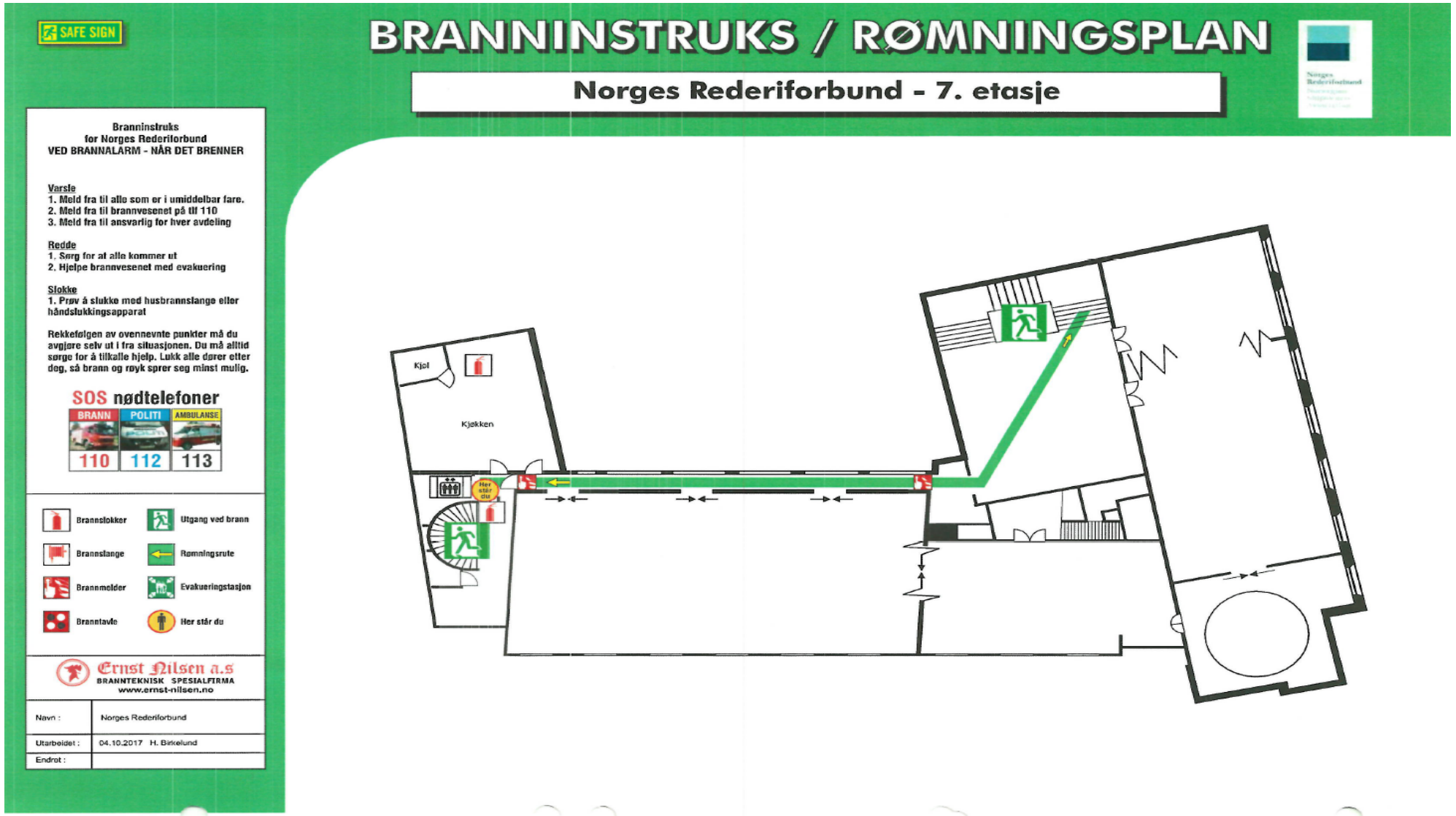

Capital Markets Day
5th June 2018, Oslo
ODFJELL

Agenda

- **Welcome and introduction**
- The Future
- Odfjell Terminals

Safety first



Today's agenda

Timer	Topic	Representative	
09:00 - 09:30	**Shifting focus to the future**	Kristian Mørch	CEO Odfjell SE
09:30 - 10:00	**Industry leading margins and returns**	Terje Iversen	CFO Odfjell SE
10:00 - 10:10	**Coffee break**		
10:10 - 10:30	**A smarter Odfjell**	Harald Fotland	SVP Odfjell Tankers and Ship Management
10:30 - 12:00	**Chemical Tanker Fundamentals**	Bjørn Kristian Røed	Research
12:00 -	**Lunch and networking**		

Key business philosophy

Our mission is:

Our core business is handling hazardous liquids –
safely and more efficiently than anyone else in the industry

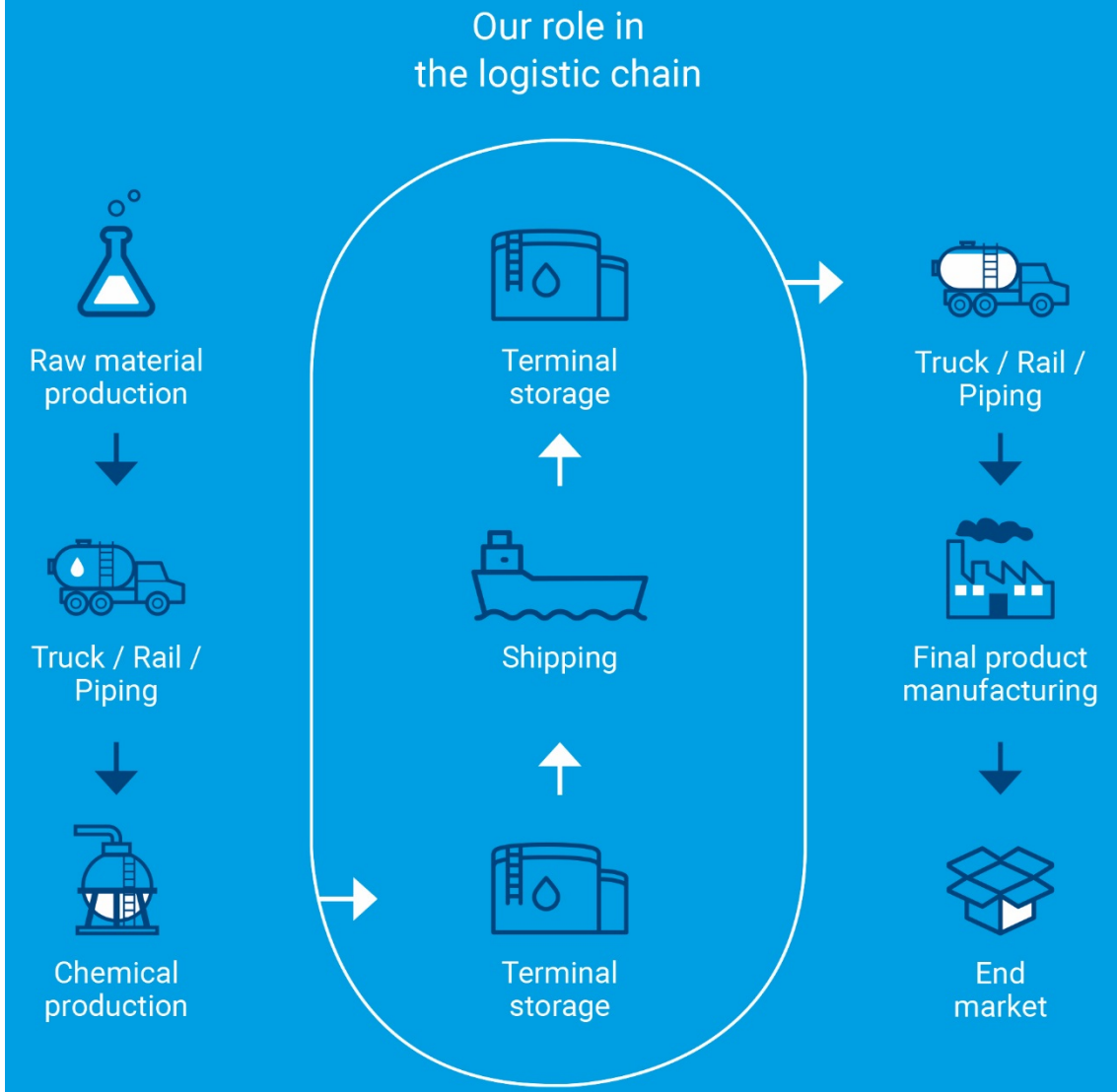
Our customer promise:

We are committed to generate value for our customers, by offering safe and reliable transportation and storage of their products, at a competitive cost.

Our goal is to deliver on spec, on-time and adapt our services to cater for the needs of our customers.

Odfjell is committed to:

- Never compromise on safety
- Always care, have integrity and be reliable
- Being accessible and responsive
- Offer competitive services and products



Serving the global chemical industry

Key figures

Odfjell Group financials (2017A)
- Gross revenue USD 843 million
- EBITDA USD 255 million
- Operating result (EBIT) USD 144 million

Employees and offices
- 2693 employees globally (1690 seafarers, 620 terminal employees, 383 on shore)
- 17 offices and 8 tank terminals

Safety
- Tankers LTIF 2017 0.23
- Terminals LTIF 2017 0.10

Odfjell Tankers
- Number of vessels 83 (DWT 2.4 million)
- Volume shipped 13.6 million tonnes per year

Odfjell Terminals
- Total tank capacity 3.1 million cubic meters
- Located in Asia, Europe and United States

It is time to stop talking about the past problems: We stand today on a strong financial and commercial platform

Strong balance sheet

- Improved through stronger financial performance and sale of Oman and Singapore terminals
- Flexibility to pay out bond, potentially do M&A and other growth projects

Competitive costs

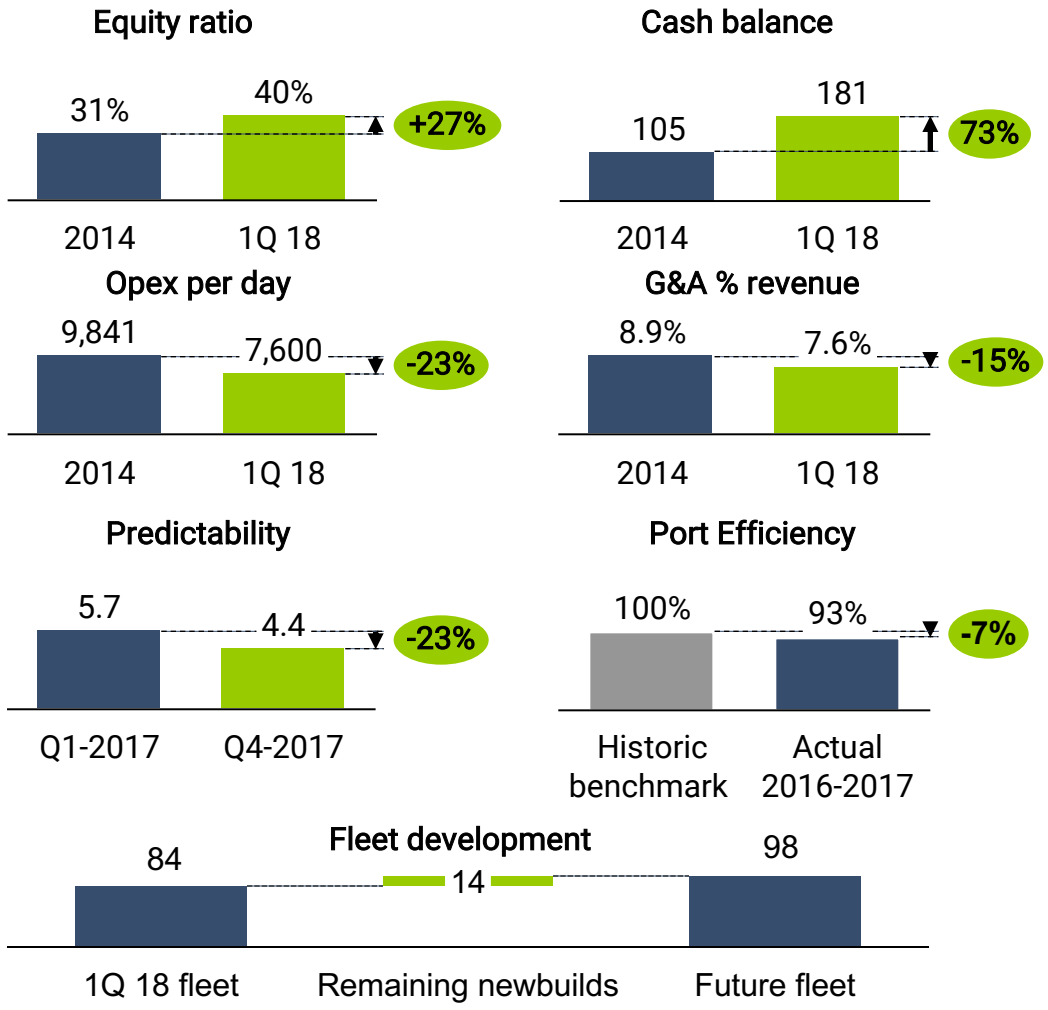
- Cost base significantly improved and competitive
- Further potential through reduced TC costs

Operational efficiency

- Tangible improvements on fleet utilization and efficiency (predictability and port efficiency)
- Several other operational excellence projects ongoing and integrated in daily operations

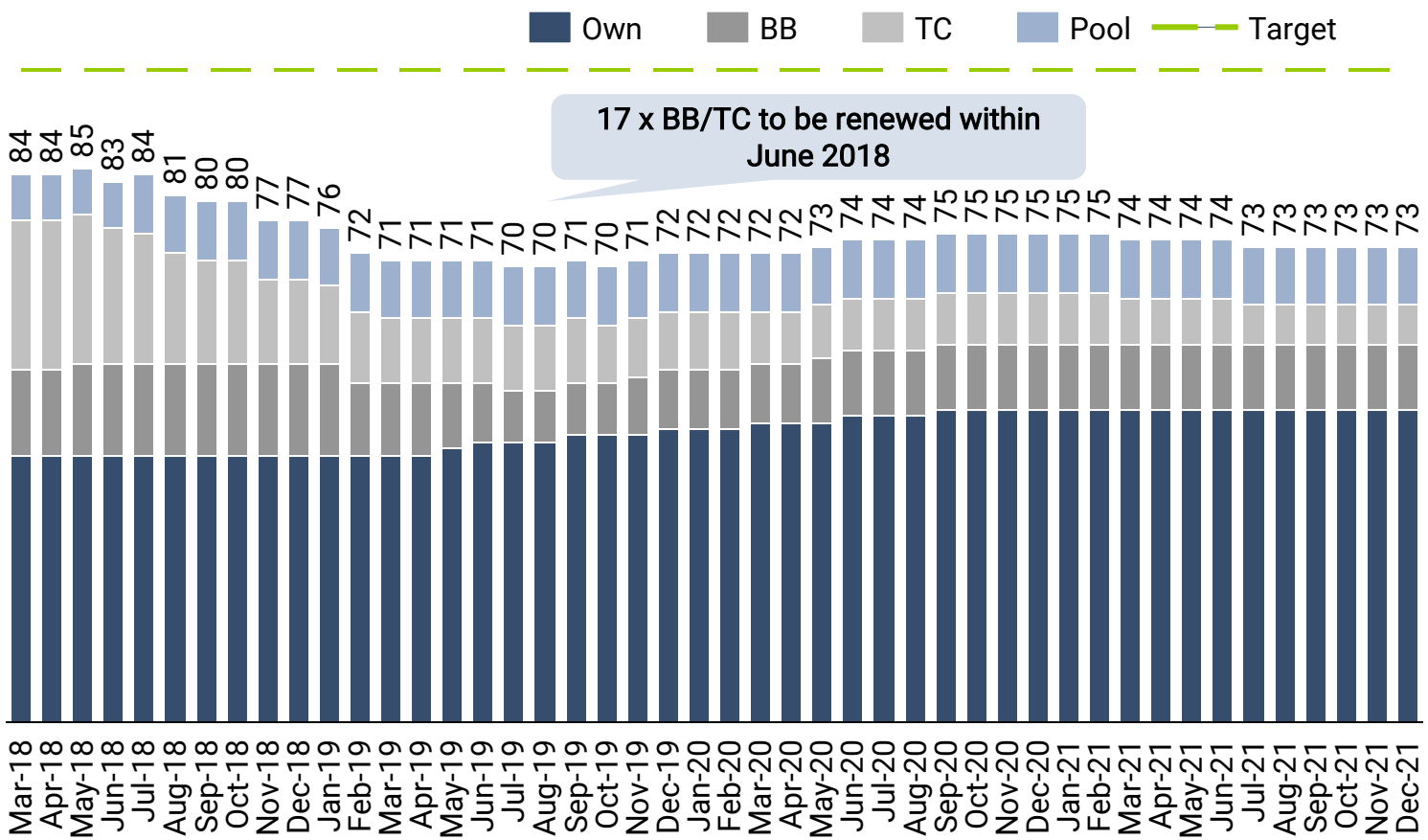
Key strategic challenge in tankers is solved

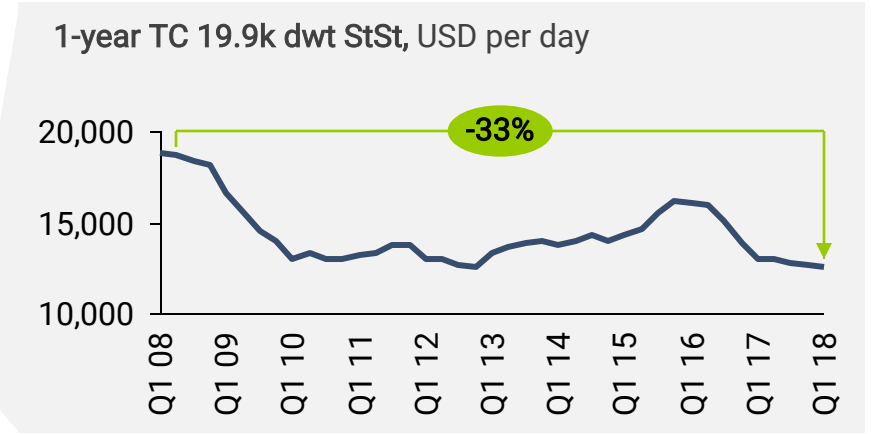
- We have secured renewal of core tonnage and added to our size at an attractive time in the cycle while strengthening the balance sheet at the same time

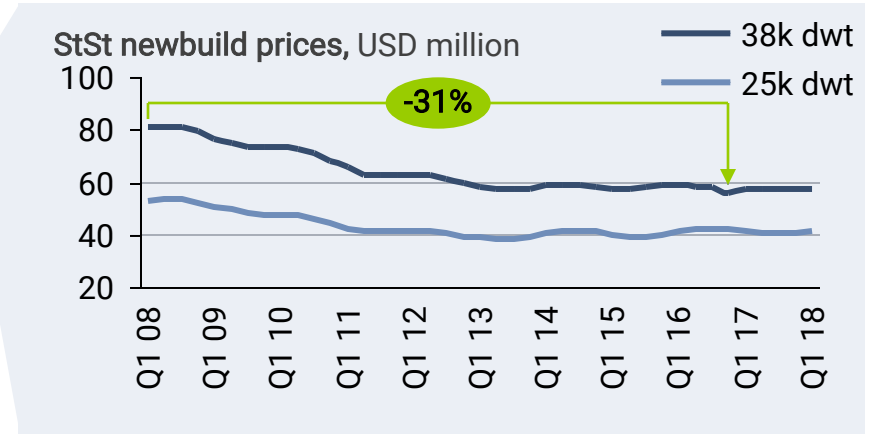


We have completed our fleet growth at attractive point – flexibility to scale up/down chartered-in fleet at an attractive point on the cycle…

Overview of fleet







Source: Odfjell, Maersk Brokers

Agenda

- Welcome and introduction
- **The Future**
- Odfjell Terminals

Our mission statement sets a clear long term direction for the company

Our core business is handling hazardous liquids –
safely and more efficiently than anyone else in the industry

We shall be a World-Class and preferred global provider of transportation and storage of speciality bulk liquids

Our customer commitment belongs together with our Mission and Vision

We are committed to generate value for our customers, by offering safe and reliable transportation and storage of their products, at a competitive cost.

Our goal is to deliver on spec, on-time and adapt our services to cater for the needs of our customers.

Odfjell is committed to:

- Never compromise on safety
- Always care, have integrity and be reliable
- Being accessible and responsive
- Offer competitive services and products

High level targets

Safety performance	*Zero incidents*
Revenue / Top-line	*Average revenue growth of 10% per year (over time)*
Profitability	*Industry leading EBITDA margins*
Tankers	*Benefit from scale advantages. Towards customers by better service (cost, efficiency and predictability) and internally through efficiency gains and unit cost*
Terminals	*Operate terminals in key locations, ideally where operational synergies with Odfjell Tankers are possible*

We have a clear plan for how we want to get there

Growth
- Target of 100 vessels
- Scalable fleet (mix of own, TC and managed)
- Re-invest in Terminals

Customer focus
- Supply chain efficiency for our customers
- Further improve our services / create loyalty
- Synergies between Tankers & Terminals

Best in class safety and quality performance
- We do not comprise on safety
- Reliability
- Predictability

Operational excellence
- Focus on asset utilization (predictability etc)
- Imbed initiatives in daily processes
- Unit cost focus

Terminals back to profit
- Solve Rotterdam
- Operational excellence initiative
- Synergies with Tankers

Financial strength
- Access to several capital sources
- Attractive cost of capital
- Shareholder returns

Create a world-class organisation
- Leadership development
- Onboarding / Training
- KPI driven performance culture

Digitalization
- Real-time connected vessels
- Advanced analytics
- Data driven decision making tools

Agenda

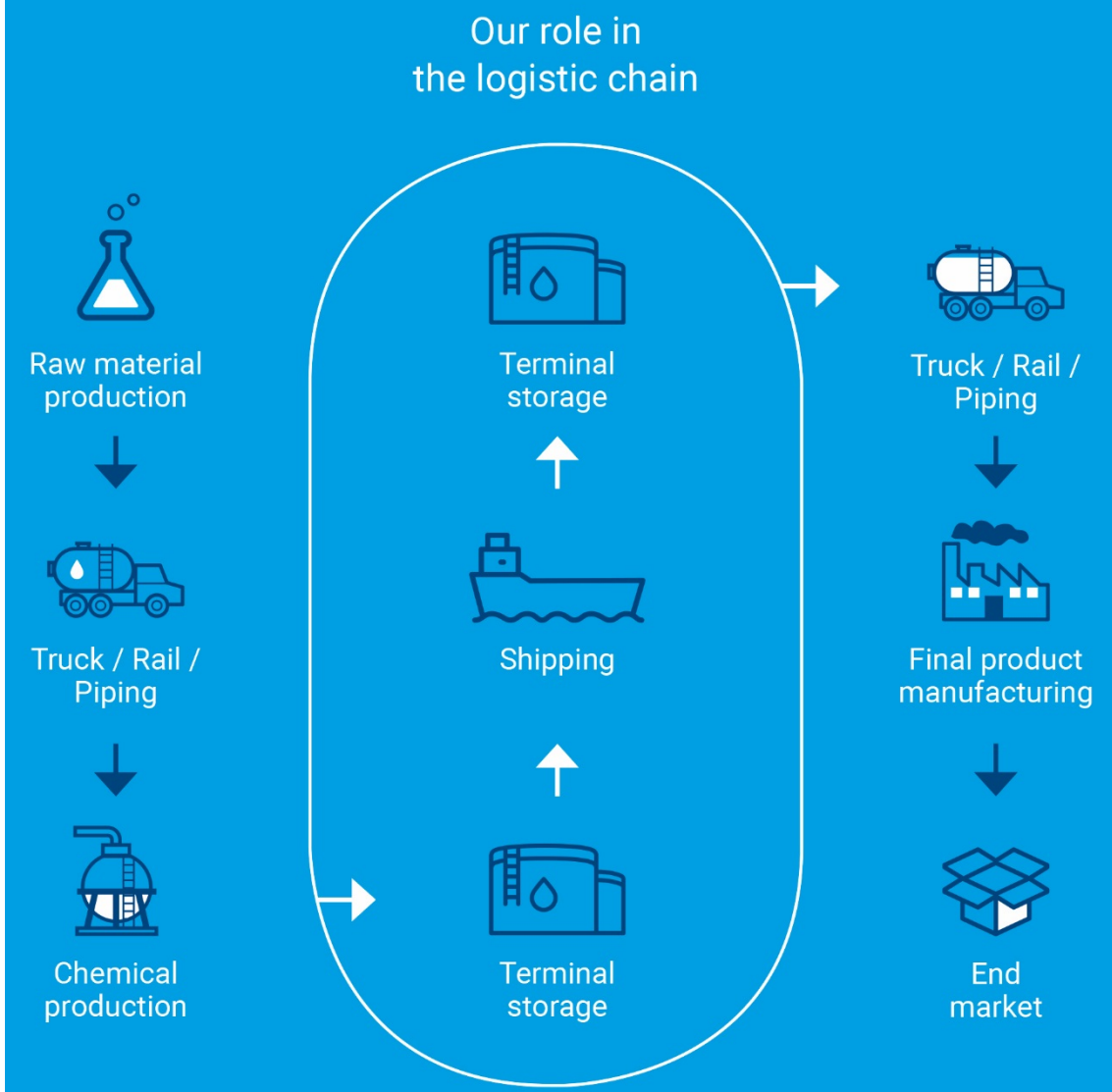
- Welcome and introduction
- The future
- **Odfjell Terminals**

We operate a 8 terminals across the globe in addition to the related terminal network in South America

	Europe		US		Asia				
	Rotterdam (OTR)	Antwerp (NNOT)	Houston (OTH)	Charleston (OTC)	Ulsan (OTK)	Dalian (OTD)	Jianyin (OTJ)	Tianjin (ONTT)	Global
Storage capacity In k CBM	1,622	348	380	79	314	120	100	138	3,100
Mineral storage In k CBM	937							113	1,000
Chemicals storage In k CBM	685	348	380	79	314	120	100	25	2,100
PID throughput Annual throughput	2,100								2,100
Revenue FY 2017 (USD M)	USD 77.5M	USD 9.9M	USD 71.8M	USD 9.5M	USD 10.2M	USD 7.7M	USD 2.7M	USD 2.4M	USD 181.8M
Odfjell SE ownership (%)	51.00%	12.75%	51.00%	51.00%	25.50%	25.50%	25.50%	25.50%	25.50%

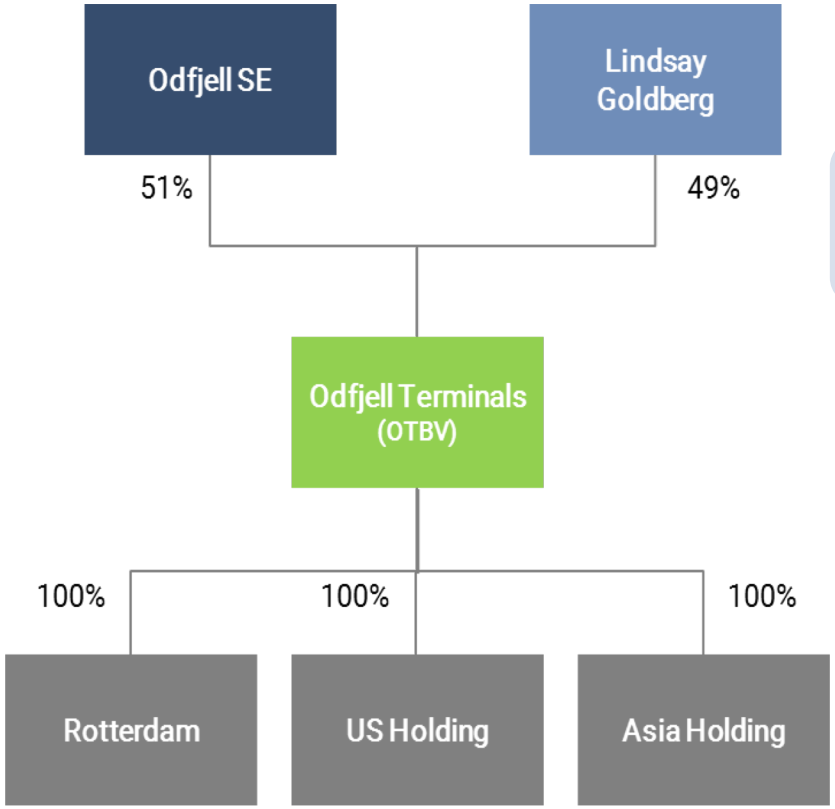
We are committed to owning and operating terminals in the long term

- LG has been partners since 2011, and is seeking an exit
- We are committed to owning and operate terminals
- We are not in exit mode, but will consider to tag along in Rotterdam due to:
  - Fundamental turnaround of terminals is completed
  - Rebuilding the terminal to its full potential will require substantial investments
  - Replacing LG with a new j/v partner will liekly accelerate the capex need
  - The terminal is mainly mineral oil focused, and Antwerp is consolitating as the chemical hub
- If Rotterdam is not sold, we will follow the plan to rebuild as long term owners
- Tangible synergies exist, and some remain untapped

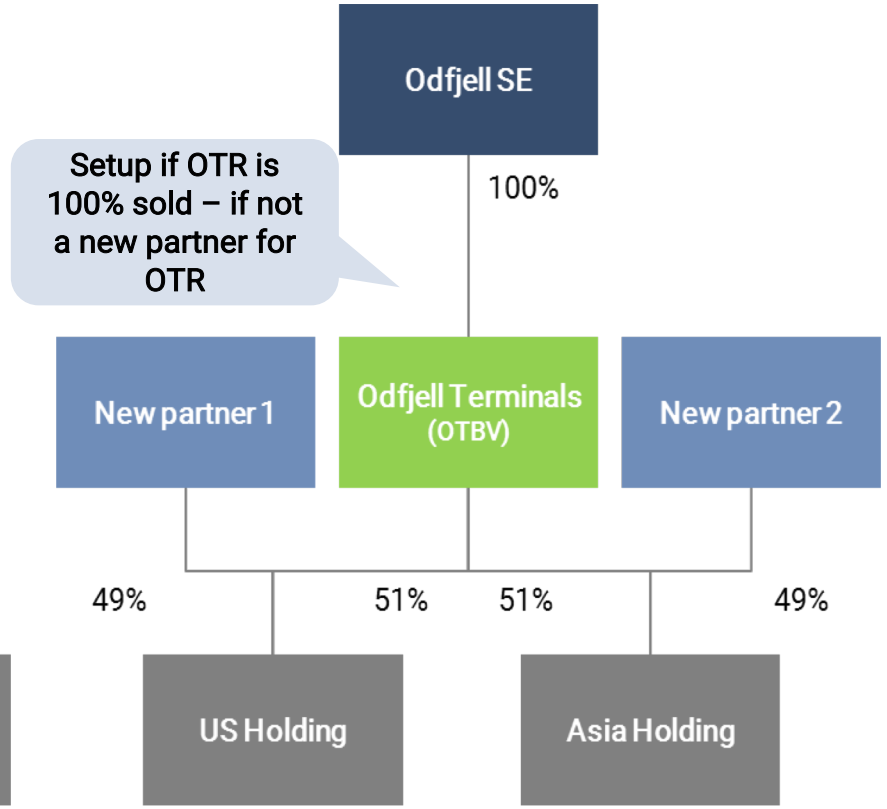


As part of the LG transaction we are hoping to change our terminal division to a more flexible structure

