

SHIPPING MARKETS AT A GLANCE

- IN THE AGE OF THE FOURTH INDUSTRIAL REVOLUTION

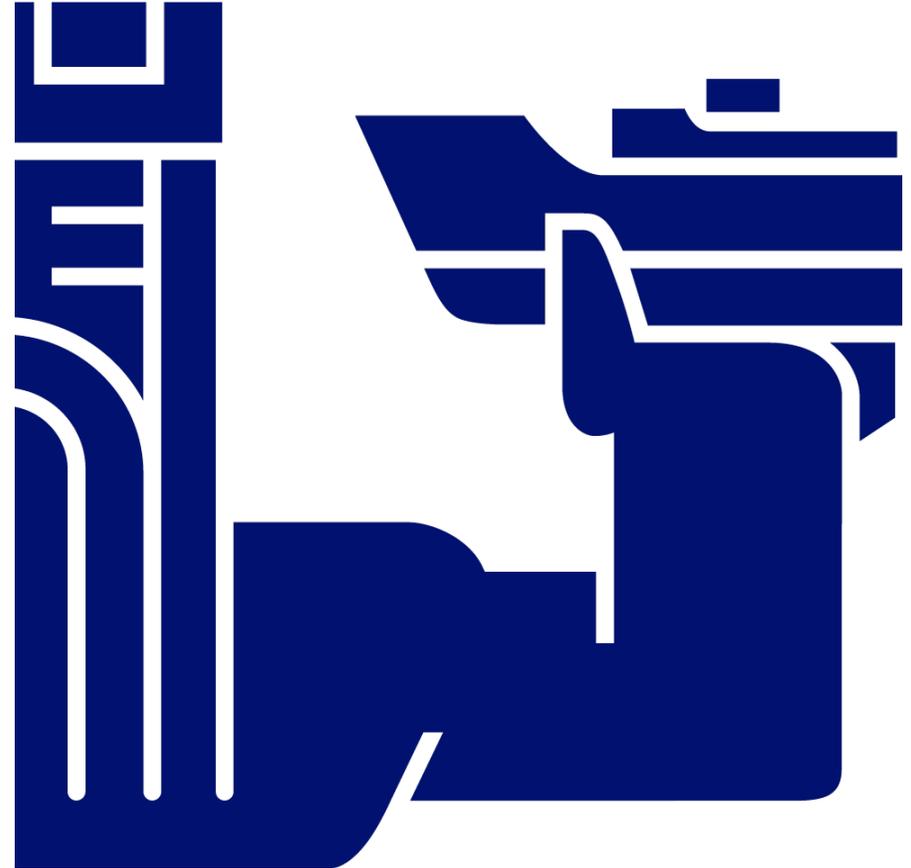


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SHIP FINANCE

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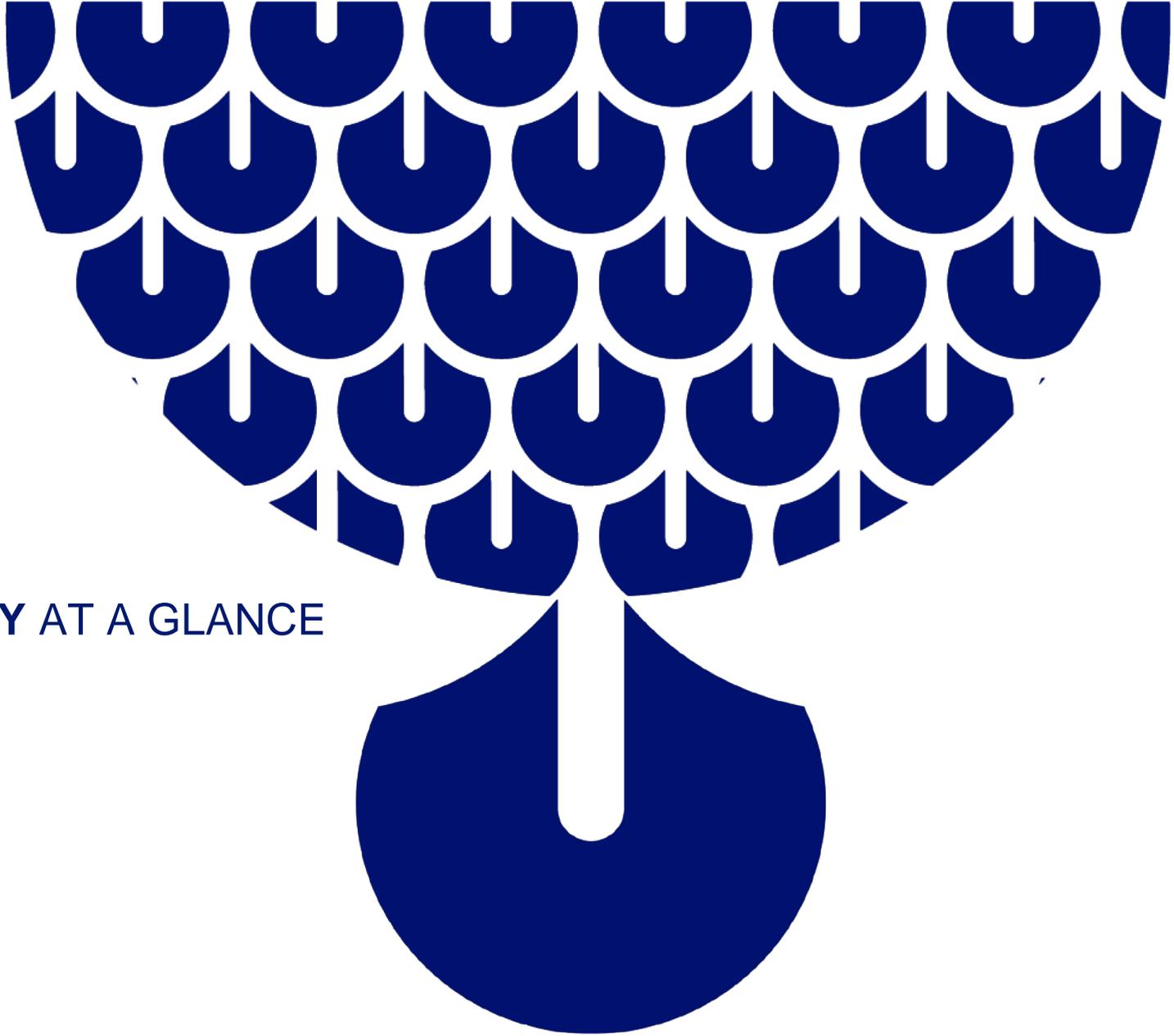
TAKEAWAYS FROM TODAY

Structural overcapacity is looming over most ship segments because supply has not yet adjusted to a **changed** demand outlook.

#1: Improvements within **renewable energy** are changing the outlook for ships transporting fossil fuels – i.e. Crude Tankers, Product Tankers, Gas Carriers and Dry Bulk vessels.

#2: **Manufacturing** is being moved closer to the consumers due to technological innovations in robotics, artificial intelligence and 3D printing. The long-term outlook for large Container vessels is structurally changed.

#3: **Seaborne trade volumes** are expected to **grow** by an annual average of approximately 1% between 2016 and 2030.



