, with just one vessel over 20 years in the fleet but 22 vessels in the orderbook.

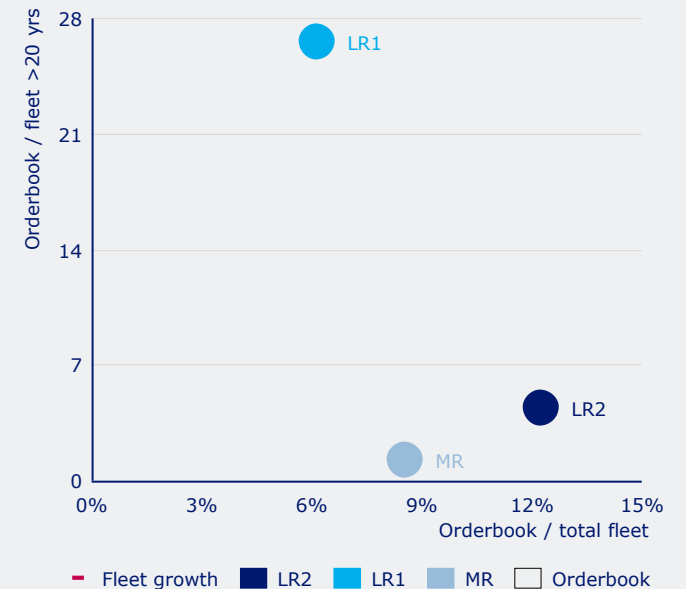
AGE DISTRIBUTION OF FLEET (MILLION DWT)



FLEET DEVELOPMENT (MILLION DWT)



FLEET RENEWAL POTENTIAL (DWT)



Source: Clarksons, Danish Ship Finance

# THE PRODUCT TANKER MARKET

## The market outlook

Market fundamentals remain out of balance, despite stronger than expected demand growth and rapid drawdowns of oil inventories in 2017 sparking optimism in the Product Tanker market. Fleet growth is set to decline to around 3% in 2018, since there will be fewer deliveries and more vessels are expected to be demolished ahead of new environmental regulations coming into force. Besides, higher scrap prices are strengthening the economic arguments for scrapping vessels. However, demand for seaborne petroleum products is expected to fall short of fleet growth in the most likely scrapping scenarios, meaning that the surplus is unlikely to shrink significantly in the foreseeable future. While MR demand is likely to be sheltered somewhat by the regional refinery imbalances in Asia and the Americas, a strong influx of LR vessels over the next two years means that fleet growth will continue to outpace demand growth.

From 2020, the global shift in marine fuel specifications could open up for new long-haul trade routes that support demand for Product

Tankers. Currently demand for bunker fuel makes up 4% of total oil products demand. Because of their coatings, Product Tankers are the obvious choice of vessel to be used to transport the new marine fuel, and thus will likely be utilised to distribute most of the new marine fuel to make it available in bunker ports across the world.

With respect to long-term demand, we maintain our stance that global growth in seaborne petroleum products will be substantially slower in the future than it has been in the past up until an eventual peak. In the developed world, oil demand has already begun to decline. In the developing world, gradual improvements in fuel efficiency and increasing ownership of electric vehicles, along with a general transition towards cleaner, alternative fuels, will curb future demand growth. While the developing world is a long way behind the developed world in terms of vehicle ownership, technology is likely to make its growth path substantially faster and increasingly less fossil fuel intensive.

### FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

<b>Refinery capacity growth east of Suez</b>	The Product Tanker market may begin to see tonne-mile demand shrink, since additional demand is expected to be close to the new refinery capacity additions east of Suez.	✘
<b>IMO 2020 low-sulphur fuel regulation</b>	Low-sulphur fuel will be transported to various bunkering ports by Product Tankers, which could create new trading routes and increase demand.	✔
<b>Growing demand for petrochemicals</b>	Seaborne demand is positively impacted if the petrochemical sector continues to increase its demand for naphtha as a feedstock, as currently expected.	✔
<b>Fuel efficiency gains and electric vehicle penetration</b>	Rapid advances in fuel efficiency and a continued increase in electric vehicle uptake could displace a significant amount of oil demand and reduce seaborne demand.	✘
<b>The clean energy transition</b>	Substitution of fuel oil, gas oil and crude oil with natural gas and renewable energy sources in the power generation sector is likely to affect demand negatively.	✘

✘ Negative    ✔ Positive



# PRODUCT TANKER MARKET DEEP DIVE: ELECTRIC VEHICLES

*The enhanced value proposition of electric vehicles and its likely effect on speeding up proliferation of these*

**In 2017, electric vehicles accounted for only 0.2% of the global fleet of passenger vehicles. Although growth is strong, the starting point was close to zero, and not until the middle of the next decade are electric vehicles expected to displace significant amounts of gasoline demand. However, advances in battery storage and grid-connection technologies are rapidly improving the value proposition of electric vehicles, both for fleet operators and consumers, and as this value proposition becomes clearer, the uptake of electric vehicles could accelerate, we argue.**

Today, the global light-duty vehicle fleet accounts for 30% of oil consumption, and it has accounted for nearly 40% of oil demand growth since 2000. Estimates suggest that up to the middle of the next decade, fuel efficiency improvements will be the main factor curbing oil demand growth, until adoption of electric vehicles reaches a level high enough to affect oil demand significantly. We argue, however, that a significantly enhanced value proposition could rapidly speed up the proliferation of electric vehicles. The largest barrier to widespread adoption of electric vehicles for many consumers remains the higher purchase cost (range seems no longer an issue), and the absence of a clear-cut value proposition in light of that higher cost. But that is changing fast, and could help bring electric vehicles into the mainstream more swiftly.

Broadly speaking, the differences between electric vehicles and internal combustion engine cars are high versus low fixed costs (acquisition cost), and low versus high variable costs (fuel cost). Regarding the first point, estimates suggest that by 2020, electric vehicles could reach cost parity with internal combustion engine vehicles. On the second point, intelligent vehicle-to-grid charging solutions that could make charging costs even lower are being brought to market.

Intelligent vehicle-to-grid connection and charging is not a futuristic idea. In the UK, a private utility company, in collaboration with an automaker, has launched an intelligent vehicle-to-grid charging product. The solution allows customers to charge their electric vehicles

when electricity prices are low and the source is most likely to be renewable, and to discharge (sell) energy to the grid when prices are high, through intelligent algorithms that delay charging times to when it is most attractive from a price perspective. By allowing the batteries of their electric vehicles to be utilised as energy storage, customers ultimately are being offered the opportunity to eliminate large parts of their fuel costs or even eradicate them completely. In terms of vehicles' lifetime costs, this option drastically increases the attractiveness of electric vehicles, and identifies a clear advantage over internal combustion engine vehicles. This might be something that for many vehicle owners, who have only considered the higher initial price of electric vehicles, has not been apparent before.