Current structure



Future structure



Key advantages

- ✓ *Odfjell SE to control management company*
- ✓ *OTBV to become an operational platform*
- ✓ *Flexibility to pursue growth projects with other new partners*
- ✓ *Flexibility to decrease or increase ownership in regions*
- ✓ *Easier to achieve synergies with Odfjell Tankers*
- ✓ *Easier governance*

Financial targets

Terje Iversen, CFO

Capital Markets Day 2018, Oslo

Our finance strategy

Have an efficient capital structure	• A capital structure that provides operational and financial flexibility at attractive cost of capital - but at the same time is efficient and provides attractive shareholder returns
Have access to attractive capital sources	• A diversified portfolio of capital sources (and lending banks) to secure financial flexibility and a competitive cost of capital
Manage risk	• The financial strategy needs to manage the impact of operational and financial risks related to our business • We want to always be able to withstand [24] months with historic low market
Accommodate our operational strategy	• We will provide the required financial capabilities to accommodate our operational strategy
Secure growth and flexibility	• We need to have the financial capability to grow and be able to act quickly as opportunities arise • Our growth in Odfjell Tankers is fully funded with equity instalments limited to USD 24 mill in 2018 and 2019
Deliver attractive returns for our shareholders	• We need to increase our marketing efforts of our share • Surplus liquidity will be distributed to our shareholders with dividends re-instated from FY2016

Financial strategy and targets (1/2)

a Growth capital	• Opportunistically seek growth opportunities, however, we have during 2017/2018 secured renewal of core tonnage and added to our size at an attractive time in the cycle while strengthening the balance sheet at the same time
b Financial leverage	• Target financing gearing of **[55-75%]** LTV depending on vessel age
c Access to capital markets	• **Secured debt** generally gives longer tenor and lower margin than unsecured debt and are the preferred source, however to maintain flexibility also other debt instruments will be continuously considered such as unsecured bond, financial leases, private placements etc. • Maintain and develop a group of **relationship banks** to which most ancillary business may be routed • **Relationship banks** to hold a balanced share of total committed bank lines • Bond loans to be fair share of the total loan portfolio depending on availability and terms
d Duration	• **Average duration** of the loan portfolio of **[3-5] years** (excluding any construction loans) • **Ratio of short-term** (less than 12 months) to total debt to be not **more than [25%]** • **Long-term debt to be refinanced** no later than **[3-6]** months prior to its maturity

Financial strategy and targets (2/2)

e Financing	• Target corporate financing gearing of **[50–60%]** LTV also including terminals • Target to maintain book equity percentage of **[30-40%]** • Any financing should be possible to terminate without any material cost • Maintain headroom to be able to act quickly as opportunities may arise
f Operational flexibility	• Maintain existing standard financial covenants in our loan agreements • Leverage ratio of maximum [75%], **minimum cash of the highest of USD 50 mill and 6% of interest bearing debt** • Maintain comfortable headroom on financial covenants level (based on company's base case) • Company to maintain a cash position of around USD **[100 – 150] million** • Cash management and risk-management as per policies and yearly mandates given by the Odfjell Board
g Dividends / re-pricing of share	• Target regular **dividend payments** at a sustainable level • Will take into consideration appropriate limits on leverage, capital expenditure plans, financing requirements, appropriate financial flexibility and anticipated cash flows
+ Tank Terminal JV	• Target flexible ownership in OTBV • Support the Company in pursuing growth and consolidation opportunities • JV to be self funded, financing & funding nonrecourse to owners • Shared services create efficiency and scale OTBV being 100% owned by Odfjell SE

1. Proportionate method

Cash focus short term, profitable growth focus long term

Cash focus short-term

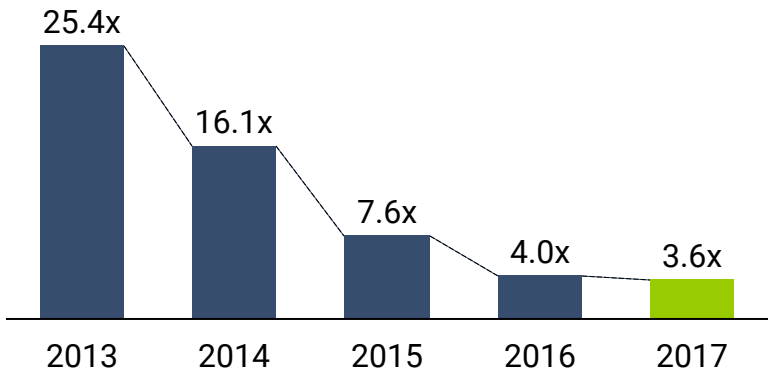
- Refinance/redeem bond maturity December 2018
- Restore profitability, reduced TC cost and increase benefits from economy of scale
- Capital discipline
- Working capital focus
- Cash flow

Profitable growth long-term

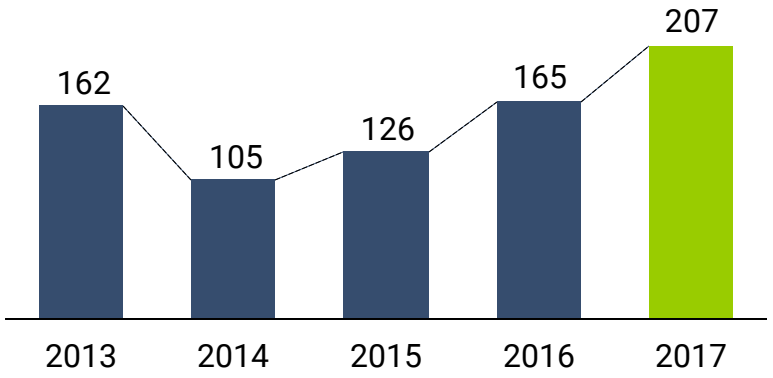
- Growing earnings with average 10% p.a. over time
- Continue to invest in our fleet with various available options
- Re-invest in Terminals and develop land banks terminals

Today our balance sheet is robust with strong liquidity, which we believe will translate into a lower cost of capital and ultimately to appreciation by the equity markets

Net interest bearing debt / EBITDA



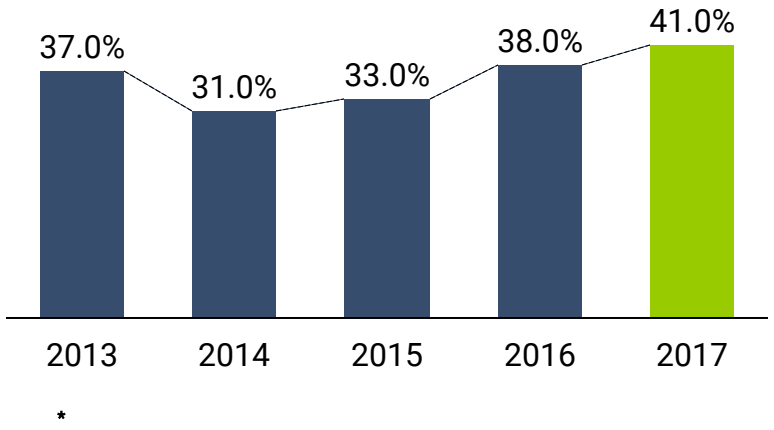
Odfjell SE cash position



Comments

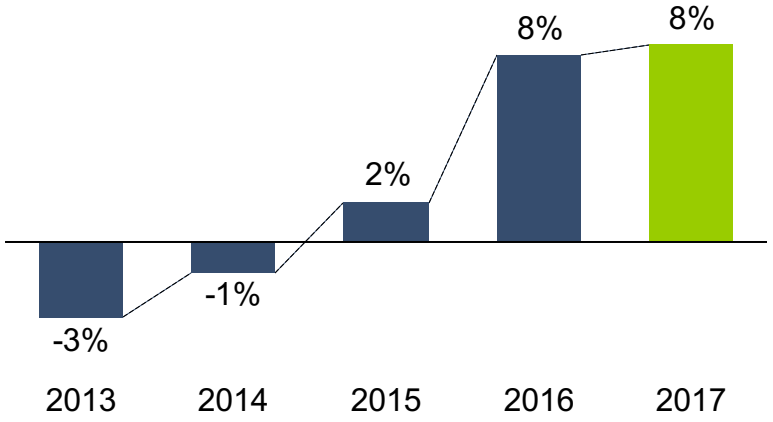
- Key ratios has improved since 2015
- Equity instalments on newbuilding programme limited to USD 24 mill
- We got liquidity and a balance sheet to act if attractive opportunities arises
- Dividends have been reinstated from 2016
- Lowering our cost of capital is an ongoing process.

Equity ratio

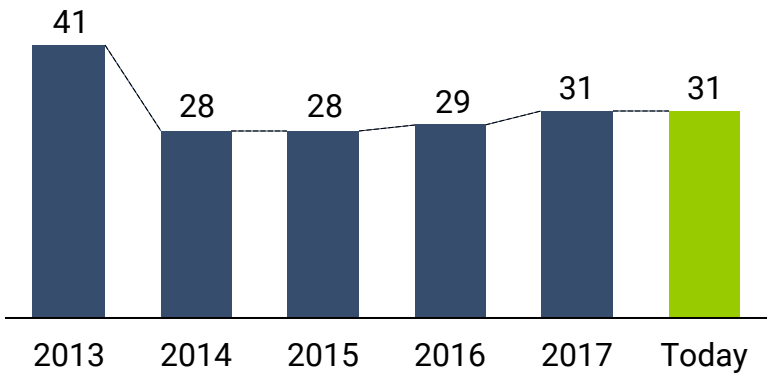


*

Return on capital employed



Share price development (NOK per share)*



** Year-end closing prices*

IFRS 16 will impact our P&L and Balance sheet as of January 2019

Item	Impact 2017	Comments
Net revenue	Unchaged	• No impact
TC expenses	189	• Significant decreased as lease will recognised as depreciation and interest
Other costs (G&A, Opex)	-78	• Increased as Opex element of TC will be recognised as Opex
EBITDA	111	• Significant increase as lease will recognised as depreciation and interest
D&A	-109	• Increase as part of lease will be recognised as depreciation
EBIT	2	• Increase as interest not included
Net finance	-11	• Increase as part of lease will be recognised as
Taxes	Unchanged	• No material impact
Net result*	Unchanged	• Overtime unchanged, but might be annual differences

Balance sheet:

Assets	167	• PV of BB element of lease obligation – reduced year on year by change in PV
Net debt	167	• PV of BB element of lease obligation – reduced year on year by linear D&A
Off balance sheet items	86	• Sum of nominal opex element of time charter

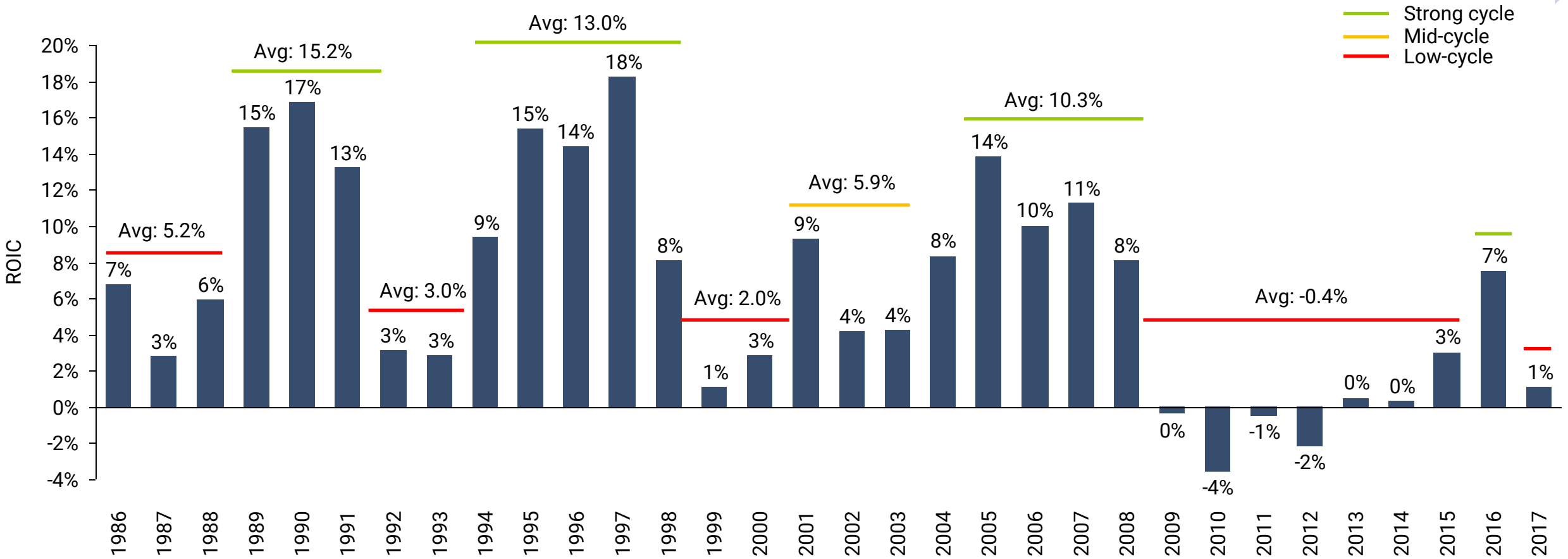
** Estimated based on today's TC commitments*

High level targets

Safety performance	*Zero incidents*
Revenue / Top-line	*Average revenue growth of 10% per year (over time)*
Profitability	***Industry leading EBITDA margins and returns***
Tankers	*Benefit from scale advantages. Towards customers by better service (cost, efficiency and predictability) and internally through efficiency gains*
Terminals	*Operate terminals in key locations, ideally where operational synergies with Odfjell Tankers are possible*

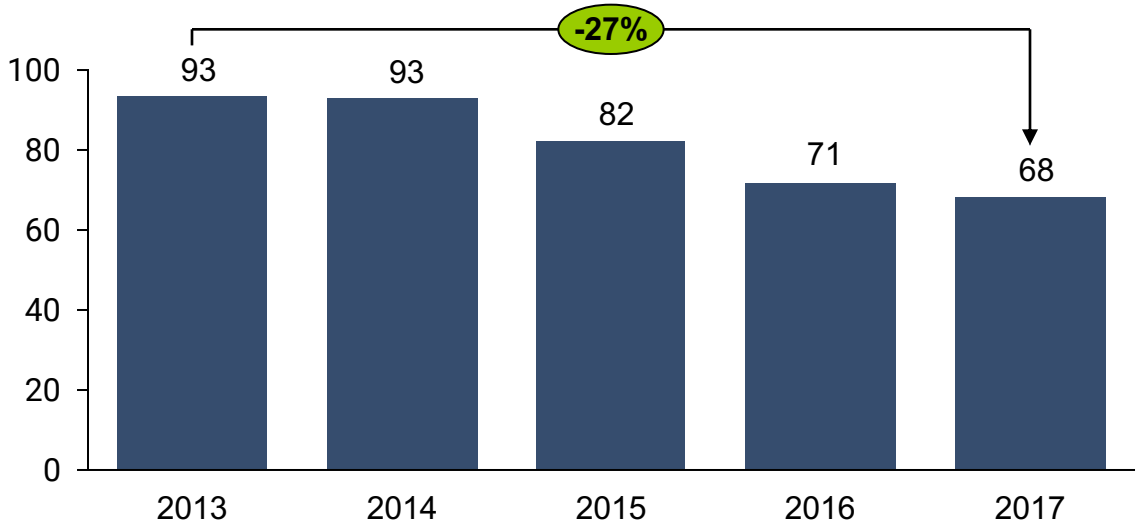
Markets have not treated us well the last 10 years but we still outperform more commoditized shipping segments

Odfjell TankersAverage ROIC since IPO in 1986 of **7%** but we remain exposed to the cyclical nature of the shipping industry where timing is of the essence

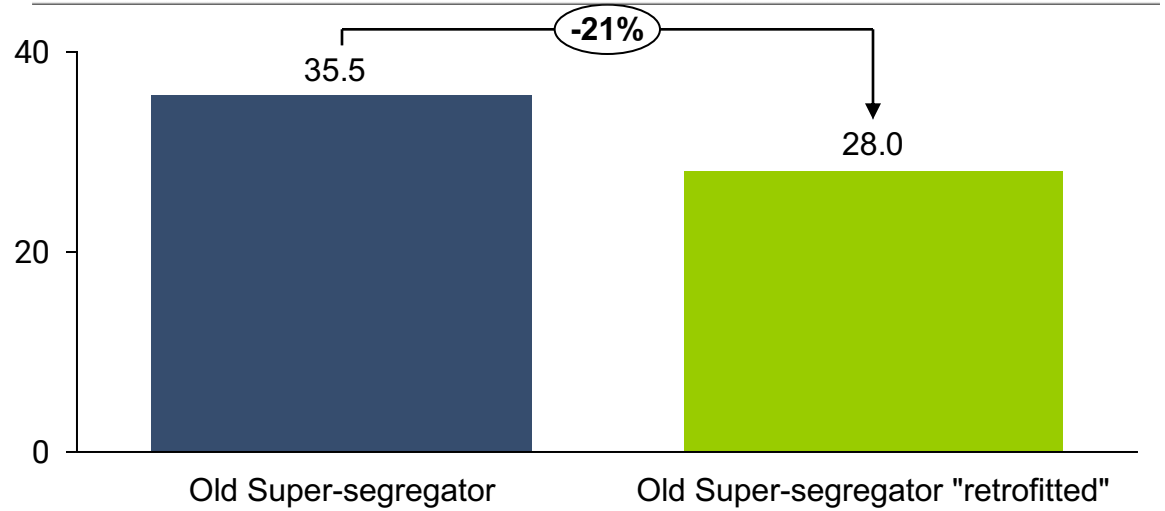


There are no more low-hanging fruits. Strict cost focus remains and we are able to reach our target of 100 vessels without a cost creep

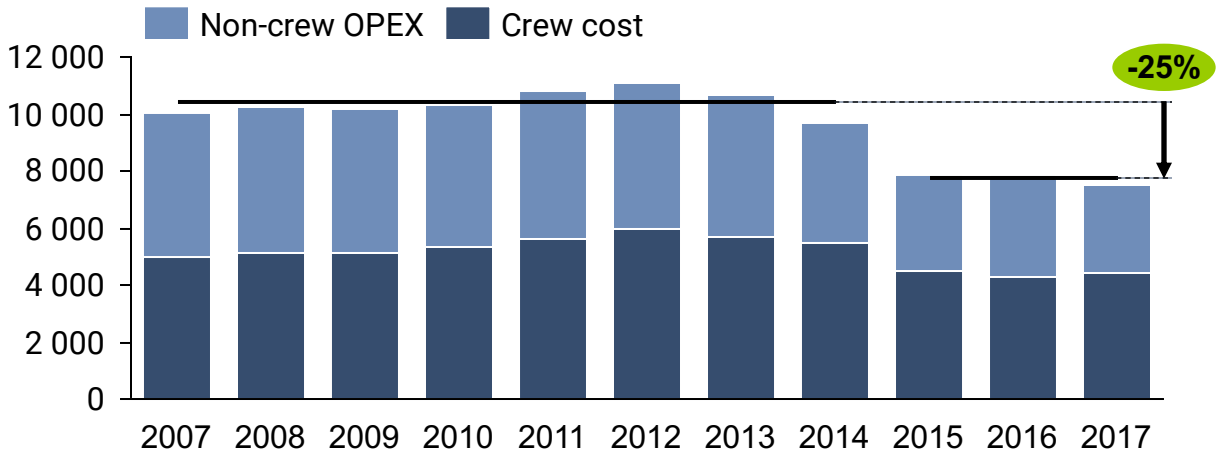
G&A, USD mill



Fuel efficiency improvements, Tonnes per day



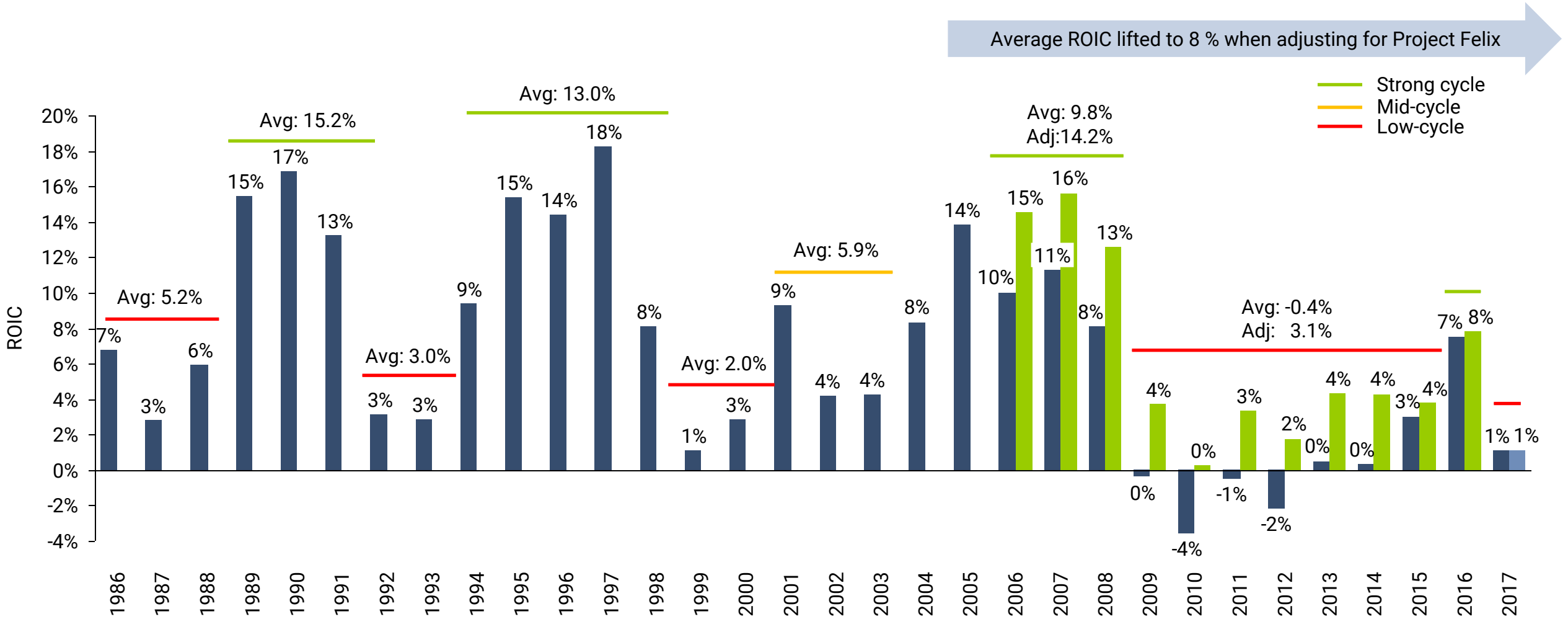
Opex per day, USD per day



- G&A now at a satisfactory level.
- No additional G&A to be added in relation to expansion programme, so G&A per ship day to reach industry leading levels
- Opex per day now at USD7,500/day and we might see some improvements from 2017 levels (some one-offs).
- Fuel efficiency improvements finalised with material gains. Focus will now be skewed towards new vessels entering our fleet with even better fuel economics

Source: Odfjell

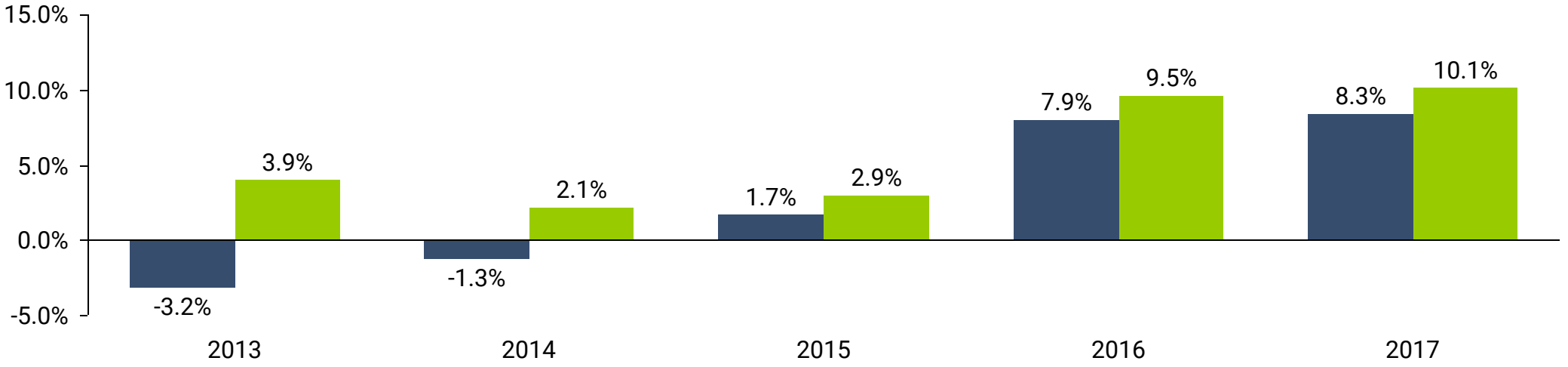
All our cost savings and efficiency initiatives mean that we now have a very competitive performance on margins and returns



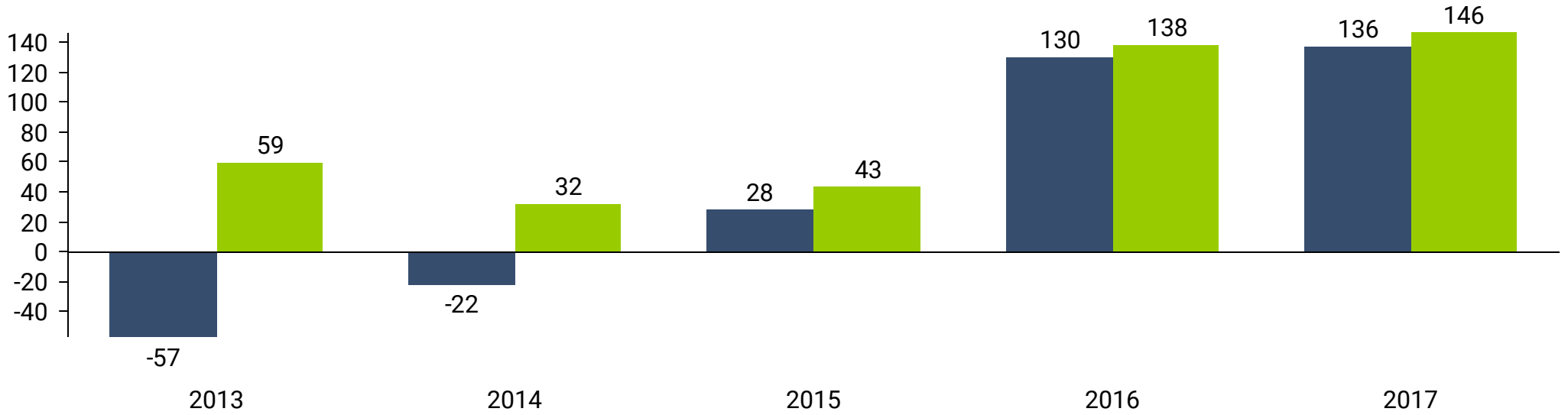
* Felix adjustments does not take into account full effect of savings (USD 109 mill), but is limited to USD 61 mill

Odfjell SE overall returns has not been satisfactory the last years, which was especially hurt by the shut-down of our Rotterdam terminal

Odfjell SE ROIC adjusting for OTR



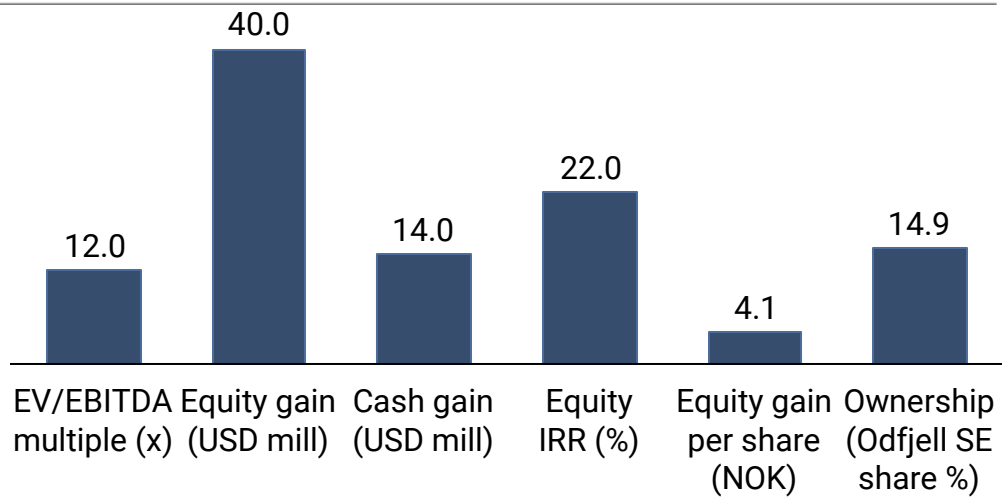
Odfjell SE EBIT adjusting for OTR



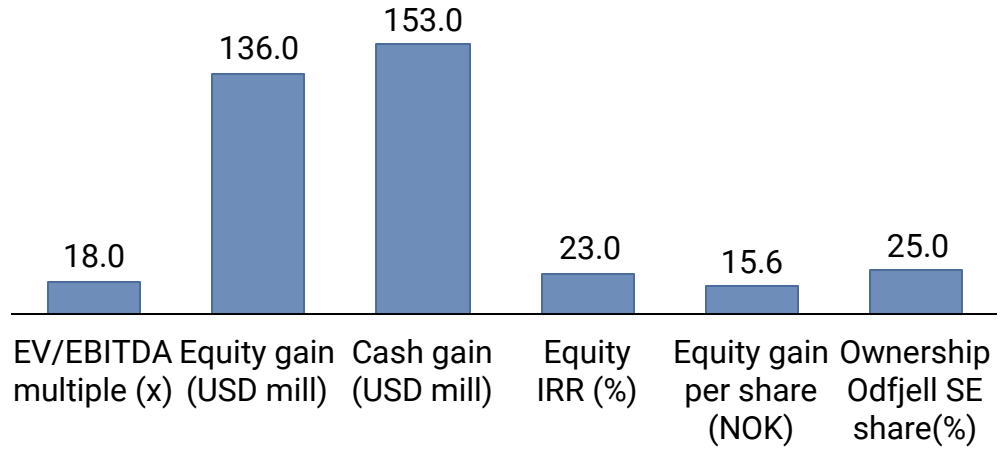
* Note:: Equity method

A strong financial platform has been made possible through sale of non-operated terminals – Houston will continue to be the main driver