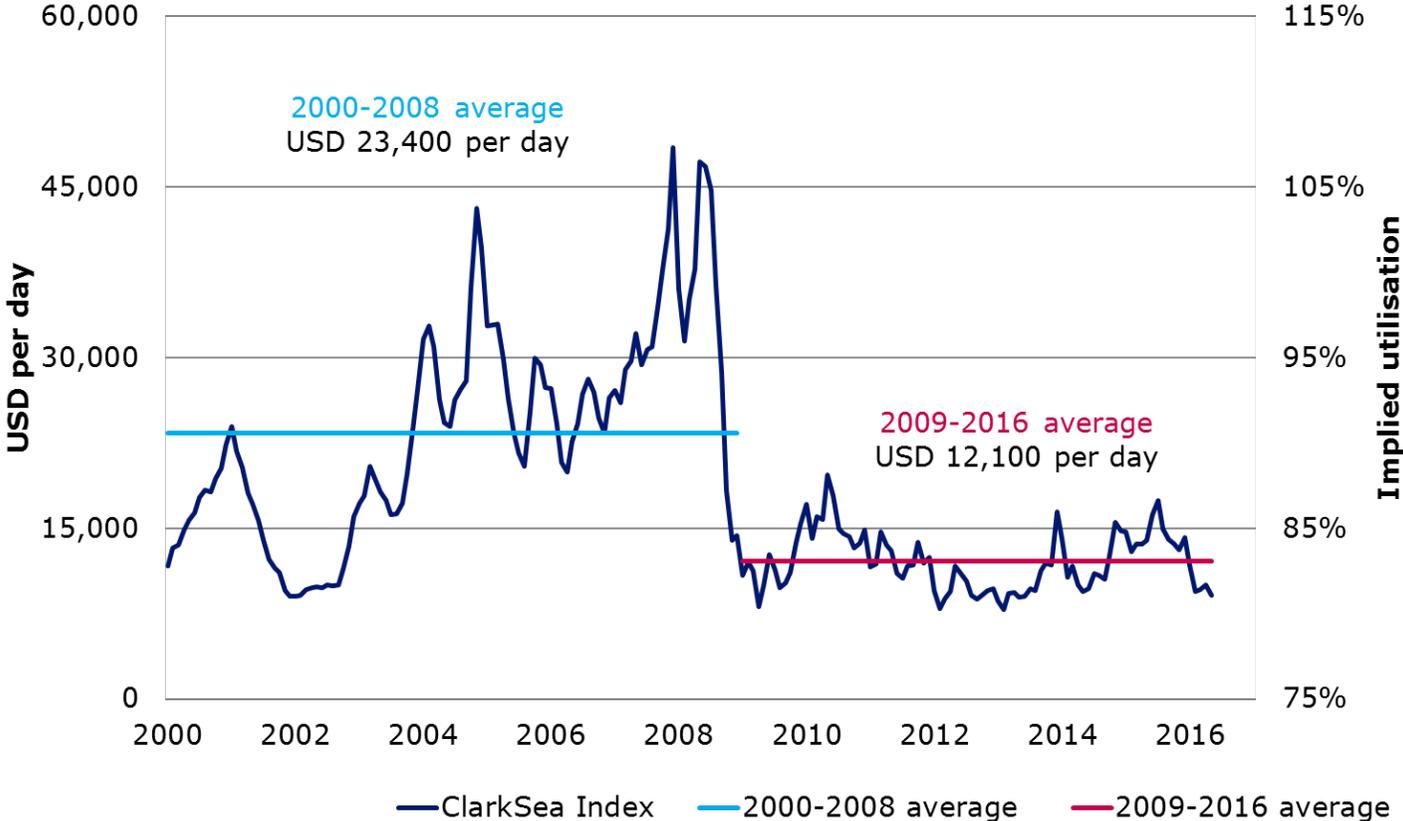
GLOBAL SHIP **SUPPLY** AT A GLANCE



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LOW FREIGHT RATES INDICATE LOW UTILISATION OF THE FLEETS

Freight rates remain low in most segments

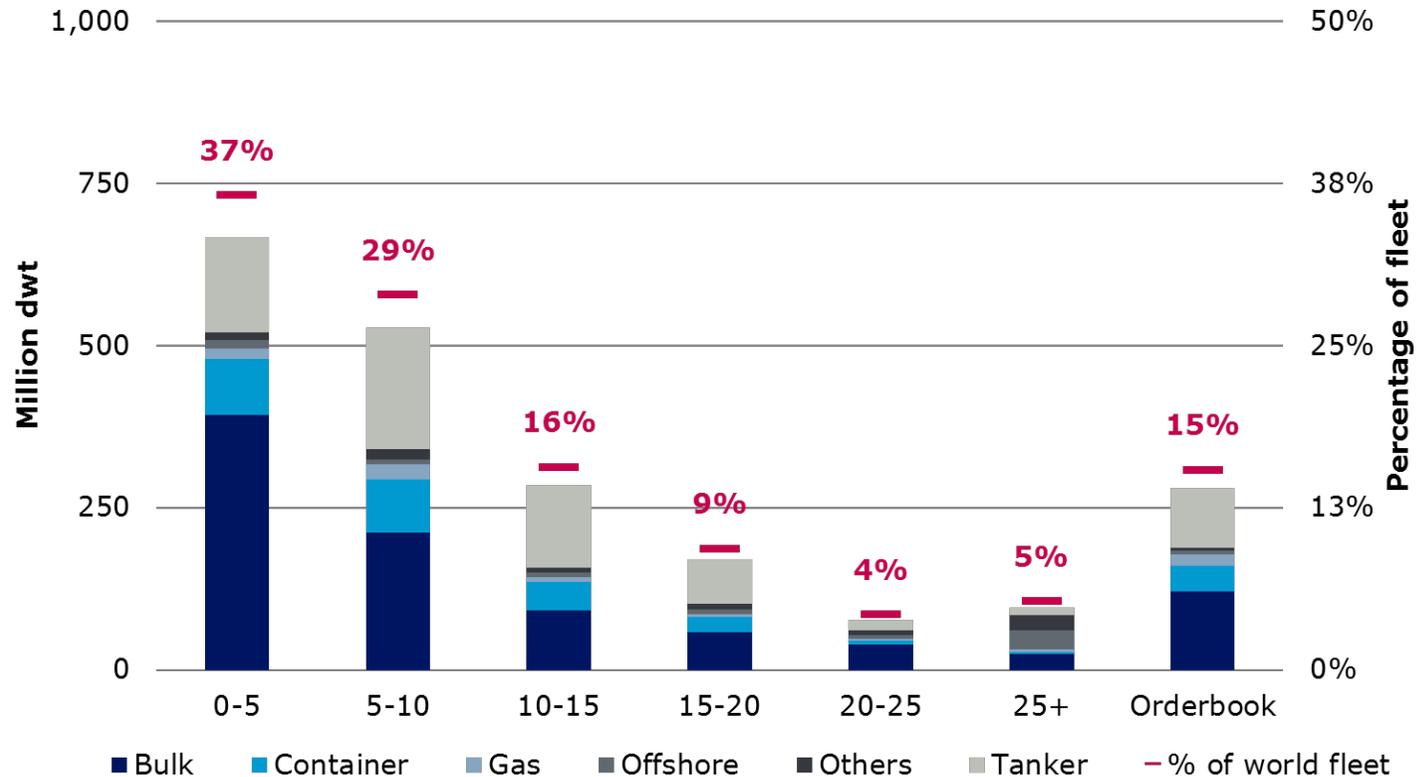


Sources: Clarksons, Danish Ship Finance

MOST SHIP SEGMENTS ARE GEARED TOWARDS HIGHER SEABORNE TRADE VOLUMES

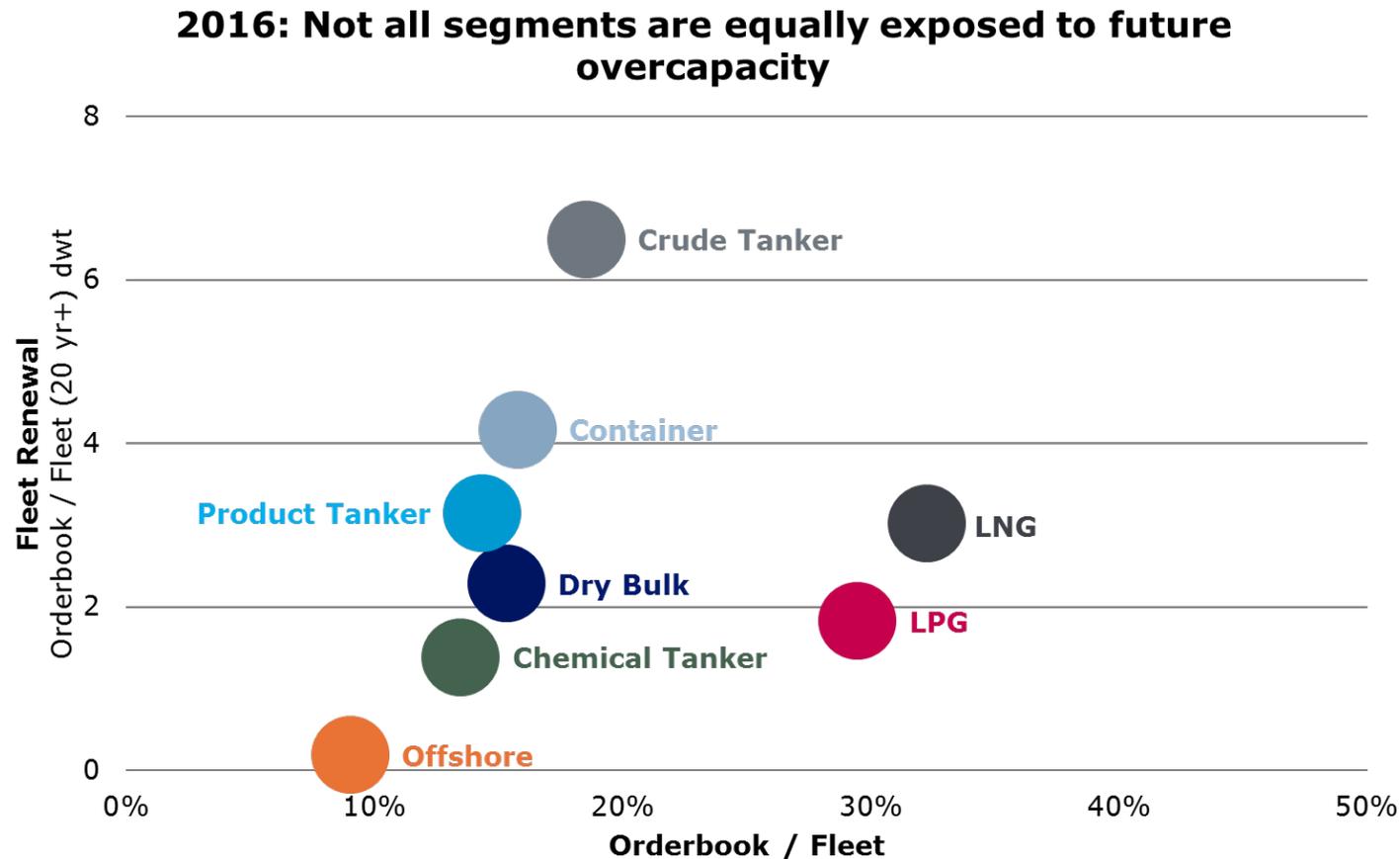
2016: 66% of the world fleet is younger than 10 years