Imagine the push towards large-scale adoption of electric vehicles, maybe first in the developed world, if utility companies in other countries begin to offer similar solutions. We argue that intelligent grids and smart charging solutions could significantly speed up electric vehicle adoption, and lead to a more rapid turnover of the global passenger car fleet. For transport fuels and Product Tanker demand, an enhanced value proposition that speeds up proliferation of electric vehicles represents a potentially severe threat. The Product Tanker fleet could end up being oversupplied for longer unless other pockets of demand materialises.



# THE LPG MARKET

SHIPPING MARKET REVIEW – MAY 2018

# THE LPG TANKER MARKET

Perspectives and key takeaways

## OUTLOOK SUMMARY

- POSITIVE
- NEUTRAL
- NEGATIVE**

The LPG market is at a cyclical low, with freight rates, newbuilding prices and secondhand prices close to all-time low levels. Market fundamentals could deteriorate further in 2018, as US export growth might slow. Fleet utilisation could see some support from increasing demolition of older vessels but this will not be enough to counterbalance lower growth in US exports. In 2019, market fundamentals could improve marginally as US exports resume growth.

The LPG market is struggling with a massive oversupply of vessels and decelerating demand growth. In 2017, the fleet expanded by 9%, while demand only grew by 3%, down from 13% in 2016.

The combination of high fleet growth and declining demand growth has brought the LPG market to a cyclical low. There has been little room for freight rate improvements and the average timecharter rate in 2017 for the SGC, MGC and VLGC segments were close to or at all-time low levels. However, the coastal carrier and ethylene carrier segments, both LPG niche markets, have seen a more positive development. In the ethylene segment, relatively strong demand has kept rates relatively stable and in the coastal carrier segment, freight rates remain high due to low fleet growth and increasing coastal trade.

In the VLGC and MGC segments, which represent around 80% of seaborne trade volumes, conditions remain very challenging. Long-haul trade is still unable to employ the growing number of VLGCs, and the large vessels are therefore competing against the smaller MGCs on shorter routes. The MGC segment is already under pressure from accelerated fleet growth and we expect that it will remain challenged until long-haul trade volumes reach sufficient levels to absorb the oversupply of VLGC vessels.

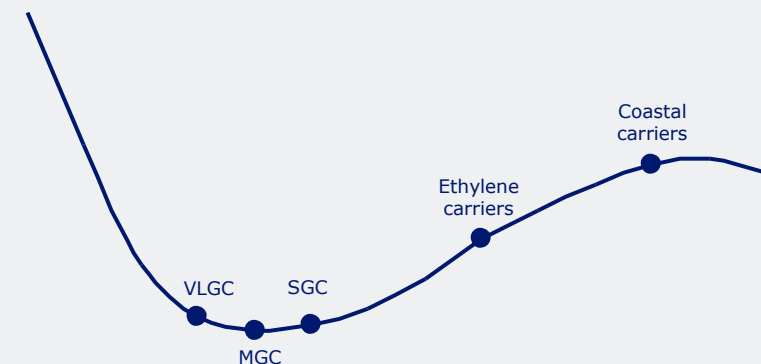
Despite the poor market fundamentals, the general interpretation of

the LPG market seems to be that it has passed the bottom and is heading for a recovery. A recovery is expected to be propelled by a slowdown in deliveries, rising demolition activity (spurred by the IMO 2020 fuel regulations), and longer travel distances as a result of increased exports from the US to Asia.

These expectations of an impending market recovery, combined with cyclical low newbuild and secondhand prices, have sparked increased activity in both markets. Undoubtedly, some shipowners are positioning themselves for the next upswing in freight rates.

We are sceptical of the argument that the market may be past the bottom, and remain unconvinced that a freight rate recovery is imminent. Demand growth could drop below 3% in 2018 if US export growth slows. Further, we expect changes in the underlying demand landscape to curb LPG demand growth at around 4% per year from 2019 to 2023. Although deliveries are slowing, they are doing so from a high level and we expect them to outpace demand growth up to 2020. We believe it will take longer than expected for the vessel oversupply to be reduced, even if demolition activity increases and US exports continue to power longer travel distances from 2019 onwards.

## WHERE WE ARE IN THE FREIGHT RATE CYCLE



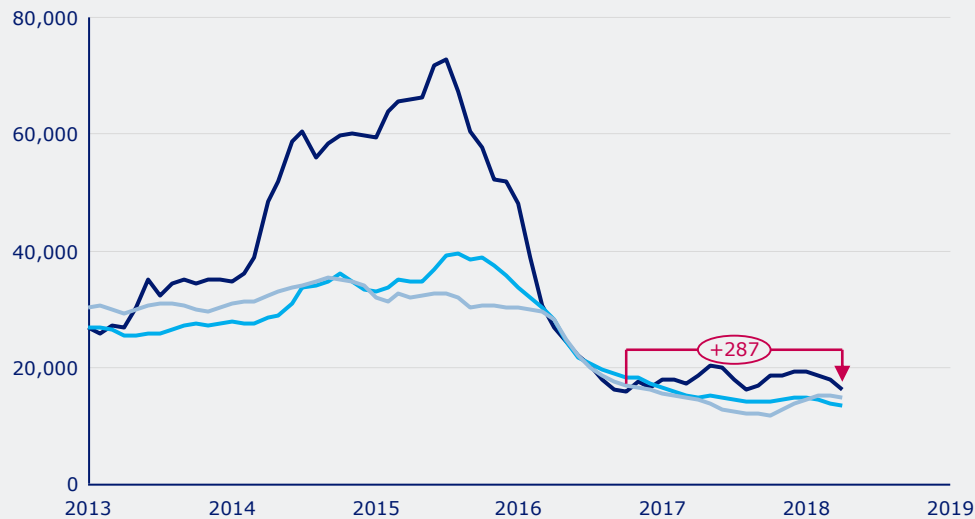
Source: Danish Ship Finance

# THE LPG TANKER MARKET

## Freight rates and ship prices

In the VLGC, MGC and SGC segments, **timecharter rates** remain close to or at all-time low levels. The VLGC timecharter rate bottomed out in October 2016 at around USD 16,000 per day after dropping more than 70% over a 12-month period. From October 2016 to March 2018, the VLGC rate increased by USD 300 per day (2%) to around USD 16,200 per day. In the same period, the MGC timecharter rate declined almost continuously and is currently at an all-time low of USD 13,500 per day. SGC (semi-ref) timecharter rates have improved to around USD 14,500 per day after reaching an all-time low of around USD 11,500 per day in October 2017. In the coastal carrier (VSGC <5,000 cbm) segment, the timecharter rate remains high due to low fleet growth and increasing coastal trade. In the ethylene carrier segment, a subsegment of MGC and SGC, growth in demand for petrochemical gases has kept freight rates from declining to near all-time low levels despite high fleet growth. VLGC, MGC and SGC timecharter rates could improve marginally in 2018 and 2019,