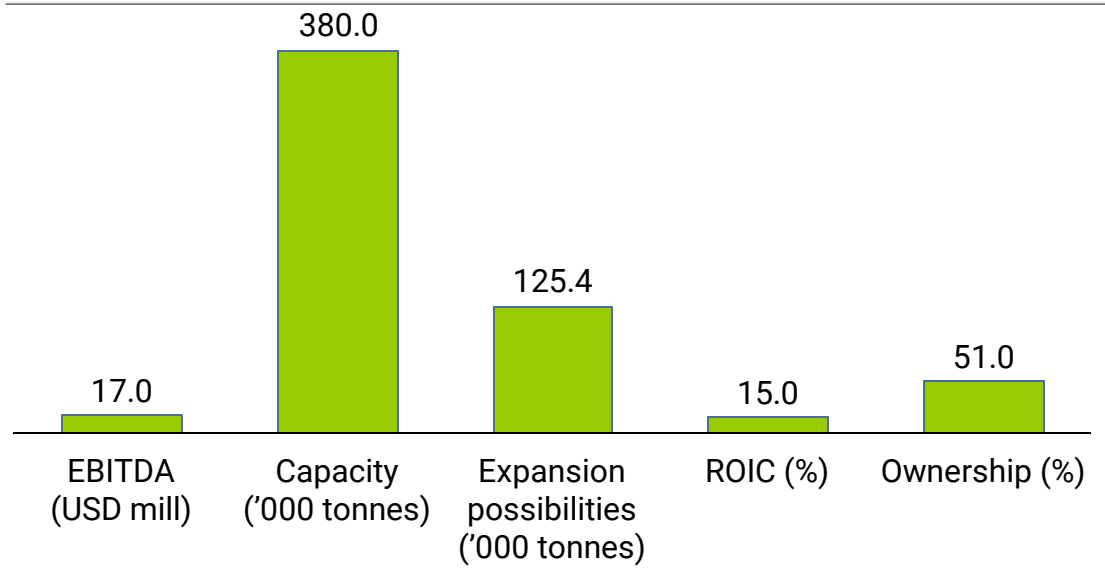
Oman transaction



Singapore transaction



Houston terminal Key facts



- Odfjell has delivered on its strategy of divesting terminals where we did not have operational control
- If we decide on a sale of our share in Odfjell Terminals Rotterdam. Odfjell Terminals Houston will be the main driver in Odfjell Terminals going forward

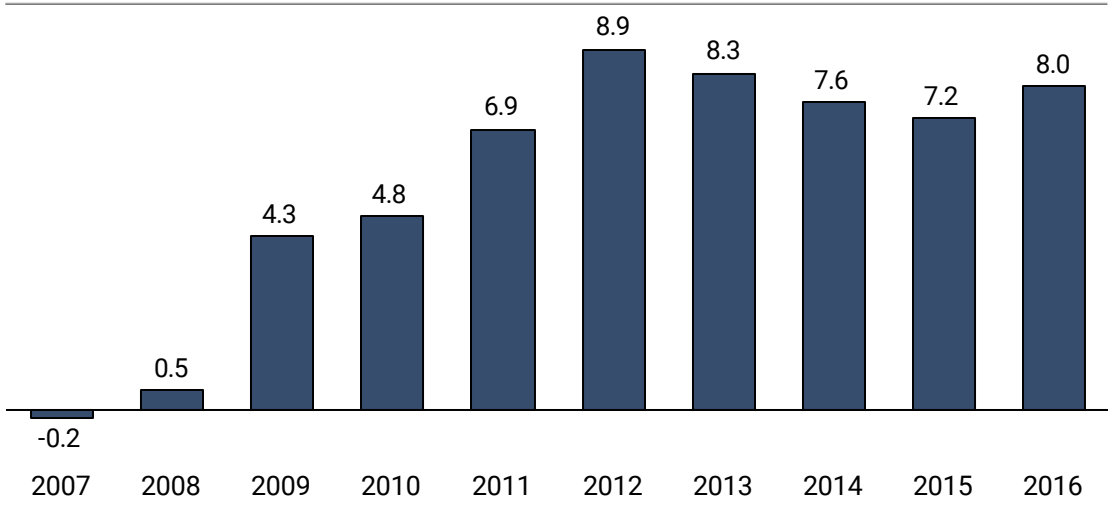
  Odfjell Terminals Houston quick facts:

  - 380,000 cbm capacity and 3rd largest chemical storage terminal in Houston
  - Available land to expand capacity by 33% in a market with a strong outlook
  - Strong historical returns and attractive location a key differentiator

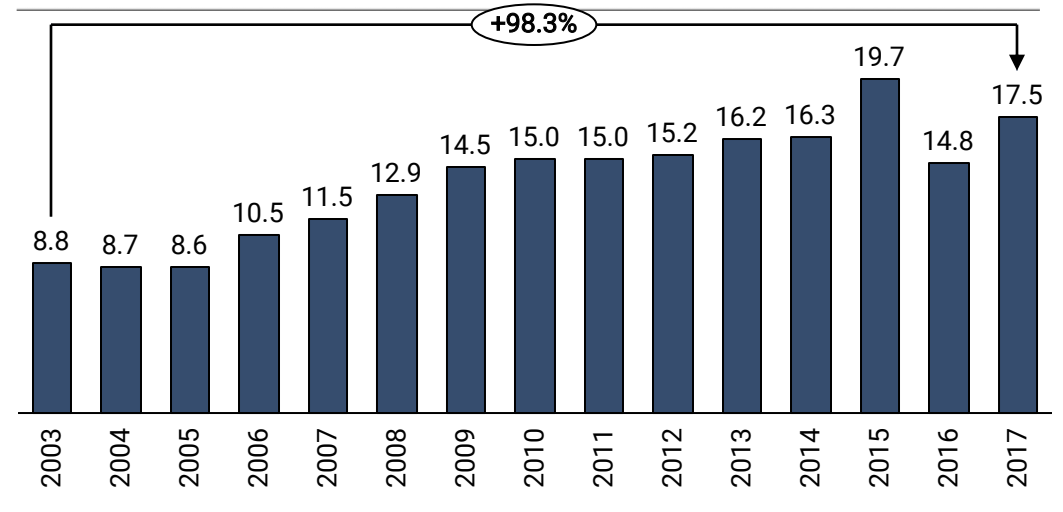
Source: Odfjell

Tank terminals are viewed as “real estate” - it takes time before the investment matures and deliver attractive returns

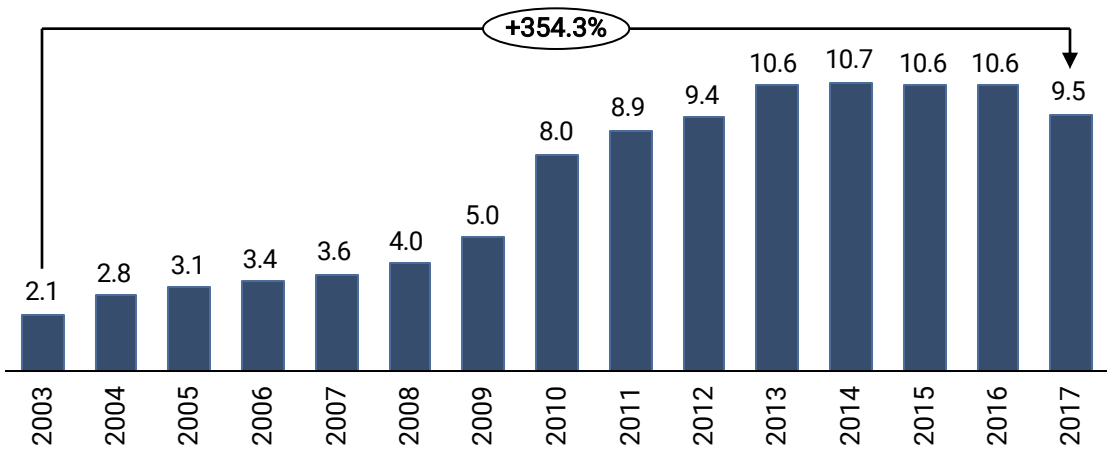
Historical EBITDA Oman



Historical EBITDA Houston*



Historical EBITDA Singapore



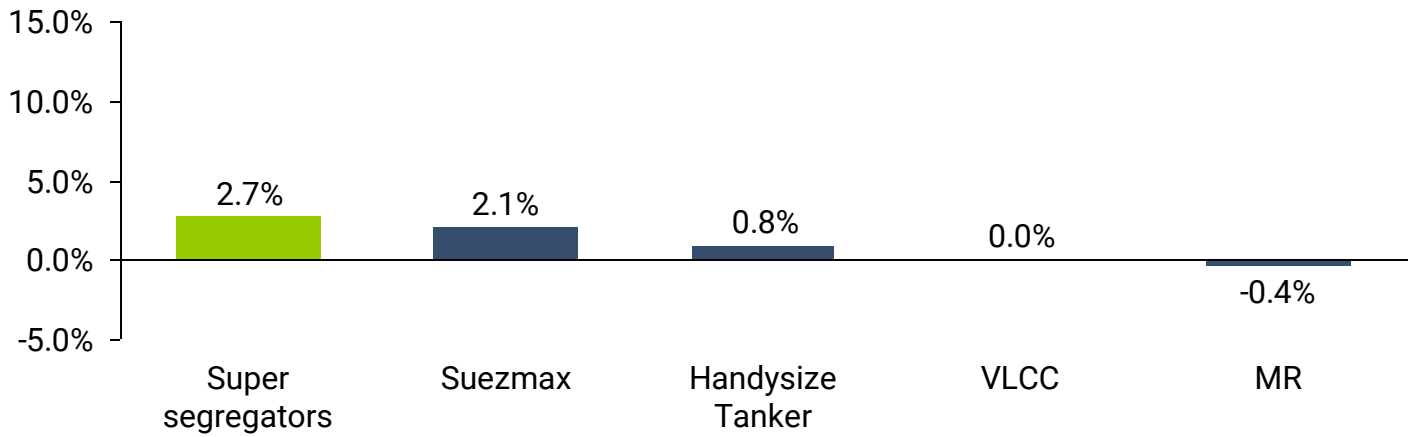
Next growth region is our terminals in China

Development of tank terminals takes time – but once up and running, returns and cash flows are stable

Source: Odfjell,* We started operations in Houston back in 1983 with EBITDA accelerating from 2003 and onwards, ** Historical EBITDA is adjusted to reflect our 51% ownership in the terminals

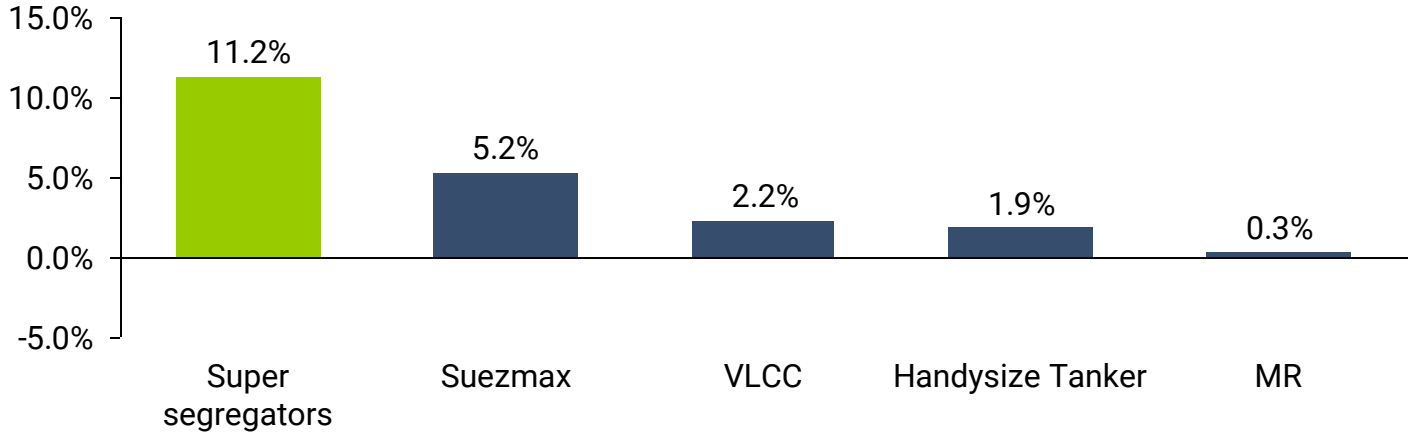
We believe our tonnage investments have been made at the bottom of the cycle

ROIC based on 2008 asset values and 2008-2017 EBIT



- Based on 2008 asset prices and 10 year median TCE rates as quoted by brokers
- Super segregator asset values based on quotes from shipyards in 2008 and TCE based on internal calculations

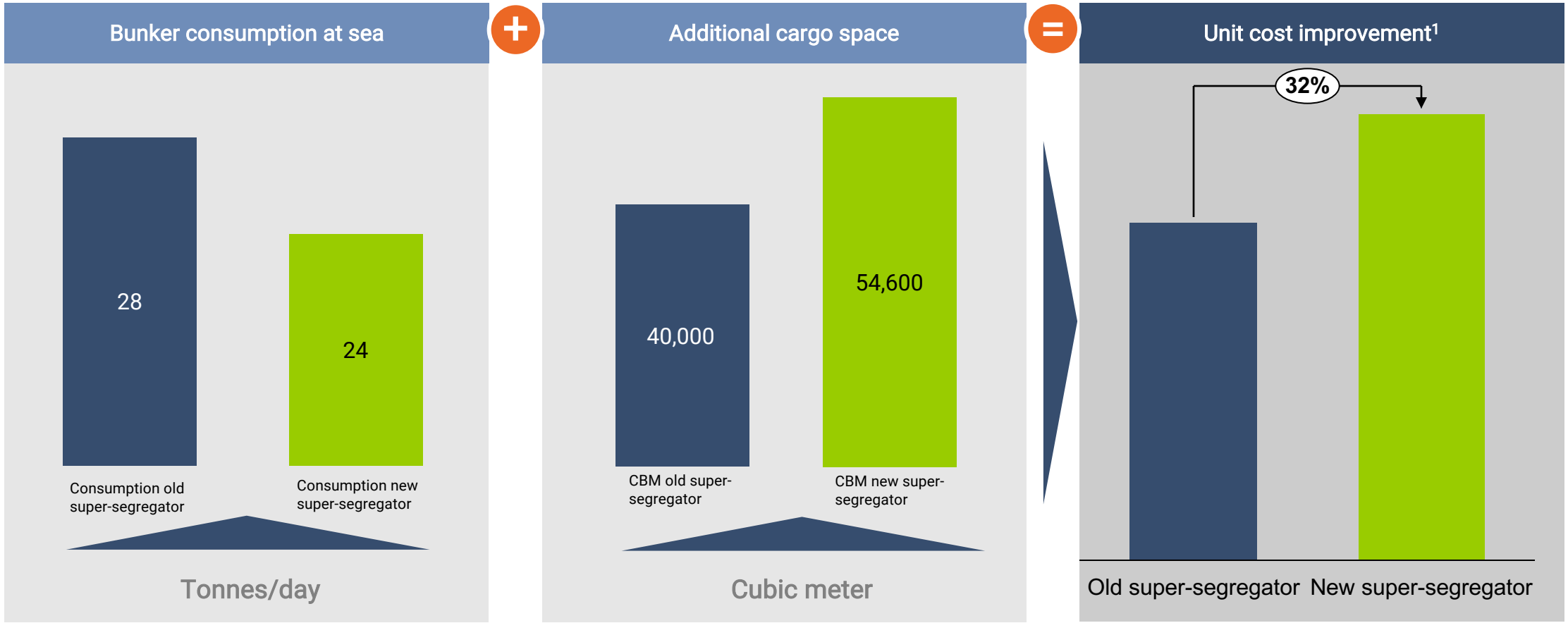
ROIC based on 2018 asset values and 2018-2027 EBIT assumed in line with 2008-2017



- Based on 2018 asset prices and last 10 year median TCE rates as quoted by brokers
- Super segregator asset values based on Odfjell's growth/renewal initiatives
- Super segregators will be more than 65% of our book values by 2020

Source: Clarksons Platou, Odfjell

.. And the new tonnage will reduce fuel consumption and add incremental cargo space, which means that our unit cost will decrease as new tonnage is phased in

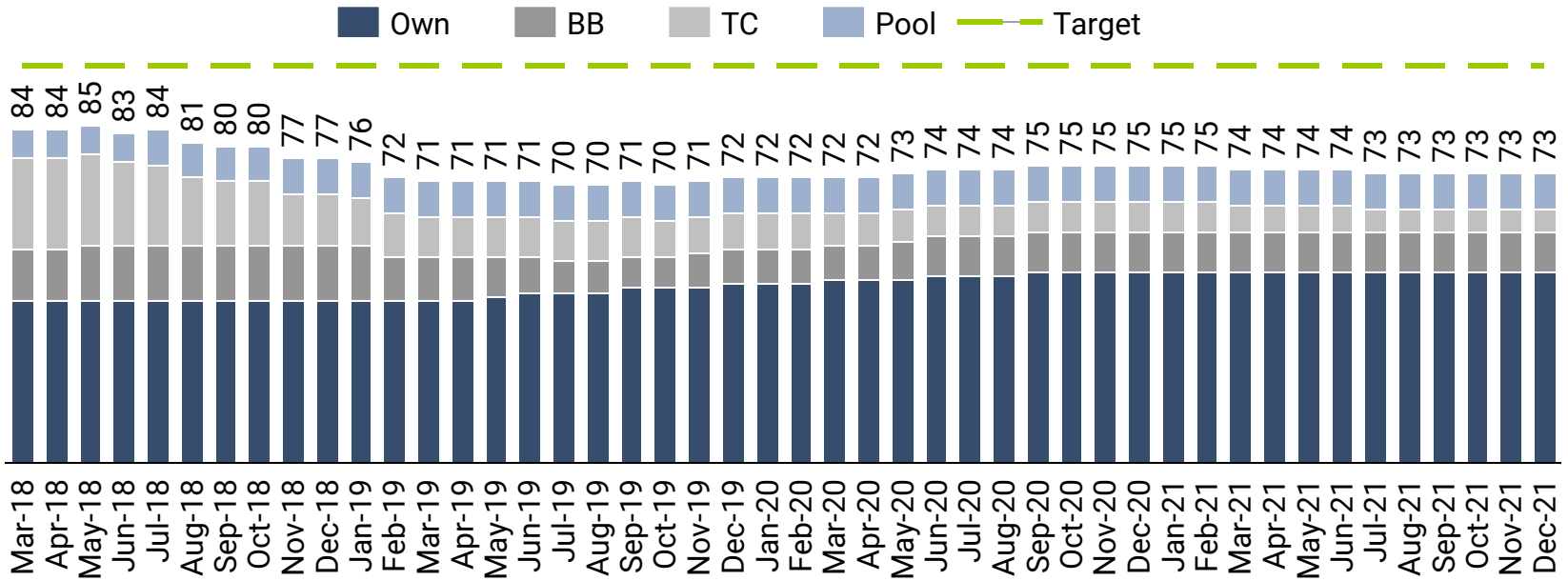


1. Improvement in unit cost

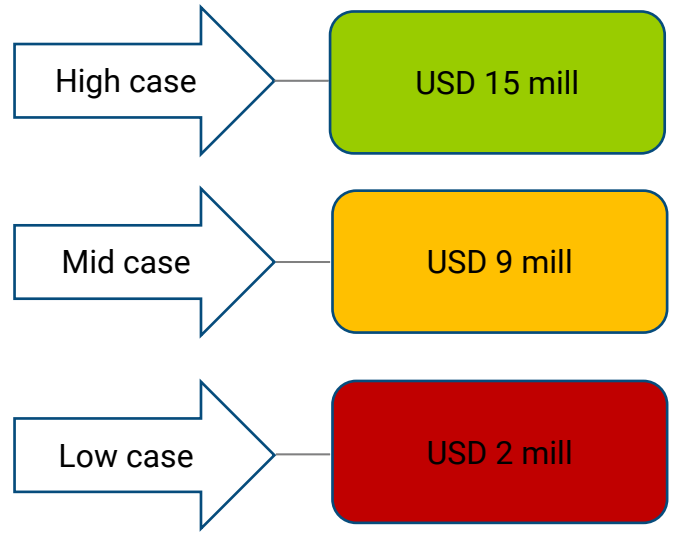
Source: Odfjell

A large part of our TC fleet is up for renewal/delivery at an attractive point in the cycle – This adds flexibility should markets remain weak and could lower our costs further

Odfjell fleet development by ownership and charters up for renewal



Scenarios and impact on annual EBITDA

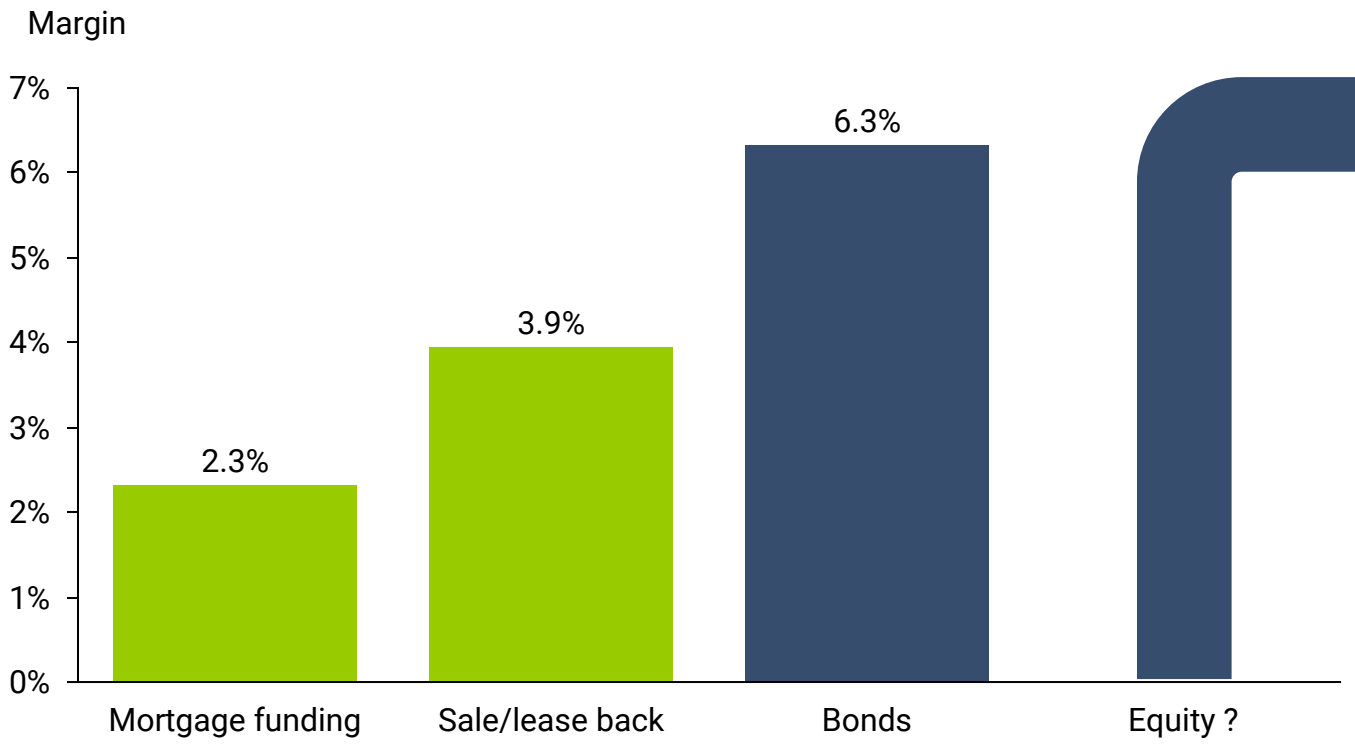


- Odfjell has 18 vessels on TC in as of 1Q 18 as 4 TC vessels were redelivered during the quarter. These were not renewed and replaced by two newbuildings (CTG) and three vessels from Sinochem initially delivered on commercial management (before bareboat hire commences)
- Going forward, we are in a position to replace part of our timecharter fleet with modern more efficient newbuildings or renew timecharter vessels at attractive rates
- We will constantly monitor the ongoing development in the market. If a market recovery fail to materialises, the TC fleet provides us important flexibility to reduce our exposure if a loss making market for medium stainless steel tonnage continues

Source: Odfjell, * Current growth path assumes no TC renewals/additions going forward ** Owned fleet includes vessels owned, on bareboat and financial leases* Scenarios include average renewal rates at USD13,000, USD14,000 or USD15,000 per day

Cost of capital is important for Odfjell and a key focus to remain competitive and industry leading

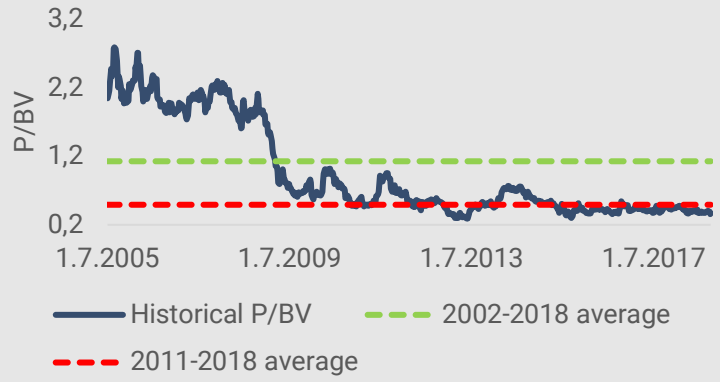
Funding sources



Equity

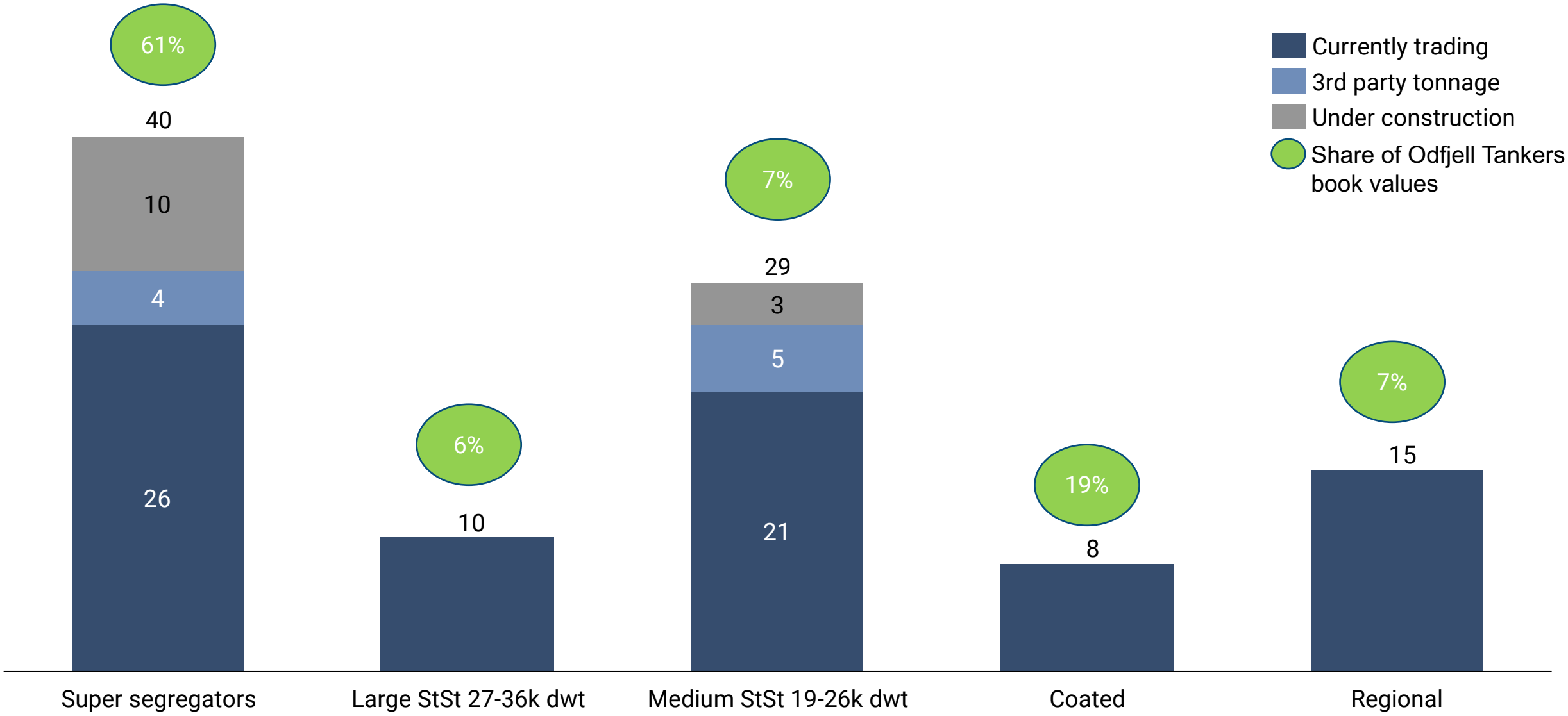
Odfjell Tankers external fleet valuation Dec-17 (USD mill)	
Market value fleet	1,427
Equity instalments NB	36
Excess market value NB	60
Total	**1,523**
Odfjell Tankers vessel debt	862
Net fleet value	**661**

Odfjell SE historical price-to-book value (pre/post OTR shutdown)



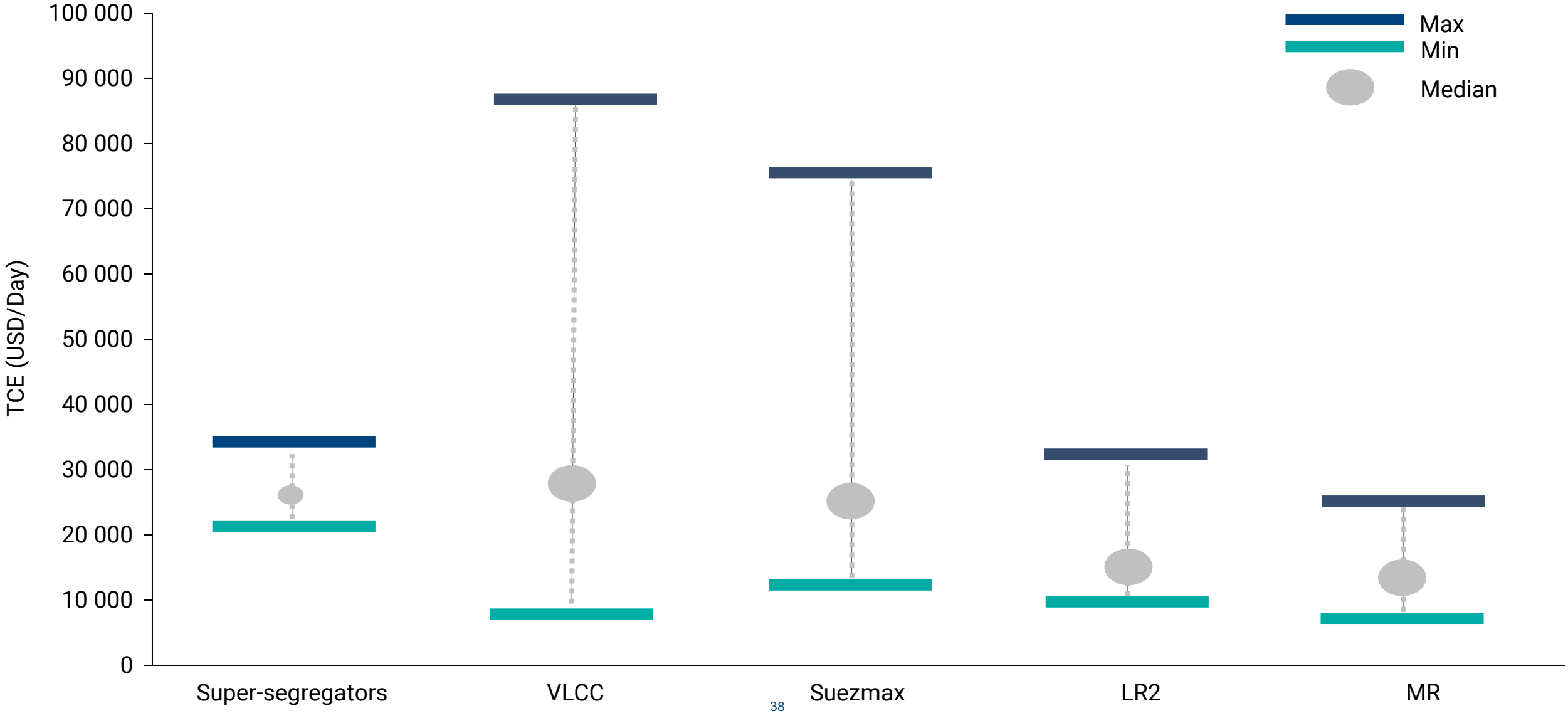
Source: Odfjell, Bloomberg, Grieg Shipbrokers, * Valuation only accounts for Odfjell Tankers on-balance sheet vessels and their associated debt (i.e. no corporate or JV factors included)