Only 9% of the world fleet is 20 years or older



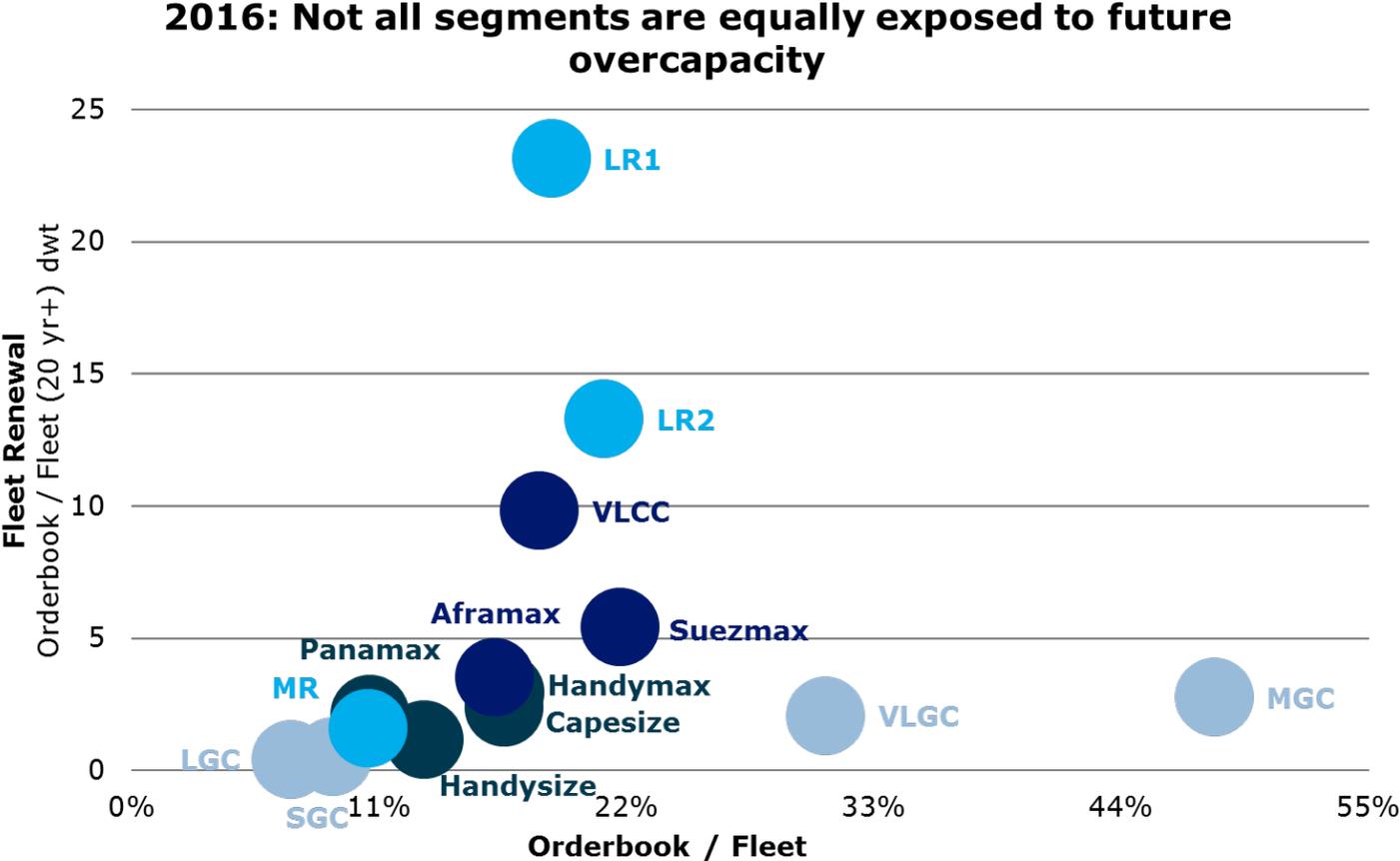
Sources: Clarksons, Danish Ship Finance

WITH FEW OBVIOUS SCRAPPING CANDIDATES LEFT, THE RISK IS THAT DEMAND FAILS TO ABSORB THE INCOMING VESSELS

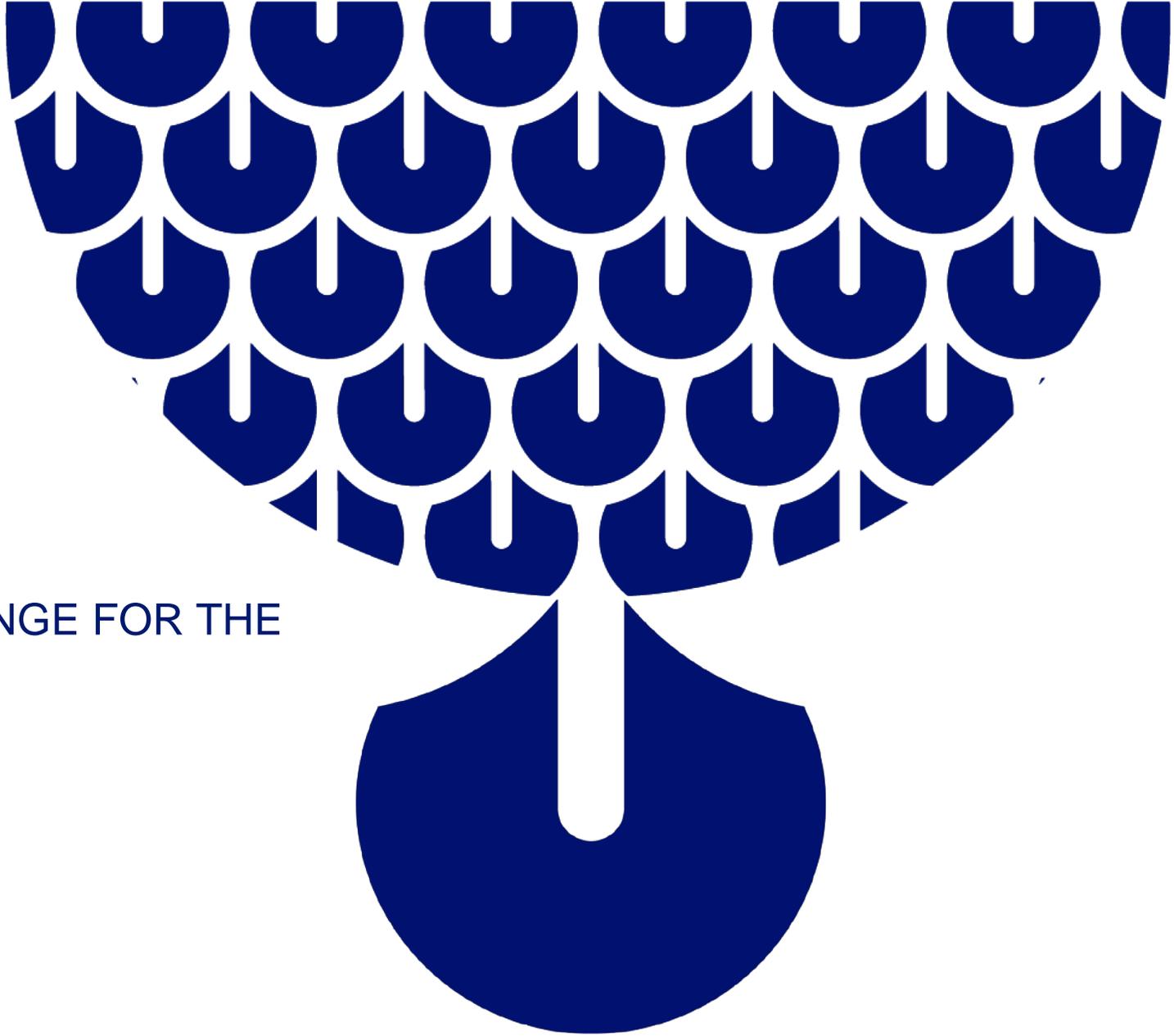


Sources: Clarksons, Danish Ship Finance

SOME SUBSEGMENTS ARE VERY EXPOSED TO OVERCAPACITY



Sources: Clarksons, Danish Ship Finance



THE **GREAT** CHALLENGE FOR THE
SHIPPING INDUSTRY



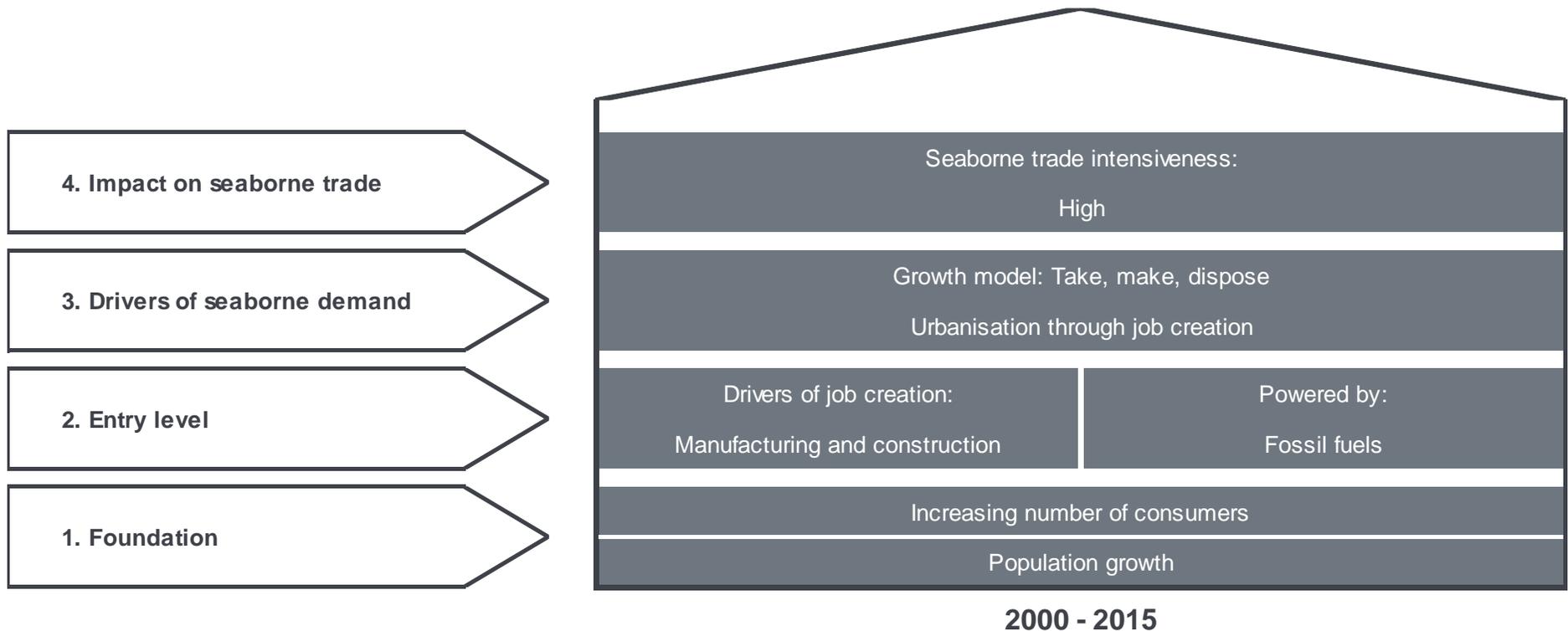
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THE ARCHITECTURE OF THE WORLD ECONOMY IS CHANGING

Period: 2000 - 2015

World GDP growth generated much additional seaborne trade

Primary driver of growth: construction and manufacturing