### 1-YEAR TIMECHARTER (USD PER DAY)

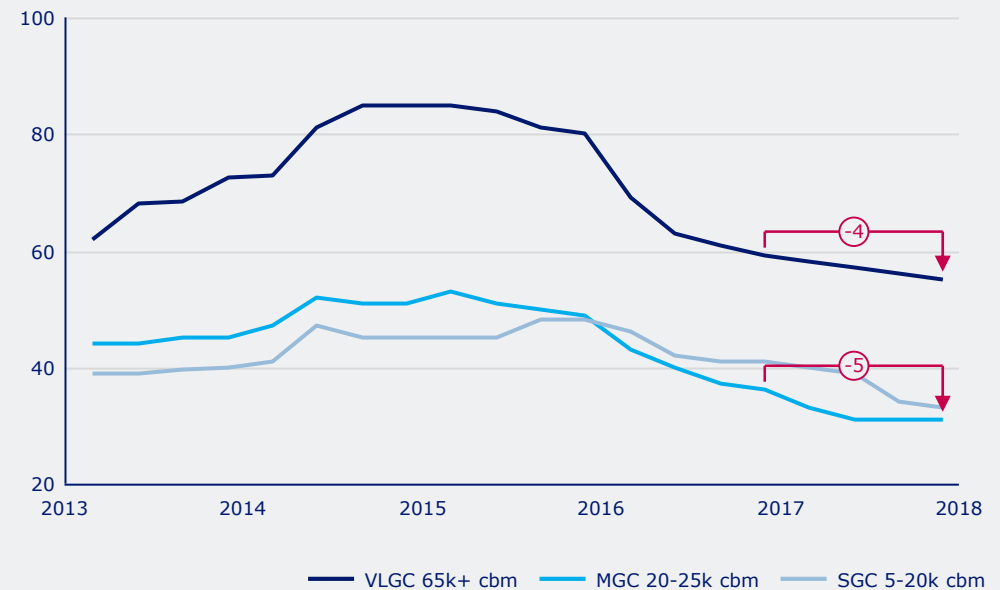


powered by longer travel distances and increasing demolition activity.

**Secondhand and newbuilding prices** are at a cyclical low. Secondhand prices for VLGCs, MGCs and SGCs declined by an average of 10% in 2017 in the wake of the deteriorating market fundamentals, and could stay at the current low levels or even decline further if freight rates only improve marginally in 2018 and 2019. Newbuilding prices dropped by around 3% on average in 2017.

**Sales activity** increased in 2017. A total of 38 vessels changed hands – five VLGCs, five MGCs, 13 SGCs and 15 VSGCs – up from 24 vessels in 2016. The increased activity did not support prices, which could suggest that investors are not yet willing to price in the expected upswing.

### SECONDHAND PRICES – 5 YEARS (USD MILLION)



Source: Clarksons, Drewry, Danish Ship Finance

# THE LPG TANKER MARKET

## Supply-side developments

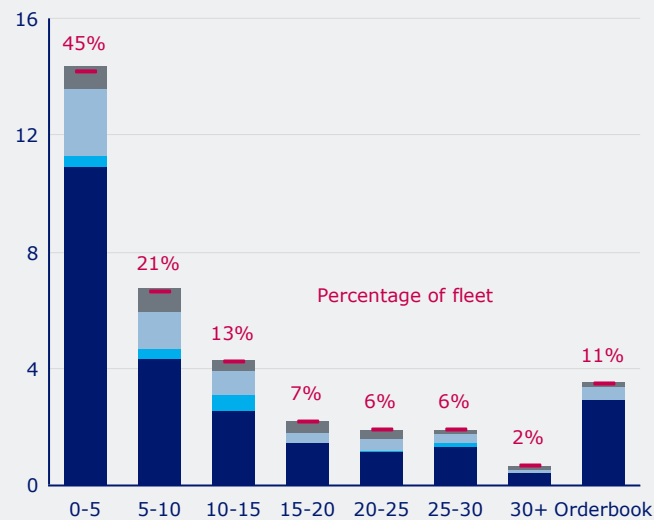
From 2014 to 2016, **contracting** plummeted from 105 vessels to just eight. In 2017, contracting started to increase, and a total of 21 vessels were ordered: 12 VLGCs, four MGCs and five SGCs. The trend continued during the first three months of 2018, with a total of 11 vessels ordered compared to just three in the same period in 2017. The increase might seem insignificant, but the upward trend is becoming a real threat to a market recovery, as it lifts future fleet growth above the expected annual increase in demand of around 4% per year up to 2020. We can only speculate about the reasons for the increase in contracting. It might be that some owners are trying to anticipate an increase in demolition activity sparked by the IMO 2020 fuel regulation. Currently, only a third of owners with vessels in the orderbook also have vessels older than 20 years.

**Deliveries** declined to 9% of the fleet in 2017 and will come down to 4% in 2018, only to rise to 6% in 2019 based on the increasing

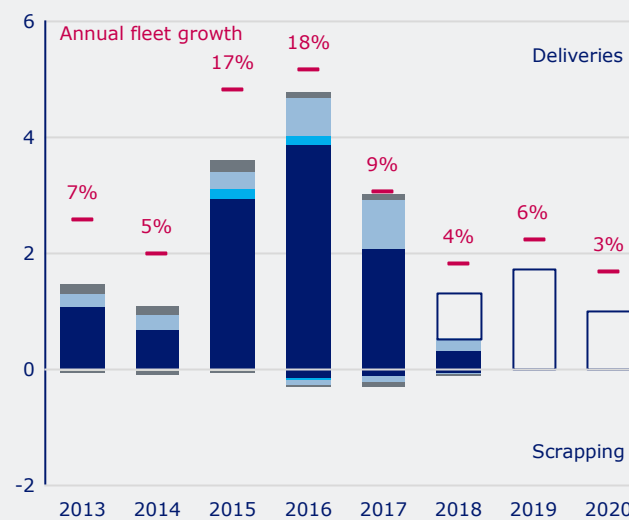
number of contracts. We believe that expected deliveries for 2020 could increase to at least 6% during 2018 if contracting continues at the current pace.