Fleet overview – Odfjell Tankers fleet counts 102 vessels upon completion of our expansion/renewal programme in 2020



* Book values as of 4Q 17

Chemical Tanker rates will typically be linked to developments in product tankers (swing tonnage) that is again linked to crude tankers – The industrial nature of our business leads to less volatility to our top line

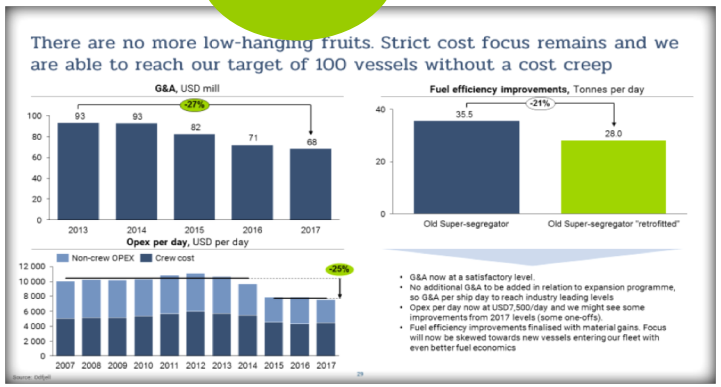


Final remarks – We are now standing on a solid platform where we are positioned for our targets of achieving industry leading returns across the cycle

Industry leading EBITDA margins

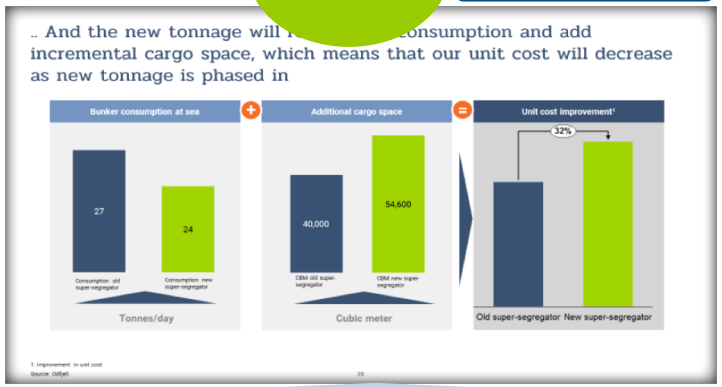
Cost control

Opex, G&A & voyage expenses



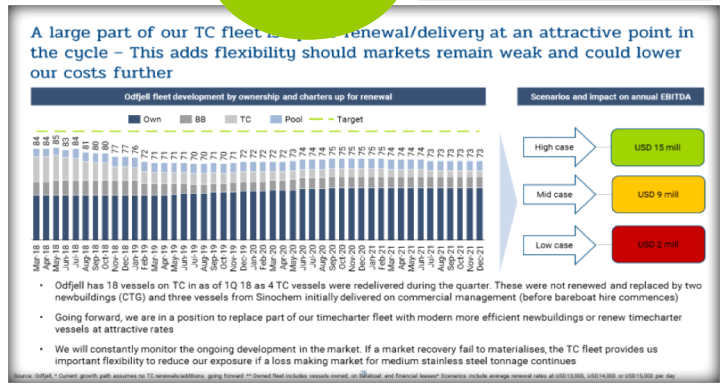
Efficiency gains

Newbuildings



TC costs

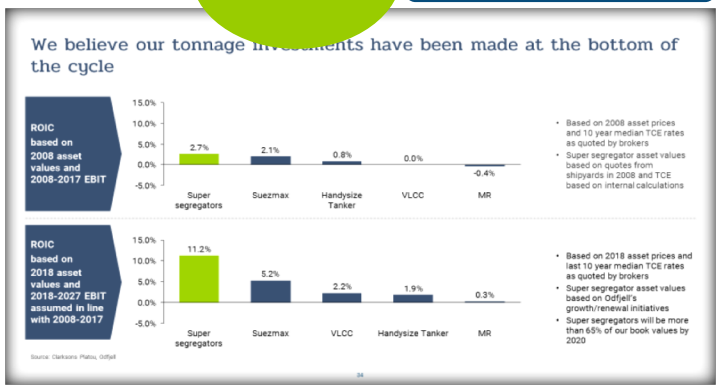
Renew/replace timing



Industry leading returns

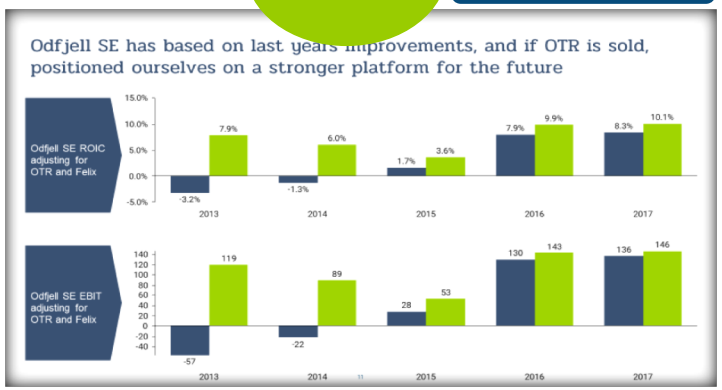
Investmens

Bottom of the cycle



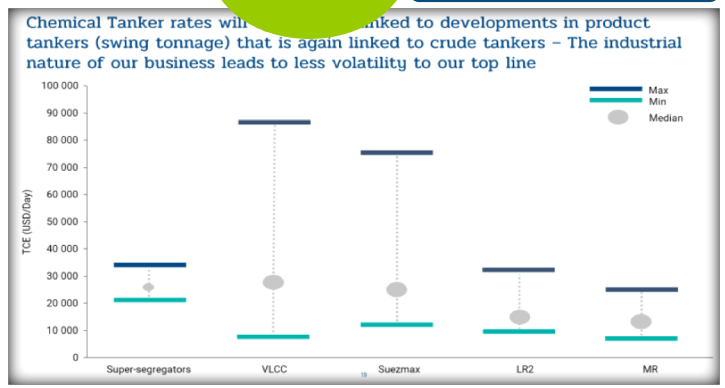
"New" platform

Adjusted for Felix (& OTR?)



Industry leading TCE

Higher higs & higher low's



Digitalization in Odfjell

Harald Fotland, COO

Capital Markets Day 2018, Oslo

Agenda

- Digitalization in Odfjell
- Selected examples

Digitalization is a competitive survival game – doing nothing is not an option

We operate in a highly competitive industry
Cost and time efficiency is key to survive in the long run

Our industry has high operational complexity
Fragmented market place, complex cargo operations, industry regulators and port congestion are challenges we face every day

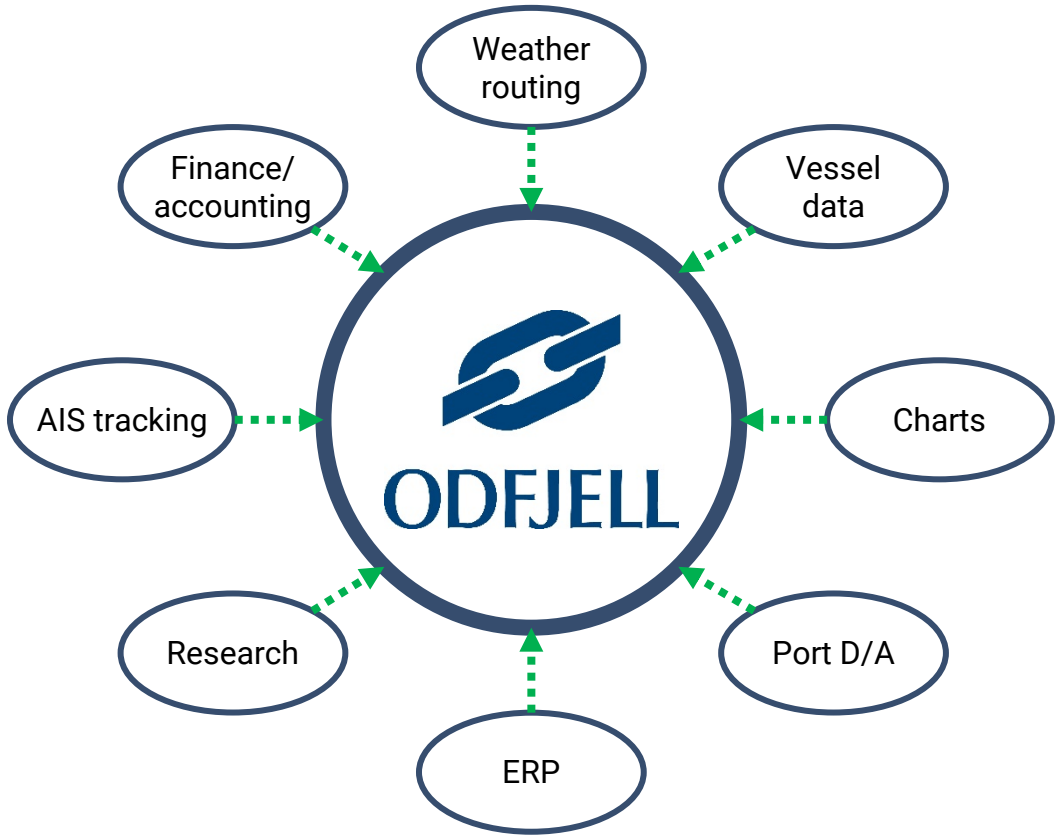
Technology opportunities arising with increasing speed
The speed of technology advancement is ever-increasing. These create opportunities for increasing our competitiveness, but needs to be driven by business needs

Our competitors are also becoming more digital
We need to stay ahead of the curve

Advancements also in other industries and adjacent shipping segments
Our customers expect us to improve continuously. In a digitalized world valuable, timely and accurate data exchange defines the company competitive abilities

We have developed a strong internal organization and our strategy is to control the platform

- Odfjell seeks to own and control data to generate synergies with other sources of data that we control
- We operate in a segment with special requirements and needs, where standard applications from other segments are of limited value
- New ways of working means that in-house digitalization is cost efficient
  - Several applications are cheaper to develop in-house than to source from third-party providers
- Today we are developing the platform ourselves, located partly on premises and partly cloud-based
- Some applications are still sourced from third-party providers
- To facilitate this approach we have established a strong internal organization, with a core development team consisting of internal resources and external consultants



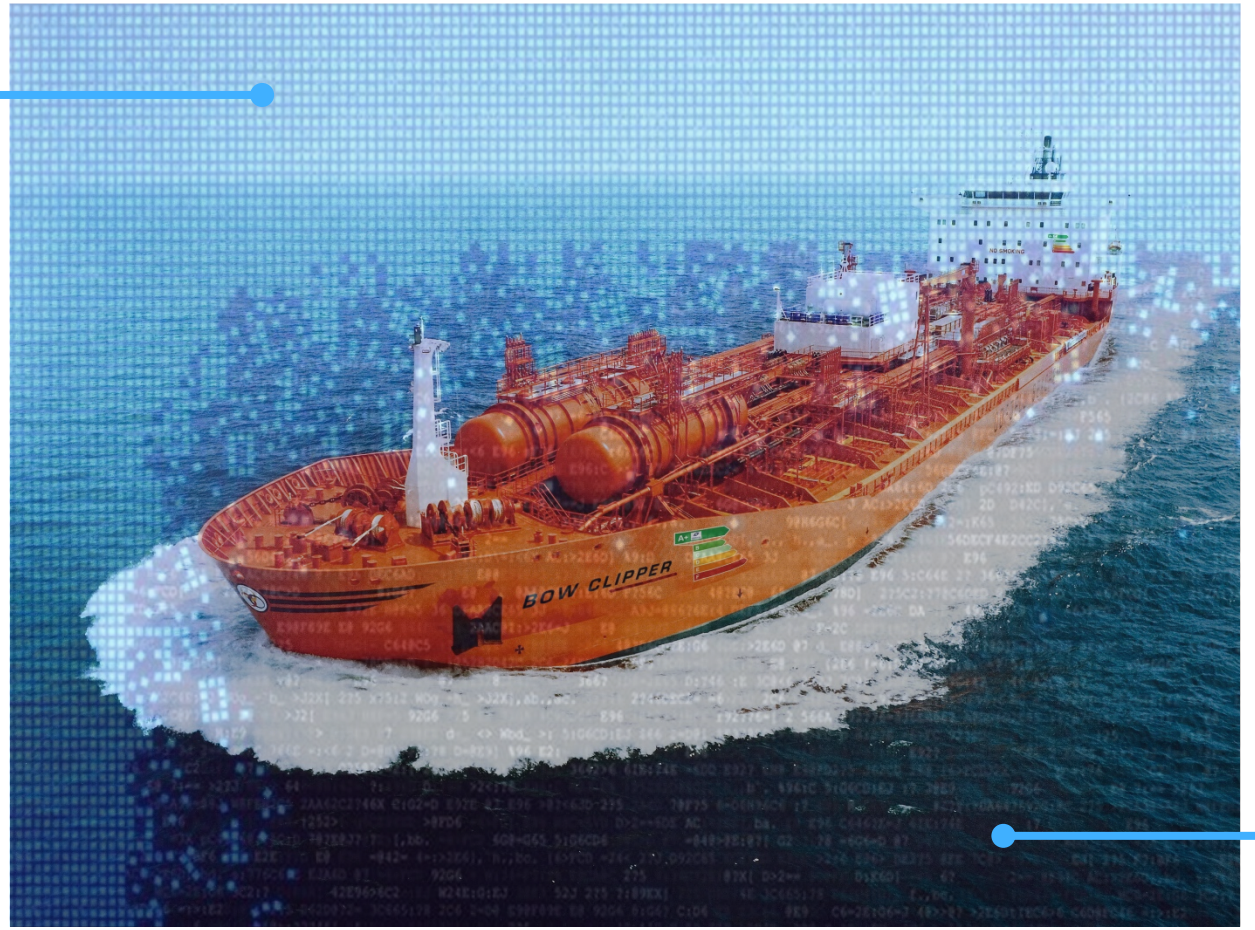
Odfjell Digital Ship

- Two vessels assigned to trystorm new technologies
- Purpose is to gain experience and prove benefits before roll-out

Selected examples:
- 4G Satellite
- Captain's Dashboard
- Advanced utilization of sensor technology
- Drones
- New communication methods

Data capturing: Vessel Connectivity – real-time access to cargo, fuel, engine and navigation data

- Our vessel connectivity goal is to collect data from existing equipment (bridge, cargo and engine systems)
- Provide foundation for big data analytics and onshore analysis
- Eliminate need for reports



- We collect 4 000 data points every 15 seconds

Chemical Tanker Fundamentals

Bjørn Kristian Røed, Research

Capital Markets Day 2018, Oslo

Agenda

- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
- Product studies
- Chemical tanker supply
- Key conclusions

Chemical tankers serve a wide range of industries leading to the segment being the most diversified shipping segment leading to less volatility…

- Alarm clock
- Shower
- Clothing
- Cup of coffee or bottle of water
- Elevators
- Computer
- Drive a car
- Phone call
- Conference room
- Bathroom
- Subway/tram/bus
- Meeting rooms

We have all been in contact with chemicals various times already today

Chemicals is said to be complex – But picture a world without?

Source: Odfjell

Does this mean you have to track it all? Key products accounts for 80% of seaborne traded chemicals and are the drivers in our markets…

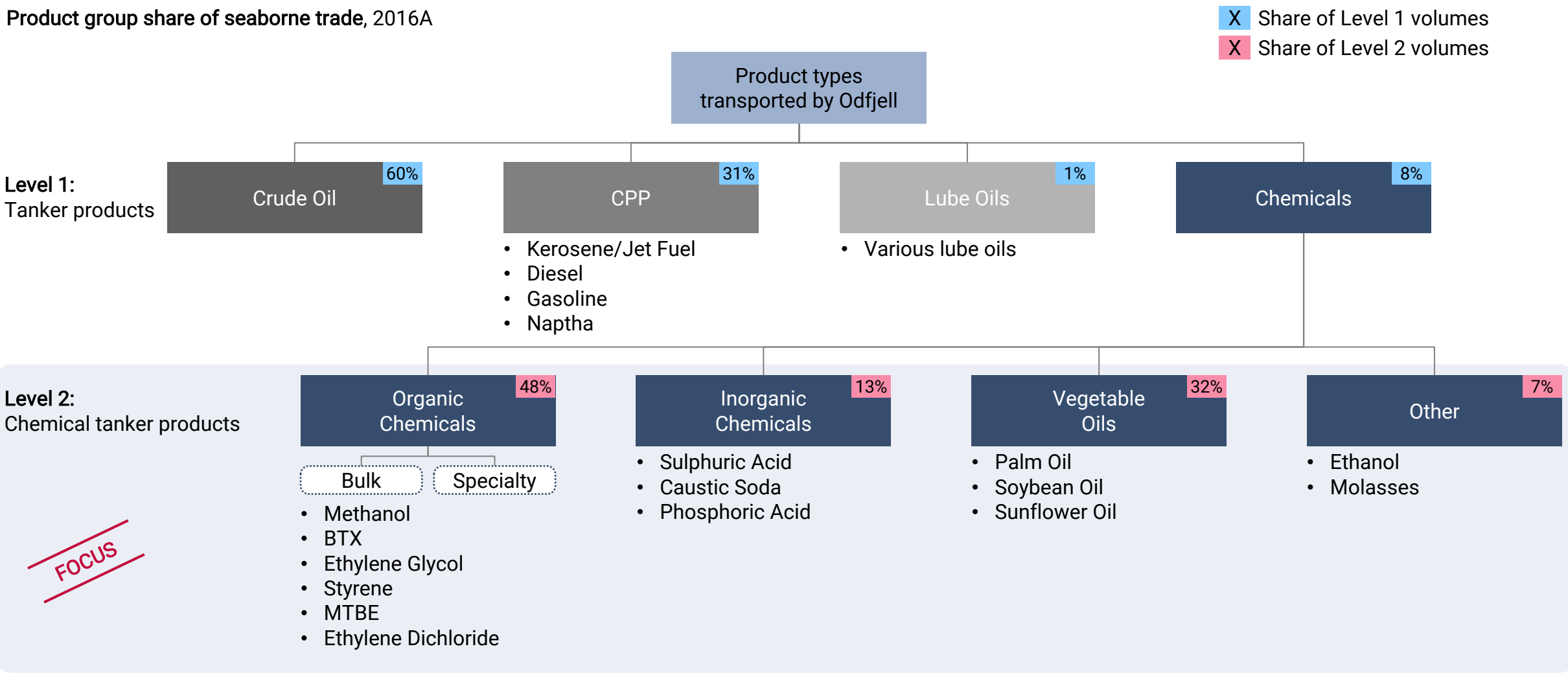
	Product	Seaborne trade (MT mill.)			Average nautical miles			Tonne-miles (Billions)			Tonne-mile growth (%)			Trend 2018-20
		2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017	
Organic	Methanol	25.4	27.8	27.9	3,753	3,984	4,050	95.3	110.8	113.0	-6%	15%	2%	↑
Organic	Para-xylene/Xylenes	18.1	19.4	19.7	1,758	1,858	1,741	31.8	36.0	34.3	-6%	13%	-5%	→
Organic	Ethylene Glycol	13.3	12.2	13.1	4,233	4,414	4,394	56.3	53.9	57.6	4%	-4%	7%	↑
Organic	Styrene	8.9	8.1	7.6	2,800	3,304	3,025	24.9	26.8	23.0	14%	7%	-14%	↗
Organic	Benzene	8.0	6.9	7.6	3,410	3,055	2,293	27.3	21.1	17.4	15%	-23%	-17%	→
Organic	MTBE	5.8	6.3	6.0	4,048	4,211	4,262	23.5	26.5	25.6	4%	14%	-4%	↘
Organic	Ethylene Dichloride	2.8	2.9	3.0	5,960	6,100	5,727	16.7	17.7	17.2	9%	5%	-3%	↗
Organic	Toluene	2.9	2.9	2.9	1,823	1,926	1,658	5.3	5.6	4.8	-3%	6%	-14%	↘
Inorganic	Sulphuric Acid	12.9	12.6	13.0	2,753	2,575	2,647	35.5	32.4	34.4	5%	-9%	6%	↗
Inorganic	Caustic Soda	9.6	10.4	11.6	4,272	4,455	4,610	41.0	46.3	53.5	8%	13%	15%	↑
Inorganic	Phosphoric Acid	4.6	5.1	5.1	4,544	4,926	4,587	20.9	25.1	23.4	-11%	20%	-8%	→
Vegoil	Palm oil	45.5	40.4	41.0	3,593	3,608	3,699	163.5	145.8	151.7	5%	-11%	4%	↑
Vegoil	Soybean Oil	11.0	10.7	9.8	6,506	6,431	7,103	71.6	68.8	69.6	40%	-4%	1%	↗
Vegoil	Sunflower Oil	7.2	8.4	10.5	3,603	3,670	3,706	25.9	30.8	38.9	-3%	19%	27%	↗
Other	Ethanol	6.1	6.8	7.7	4,902	5,373	4,728	29.9	36.5	36.4	19%	23%	-1%	↑
Other	Molasses	5.1	5.2	5.2	3,168	3,069	3,417	16.2	16.0	17.8	0%	-1%	11%	→
	Others	45.5	46.3	48.5	3,046	2,933	3,208	138.6	135.8	159.1	11%	-2%	17%	→
	Total	232.7	232.4	240.2	3,668	3,735	3,736	853.8	868.1	897.7	6%	2%	3%	

↑ GDP (+)
→ GDP
↘ GDP (-)

Source: Odfjell, Drewry, ICIS, Customs data

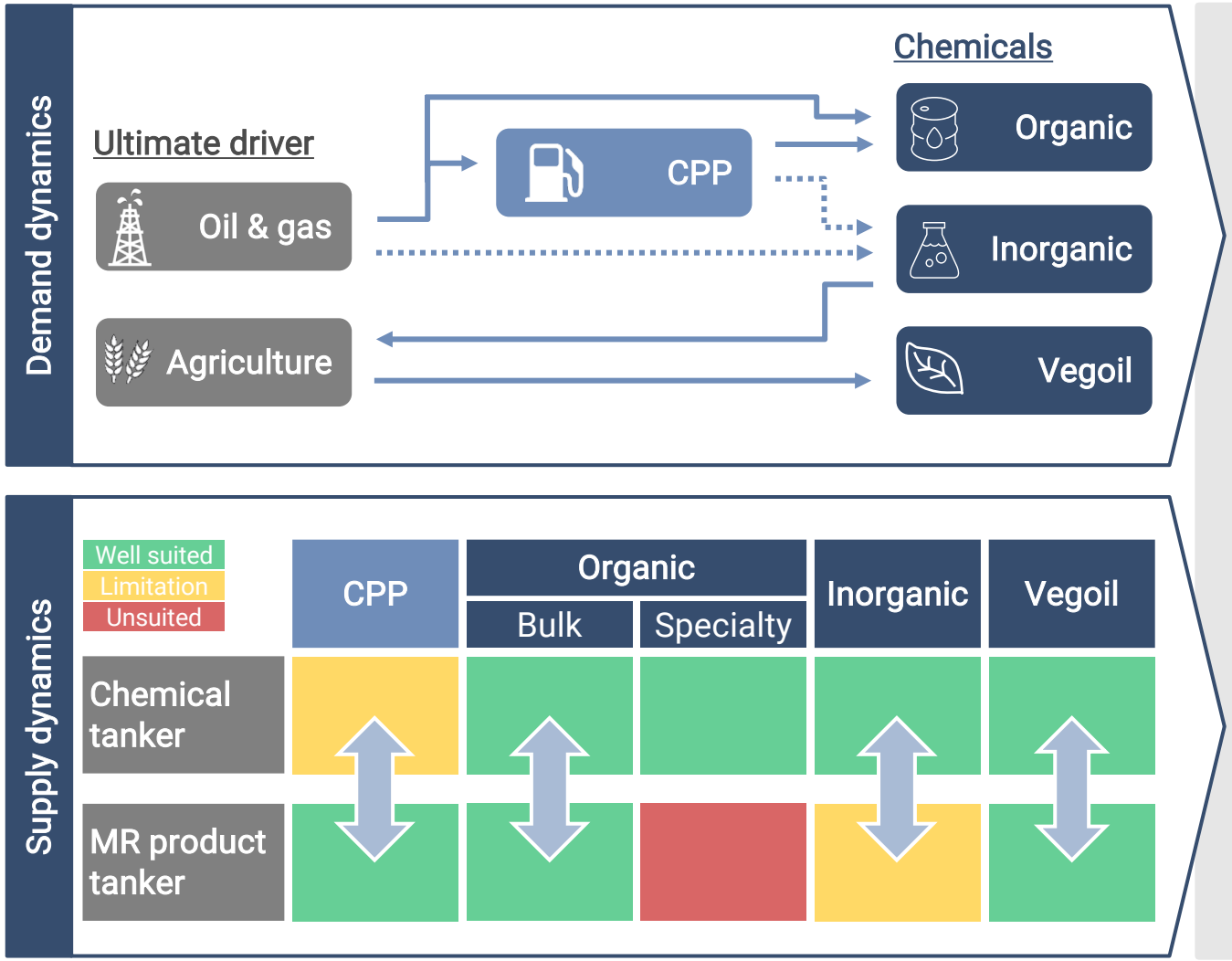
...And several products share similar dynamics within a product category - Chemicals account for ~8% of total tanker products trade

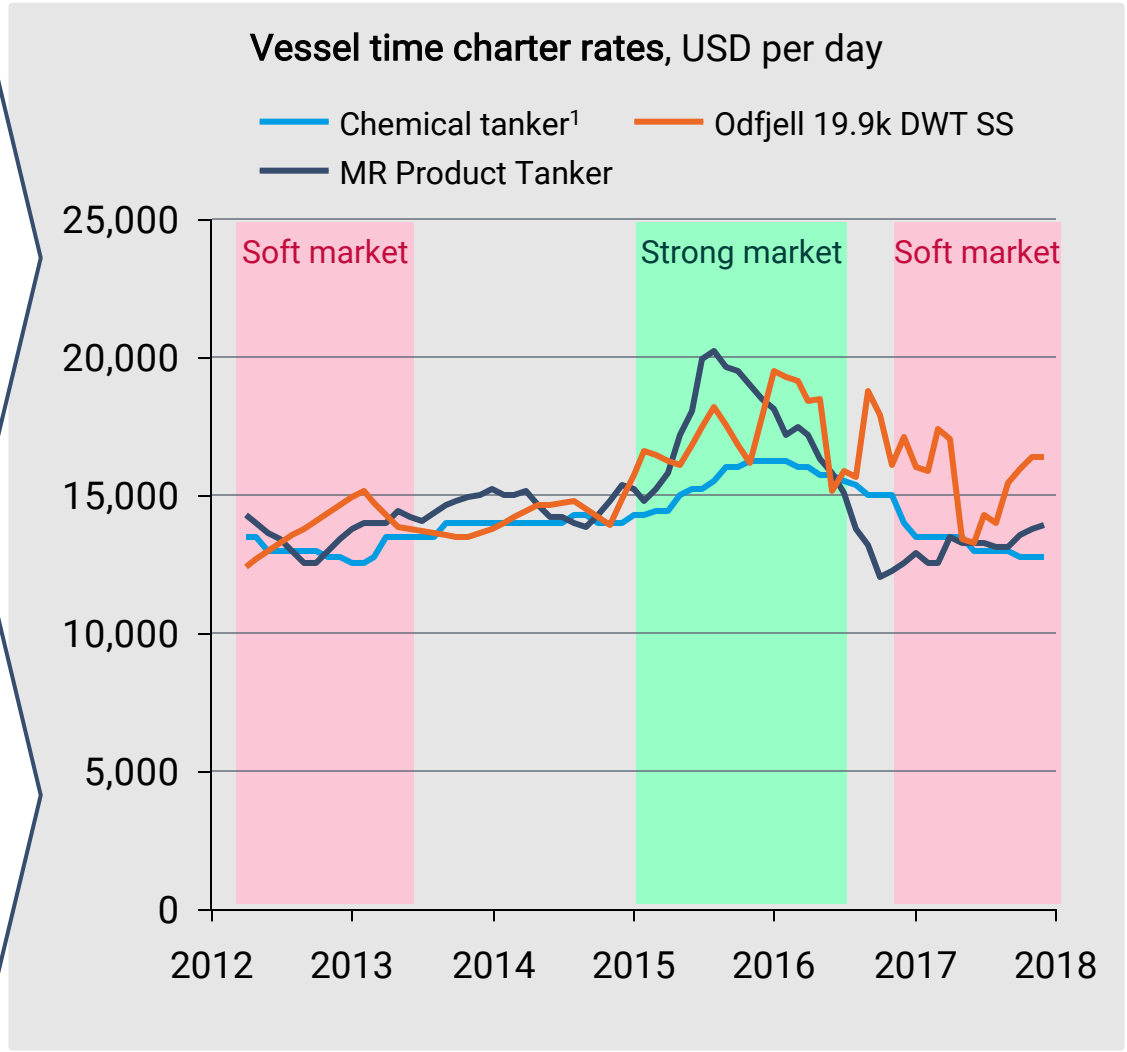
Product group share of seaborne trade, 2016A



Source: ICIS, Clarksons Platou, Odfjell * Benzene, Toluene and Xylene's

… Odfjell is indirectly exposed to the same market fluctuations as simpler vessel segments due to same underlying demand drivers and "swing tonnage"