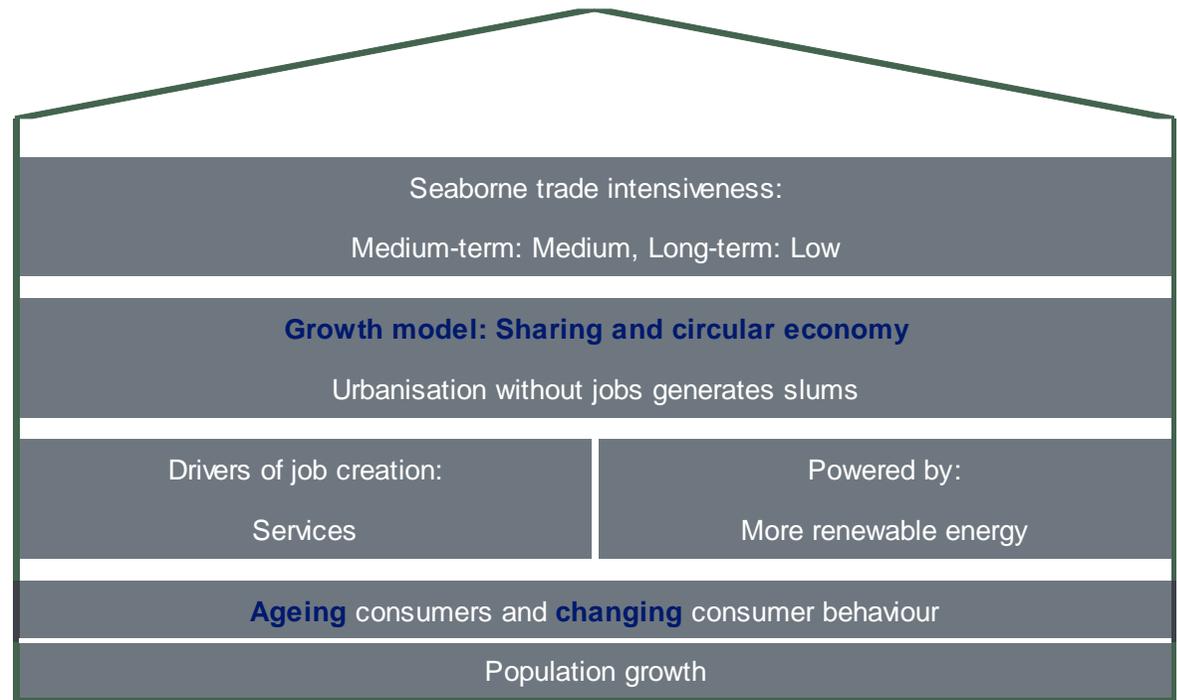


FUTURE ECONOMIC GROWTH MAY CREATE LESS SEABORNE DEMAND

Period: 2016 - 2030

World GDP growth decouples from seaborne trade

Primary driver of growth: services



2016 - 2030

CHANGING DEMAND LANDSCAPE

The **architecture** of the world economy is changing:

- Global consumers are ageing.
- Robots are increasingly doing the jobs of workers.
- Continued urbanisation without job creation may jeopardise economic growth – also in developing regions.
- The engines of the global economy are changing: from fossil fuels to renewable energy and from an ownership to an access economy.

The **infrastructure** of the global economy needs to adapt to the new world order.

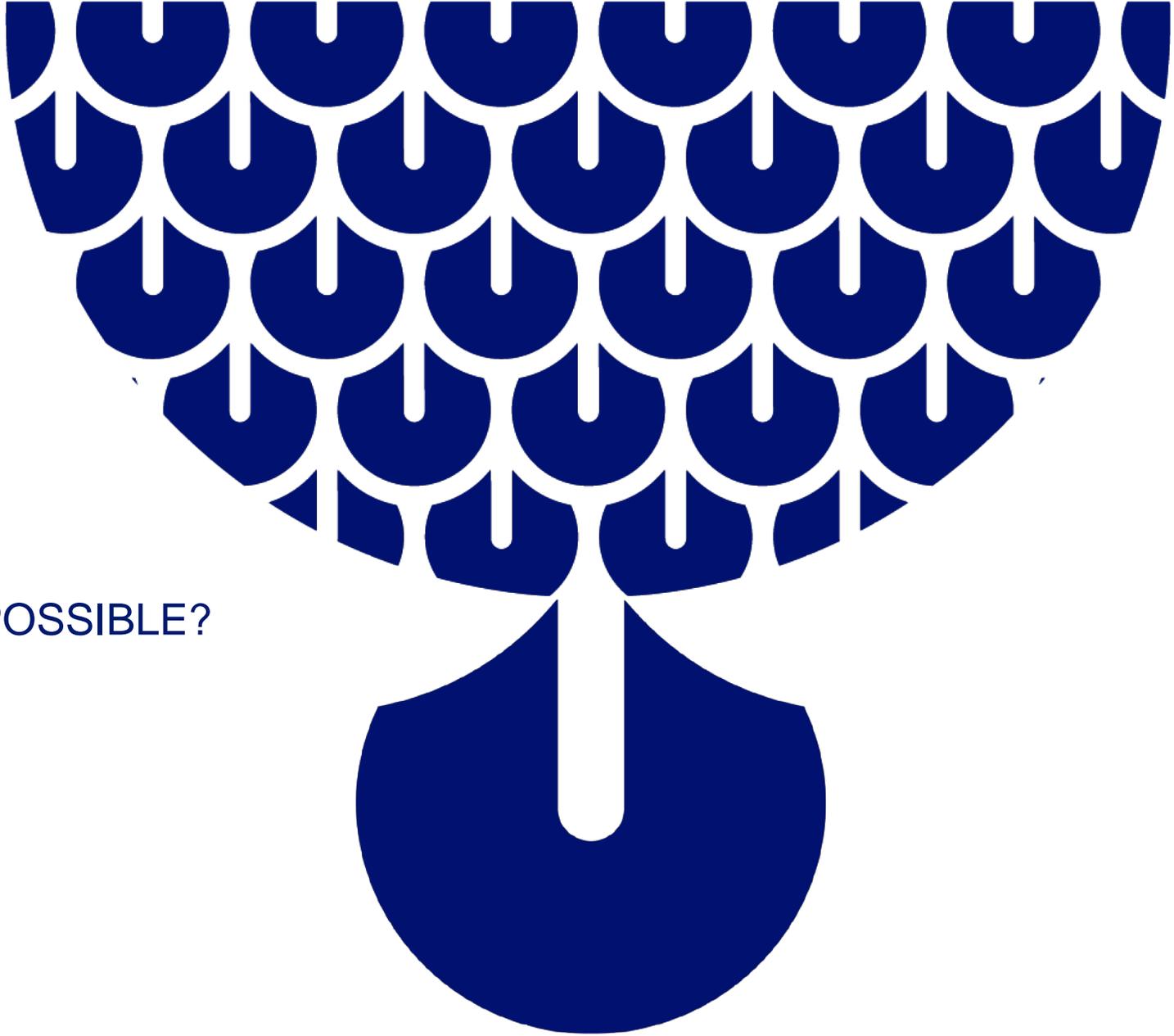
- All ship segments risk being impacted.