Driven by high scrap prices and the poor market fundamentals, **demolition** increased sharply during the first three months of 2018, as ten vessels exited the fleet compared to 23 and 20 vessels in the whole of 2016 and 2017, respectively. Over the next two years, the IMO 2020 fuel regulation (IMO 2020) is expected to provide shipowners with an added incentive to scrap older vessels. IMO 2020 will necessitate additional investments, possibly reducing the future profit of older vessels to the point where scrapping is a more economical alternative. However, the fleet renewal potential figure below shows that only the SCG and VSGC segments will be able to absorb the current orderbook without vessels younger than 25 years being scrapped.

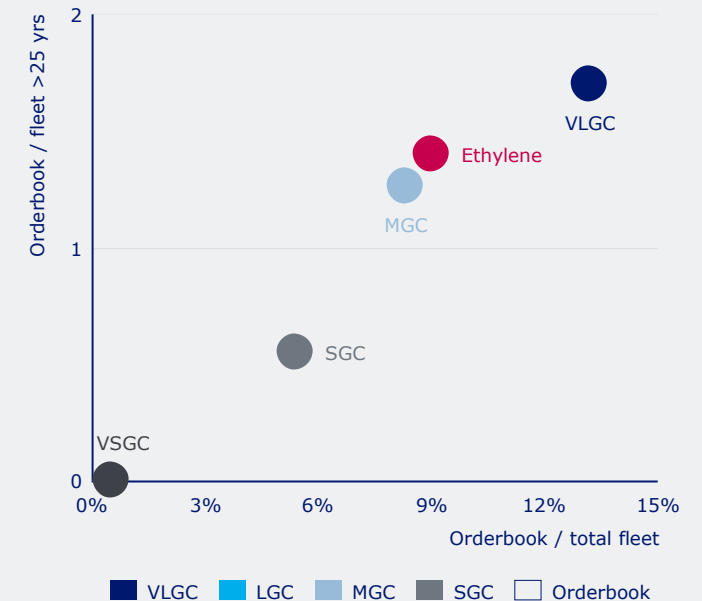
AGE DISTRIBUTION OF FLEET (MILLION CBM)



FLEET DEVELOPMENT (MILLION CBM)



FLEET RENEWAL POTENTIAL (CBM)



Source: Clarksons, Danish Ship Finance

# THE LPG TANKER MARKET

## The market outlook

Conditions in the LPG market are expected to remain challenging in 2018 and 2019. We identify additional downside risk in the freight rate market. In the first quarter of 2018 US LPG volumes available for export were limited due to higher domestic LPG demand, which is creating uncertainty of total US export in 2018. Moreover, the current oversupply of vessels and the fact that fleet growth could outpace demand even more strongly in 2018 and 2019 may lower fleet utilisation further. Two factors that support freight rates during this period are increasing demolition activity sparked by the IMO 2020 fuel regulation and growth in travelling distances driven by long-haul US exports bound for Asia from 2019 onwards.

From 2020 onwards, we expect demand to grow at an annual average rate of around 4%. Although this is significantly slower than in past years, the LPG market could still start to recover. However, if contracting activity continues at the current pace, fleet growth could outstrip demand in 2020 and demolition activity would have to

increase to absorb excess capacity. We argue that the expected recovery in freight rates may be slower and weaker than generally seems to be expected currently.

There are factors that could push LPG demand growth higher than 4% in the medium to long term. Growing demand for plastic, particularly in Asia, could initiate a new wave of newbuild petrochemical capacity, some of which will be fuelled by LPG. Moreover, the environmental push in many emerging economies could spark higher LPG demand as households seek to replace dirty-burning fuels. The unmet potential is sizeable, but it requires local governments both to invest heavily in infrastructure and to subsidise LPG prices to incentivise people to switch fuel types. If this added demand emerges, it would support the LPG market. However, it is difficult to predict the likelihood and timing of this, and downside risk related to plastic recycling and the emergence of solar-powered cooking stoves persists, which could keep demand growth at around 4%.

### FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

<b>IMO 2020 fuel regulations</b>	The IMO 2020 fuel regulations could potentially increase demolition of older vessels to the point where supply growth dips below demand growth.	✓
<b>Changing demand landscape</b>	A slowdown in newbuild PDH plants in the petrochemical sector and increased competition from natural gas in the industrial and household sector are causing demand growth to decelerate.	✗
<b>Growing demand for plastic</b>	Demand for plastic products is expected to double by 2050. In order to meet demand, petrochemical capacity needs to be expanded massively.	✓
<b>Circular economy</b>	Applying circular economy principles to the plastics industry could reduce the growth rate of new plastic production.	✗
<b>Household sector demand</b>	There is a need to replace dirty-burning fuels like wood and charcoal in the household sector in large parts of the world.	✓

✗ Negative ✓ Positive

# LPG MARKET DEEP DIVE: MARKET DYNAMICS ARE CHANGING

*Changes in the underlying demand landscape are affecting growth in seaborne LPG trade*

**New market dynamics for seaborne LPG demand are emerging. Key LPG market drivers like Chinese propane dehydrogenation plants, the Indian household sector and US exports are moving into a more mature phase, and growth rates in the seaborne LPG market are decelerating.**

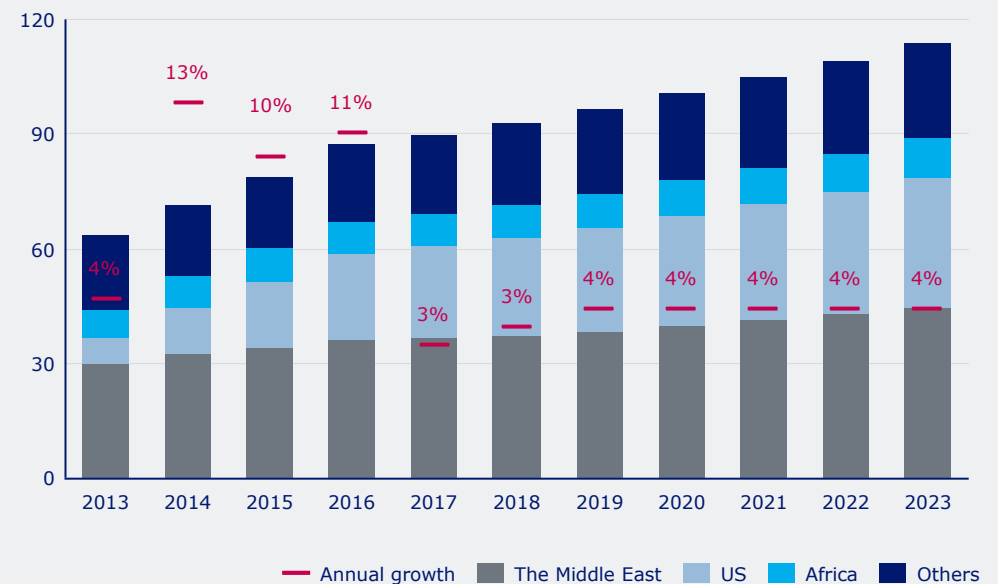
The strategy to lower propylene imports by taking advantage of cheap and abundant propane feedstock has been behind the expansion in Chinese propane dehydrogenation capacity (PDH plants). Powered by the massive growth in PDH plant capacity, China has become the world's largest LPG importer. PDH plants in China consume more than 5 million tonnes of LPG per year, accounting for about a quarter of Chinese LPG imports. However, Chinese propylene production has caught up with demand and for now PDH capacity is set to expand at a slower rate. In India, demand growth is also expected to slow. India has doubled its imports of LPG over the last four years and has become the world's second-largest importer. The government's massive investments in LPG infrastructure have raised LPG coverage to almost 80% of the population and subsidised prices have stimulated massive demand growth. However, as Indian LPG coverage increases, the untapped demand potential shrinks. Moreover the remaining 20% of the Indian population without access to LPG is generally very poor and not expected to generate massive new demand growth.