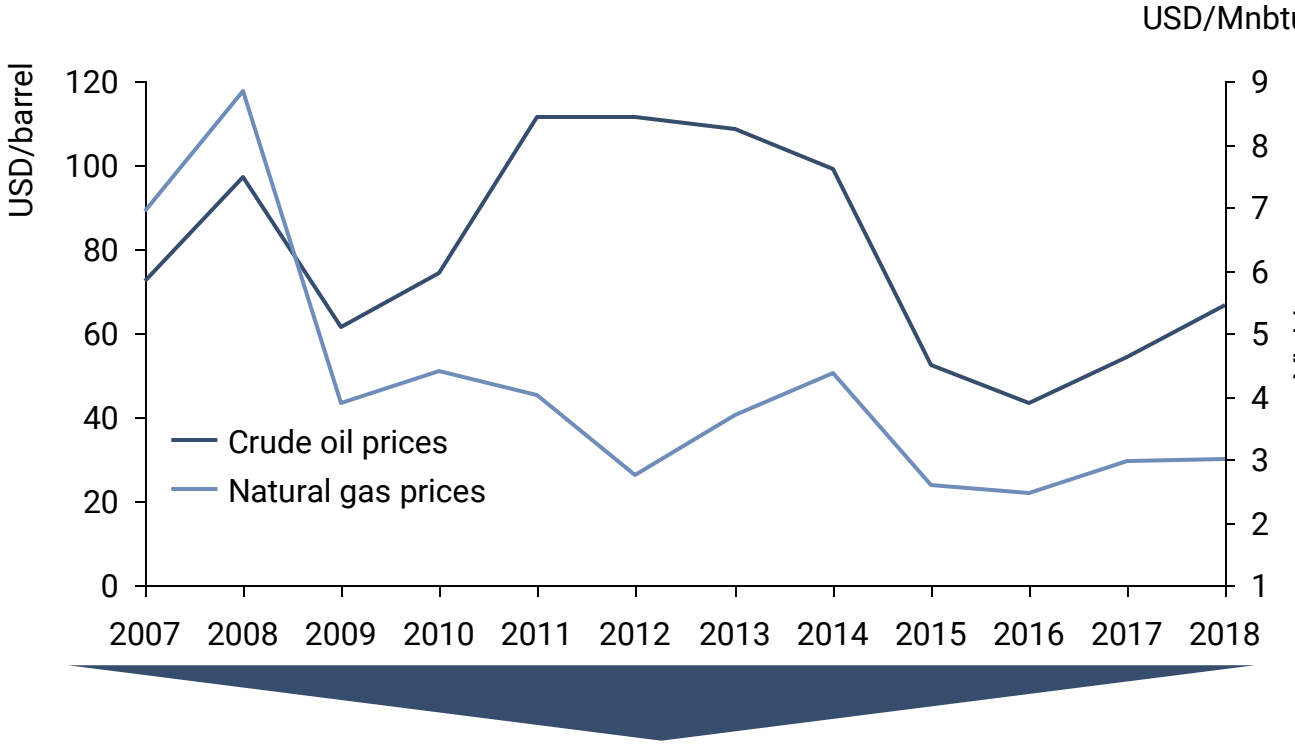
1. 19.9k DWT SS Chemical Tanker

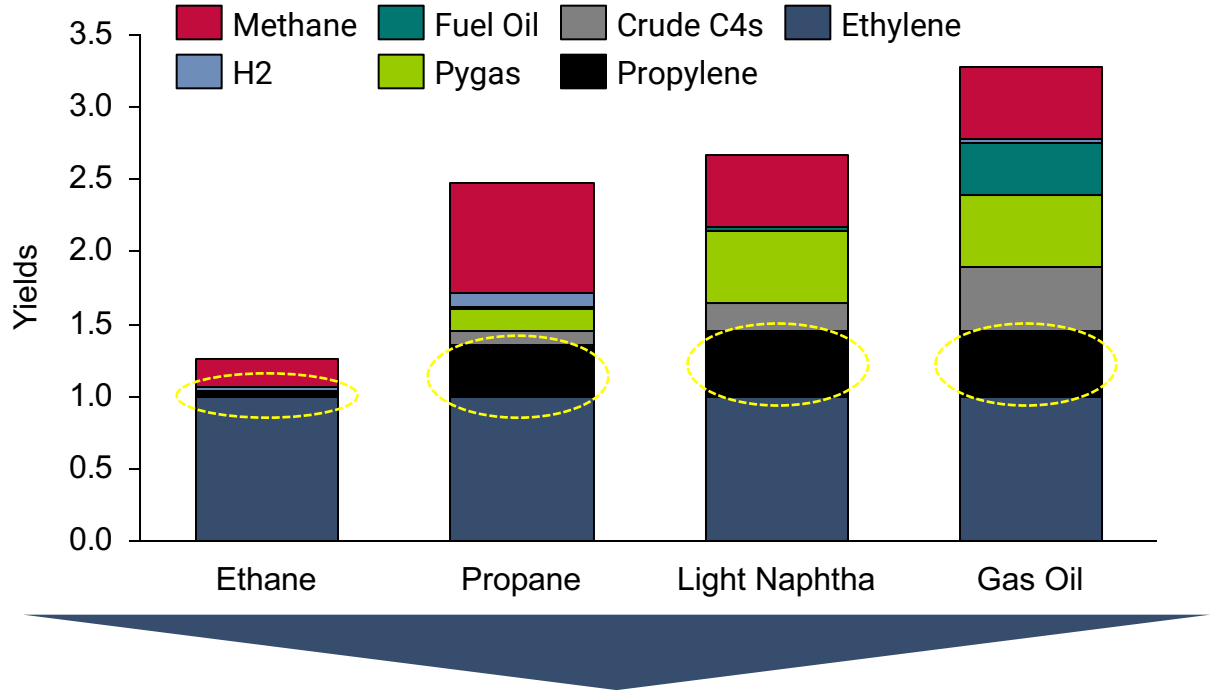
Source: Clarksons Platou, Odfjell

Agenda

- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
- Product deep-dives
- Chemical tanker supply
- Key conclusions

Changes in the energy markets impacts production, consumption and technology developments in various markets





- US shale gas revolution has disconnected US gas and global crude oil prices
- This has led to a surge in chemical investments sourced from natural gas in recent years
- The oil price drop in 2015 reduced the competitiveness of natural gas based chemicals versus crude/naphtha based chemicals…
- …Just like the increase in oil prices in 2018 improves competitiveness for gas based chemicals again…
- Gas based chemicals are mainly produced in the US and Middle East with Asian chemicals are mainly crude based. These regional differences makes energy markets important to monitor future long-haul trades of chemicals

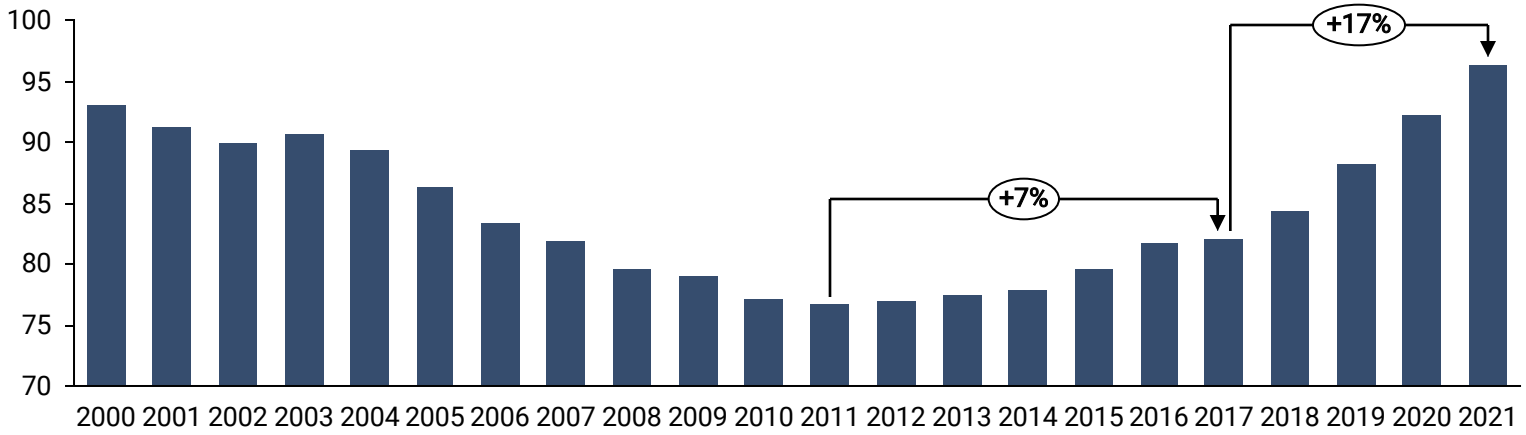
- The shale revolution has led to a surge in ethane based crackers.
- This is driven by abundant supply and competitive prices
- This change of trend has had meaningful knock-on effect on other type of production of chemicals because:
  - Ethane yields no propylene (another important chemical building block)
  - This has led to a shortage of Propylene which has led to on-purpose production technologies like MTO, PDH and Crude to chemicals among others

- This was all driven by changes in crude and natural gas price dynamics

Source: Bloomberg, Odfjell, IHS

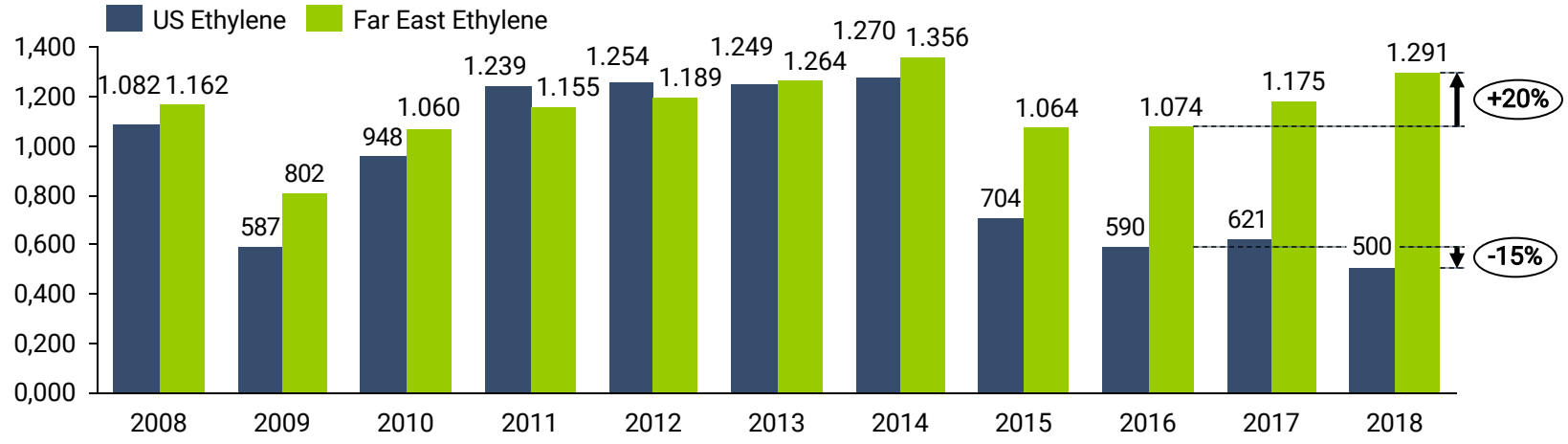
US shale revolution moved the US chemical industry from "dinosaur" state to a boom mode with availability of the world's most attractively priced feedstock

US petrochemical production capacity development



- US capacity resurrection post 2010
- Graph also involves feedstock chemicals not shipped on our vessels
- Current investment cycle concludes in 2020/21 with another round of investments now on the table

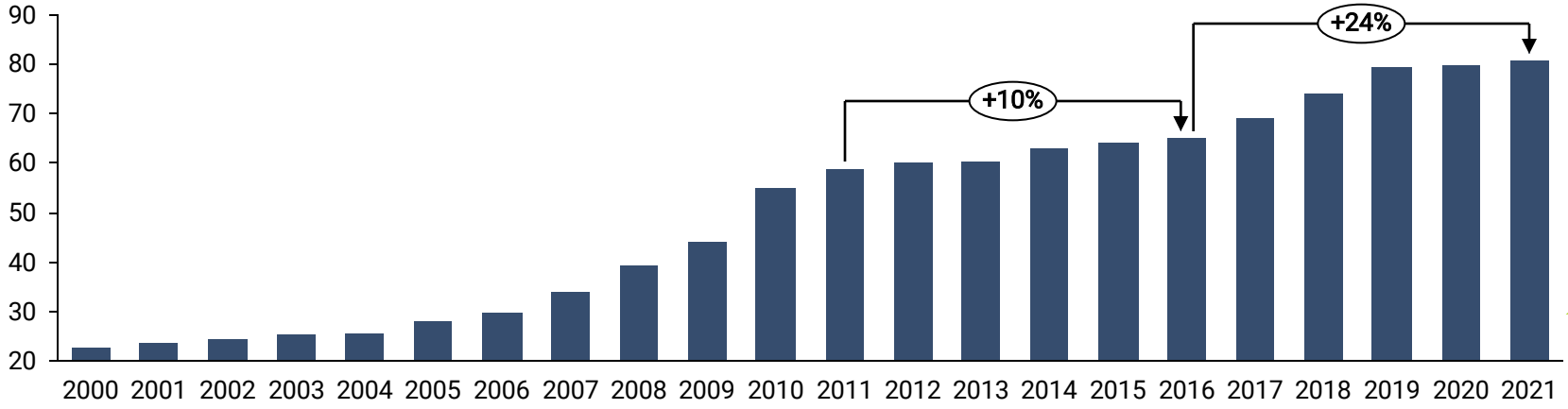
US and Far East Ethylene prices development



- Ethylene is one of the largest petrochemical building blocks
- US Ethylene stems from Natural Gas (Ethane) while Far East depends on crude (Naphtha)
- Higher crude oil prices therefore favouring US and Middle Eastern production based on this disconnection

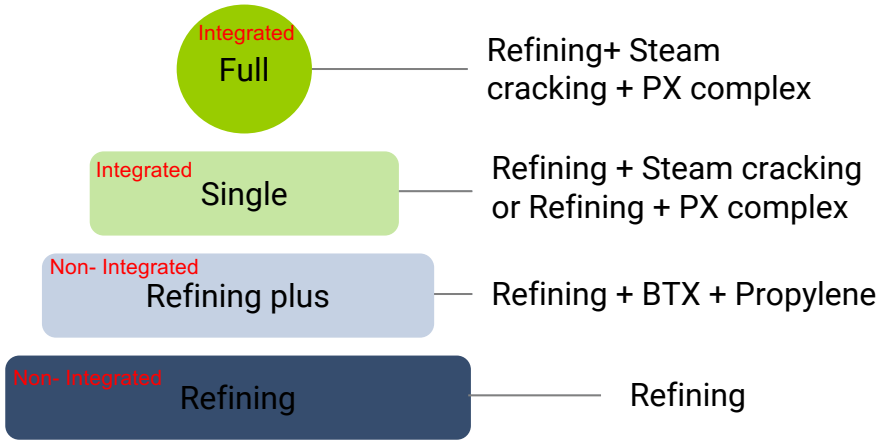
Source: ICIS, Odfjell, Argus

Strong outlook for petrochemical demand and a wish to maximise the value of its barrels has led to large investments in production facilities in the Middle East

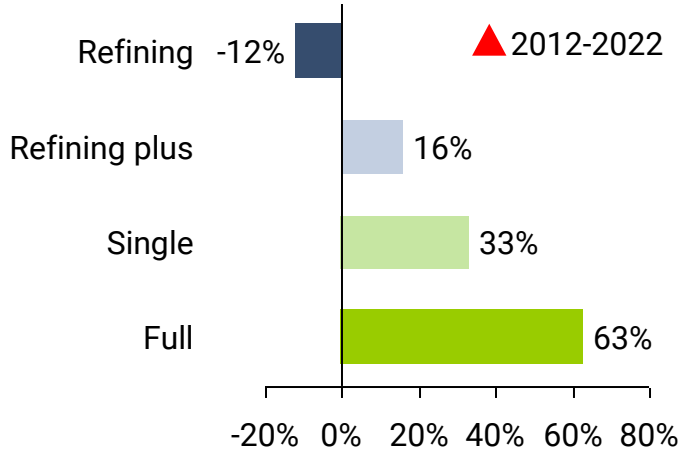


"We plan to double the production capacity of the petrochemical sector by 2030 with our local and foreign partners"
Saudi Aramco CEO, Amin Nasser
24 October 2017

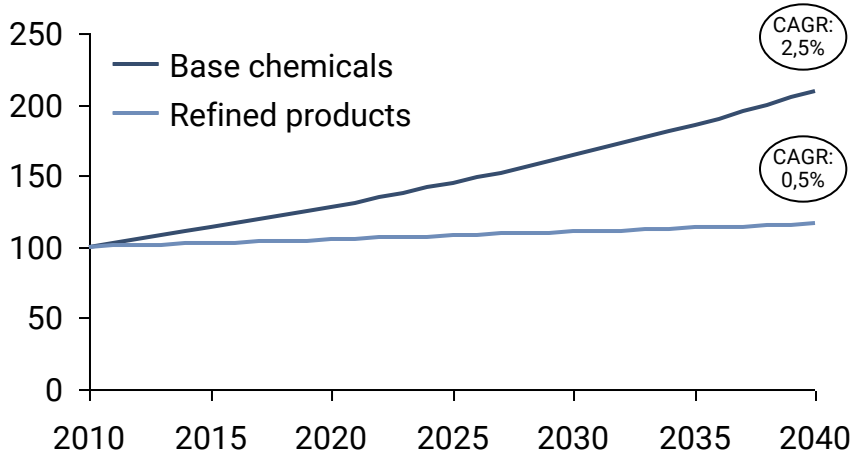
Review of integration levels



Middle East targeting full integration in hunt for margins...

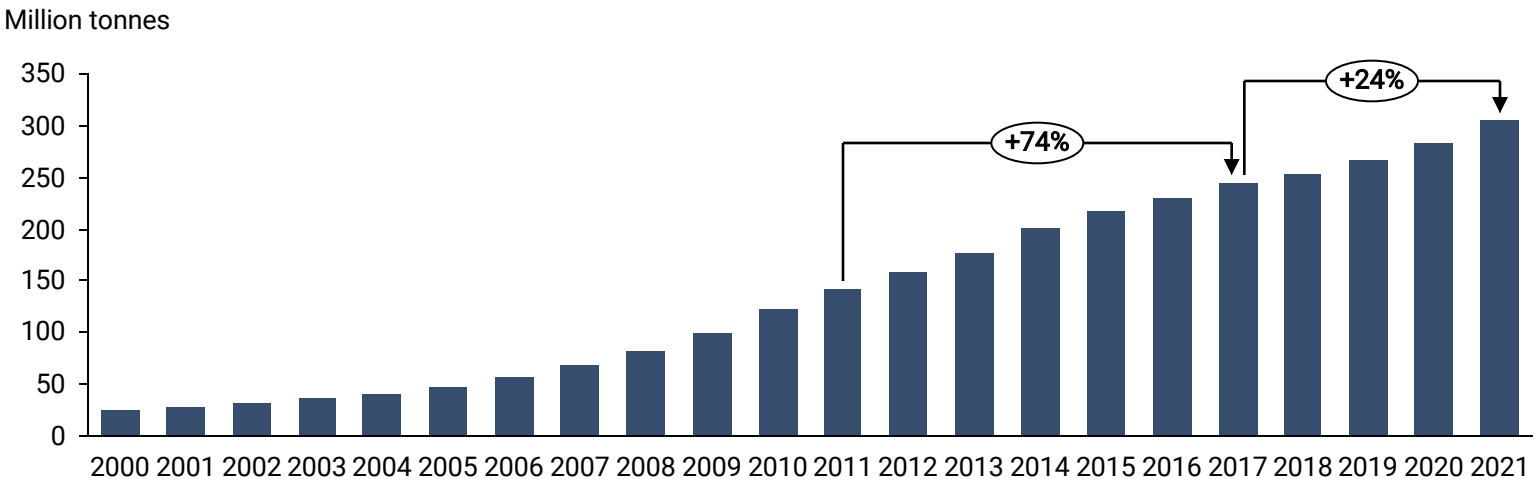


...and based on strong chemical demand vs refined product demand

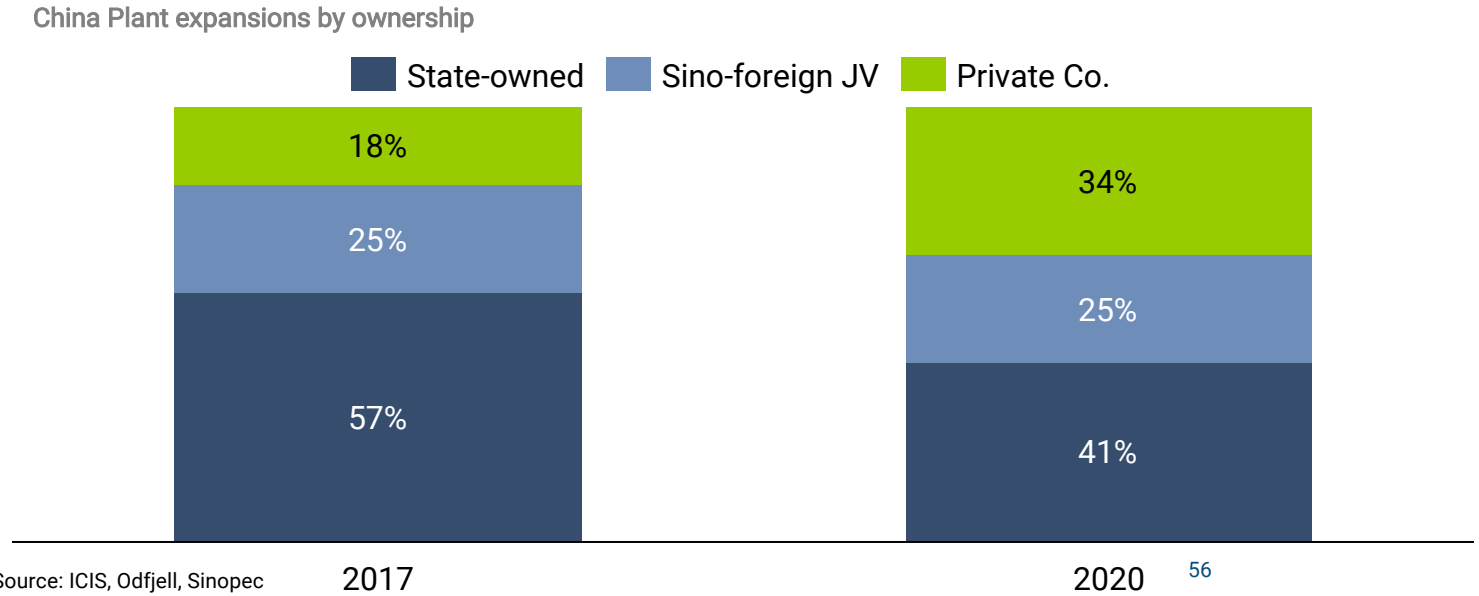


Source: ICIS, Odfjell, IHS

China wants exposure to a longer part of the value chain and is pushing towards self-sufficiency of selected products…



- The petrochemical sector is still considered “young” in China
- Planned capacity start-ups in 2018 and 2019 is delayed
- China will move closer to self-sufficiency for some products in 2020 and 2021.
- Reduced import needs will mainly involve aromatics
- Still, China will based on its huge demand growth continue to be short various products and remain the world’s largest driver for liquid chemical shipments



- The majority of investments has been made by private companies that will gain market share by 2020
- Government is not interfering on chemical plant licenses except for strict focus on safety and environment
- Chemical plants in China needs to be profitable and will be shut down if they loose money three years in a row…
- …Which makes the profitability of new plants that started construction in a low oil price environment interesting to follow going forward

Source: ICIS, Odfjell, Sinopec

...However, China's war on pollution is countering the expansions, hiking prices and hiking import demand for key liquid chemicals

Environment

ICIS Chemical Business

China pollution curbs a key turning point for chemicals

By JOHN RICHARDSON 22 September 2017 10:59 Source: ICB

Share Save Print

It is a Hurricane Harvey moment, in fact even bigger as far as the Asian chemicals industry is concerned. China's campaign to improve its air quality is causing major, and quite probably unprecedented, disruptions in supply up and down many of the region's chemicals value chains. Since January, there has been a big increase in the number of environmental inspections taking place throughout China.

Environmental impact on production

1. 70,000 chemical plants shut down
2. Receives production quotas
3. Asked to move facilities to sea-side

= Impact on chemical tankers

1. Supply shortages = higher imports
2. Utilisation is lower than normal
3. To shut down once new capacity is ready for production

Competitiveness

Competitiveness

1. Have old and outdated capacity
2. Asked to shut down if loosing money three years in a row

= Impact on chemical tankers

1. Outcompeted = higher imports
2. Investments have been made in a low-oil price environment that could accelerate shut-downs with higher oil prices

Attracting capital

Shut-downs have a wider meaning

1. Moving from quantity to quality
2. Key to attract foreign capital

= Impact on chemical tankers

1. Shut down potential is higher than just the environmental aspects
2. Selling chemicals in China to be done at a "level playing field". This will favour exporters to China

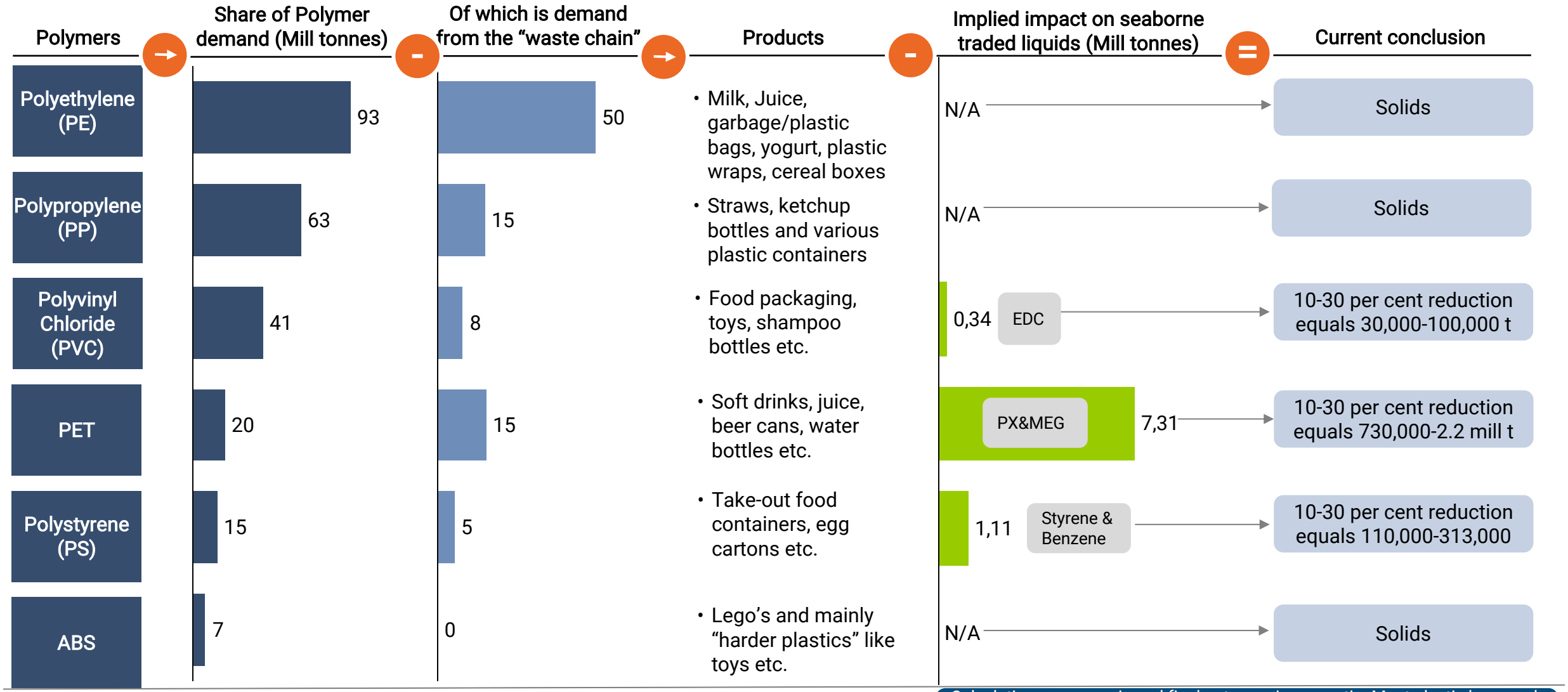
Shutdown potential

Final outcome:

1. A complete number of shutdowns is difficult to predict
2. Shutdowns to create a short-term pain in China and favour imports, but will help the industry long-term.
3. When adjusting for known and potential shut-downs, the "war on pollution" ensures strong imports despite increased domestic capacity

Source: ICIS, Odfjell

Increased focus on plastic waste is a mega trend approaching – However, this is not expected to significantly affect liquid shipments

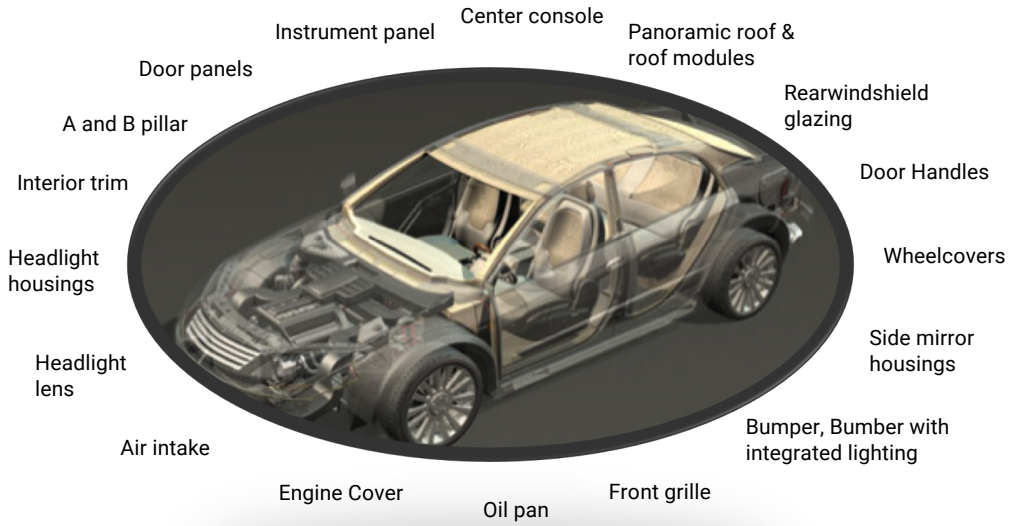


Source: Odfjell, IHS

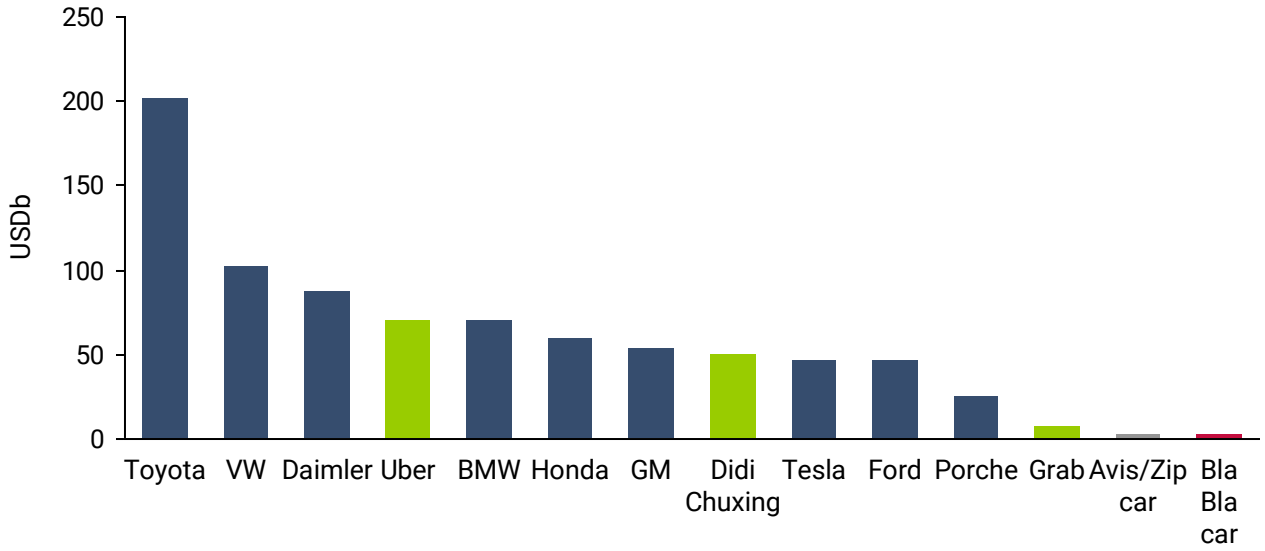
Calculations are generic and final outcome is unceratin. Most plastic bans and targets for recycling involves products in the PE chain. We do not expect a meaningful impact on tankers

The rise of electrical vehicle and car sharing could potentially be a long term factor for our markets – There will be both winners and losers

Examples of chemical components in a vehicle



Market cap of auto manufacturers



Impact examples...