The changing **architecture** demands major changes to the **infrastructure** of the world economy. The long-term risk (i.e. beyond 2030) is that **fewer volumes** may need to be shipped in the future.

THE GREAT CHALLENGE FOR THE SHIPPING INDUSTRY

The issues to consider for the short- to medium-term demand outlook are not the **stock** but the **flows**:

- Most ship segments are geared towards growth in seaborne trade volumes.
- Based on a 15-year projection, we expect that seaborne demand will grow by approximately 1% per annum until 2030.
- There is little to indicate that seaborne volumes will increase significantly above the trend or travel longer distances in the long term.
- Supply could end up being **ahead of demand** for the next three to five years or maybe longer.
- Regional seaborne transport volumes could decline, leaving some ship segments exposed to overcapacity for longer.



HOW CAN **THAT** BE POSSIBLE?



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HOW CAN THAT BE POSSIBLE?

- We still expect world GDP to increase by between 3% and 4% per annum.
- The global population continues to increase.
- Economies in Latin America, Asia and Africa still have **great growth potential**.

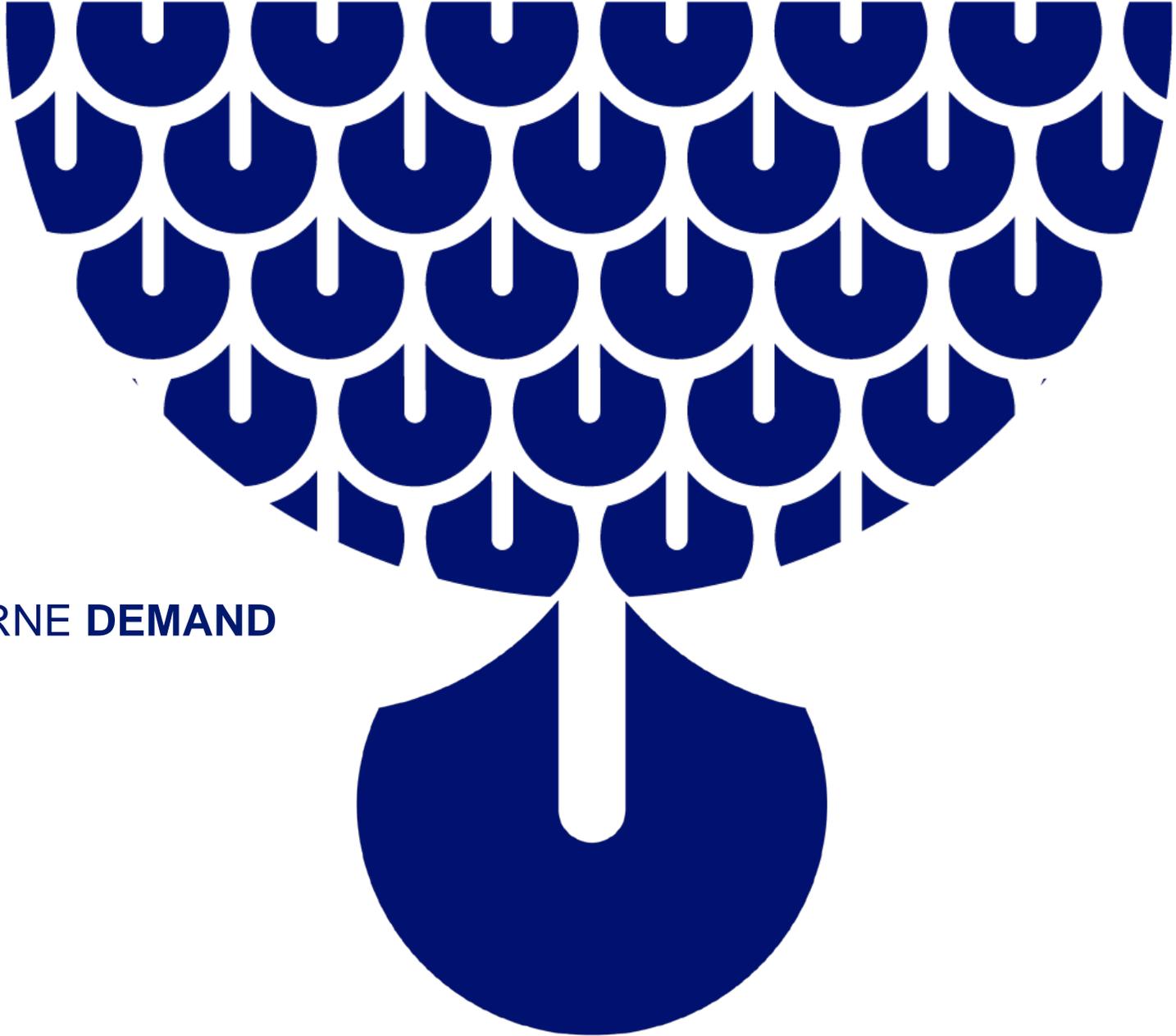
Many believe that trade will continue to increase until...:

“...every person in “India” has bought a car, a washing machine, a mobile phone etc...”

There is clearly some **truth** to this but it is only **partly true**.

DIVERSE DYNAMICS IN THE GLOBAL ECONOMY

- Trade volumes are expected to **continue growing** in developing and emerging regions.
- But in regions where the consumers are ageing or where the economy has reached a new level of maturity, trade volumes will stagnate or begin to decline.
=> This is about to happen in China and within many OECD economies.
- True, **ageing consumers** will continue to spend, but their **spending behaviour changes** significantly as they get older: they commute less, buy fewer items and build fewer houses. They spend their money on health care, tourism and domestic services.
- Older consumers basically create less seaborne trade than younger ones.



DRIVERS OF SEABORNE DEMAND



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LEARNING POINT #1: THE DRIVERS OF GROWTH MATTER FOR SEABORNE DEMAND

- Growth in world GDP measures the activity of the economy.
- The building blocks of the growth are important for seaborne trade volumes.
- Service-driven growth generates less trade growth than industry-driven growth.
- World trade has become less responsive to changes in world GDP, since the dependence on the service sector is increasing in major economies, not least due to **ageing populations**.
- Future world trade is expected to grow on a par with world GDP growth or at a discount.

OUTLOOK FOR THE EMERGING ECONOMIES

The fourth industrial revolution is reducing the **structural** economic outlook for several emerging economies, since their **two most important contributions** to the global economy's ecosystem seem to be becoming less attractive:

1. A large pool of workers is at risk of being replaced by robotics, 3D printers and the like.
2. Raw materials are expected to be less in demand in a future where renewable energy gains pace and where resources are better utilised, recycled, reused and remanufactured (i.e. the sharing and circular economy).

OUTLOOK FOR THE DEVELOPED ECONOMIES

The fourth industrial revolution is improving the structural economic outlook for several developed economies, since robotics supercharged by artificial intelligence may mitigate some of the adverse effects of an ageing population.

- In value terms, Europe lost 95% of material and energy value, while material recycling and waste-based energy recovery captured only 5% of the original raw material value.
- Even recycling success stories like steel, PET, and paper lose 30-75% of the material value in the first use cycle.
- On average, Europe uses materials only once.
- Import volumes could decline if materials were **recycled, remanufactured** and **reused** to a larger extent.

LEARNING POINT #2: DO NOT NAVIGATE USING A REAR-VIEW MIRROR

Still, most long-term forecasts for growth in seaborne import volumes are centred around two fundamental forces:

1. The growing world population
2. Continuing urbanisation

These two forces are driving demand projections for **fossil fuels, building materials, cars and containerised goods**, as well as intermediate goods including **chemicals and plastics**.

The point is that these forces are still at play but the dynamics they create have changed significantly, basically due to: 1) **ageing in major economies** and 2) **the fourth industrial revolution**.

LEARNING POINT #3:

IT IS ALL ABOUT JOB CREATION AND SPILLOVER EFFECTS

IMAGINE THE CHINESE GROWTH STORY **WITHOUT** THE MILLIONS OF JOBS CREATED IN THE MANUFACTURING SECTOR BETWEEN 2002 AND 2005.