The explosive growth in US LPG exports, which has boosted distance-adjusted LPG demand, has begun to slow as production moves into a more mature phase. From 2012 to 2016, US LPG exports alone generated an annual average increase in global seaborne LPG demand of 7%. From 2018 to 2023, US LPG exports are only expected to lift global seaborne LPG demand by an annual average of around 2%. Growth could potentially fall lower than this and approach 0% in 2018. US domestic LPG demand has increased significantly in the first quarter of 2018 due to new petrochemical capacity coming online and strong heating requirements. US exports have not only supported seaborne demand by increasing travelling distances, they have also boosted arbitrage trade. When US LPG exports accelerated around 2012, the low price of US LPG created very profitable arbitrage opportunities in the higher-priced global market, which supported

seaborne demand and boosted freight rates. However, as global demand for US LPG increased, the price gap narrowed towards shipping costs. Going forward, the price gap is expected to remain relatively close to shipping costs and arbitrage opportunities are likely to be limited. But should extreme changes in US gas prices or global oil prices occur, it would stimulate arbitrage and increase freight rates.

These new market dynamics dampen the demand outlook considerably. Seaborne demand grew at double-digit rates between 2014 and 2016 but only increased by 3% in 2017. We expect seaborne demand to grow by another 3% in 2018 but to average 4% annually up to 2023. If owners do not adjust to a much lower demand outlook, freight rates could stay low for longer. We are already seeing increased activity in the newbuilding market, indicating that some market players believe the market has reached the bottom. If this trend gains pace, it may prolong the low freight rate environment beyond 2019.

## LPG IMPORTS BY SOURCE (MILLION TONNES)



Source: Clarksons, Drewry, Danish Ship Finance





# THE LNG MARKET

SHIPPING MARKET REVIEW – MAY 2018

# THE LNG TANKER MARKET

Perspectives and key takeaways

## OUTLOOK SUMMARY

● **POSITIVE**

○ NEUTRAL

○ NEGATIVE

Market fundamentals continue to improve in the LNG market. The spot rate and the timecharter rate increased throughout 2017. The market recovery is expected to continue up to 2020, supported by strong demand and increasing travelling distances. However, the supply and demand balance will remain sensitive to delays in LNG export facilities and is contingent on the delivery rate of newbuild vessels being lower than expected.

The LNG market continues to recover from its cyclical low. Market fundamentals are being supported by strong demand, lower than expected fleet growth and longer travelling distances.

In 2017, demand increased by around 10%, reaching roughly 295 million tonnes. The fleet only grew by 6%, whereas around 9% was expected, and vessel utilisation was further supported by longer travelling distances on the back of long-haul US exports. This powered a recovery in the freight rate market, with spot rates rising around 60% to around USD 78,000 per day and timecharter rates up by around 30% to around USD 40,000 per day in 2017.

The freight market is becoming more spot-oriented: more cargo contracts are being traded with shorter maturities, smaller volumes and destination flexibility. Buyers are becoming more price-sensitive, especially in the less mature markets. This translates into more spot trades and shorter timecharter contracts in the vessel market. Spot trade accounted for around 25% of all trade volumes in 2017, up from around 20% in 2014. In the same period, the average length of a timecharter contract declined from around 12 years to around seven. This development increases the investment risk, as vessel earnings become more exposed to freight rate volatility.

We maintain a positive market outlook for the next two years. Demand

will be driven by the expansion of export facilities in the US, Australia and Russia. US exports to Asia are increasing travelling distances, which is supporting vessel utilisation beyond growth in cargo volumes. However, the orderbook remains high at 25% of the fleet and is heavily front-loaded. For freight rates to recover further, several deliveries will need to be postponed.

The medium-term outlook is weakening, though, as expansion of LNG export facilities is set to slow after 2020, and growth in cargo volumes will decline unless new export facilities are built. This could cause the balance between supply and demand to deteriorate on the vessel side by the early 2020s. For seaborne LNG demand to continue to grow beyond the early 2020s, final investment decisions need to be secured for several new export facilities within the next few years.

Our long-term outlook for seaborne LNG is burdened by the prospect of deregulation in global energy markets. LNG projects have long repayment periods, corresponding to investors' preference for long-term volume contracts. However, importers are now starting to seek short-term contracts to stay competitive in downstream markets, since the deregulation of energy markets is enabling customers to take a more individual and flexible approach to their energy supply, including renewable energy.