+	Polyurethane
	Elastomers - tires
	Polyester
÷	Polyethylene
	Elastomers – Belts/hoses/gaskets
	Nylon

Less volumes?
More volumes?
New technologies?
Share of EV?
Share of Autonomy?
Share of Mobility?

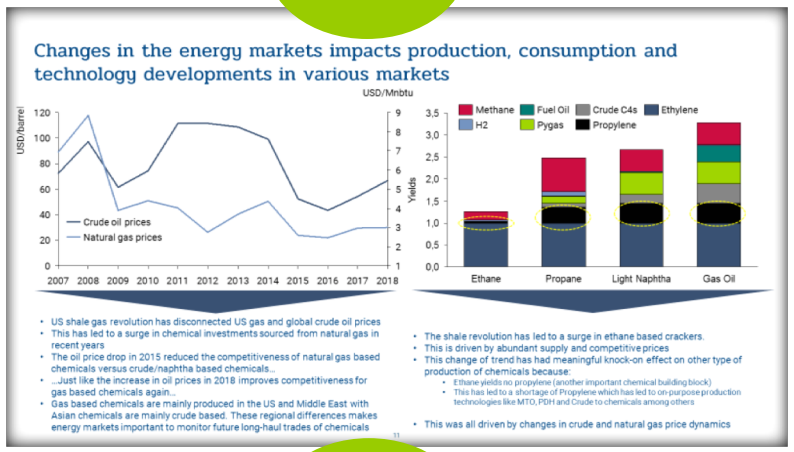
...Impact goes beyond car manufacturers and ultimately chemical shipping demand

Motor fuels distribution	Insurance	Parts suppliers
Raw material suppliers	Car dealers	Information technology
Power generation and distribution	Car distribution	Repairs and services
Oil production & refining	Car manufacturing	Road construction & maintenance
Car rental/hailing	Factory & equipment suppliers	Parking
Finance/legal	Chemical tanker markets	

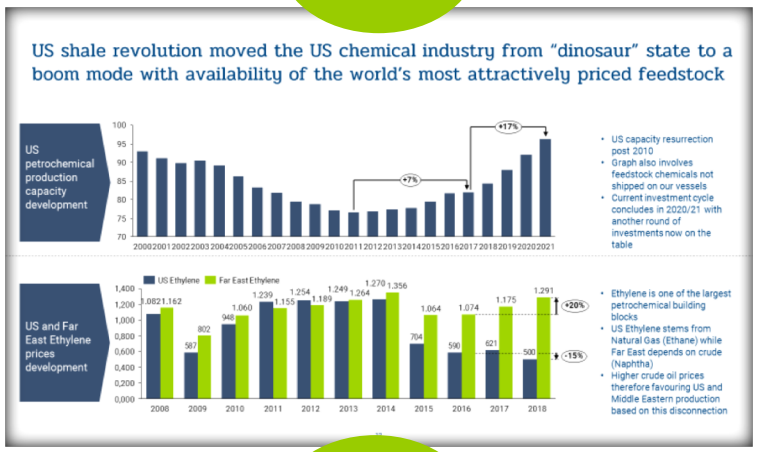
Source: Odfjell, IHS Markit RIW study, NYSE, * Private valuations applied on non-listed companies on previous fund raisings

Final remarks: These megatrends are long-term drivers that is and will shape future tonne-mile demand for chemical tankers

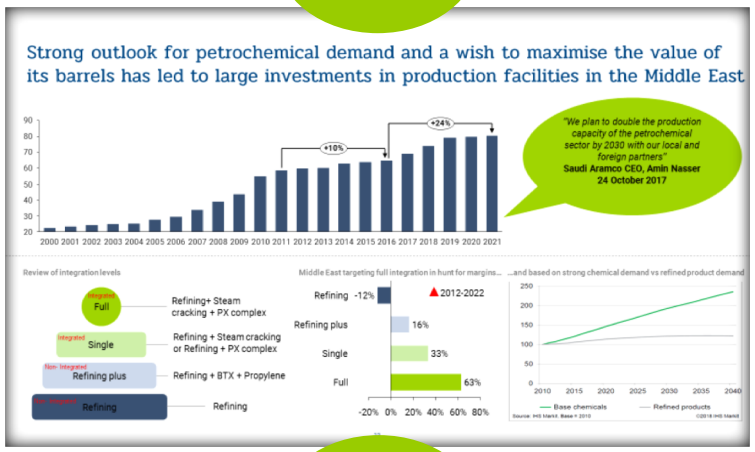
Crude vs Natural gas **+**



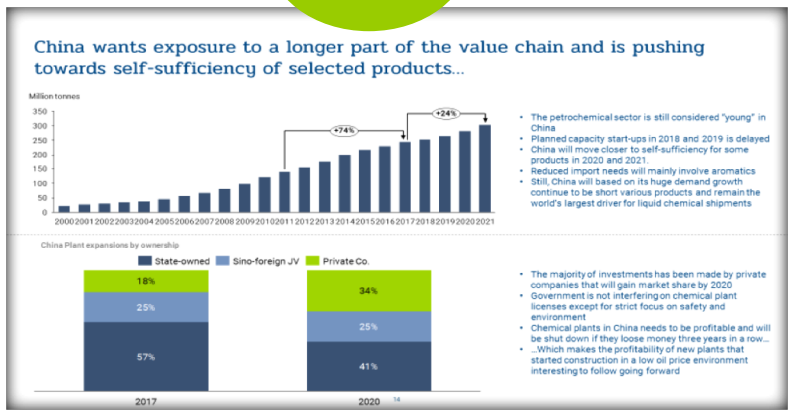
US Shale **+**



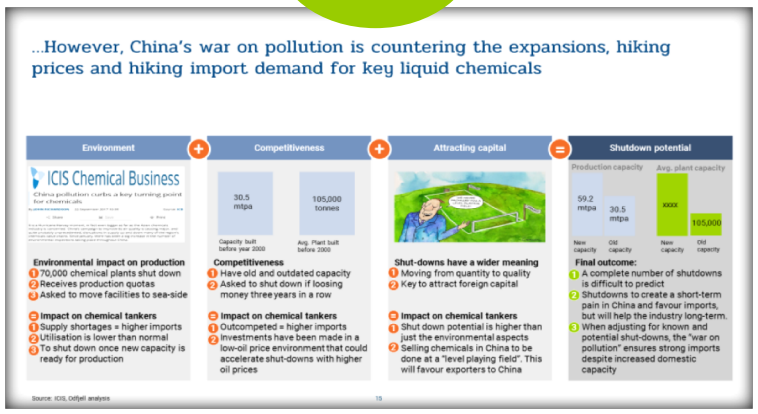
Vertical integration **+**



China domestic capacity **-**



"War on pollution" **+**



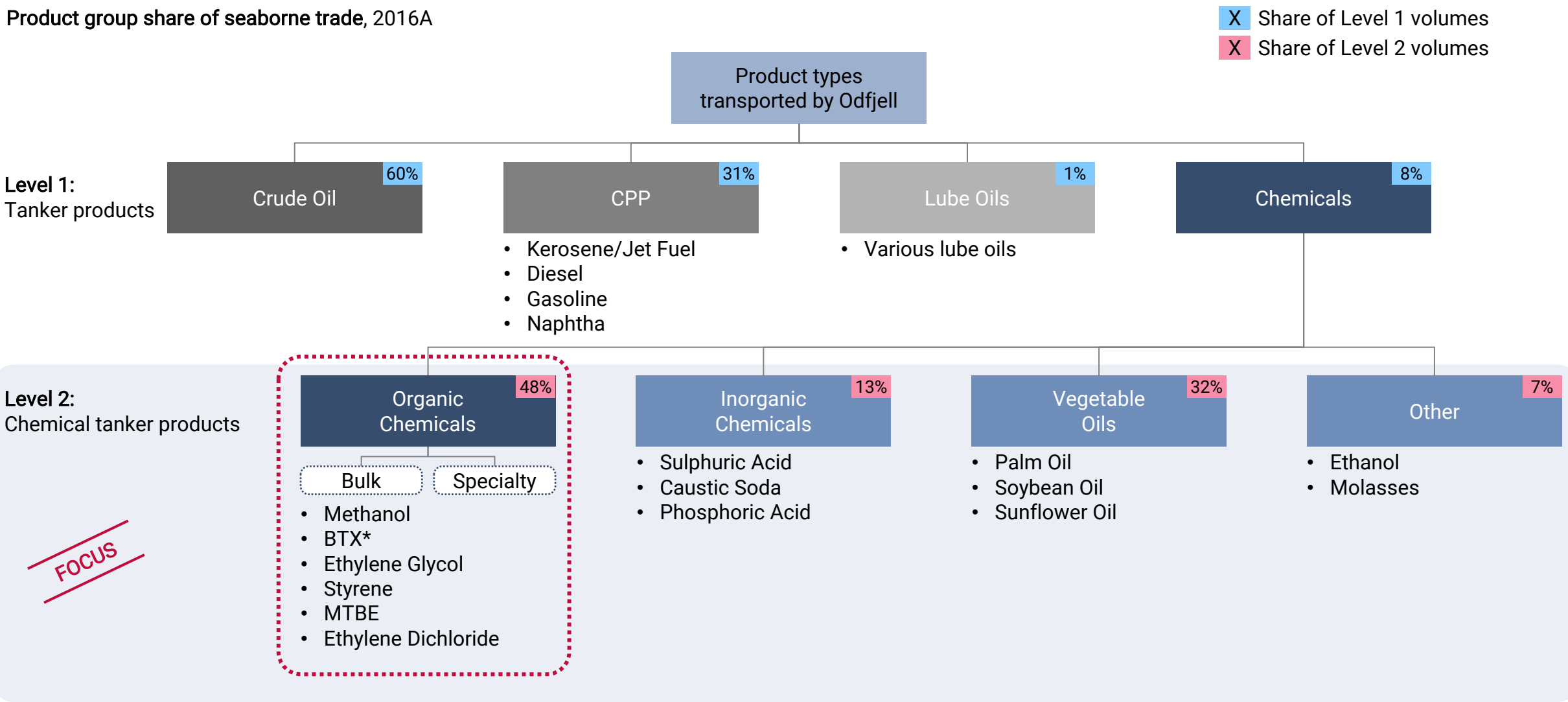
EV & Mobility **?**

Agenda

- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
  - Organics
  - Inorganics
  - Vegetable Oils
  - Others
- Product studies
- Chemical tanker supply
- Key conclusions

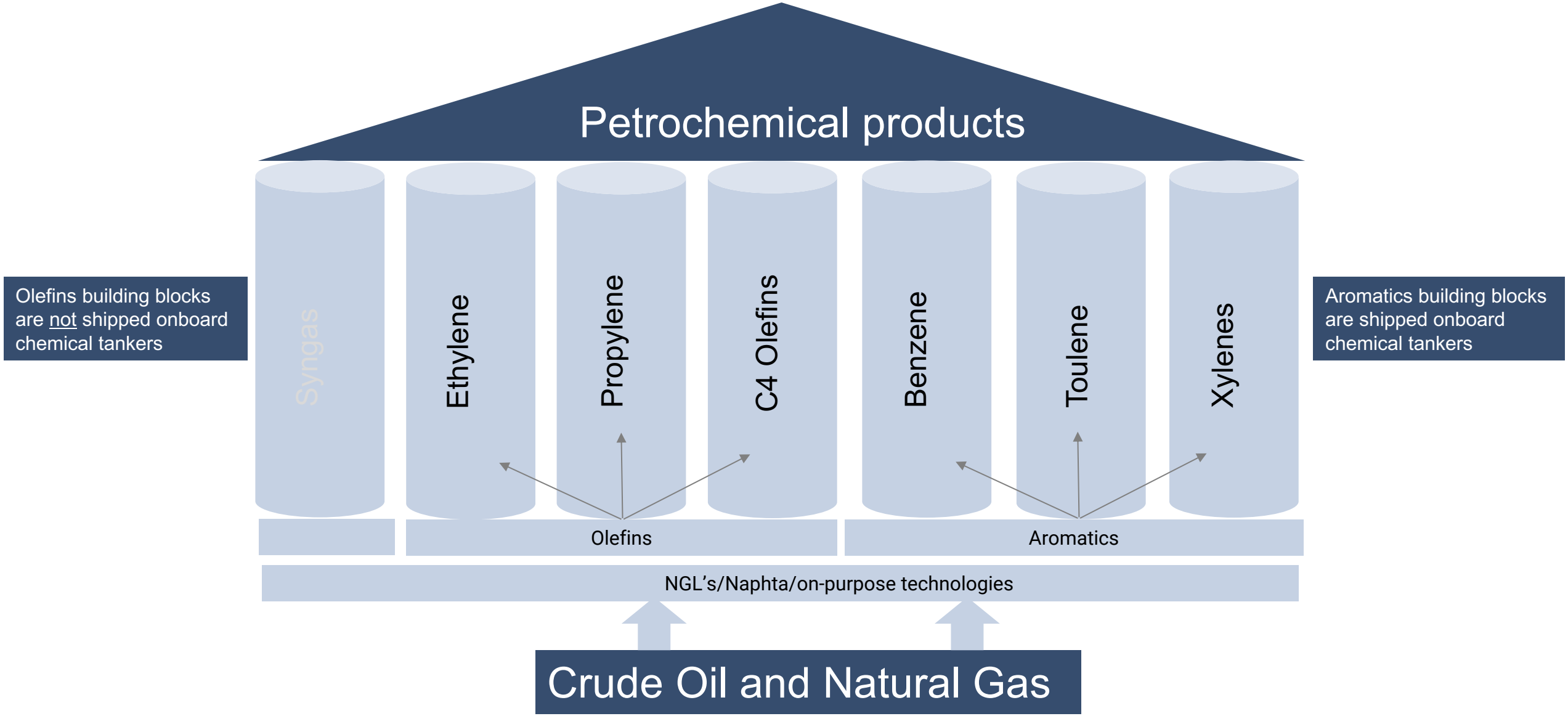
Chemicals account for ~8% of total tanker products trade, and organic chemicals is the largest category within the chemicals group

Product group share of seaborne trade, 2016A



Source: ICIS, Clarksons Platou, Odfjell * Benzene, Toluene and Xylene's

Organic chemicals are carbon based chemicals with seven building blocks for production of chemical products

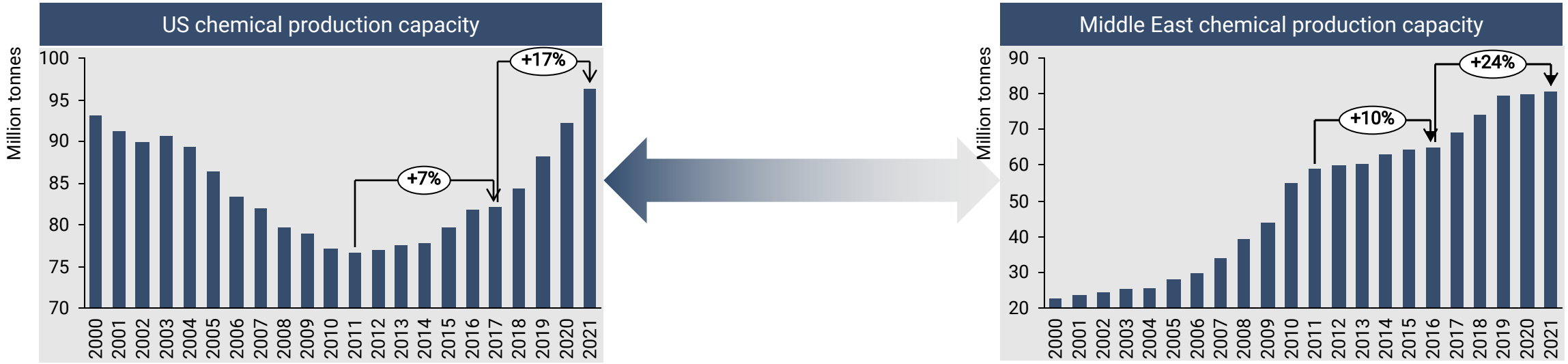


Source: Odfjell, IHS

Many factors could affect future shipping demand – but key drivers are visible years in advance

- 2005-2008 – Iron ore production surges in Brazil and Australia and dry bulk carrier tonne-mile demand reaches double digit levels (Brazil-China arb on top of this)
- 2010-2011 – LNG production accelerates on the delayed start-up of worlds largest liquefaction capacity in Qatar and LNG carrier demand grow at double digits
- 2014-2015 – US LPG export capacity has grown from 3 mtpa to 38 mtpa and VLGC demand climbs by more than 30% in 2015
- 2015 – New «OPEC policy» and crude tanker demand accelerates from 1-2 per cent in previous years to 5%. (Not visible in advance)
- 2015 – New large refinery capacity ramps up in India and Middle East with Product tanker tonne-mile demand growing by 9% (arb. trades on top of this)
- 2017 – Iron ore production grows again with Serra Sul project in Brazil ramping up in Q1 2017. Capesize rates reaches USD10,106 (Q1 16 rates at USD1,424)
- 2017 – US LNG production increases together with start-up of delayed Australian production capacity. LNG carrier demand outgrows supply growth of 8%

So what about chemicals?



Source: Odfjell, ICIS

Several of the main Organic Chemicals are used as feedstock for more refined grades of chemicals

Overview of main Organic Chemicals (trade and production figures from 2016)

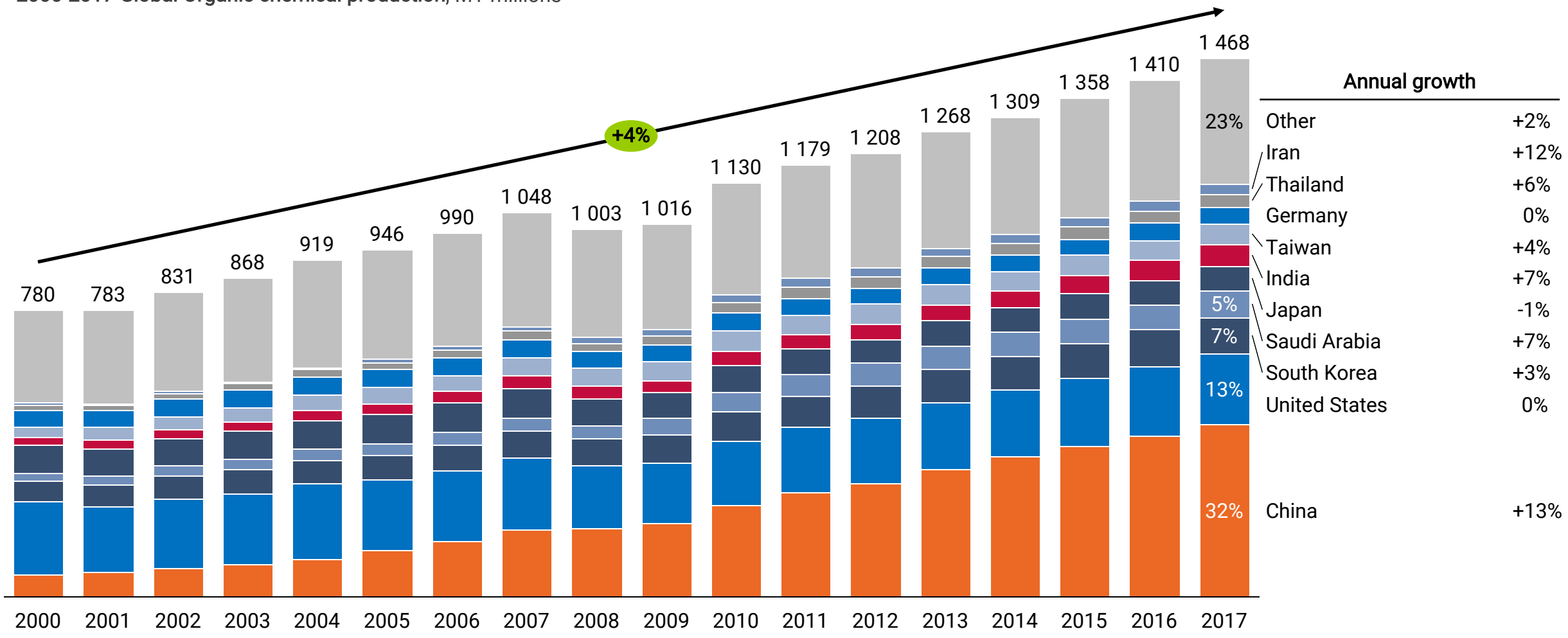
Product		Description	Use	Global production MT mill.	Seaborne trade MT mill.	IMO-type requirement[1]
Methanol	CH_3OH	• Colourless, flammable, volatile and poisonous	• Mainly used as feedstock for other chemicals (30% fuel, 30% formaldeh., 10% acetic acid)	88	28	IMO 3
Xylenes	$(CH_3)_2C_6H_4$	• Colourless, nonviscous, flammable, insoluble in water	• Feedstock for Xylene derivatives (90% para-xylene, 9% ortho-x., 1% meta-x.)	93	19	IMO 2
Ethylene Glycol	$C_2H_6O_2$	• Colourless, odourless, syrup-like toxic liquid, miscible with water	• Main use is as PET and bottles (~80% of use) • Second use as Antifreeze component (10%)	26	12	IMO 3
Styrene	C_8H_8	• Colourless, oily liquid	• Used as feedstock for derivatives (40% general polystyr., 22% expandable polystyr.)	29	8	IMO 3
Benzene	C_6H_6	• Colourless, highly flammable and volatile, gasoline-like odour	• Feedstock for Benzene derivatives (50% ethylbenz., 20% cumene, 12% cyclohex.)	47	7	IMO 3
MTBE	$C_5H_{12}O$	• Colourless, flammable volatile	• Used as a gasoline additive, improving the octane content	22	6	IMO 3
Ethylene Dichloride	$C_2H_4Cl_2$	• Colourless, oily and flammable • Chloroform-like odour	• 95% used for manufacturing vinyl chloride monomer (VCM) which goes into PVC	50	3	IMO 2
Toluene	C_7H_8	• Clear, water-insoluble with the odor of paint thinner	• ~50% used for production of Benzene/Xylene • ~15% used in the solvent market	28	3	IMO 3
Acetic Acid	$C_2H_4O_2$	• Acid with antibacterial and antifungal properties	• Mainly used in production of VAM • Also used in production of PTA (bottles)	14	2	IMO 3
Vinyl Acetate	$C_4H_6O_2$	• Colourless liquid with sweet odour	• 80% goes into production of PVA which is used in adhesives and paint	6	2	IMO 3
Other		• Several other organic chemicals exist, but seaborne trade is primarily concentrated around the major products		1 008	21	

1. Required IMO-classification of vessel transporting substance

Source: Drewry, ICIS, The Chemical Company, Odfjell

Global production of organic chemicals grown at 4% per year since 2000 - China and US are the biggest producers with 45% of the volume

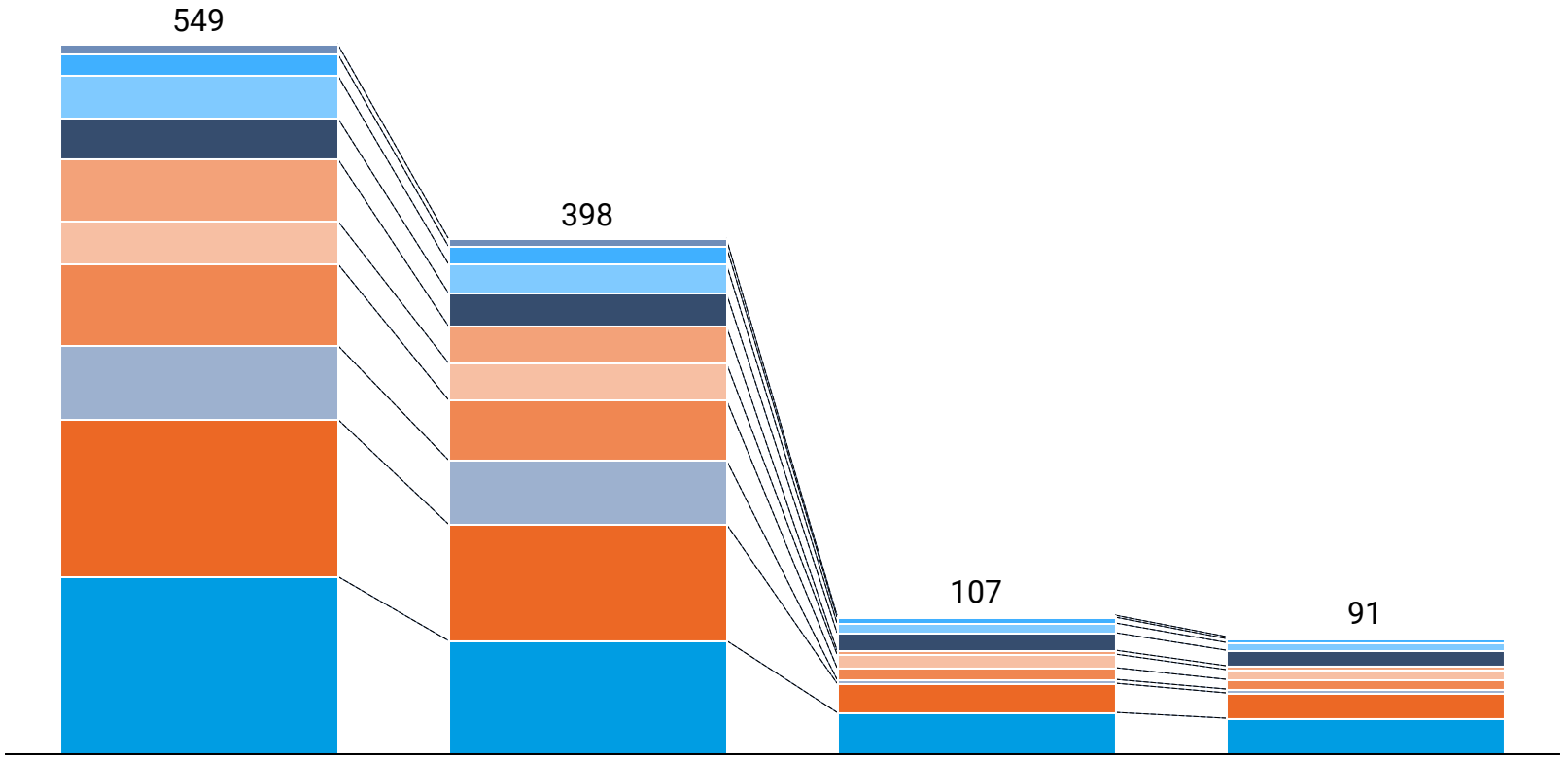
2000-2017 Global Organic chemical production, MT millions



Source: ICIS, Odfjell

Seaborne trade of Organic Chemicals is ~15% of global plant capacity. ~30% of capacity not utilized and only ~25% of production is exported

Top-10 seaborne traded organic chemicals plant capacity, production, trade and seaborne trade 2016, MT millions



Seaborne trade as share of plant capacity

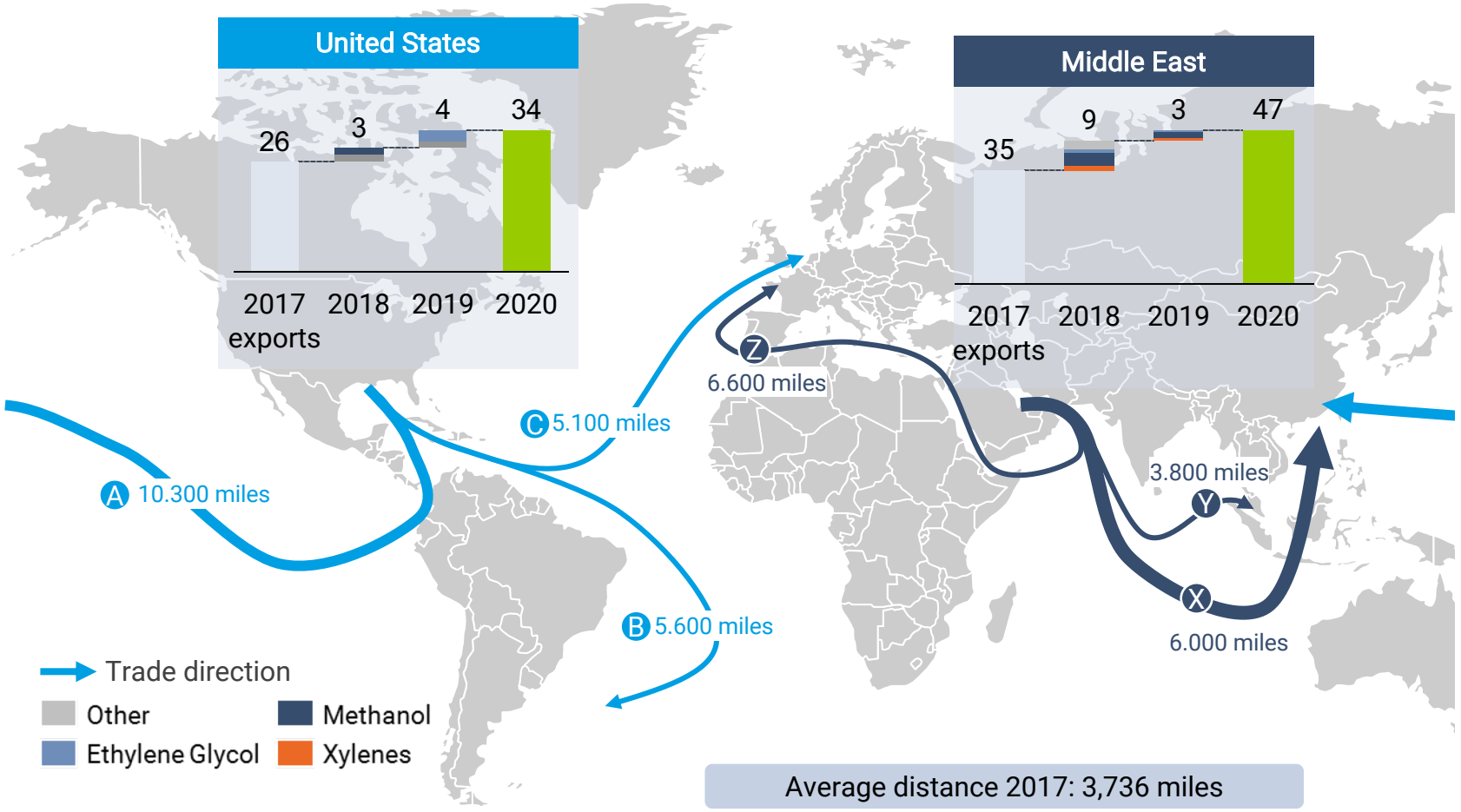
Vinyl Acetate	22 %
Acetic Acid	14 %
MTBE	19 %
Ethylene Glycol	39 %
Toluene	6 %
Styrene	25 %
Benzene	11 %
Ethylene Dichloride	5 %
Xylenes/incl Paraxylene	16 %
Methanol	20 %

Share of plant capacity	100%	73%	19%	16%

Source: ICIS, Drewry, Odfjell

New capacity for Organics mainly come in US and Middle East which will have a significant impact on tonne-mile demand

New US and Middle East capacity of organic chemicals, MT millions cumulative



Impact on chemical tanker tonne-miles demand
Total tonne-mile growth 2017[1]-2020

Case	Assumptions	Demand impact
High	Majority of volumes on longest routes	+3% +4% Tonne demand
Base	Equal export split based on length of routes	+2% +4% Tonne Demand
Low	Export split favouring shorter routes	+1% +4% Tonne Demand