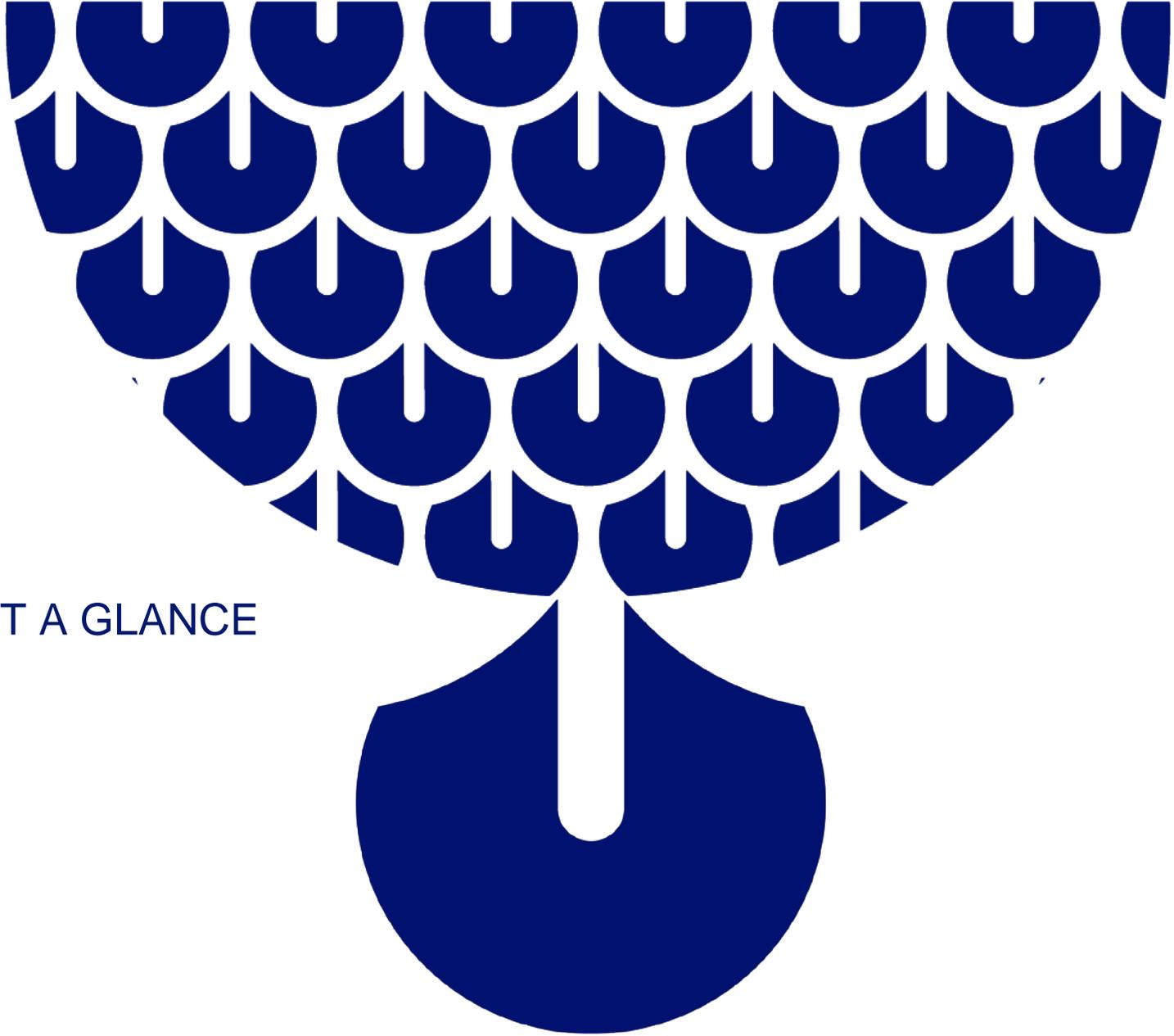
- Would the economy have been able to start the construction boom that has fuelled much of the GDP creation and seaborne demand growth during the last decade without the **initial job creation** in manufacturing?
- We would have seen several 'Chinas' in the past if the primary input needed to create a booming economy was a lot of people moving into cities.
- **Job creation is the central enabler for end-user demand and long-term GDP growth.**
- People moving into cities **without** a job risks creating slums. This could be negative for GDP.

THE TECTONIC PLATES UNDERNEATH GLOBAL TRADE ARE SHIFTING

The fourth industrial revolution is increasing the **efficiency** and **productivity** of the world economy, but is creating few new jobs and **less demand for seaborne trade**.

The recipe for growth in many emerging markets has been related to: **a large pool of low-skilled workers** and/or **raw material exporting**.

1. Automation is increasingly replacing low-skilled workers with robots, 3D printers and the like.
2. Renewable energy is meeting much of the new demand for energy in emerging economies.



ENERGY MARKETS AT A GLANCE



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THE MACROECONOMIC DRIVERS OF FOSSIL FUEL DEMAND

- Consumption of fossil fuel usually peaks at the point where industry (vs. services) contributes the most to world GDP creation. With the Chinese economy rebalancing, we could be near the tipping point, since services are increasingly replacing construction activity and manufacturing.
- This is currently coinciding with major gains in energy efficiency, renewable energy and energy storage partly brought about by **the fourth industrial revolution**.
- The **energy** that is required to **produce one unit of GDP** is falling accordingly in most countries around the world.

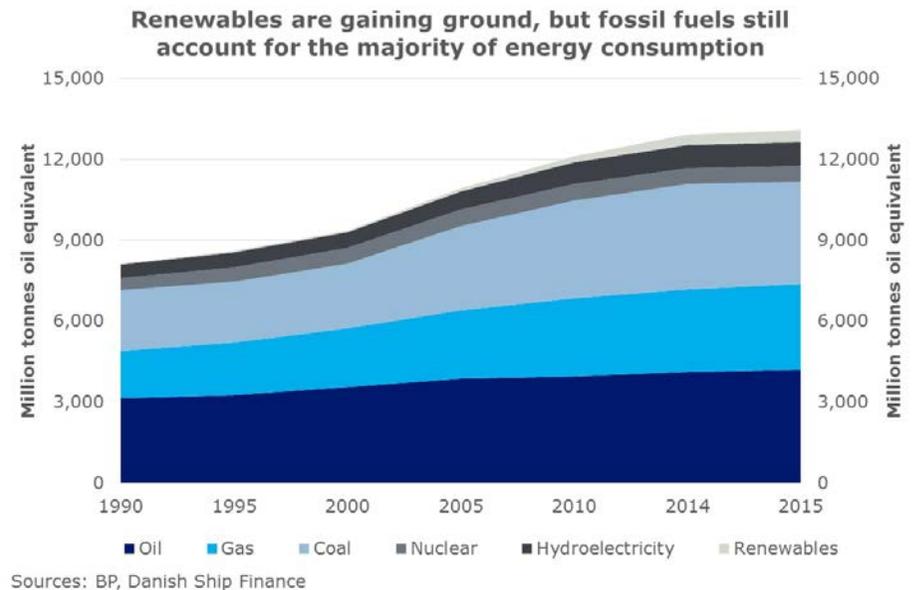
Key question:

- Will fossil fuel demand continue to increase in tandem with global GDP?

THE GLOBAL ENERGY PICTURE

The cost competitiveness of renewable energy has resulted in major shifts in the shares of key fuel sources for energy in general and for electricity generation in particular. Utilities, regulators and planners are pushing towards even greater diversity in their fuel mix in order to protect against price swings and to capture benefits from new market trends.

Source: World Resources Institute



THE GLOBAL ENERGY LANDSCAPE IS CHANGING

- New technological innovation has enabled a higher level of wind and solar power penetration, from mature markets to isolated diesel-powered grids.
- In 2015, renewable energy accounted for between 60% and 80% of new electricity-generating capacity on a global scale.
- From 2016, wind and solar photovoltaic systems (ranging from rooftop-integrated systems to large utility-scale power stations of hundreds of megawatts) are expected to be able to produce electricity at a cost in line with new coal and gas plants.
- The **price of renewable energies** (in particular solar) **is nearing grid parity**, the point at which it costs the same or less than the traditional technologies.
- Not only is renewable energy becoming more affordable, but **operational costs** after construction are also **minimal** compared to hydrocarbon-based generation.

DIFFERENCE BETWEEN RENEWABLE ENERGY AND FOSSIL FUELS

Take solar as an example: **Solar is a technology** (i.e. not a fuel)

- Technologies tend to become more **efficient** and **cheaper** as time goes on and more people use them.

Exponential improvements in solar technology create exponential cost-performance in combination with massive gains in productivity.