## WHERE WE ARE IN THE FREIGHT RATE CYCLE



Source: Danish Ship Finance

# THE LNG TANKER MARKET

## Freight rates and ship prices

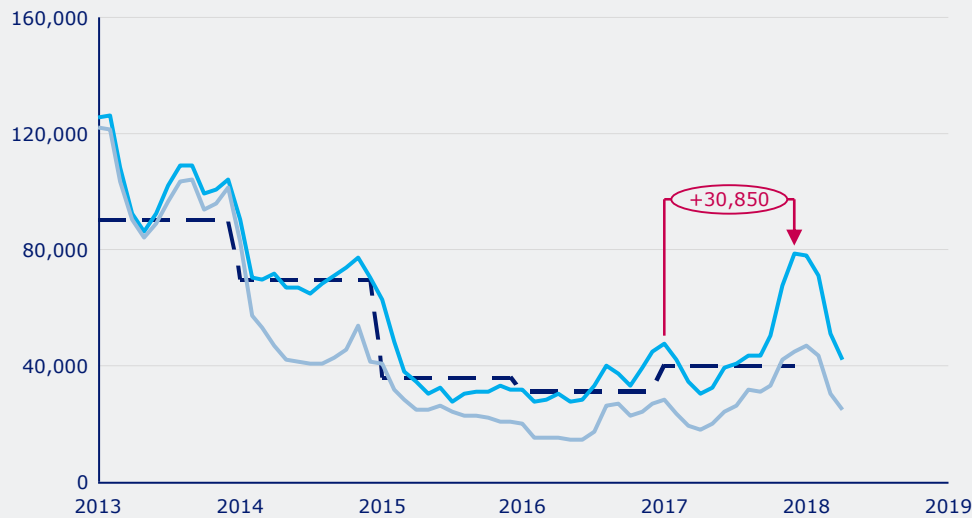
The freight rate market continued its recovery throughout 2017. **Spot rates** increased by around USD 23,000 per day (60%) on average and the **timecharter rate** rose by around USD 10,000 per day (30%) to around USD 40,000 per day. Spot rates peaked at the end of the year with demand growing at an average monthly rate of 9% in November and December. In the first quarter of 2018, rates came down sharply as nominal fleet growth hit a record high of almost 3 million cbm (4% fleet growth). In mid-April, spot rates were USD 25,000 per day for a 140,000 cbm steam turbine (ST) vessel and USD 42,000 per day for a more modern 160,000 cbm tri-fuel diesel electric (TFDE) vessel. We expect that freight rates will recover some of the recent lost ground, but the orderbook will continue to cap the upside potential.

The **newbuild price** for a 174,000 cbm vessel has declined 10% since 2016. In this period, the orderbook has come down from 155 vessels to 105. The current newbuild price is USD 180 million. Newbuild prices

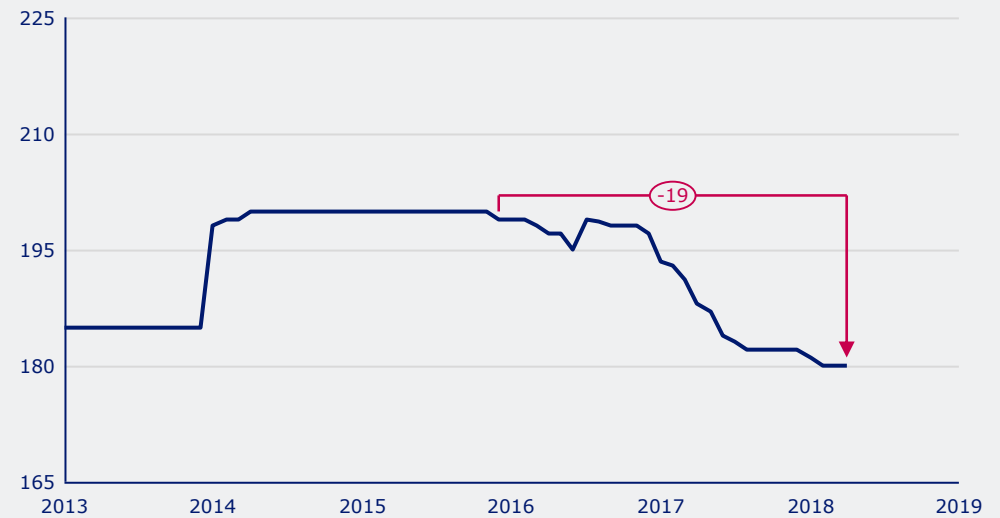
are expected to increase if contracting continues its current upward trend.

**Sales activity** increased in 2017: a total of eight vessels changed hands in the secondhand market compared with only four in 2016. **Secondhand prices** series are not available, as the market is illiquid with few vessels being sold. Half of the vessels sold in 2017 were younger than 15 years, while the other half were 35-plus years. The older vessels were in lay-up prior to being sold and have remained so. Sales activity in the LNG market is typically low and 2017 sales represent the fourth-largest number of vessels traded in the secondhand market in the last ten years.

**FREIGHT RATES (USD PER DAY)**



**NEWBUILDING PRICES (USD MILLION)**



— TC 160k cbm — Spot 160k cbm TFDE — Spot 140k cbm ST — NB price 174k cbm

Source: Clarksons, Danish Ship Finance

# THE LNG TANKER MARKET

## Supply-side development

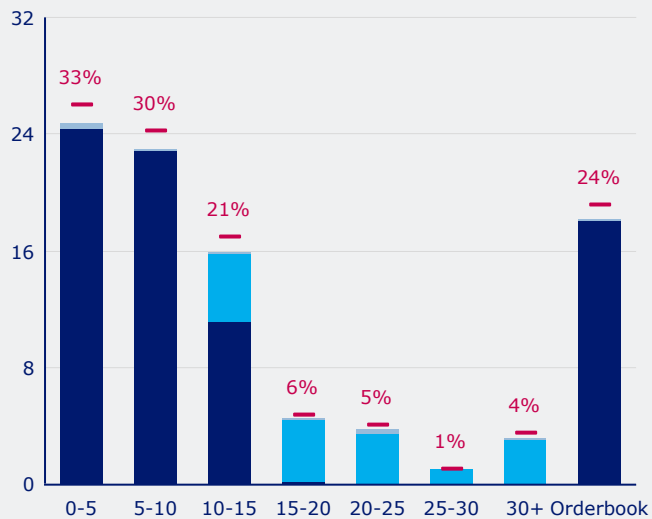
The LNG segment is a niche market. The LNG fleet (>40,000 cbm) contains 480 vessels and the orderbook holds 105 vessels. As vessels' earnings have started to increase, investors are showing renewed interest in the LNG market and **contracting** has starting to recover. In 2017, 13 vessels were ordered after the steep drop from 64 vessels in 2014 to just eight in 2016. In the first quarter of 2018, 17 vessels (2.9 million cbm) were ordered.

One of the main drivers of the current market recovery has been delays in **deliveries**. In 2017, more than 50 vessels were expected to enter the fleet, but only 28 vessels ended up being delivered. This kept fleet growth at 6% and supported higher fleet utilisation. As orders were postponed into 2018, expected fleet growth ballooned to a record high of 15%. Even though nominal fleet growth reached a record high of almost 3 million cbm in the first three months of 2018, only 17 vessels out of an expected 35 actually entered the fleet. We

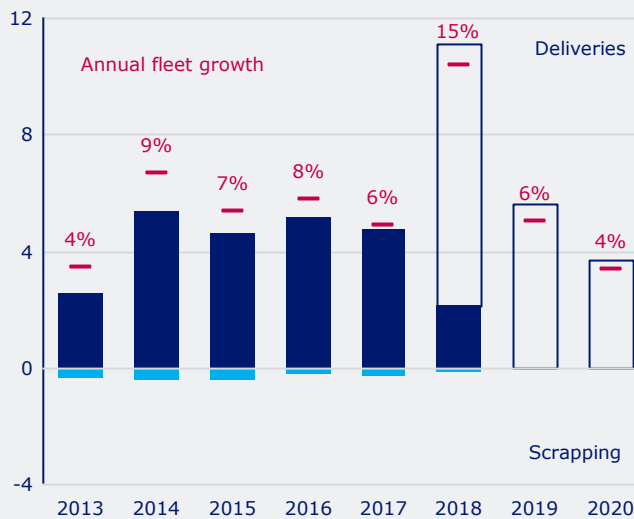
believe this trend will continue throughout the year and expect to see a fair share of 2018 deliveries being postponed to 2019. Based on the current orderbook and assuming that half of annual deliveries are postponed year after year (see the righthand chart below, which shows the fleet development with a delivery ratio of 50%), the fleet is expected to grow at annual average rate of 7% over the next three years.