1. Total market 2017: 901 billion tonne-miles including organic, inorganic and vegoil products

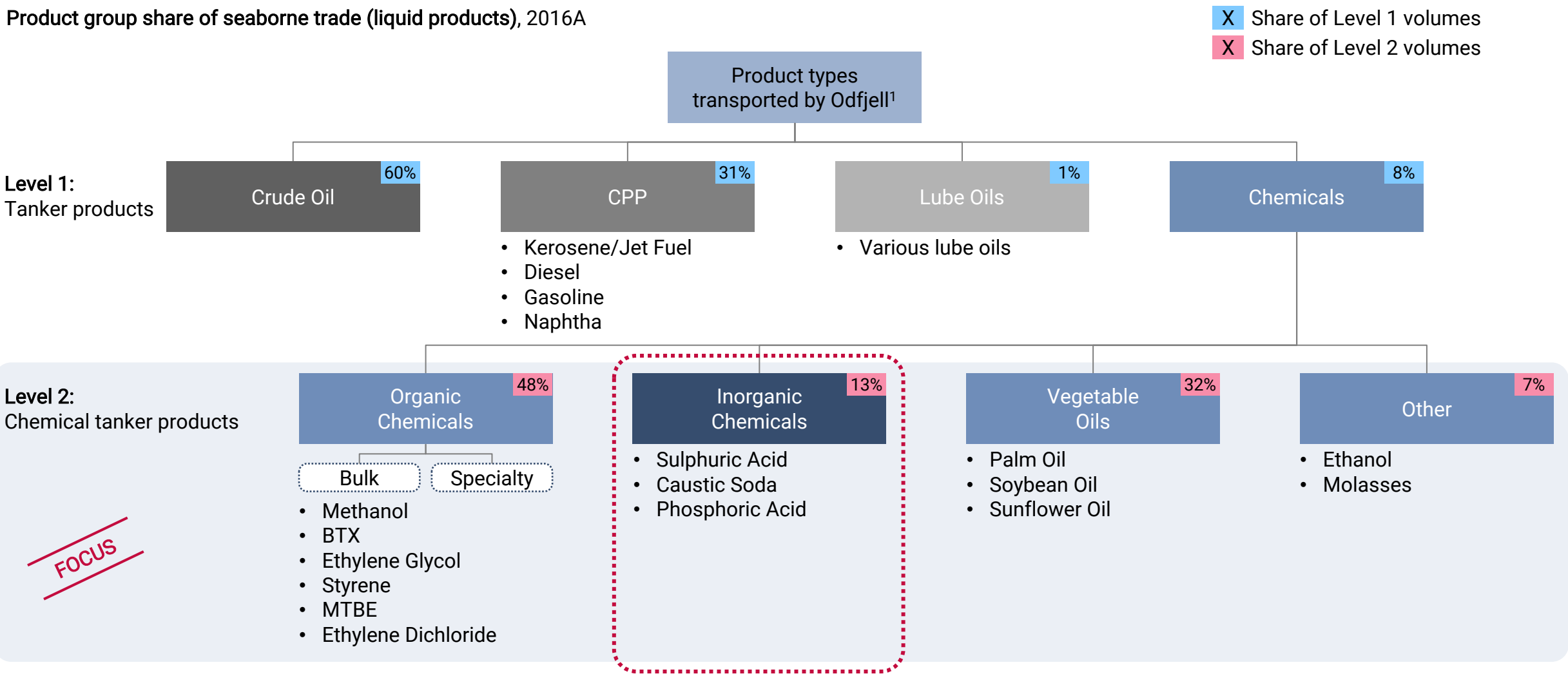
Source: ICIS, Drewry, Odfjell

Agenda

- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
  - Organics
  - Inorganics
  - Vegetable Oils
  - Others
- Product studies
- Chemical tanker supply
- Key conclusions

Inorganic Chemicals constitute 13% of the Chemical Tanker products seaborne trade

Product group share of seaborne trade (liquid products), 2016A



Source: ICIS, Clarksons Platou, Odfjell

The major user of Inorganic Chemicals is the fertilizer industry – due to the corrosive nature of the products, inorganics are typically transported by stainless steel tankers

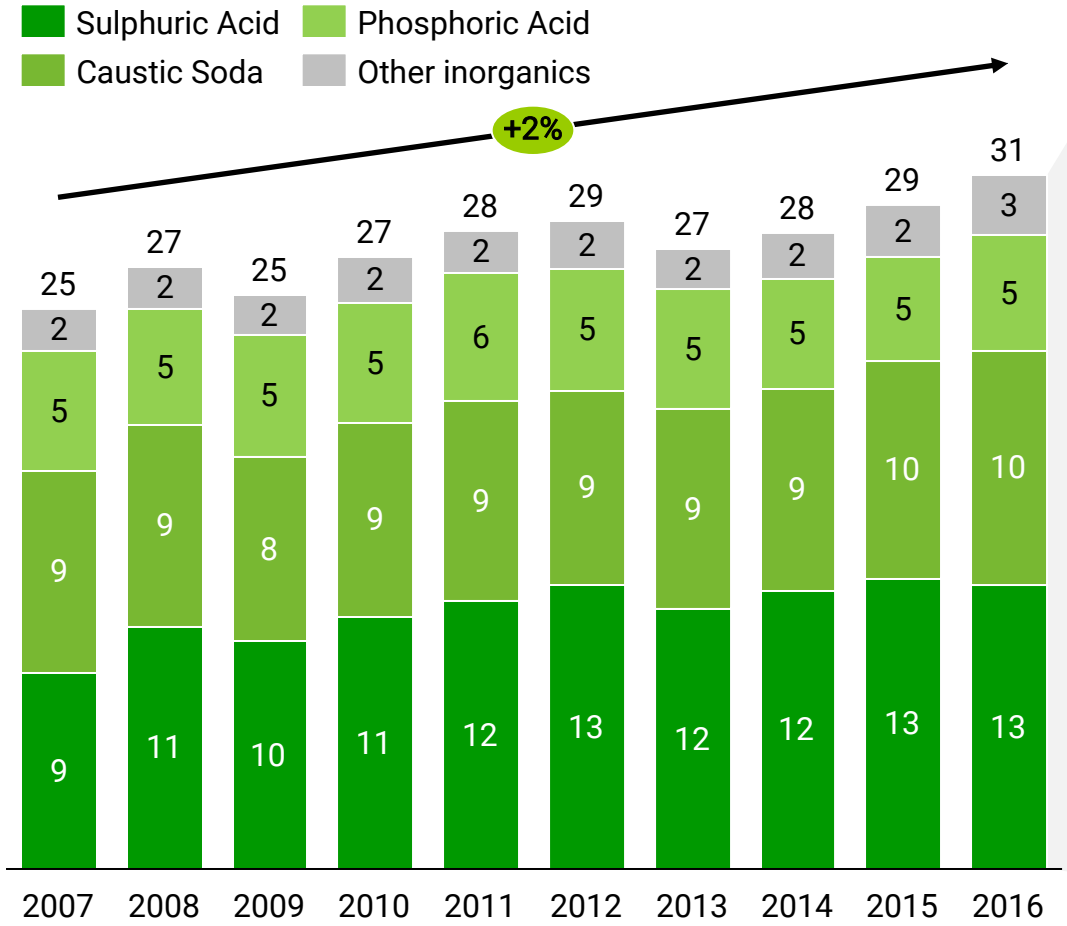
Overview of main Inorganic Chemicals (trade and production figures from 2016)

Product	Description	Use	Global production, MT mill.	Seaborne trade, MT mill.	IMO-type requirement[1]
Sulphuric acid 	• Mineral acid (H_2SO_4) • Produced from reaction between sulphur, water and oxygen	• ~55% of sulphuric acid is used for production of phosphate fertilizers • ~15% of sulphuric acid is used as feedstock for production of chemicals • ~10% goes into metal industry	272	13	IMO 3
Caustic soda 	• Ionic compound (NaOH) • Produced using chloralkali process on NaCl	• ~25% used as feedstock for other inorganic (and organic) chemicals • ~15% used in pulp and paper industry • ~10% used in production of alumina from bauxite	82	10	IMO 3
Phosphoric acid 	• Mineral acid (H_3PO_4) • Produced from phosphate rock	• The fertilizer industry consume ~90% of phosphoric acid produced • Also used as a food additive and in rust-removal products	43	5	IMO 3
Other	• Several other inorganic chemicals exist, but seaborne trade is primarily concentrated around the major products		N/A	3	

Source: Drewry, ICIS, Beroe, The Chemical Company, Odfjell

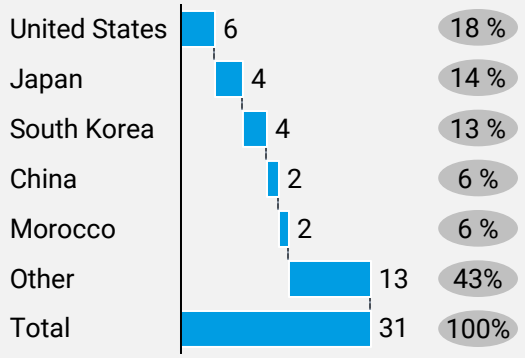
Seaborne trade of Inorganic Chemicals has grown by ~2% p.a. since 2007

Historic development in seaborne trade of Inorganic Chemicals, MT mill.

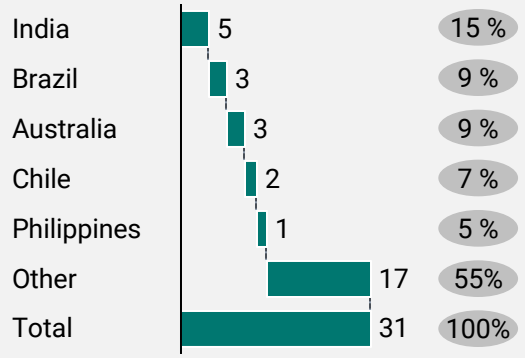


Main seaborne trade countries

Exporters (2016), MT mill.



Importers (2016), MT mill.

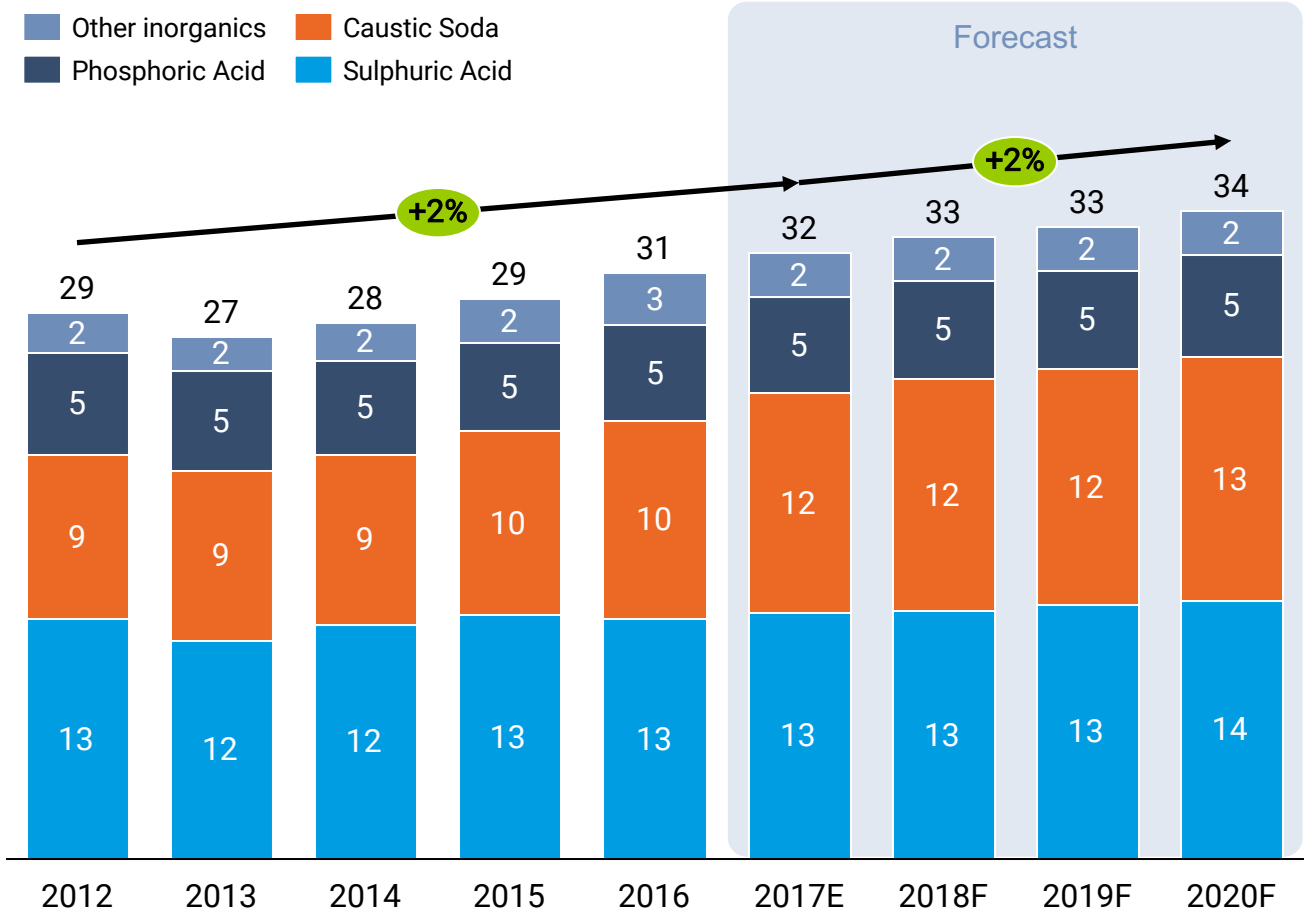


- Seaborne trade volumes of Inorganic Chemicals has grown by ~2% p.a. since 2007
- Overall volume growth linked to general GDP growth as inorganics are important input in fertilizer production
- Inorganic chemicals are typically consumed close to production sites due to their corrosive and aggressive nature, and exports are typically only excess production
  - About 15% of inorganic consumption is transported on ships
- Large importers such as India use inorganics to cover demand from production of fertilizers, metal processing and waste water treatment

Source: ICIS, Drewry, Odfjell

We expect 2% p.a. volume growth for Inorganic Chemicals – main growth driver is European imports of caustic soda

Expected development in seaborne trade of Inorganic Chemicals, MT mill.



Growth drivers

- We expect historic pattern of production for local consumption to persist due to the aggressive nature of these chemicals, but surplus production will continue to be exported
- For phosphoric and sulphuric acid we also expect historic trade pattern to continue with main importers being large fertilizer consumers such as India and Brazil
- For caustic soda we expect that the European shortage of MT ~1 mill. will be met by US and/or Middle Eastern producers who has spare capacity and a cost advantage

Potential upsides

- India recently adjusted GST for imported phosphoric acid down from 18% to 12%, and further political changes could be positive for trade of phosphoric (and sulphuric) acid
- The world is currently short Sulphuric Acid and we could see new investments take place
- Increased growth in Chinese consumption of caustic soda could reduce Chinese exports and lead other Asian countries to seek import from deep-sea areas

Potential downsides

- Political changes (e.g. GST increases) would reduce trade

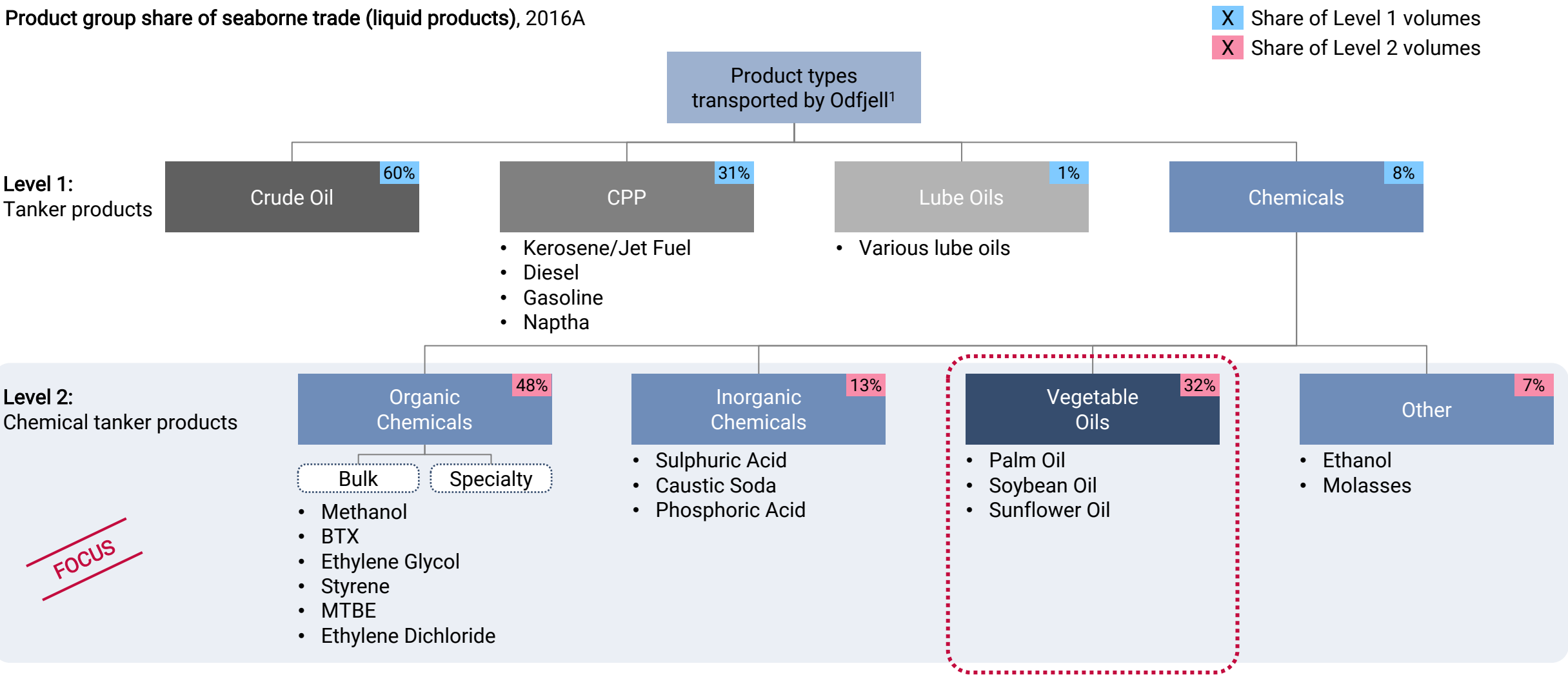
Source: Odfjell, ICIS, Drewry

Agenda

- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
  - Organics
  - Inorganics
  - Vegetable Oils
  - Others
- Product studies
- Chemical tanker supply
- Key conclusions

Vegetable Oils constitute ~30% of the Chemical Tanker products seaborne trade

Product group share of seaborne trade (liquid products), 2016A



Source: ICIS, Clarksons Platou, Odfjell

Vegetable oils are derived from various plants through either pressing, cracking or refining processes

Overview of main Vegetable oils (trade and production figures from 2016)

Product	Production	Use	Global production, MT mill.	Seaborne trade, MT mill.
Palm Oil 	• Derived from the fruit of oil palms • After milling, palm oils are produced from refining processes • Mainly produced in S.E. Asia	• Primarily used as a cooking oil and substitute for butter/trans fat • Also used to produce methyl ester and biodiesel	59	41
Soybean Oil 	• Derived from soybeans • Soybeans are cracked and heated, and oil is extracted • Produced in N. and S. America	• Primarily used for frying and baking • Industrial application includes biodiesel and paint/ink component	52	10
Rapeseed/ Canola Oil 	• Extracted from the seeds of the bright-yellow rape plant • EU is a major producer	• Primarily used as a cooking oil • Industrial application includes lubricants and plastics	25	3
Sunflower Oil 	• Extracted using chemical solvents or through pressing • Largest producers are Ukraine and Russia	• Commonly used in food as a frying oil, but also for cosmetic formulations as an emollient	16	11
Other 	• Several other Vegoils exist (e.g. Fish Oil and Olive Oil), and constitute ~25% of global production volume		53	14

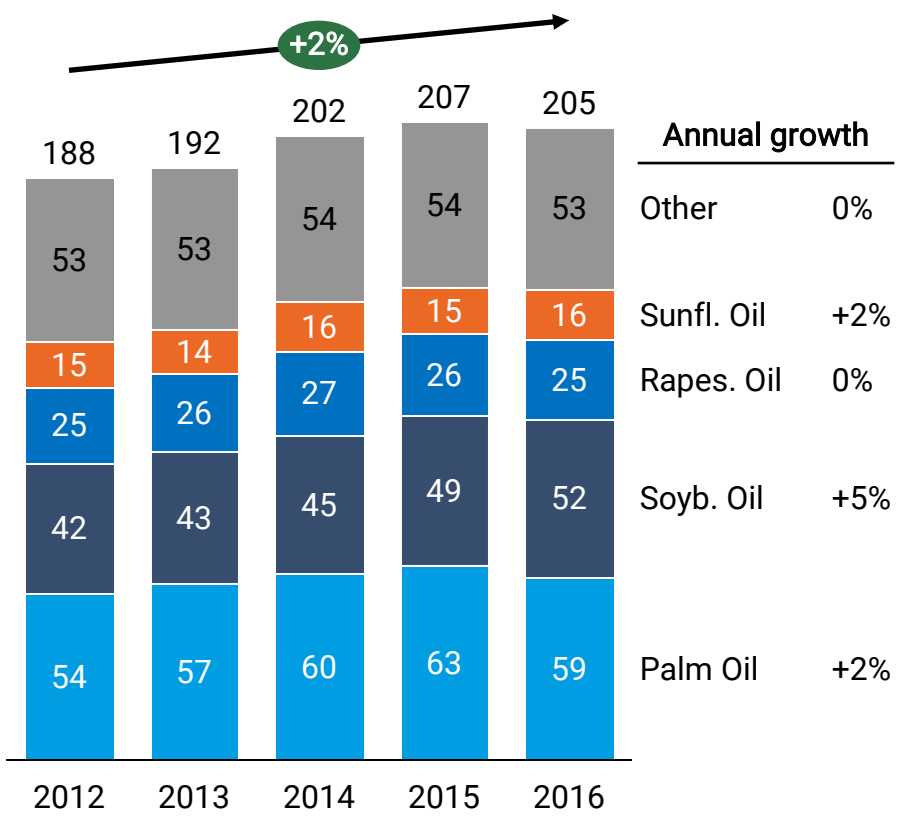
Source: ICIS, Odfjell

Global Vegoil production is growing at ~2% per year – Five countries produce more than half of the global production

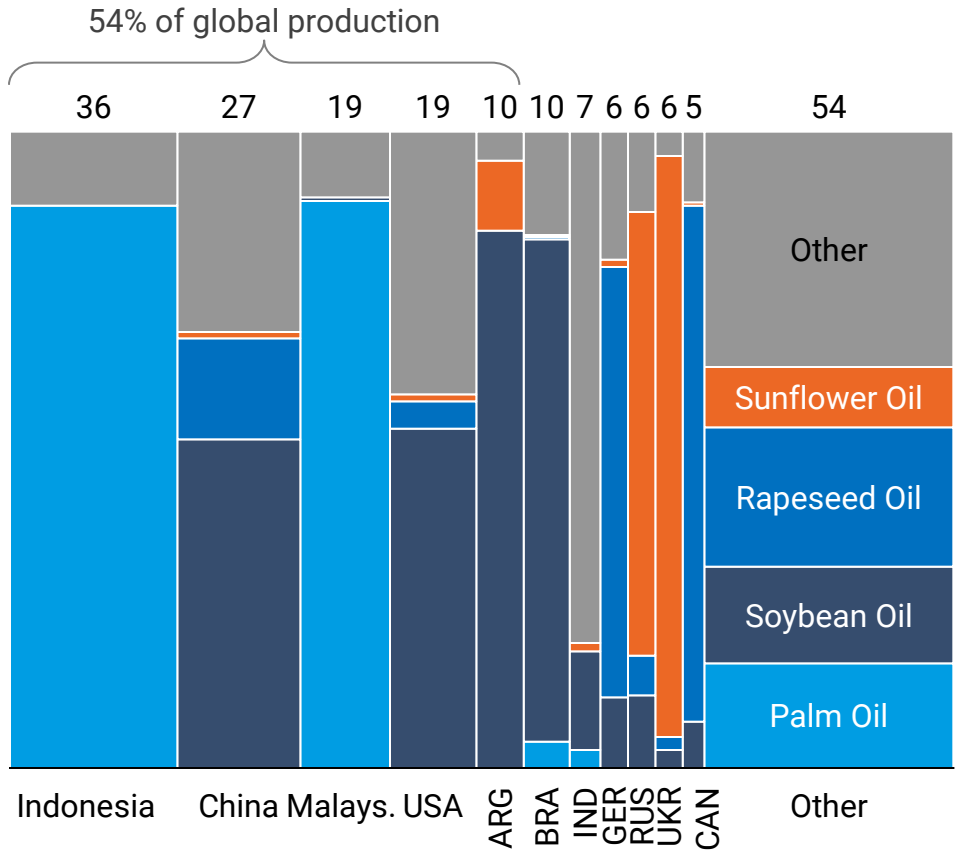
Observations

- Global Vegoil production has grown by ~2% per year since 2012
- Palm Oil and Soybean Oil are the largest vegetable oils
- Production is primarily driven by increased consumption which again is a product of general population growth
- Palm Oil production was impacted by El Nino in 2016 but is expected to recover in 2017
  - Warming of the Eastern Pacific gave dry weather across S.E. Asia which lowered palm yields in Malaysia and Indonesia
- Soybean Oil production increased due to Palm Oil decline and biodiesel demand

Global Vegoil production (2012-2016), MT millions



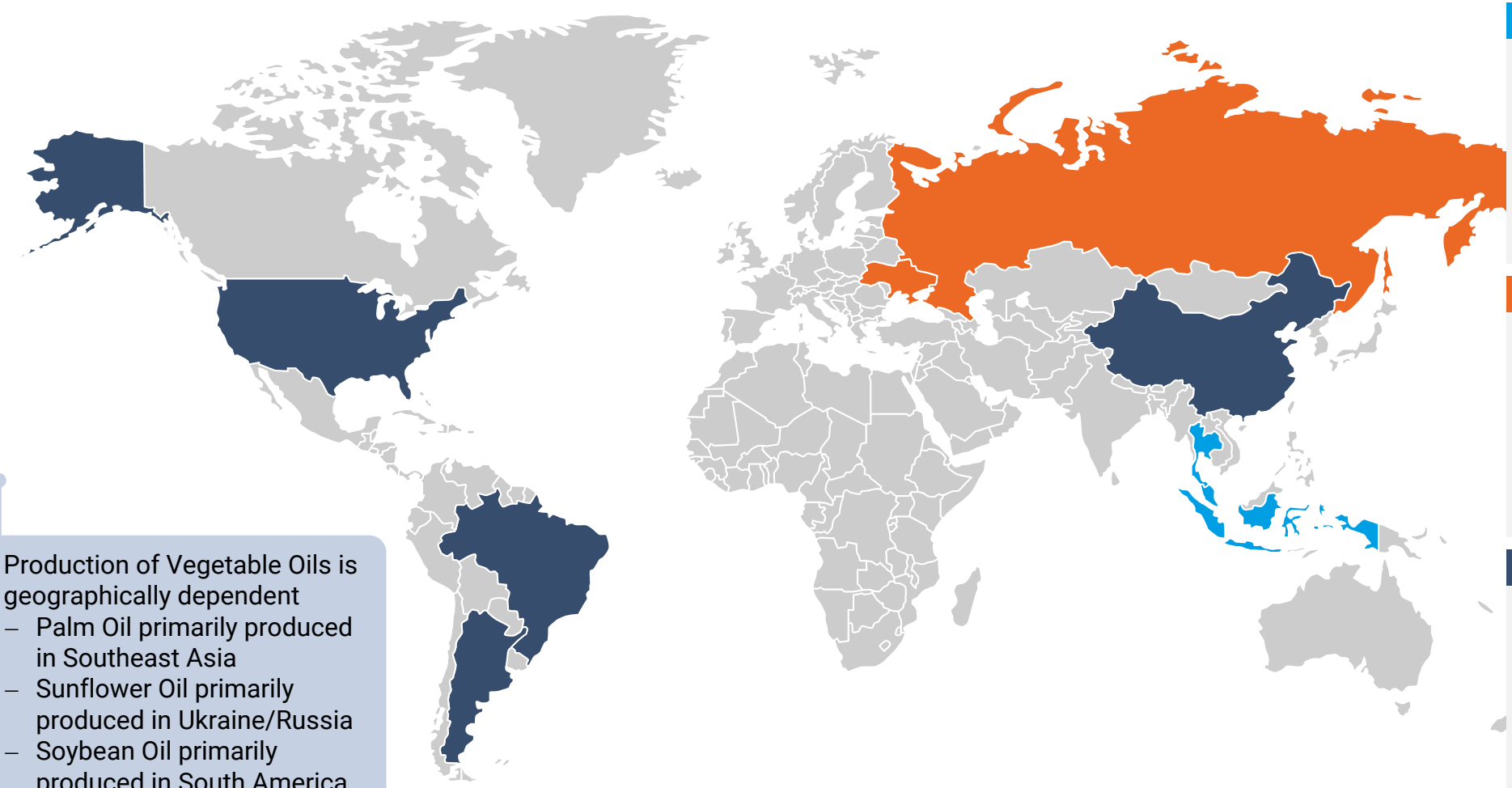
Vegoil production per producer country, 2016



Source: Oil World, Odfjell

The main traded Vegetable Oils are produced in different areas of the world

Overview of largest producers of Vegetable Oils 2016



- Production of Vegetable Oils is geographically dependent
  - Palm Oil primarily produced in Southeast Asia
  - Sunflower Oil primarily produced in Ukraine/Russia
  - Soybean Oil primarily produced in South America

Palm Oil

Largest producers (2016), MT mill.

Indonesia	32
Malaysia	17
Thailand	2
Colombia	1
Nigeria	1
Other	6

Sunflower Oil

Largest producers (2016), MT mill.