Example:

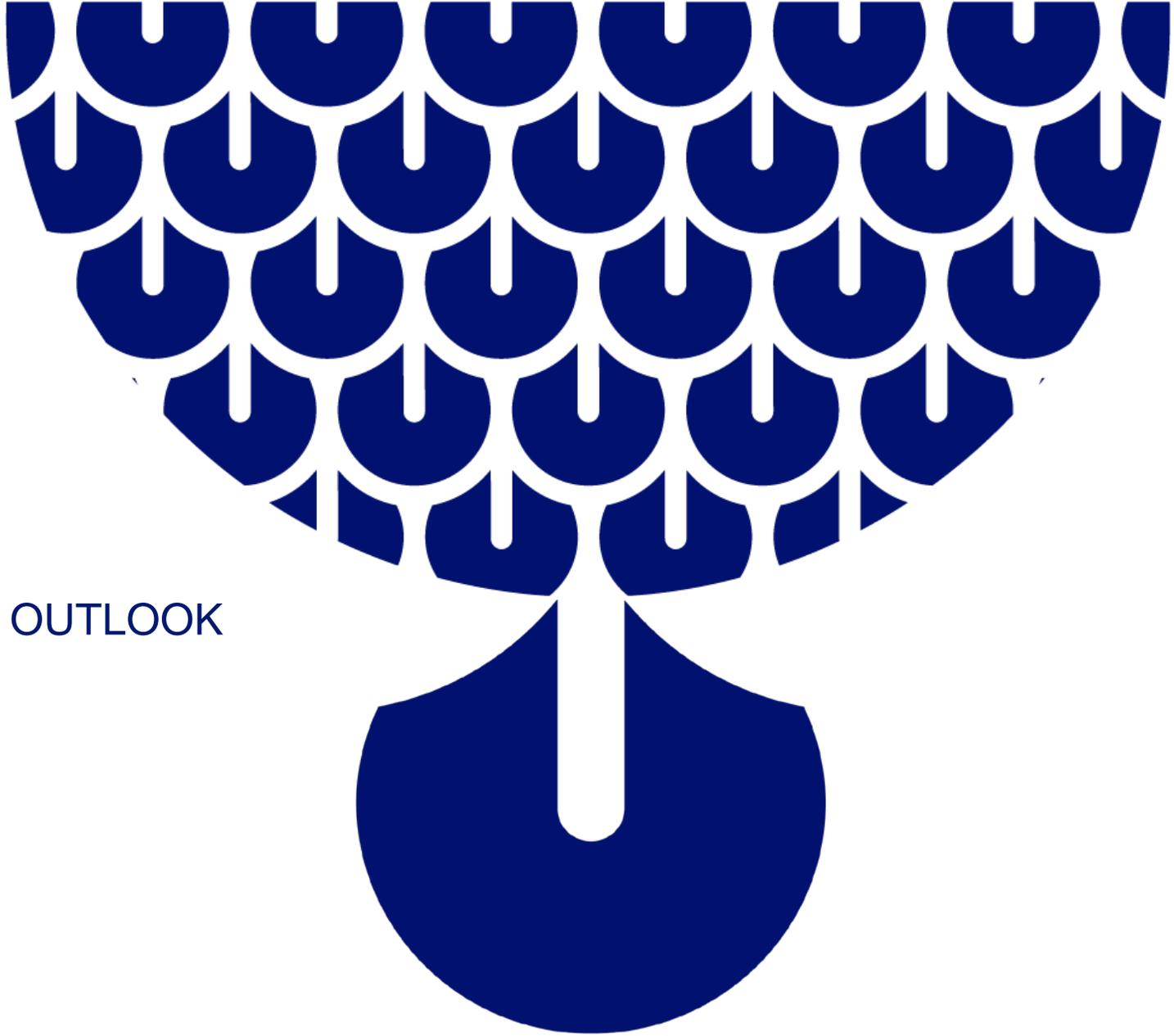
If a new technology starts with a market share of 0.01% and doubles its share every year, it will take **seven years to reach 1%**. Yet it will only take another seven years to reach 100%.

EXPECTATIONS FOR FUTURE OIL DEMAND

- The current consensus among leading energy analysts indicates that global oil demand is expected to continue to grow.
- Most expect an annual increase of approximately 1.3% per annum up until 2020.
- After that, growth in global oil demand is expected to plateau as energy efficiency and alternative energy sources gain ground.

We are less confident in the short- to medium-term outlook, since the global economy and the global energy landscape are changing rapidly.

- In the short to medium term, much depends on the **drivers of global economic growth**.
- In the longer term, oil demand is at risk of being substituted by alternative energy sources, leading to stagnant or declining consumption of fossil fuels. This effect could be exacerbated should oil prices increase in the coming years.



SEABORNE **DEMAND** OUTLOOK



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CONTAINER DEMAND OUTLOOK

- **Travel distances** are expected to **shorten**, since production is expected to move closer to consumers in Asia, Europe and North America (*enabled by artificial intelligence-driven robotics, 3D printers and the like*).
- **Volumes** may **decline**, since logistic supply chains will be shortened and fewer items (i.e. component trades) will be moved between different producers.
- The Container industry is expected to become decentralised with more regional trades and fewer long-haul overseas trades.
- Fewer super-large Container vessels will be needed, while more smaller vessels are expected to be required.

FOSSIL FUEL DEMAND OUTLOOK

Energy (e.g. electricity) demand is expected to continue growing, but demand for fossil fuels is expected to come under pressure from:

1. Increased energy efficiency (e.g. *standard fluorescent light bulbs versus LED*).
2. Renewable energy, in particular wind and solar.
3. Increased energy storage capacity, including batteries.
4. Electric cars or hybrid vehicles – in particular in a sharing-economy context.

Demand for Crude Tankers, Product Tankers, Gas Carriers and Dry Bulk (i.e. coal) will all be impacted.

DEMAND OUTLOOK FOR BUILDING MATERIALS

The long-term demand outlook (2030 and beyond) for building materials could be among the brightest.

But the challenge for the Dry Bulk segments is that declining coal demand may outweigh this potential for the next five to ten years.

Dry Bulk volumes could actually decline for a period if Asian (i.e. China) construction activity pauses.

Issues to consider:

- A return of the non-performing loan crisis to the Chinese banking system.
- Lower construction activity results in lower electricity demand (i.e. coal) and lower diesel demand (i.e. Product Tankers).

PETROCHEMICAL DEMAND OUTLOOK

Demand for petrochemicals, including plastics, is expected to come under pressure from:

1. Material science (including nanotechnology): Smart materials that are optimised for remanufacturing, reuse and recycling (i.e. circular economic principles) are being developed.
2. The sharing economy (e.g. car-sharing schemes like Uber), which is increasing the utilisation of existing stocks and lowering the demand for input materials through fewer units sold.
3. The introduction of autonomous vehicles, which is expected to amplify this development in larger cities.

FUTURE DEMAND DRIVERS

Decentralisation of the global economy.

Container: More regional trades, shorter travel distances.

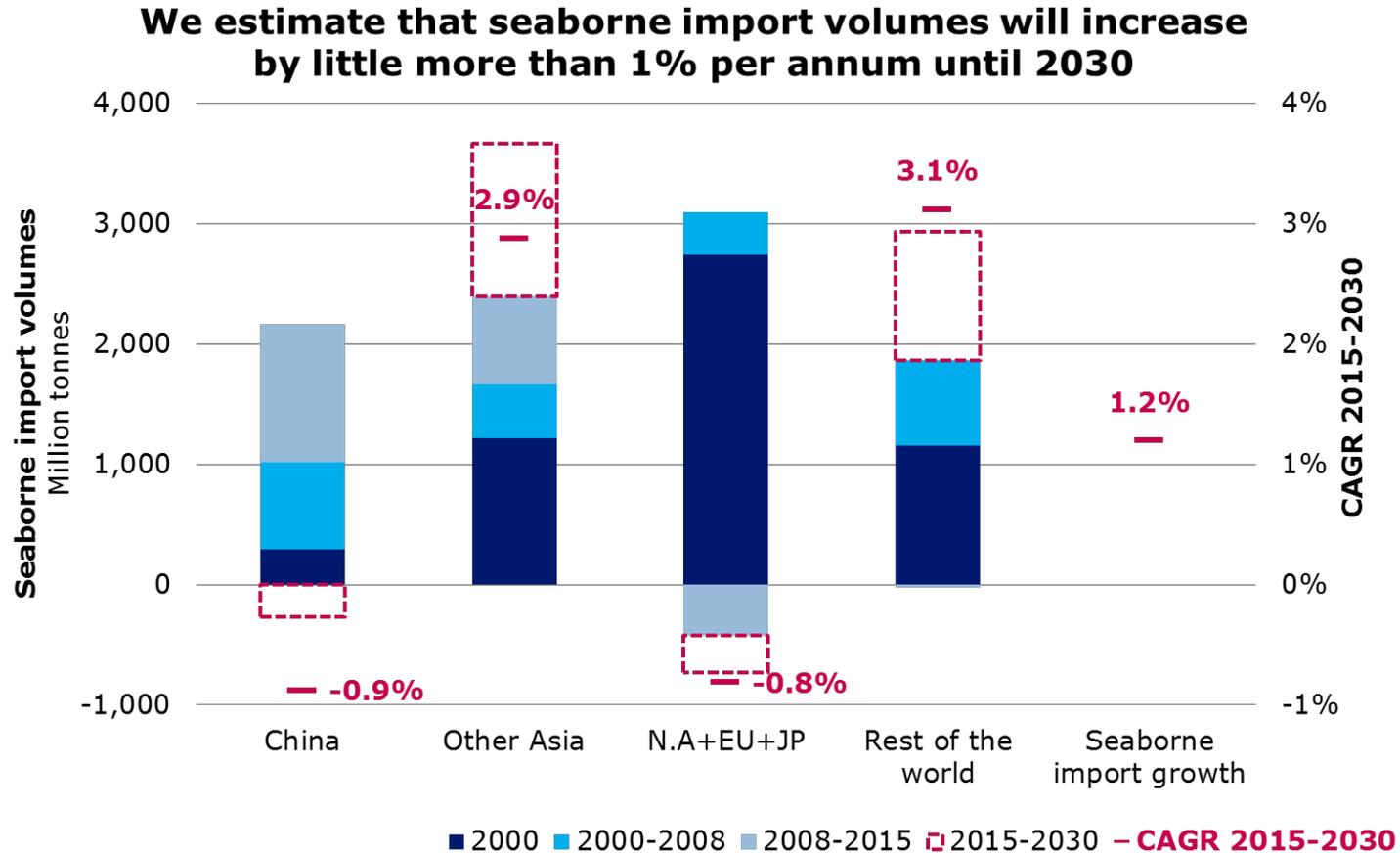
Dry Bulk: Potential positive outlook for building materials, including steel.
Negative outlook for coal.