**Demolition** in the LNG market has historically been very low. The maximum number of vessels scrapped in a single year is five, in 2013. In 2017, two vessels with a combined capacity of around 250,000 cbm were demolished and a single vessel with a capacity of 120,000 cbm has so far been scrapped in 2018. We expect demolition to remain limited as rising freight rates reduce the incentive to scrap older vessels.

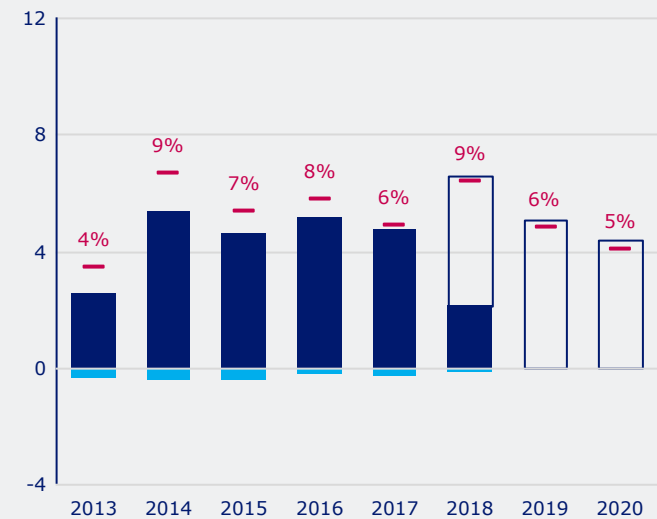
AGE DISTRIBUTION OF FLEET (MILLION CBM)



FLEET DEVELOPMENT (MILLION CBM)



FLEET DEVELOPMENT - DELIVERY RATIO AT 50%



■ >140k cbm ■ 100-140k cbm ■ <100k cbm □ Orderbook

Source: Clarksons, Danish Ship Finance

# THE LNG TANKER MARKET

## The market outlook

The recovery in the LNG market is expected to continue up to 2020 driven by the completion of new LNG export facilities currently under construction. This will shift export growth from Australia to the US, which should lengthen travelling distances and support fleet utilisation. However, fleet utilisation will remain sensitive to delayed start up of new LNG export facilities, which could lead to a temporary build-up of vessels in the spot market. Beyond 2020 fewer new export facilities are scheduled to start up and new pipeline infrastructure between Russia and China will come online which is expected to reduce LNG demand growth. Demand is expected to grow at an annual average of 6% up to 2020 and then decline to around 4%. However, demand outpaced expectations in the first three months of 2018 with seaborne volumes growing by 10% and tonne-mile demand by 16% compared with the same period in 2017.

Up to 2020, renewal of timecharter contracts is expected to result in older steam turbine vessels being replaced with more modern diesel

electric (DFDE/TDDE) and gas injection (ME-GI) vessels. There are some indications that the competitive advantages afforded by modern vessels could increase speculative ordering. In 2018, some vessels have been ordered without long-term contract coverage, two of them by shipowners new to the LNG market.

As the start up of new LNG export facilities slows, surplus vessel capacity may begin to build towards the mid-2020s. We believe fewer LNG buyers will be willing to enter into long-term contracts which are necessary for new LNG export facilities to secure finance. This trend may eventually lead to fewer LNG projects being sanctioned and result in slower than expected growth in the LNG market.

### FORCES AT WORK IMPACTING THE DEMAND OUTLOOK

<b>Coal-to-gas switch</b>	The need to improve air quality (China) and carbon tax (Europe) are major drivers of the coal-to-gas switch and will continue to boost gas demand in these regions.	✓
<b>Higher gas prices</b>	The higher gas prices needed to drive the next wave of LNG projects could make gas increasingly uncompetitive and lead to demand destruction.	✗
<b>Deregulation in global energy markets</b>	To stay competitive in downstream markets LNG imports seek shorter length and smaller volume contracts.	✗
<b>Competition from renewable energy</b>	In the power generation sector, gas will increasingly struggle to compete with solar, wind and battery storage technologies.	✗
<b>Emission targets</b>	If the COP21 emission targets are to be met, carbon emissions from gas will cause it to become increasingly unusable – particularly beyond 2040.	✗

✗ Negative ✓ Positive

# LNG MARKET DEEP DIVE: THE LONG-TERM GROWTH POTENTIAL

*Renewable energy and gas market liberalisation could prevent the LNG market from reaching its long-term potential*

**Based on the COP21 Paris agreement, seaborne LNG volumes are expected to double by 2040 and then stagnate. The massive growth up to 2040 is expected to be driven by a coal-to-gas switch, specifically in the power sector, and by an expansion of gas consumption to other sectors in undeveloped gas markets. However, beyond 2040, even gas consumption will have to be reduced if climate goals are to be reached. This introduces a limited period for gas demand growth, which is problematic for the long-term investments needed to support LNG growth.**

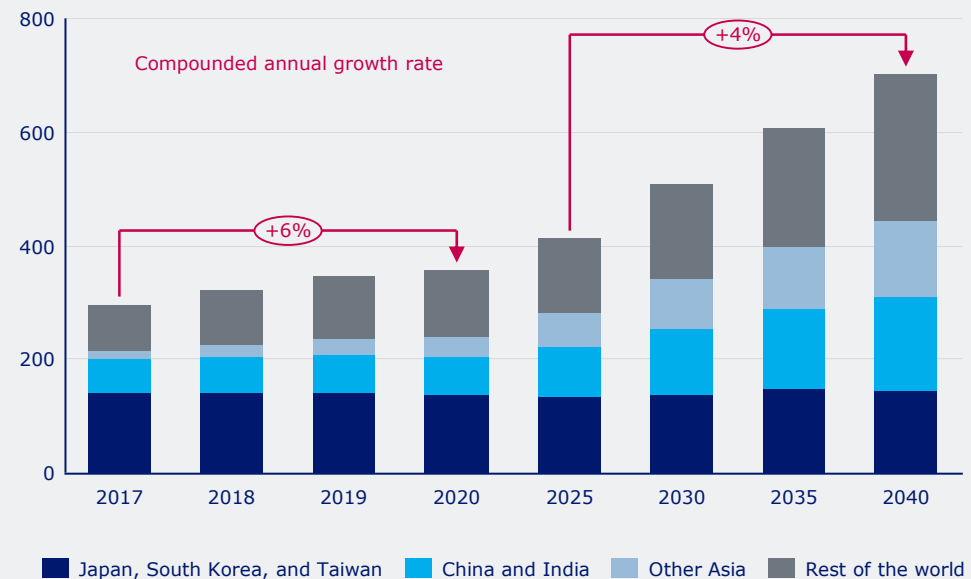
The **coal-to-gas switch**, which is increasing demand for LNG, remains a local phenomenon driven by emission taxes in some European countries and by air quality targets in China. There is little to suggest that this will happen on a global scale, as gas-fired power plants cannot compete with coal-fired plants without emission taxes or public pressure to improve air quality. For example, in Asia coal-fired power plants are continuing to grow in both developed countries and emerging markets. In many of these countries, policies that promote LNG seem to have been introduced as a diversification strategy designed to reduce import dependence rather than with the aim of cutting emissions or improving air quality. It seems more likely that a reduction in emissions will be propelled by replacing coal with renewable energy sources once the cost of these has come down sufficiently. Furthermore, a coal-to-gas switch could result in job destruction, as coal is domestically produced in many countries, whereas gas is largely imported as LNG. A coal-to-renewables switch, on the other hand, could offset some of the job losses from, for example, coal mines being closed, as part of the manufacture of renewable technology could be located domestically.

Gas consumption is often confined to the niche market of power generation. **Expanding consumption to other sectors** (industrial, commercial and residential) seems questionable, though, as it would require long-term investments in downstream infrastructure. In many high-income countries, deregulation has removed the monopoly structure of utility companies needed to support new long-term investments in the gas market. In low-income countries where the monopoly structure may still exist, poor creditworthiness of utility

companies and other end-users is dampening investors' appetite to develop markets. However, there have been some suggestions that gas suppliers should partner with local companies and invest in downstream infrastructure, e.g. power plants and gas pipelines, to open up new markets and secure an outlet for their product. The group of potential investors also includes large-scale importers such as Japanese utility companies which could benefit from securing an outlet for re-exporting surplus LNG imports to untapped local Asian markets.

Even though these are long-term trends that are unlikely to affect the 2020 outlook for LNG tankers, they underline the growing uncertainty about future cargo volumes facing all investors in the LNG market. The lifetime of a newbuild LNG tanker reaches well beyond 2040 and roughly two-thirds of all vessels in the fleet and the entire orderbook could be trading in the LNG market after 2040. If the deregulation of global energy markets and adoption of renewable energy sources continues, LNG investments will become riskier.

**LNG DEMAND (MILLION TONNES)**

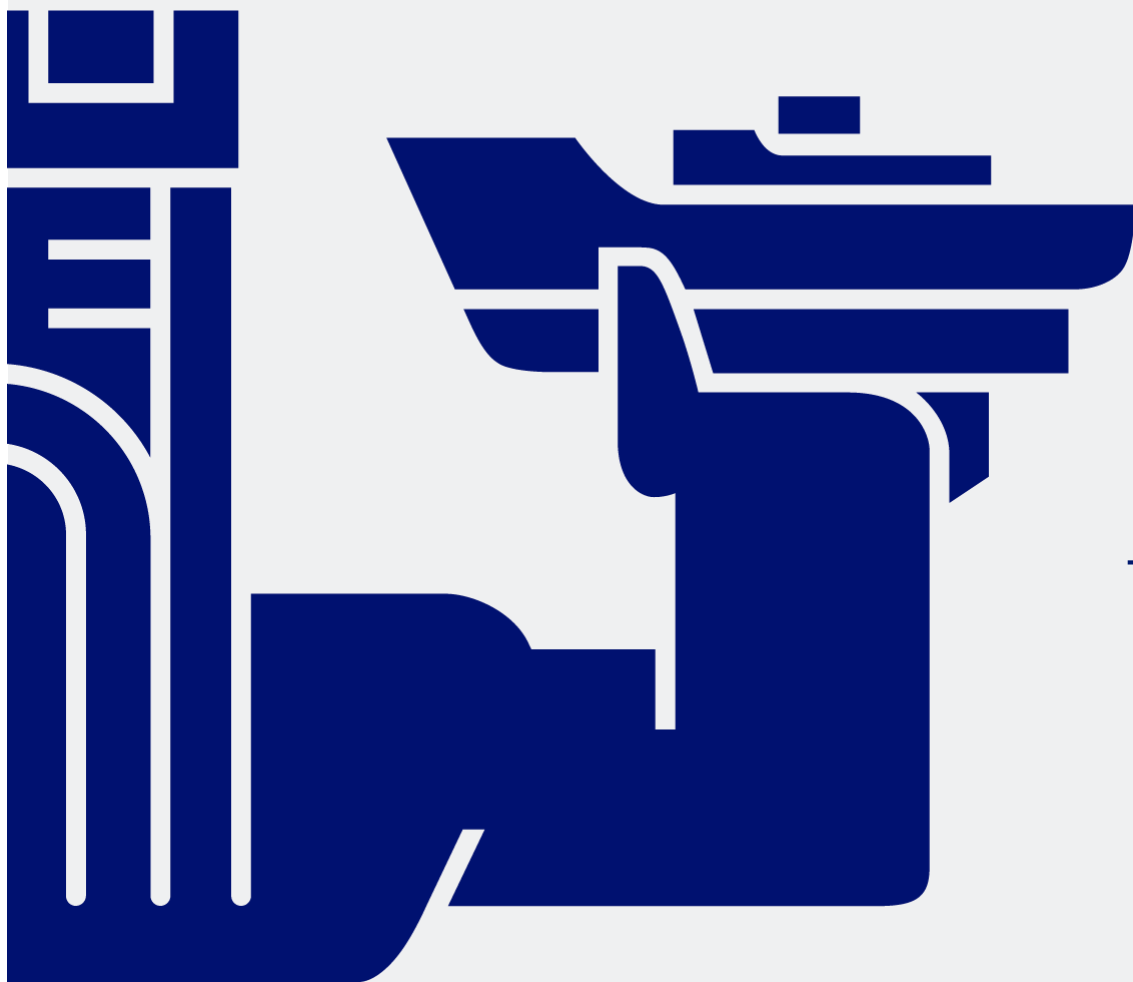


Source: IHS Markit, Danish Ship Finance

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FOR FURTHER INFORMATION

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