Crude-, Product- and LPG Tankers: The short-term outlook appears to be dependent on the industrial outlook, but the medium- to long-term end-user demand outlook may deteriorate rapidly.

LNG Carriers: Supply is expected to be ahead of demand for the foreseeable future. Much depends on the renewable energy development.

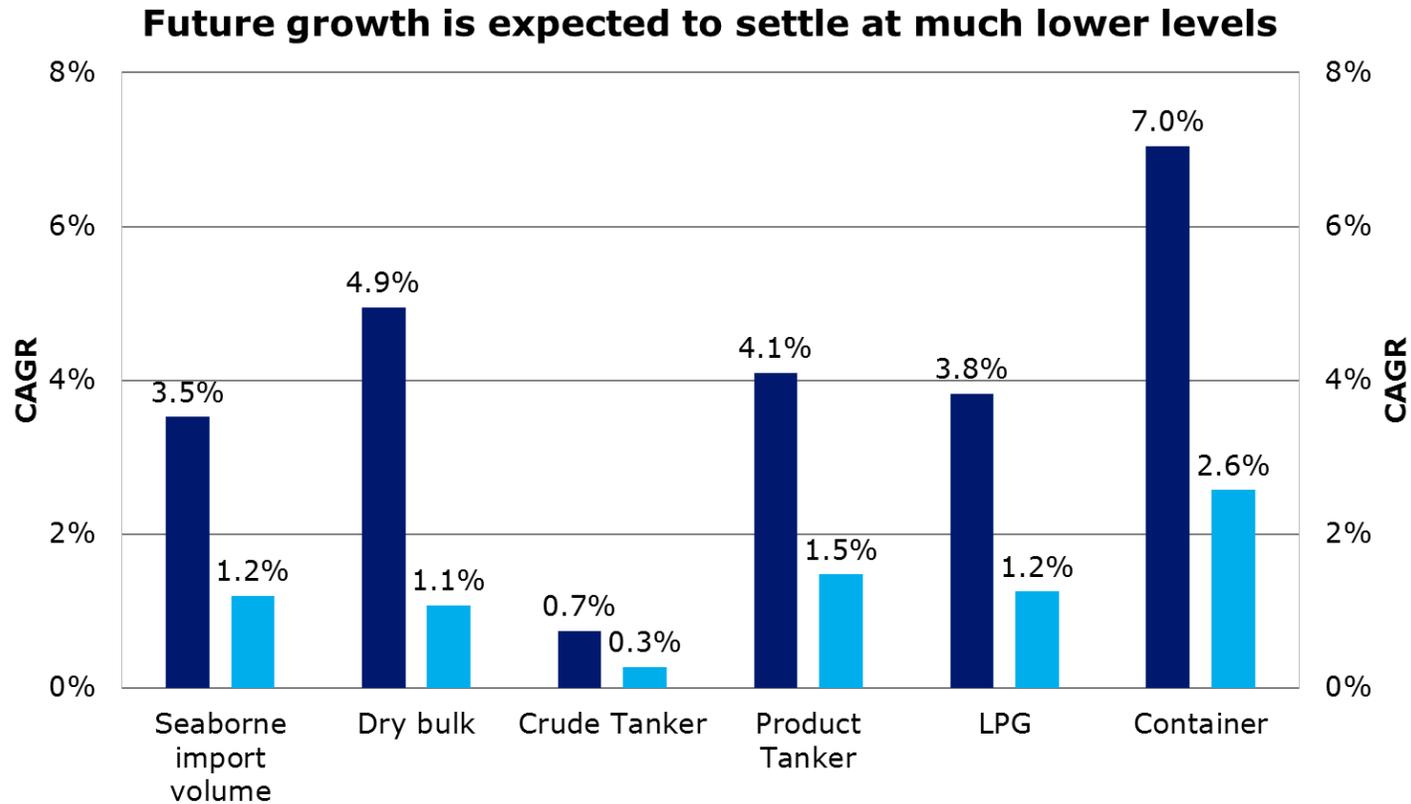
Offshore: Might suffer in tandem with the expected success of renewable energy.

AT THE AGGREGATED LEVEL WE SEE LITTLE UPSIDE POTENTIAL IN IMPORT VOLUMES INTO CHINA AND THE OECD



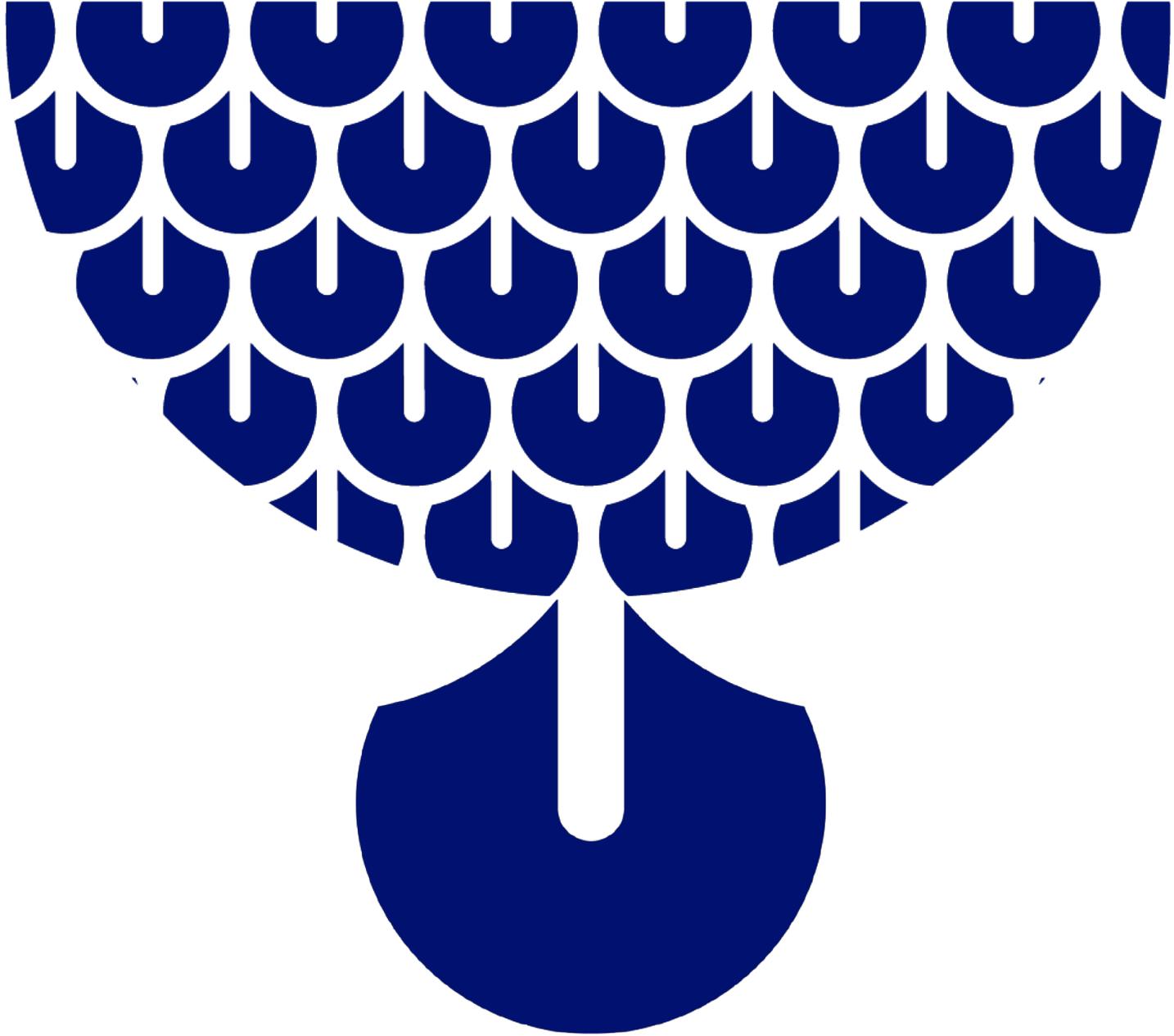
Sources: IHS Global Insight, Danish Ship Finance

WE SEE LITTLE GROWTH POTENTIAL IN CHINA, EUROPE, JAPAN OR TO SOME EXTENT IN NORTH AMERICA



Sources: IHS Global Insight, Danish Ship Finance

■ 2000-2015 ■ 2016-2030



SUMMARY



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TAKEAWAYS FROM TODAY

Structural overcapacity is looming over most ship segments because supply has not yet adjusted to a **changed** demand outlook.

#1: Improvements within **renewable energy** are changing the outlook for ships transporting fossil fuels – i.e. Crude Tankers, Product Tankers, Gas Carriers and Dry Bulk vessels.

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THANK YOU FOR YOUR ATTENTION



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