Ukraine	5
Russia	4
Argentina	1
Turkey	1
France	0
Other	5

Soybean Oil

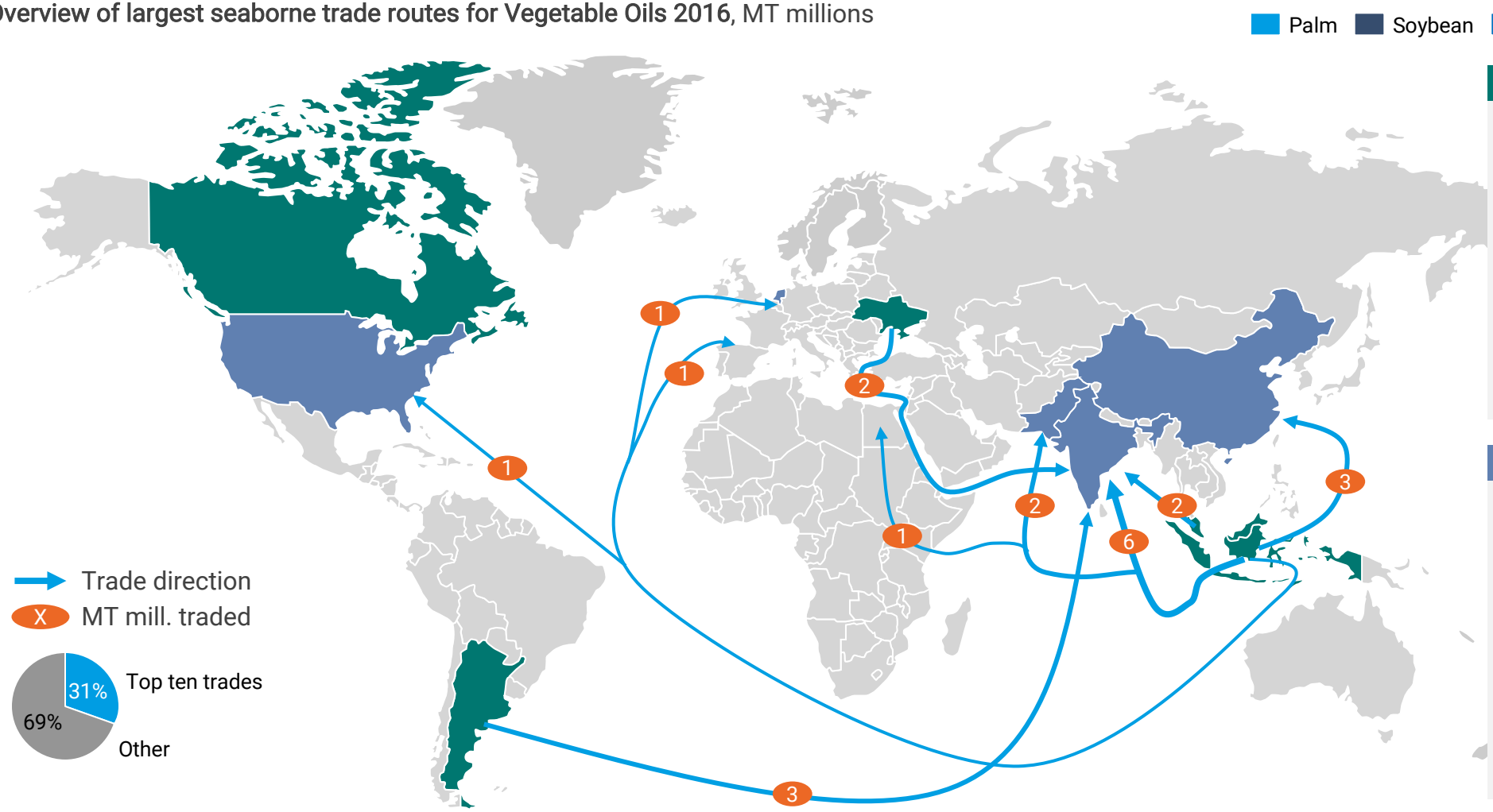
Largest producers (2016), MT mill.

China	14
USA	10
Brazil	8
Argentina	9
India	1
Other	10

Source: ISTA Mielke GmbH, Odfjell

54% of seaborne Vegoil trade is export from Southeast Asia – Intra-regional imbalances also drive short-sea trade (e.g. Intra-Asia)

Overview of largest seaborne trade routes for Vegetable Oils 2016, MT millions



Vegoil exporters

Largest exporters (2016), MT mill.

Indonesia	26	32%
Malaysia	17	22%
Argentina	7	8%
Ukraine	5	6%
Canada	3	4%
Other	22	28%

Vegoil importers

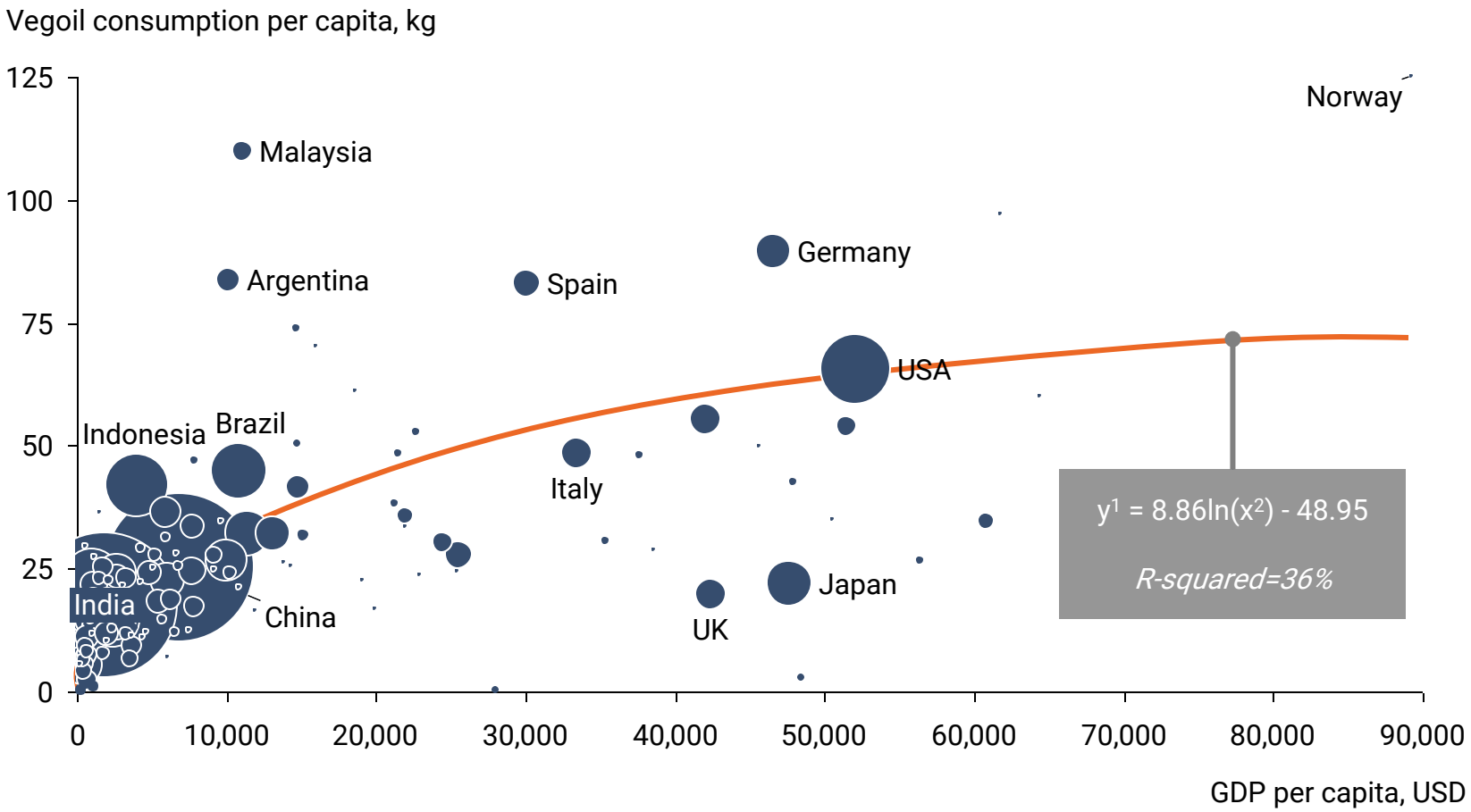
Largest importers (2016), MT mill.

India	14	18%
China	8	10%
USA	5	6%
Netherlands	3	4%
Pakistan	3	4%
Other	47	58%

Source: Oil World, Odfjell

Increased wealth will drive Vegoil consumption. GDP per capita explains 1/3 of the variance in Vegoil consumption per capita

Correlation between wealth and Vegoil consumption per country, 2016

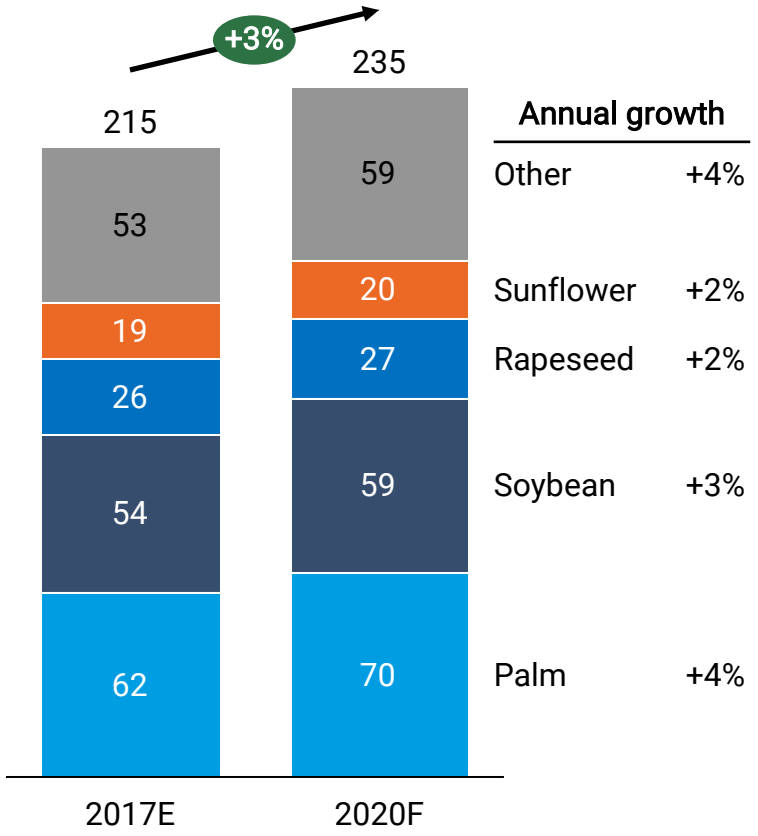


- Wealth (GDP per capita) is the single most important factor when describing countries Vegoil consumption per capita
- Growth in Vegoil consumption is diminishing when countries get richer (non-linear relationship)
- High expected increase in wealth in countries with large populations such as China, India, Pakistan will drive Vegoil demand

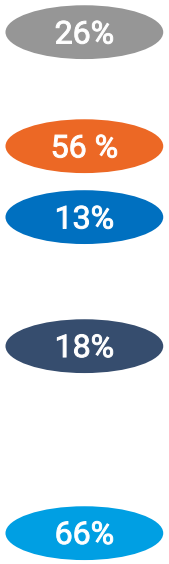
1. Vegoil consumption per capita, kg 2. GDP per capita, USD
Source: Odfjell

Strong growth in seaborne trade of vegoils as palm oil production yields return to normal in 2018/19 but long-term forecast is growth at GDP (-)

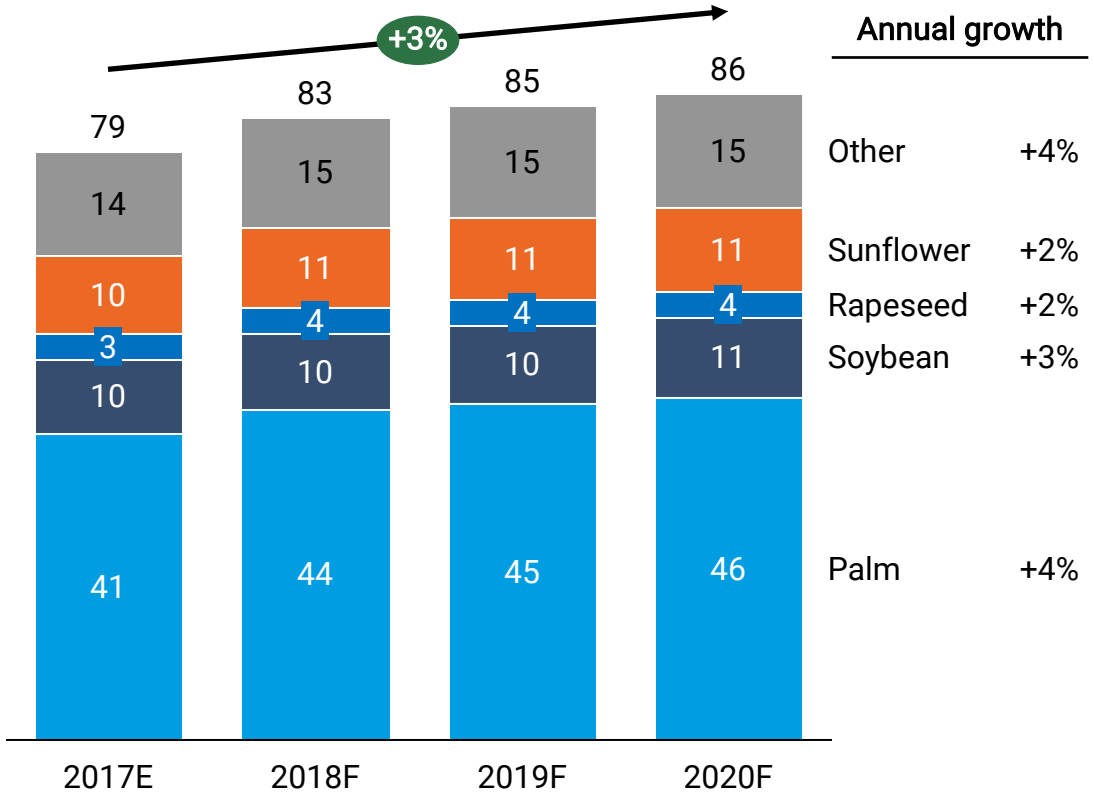
Global Vegoil consumption, MT millions



Seaborne trade as share of consumption, 2017E



Global Vegoil seaborne trade, MT millions



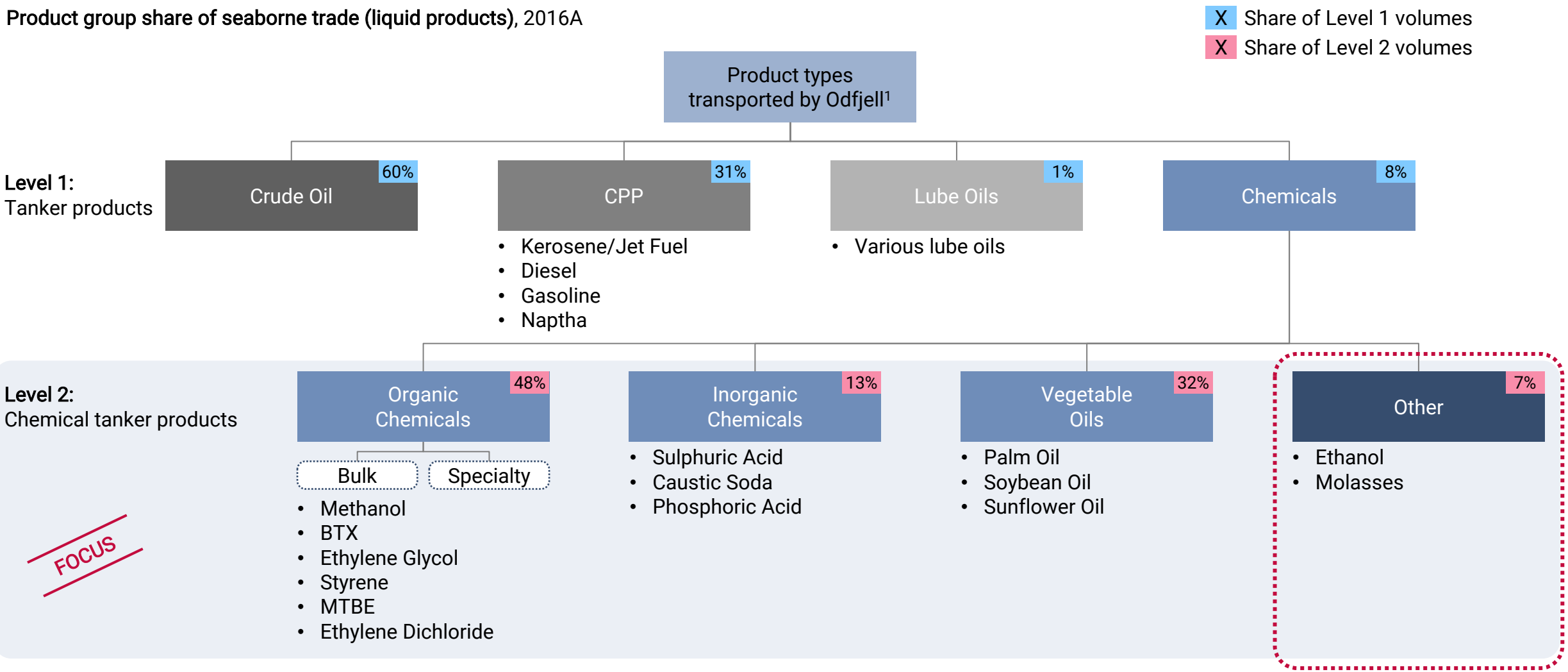
Source: Drewry, Oil World, Odfjell

Agenda

- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
  - Organics
  - Inorganics
  - Vegetable Oils
  - Others
- Product studies
- Chemical tanker supply
- Key conclusions

Other Chemicals constitute 7% of the Chemical Tanker products seaborne trade

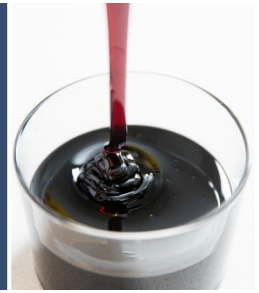
Product group share of seaborne trade (liquid products), 2016A



Source: ICIS, Clarksons Platou, Odfjell

Other Chemicals include Ethanol, Molasses and Urea Ammonium Nitrate

Overview of main Other Chemicals (trade and production figures from 2016)

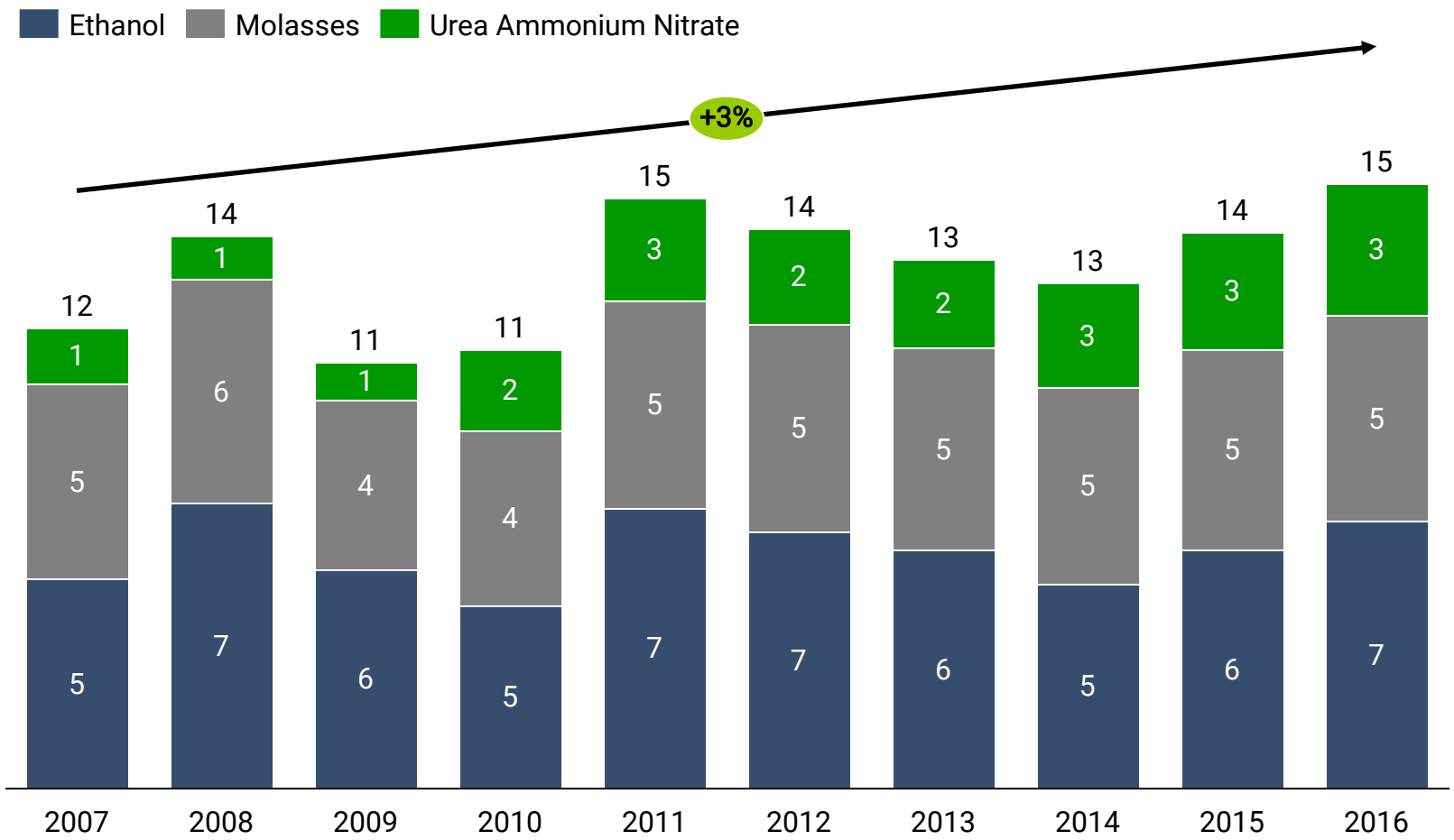
Product	Description	Use	Global production, MT mill.	Seaborne trade, MT mill.	IMO-type requirement
Ethanol 	• Volatile, flammable, colorless • Alcohol found in alcoholic drinks • Produced by fermenting sugars (corn etc.) or hydration of ethylene	• Largest single use of ethanol is as an engine fuel and fuel additive • Chemical feedstock (precursor for other organic compounds such as ethyl halides, acetic acid) • Solvent (e.g. paint)	79	7	No req.
Molasses 	• Viscous product resulting from refining sugarcane or sugar beets into sugar	• Sugarcane molasses is primarily used for sweetening and flavoring foods • Sugar beet molasses is mainly used as an animal feed additive • Molasses can be used to make Ethanol	61[1]	5	No req.
Urea Ammonium Nitrate 	• Corrosive, colorless liquid with a slight ammonia odor • Solution of urea and ammonium nitrate in water	• Fertilizer for agriculture	14[1]	3	IMO 3

1. 2014

Source: Drewry, Renewable Fuels Association, Food and Agriculture Organization of the United Nations, Odfjell

Seaborne trade of Other Chemicals has grown by ~3% p.a. since 2007

Historic development in seaborne trade of Other Chemicals, MT mill.

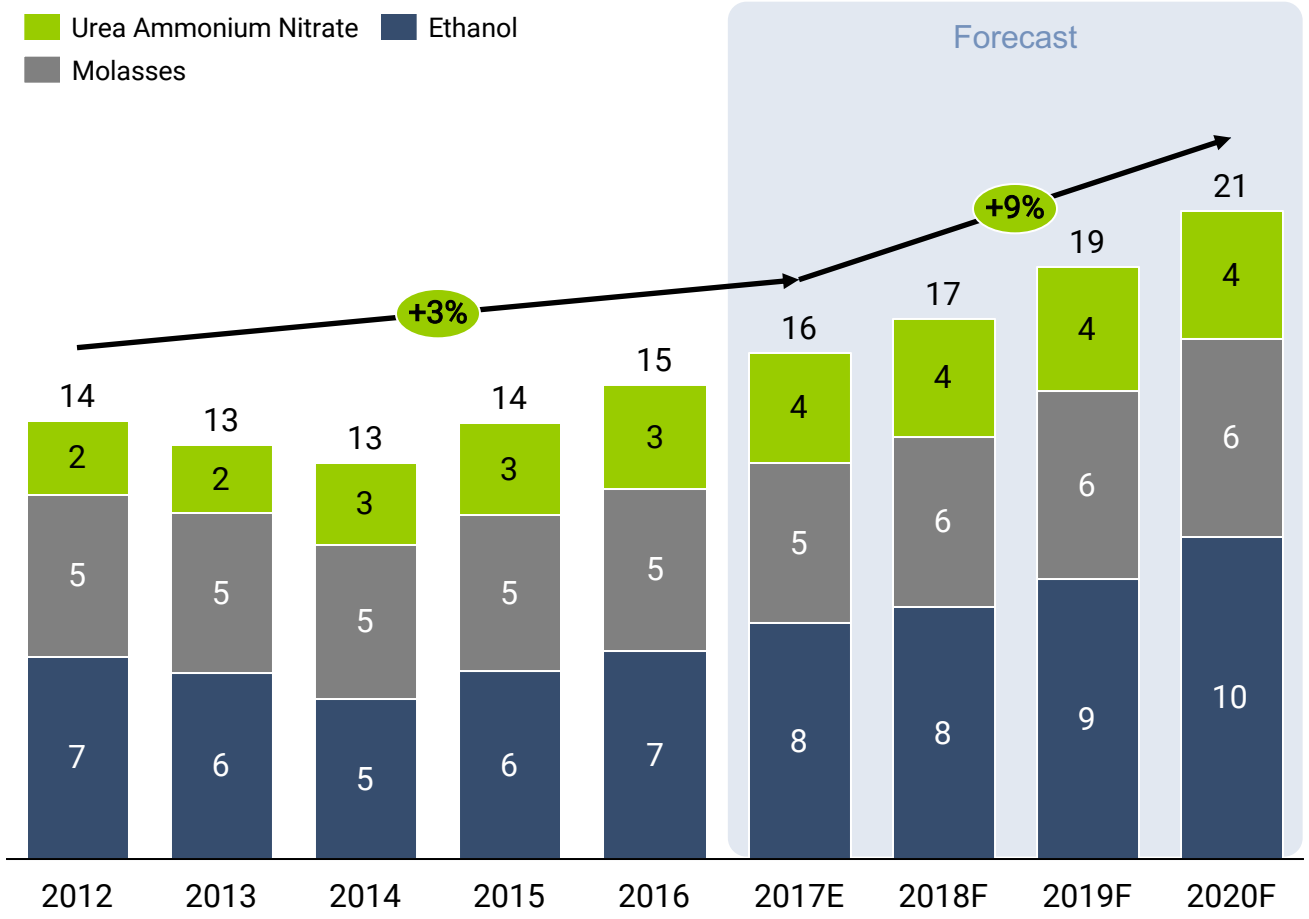


- Ethanol trade has been stable between 5 and 7 MT mill. Ethanol volumes are dependent on government regulations as it is primarily used as an environmentally friendly alternative fuel/fuel additive
- Molasses trade has been stable over the period and molasses has multiple applications including food, ethanol production and livestock feed
- Relatively small volumes are traded of UAN and it is only relevant in a few selected trades as is mainly used in North America and to some extent in Europe

Source: ICIS, Drewry, Odfjell

We expect strong growth in seaborne trade of other chemicals driven primarily by increased ethanol consumption in China

Expected development in seaborne trade of Other Chemicals, MT mill.



Growth drivers

- Use of Ethanol as fuel and fuel additive (ETBE) to drive volume of seaborne trade in "other chemicals"
  - China has proposed 10% ethanol-blend for nine regions, and is likely to restrict use of MTBE
  - Increasing use of ethanol as an automotive fuel
  - Several European countries with ambitious biofuels targets
- Limited growth expected in trade of Molasses and UAN

Potential upsides

- Stricter biofuel regulations would further drive trade of ethanol and potentially also molasses as a secondary effect
- MTBE to ETBE switch driver only applicable for China as it is the only major remaining consumer of MTBE

Potential downsides

- Declining oil prices would make conventional gasoline cheaper, with resulting reduced demand for biofuels

Source: Odfjell, Drewry

Agenda

- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
- Product studies
  - Organics: Methanol, Ethylene Glycol, Para-xylene, Benzene, Styrene
  - Inorganics: Caustic Soda
  - Vegetable Oils: Palm Oil
  - Other: Ethanol
- Chemical tanker supply
- Key conclusions

Import of Methanol increase in China due to high consumption growth – USA is moving from net importer to net exporter

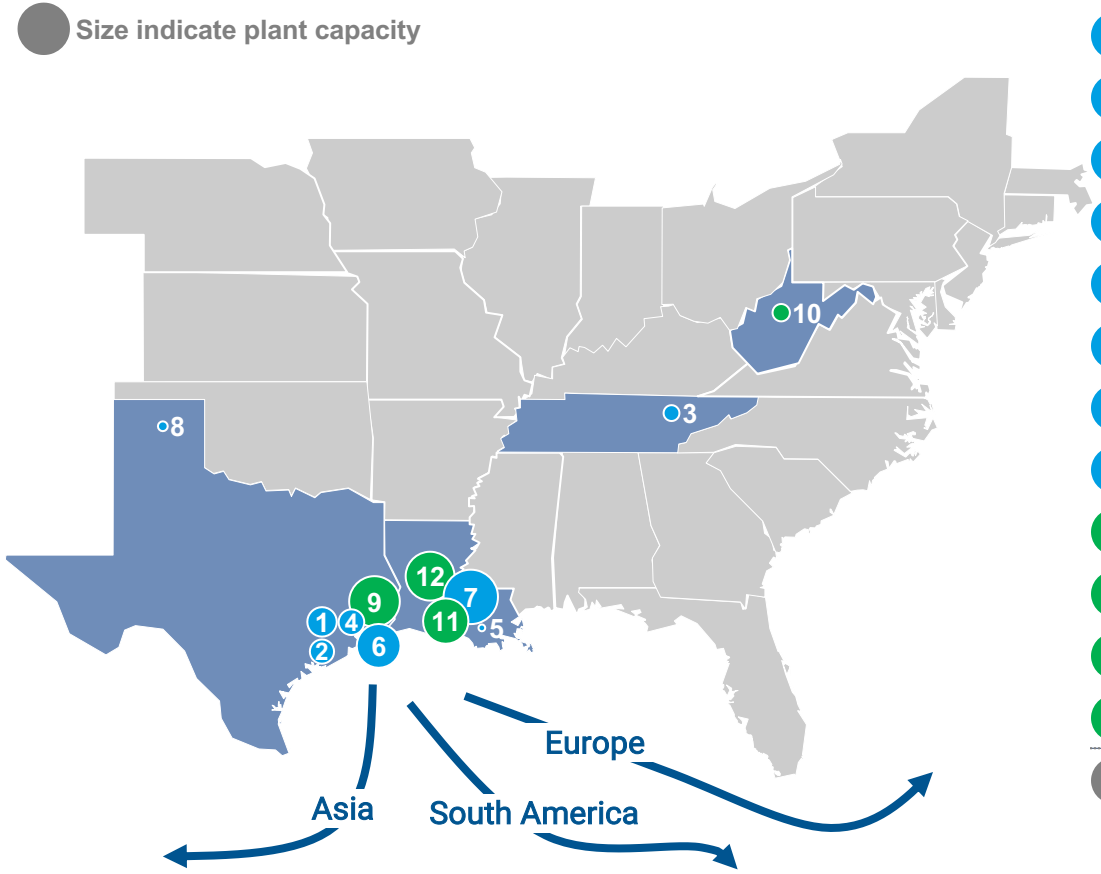
Consumption
Production
Net import
Net export

	Trade balance 2016, MT mill.	**Trade balance F2020**, MT mill.	**Capacity growth**, MT mill.		**Comments**
China	Prod: 47 Net imp: 8	Prod: 61 Net imp: 15	71 → 85	New plants: 5	• Five new plants and 14 MT mill. additional capacity expected • Net import increase by 7 MT mill. despite large increase in production due to high consumption growth
Saudi Arabia	Prod:6 Net exp: 5	Prod:7 Net exp: 5	7 → 7	-	• No new plants planned. Small increase in production/utilization
United States	Prod: 6 Net imp: 1	Prod: 11 Net exp: 4	6 → 11	4	• Large increase in capacity and prod. • From net importer to net exporter
Trinidad	Prod: 5 Net exp: 5	Prod: 6 Net exp: 6	7 → 8	1	• Growth in capacity and production
Iran	Prod: 5 Net exp: 5	Prod: 7 Net exp: 8	6 → 12	3	• High growth in capacity and production
Venezuela	Prod: 2 Net exp: 1	Prod: 0.3 Net exp: 0	2 → 2	0	• Loosing market share • 2017 exports dropped 70%
		Σ =	136 → 163	17	
			2016	2020	

Source: Odfjell, ICIS

Four new Methanol plants will increase capacity with 88% and are ideally located for export to Asia, South America and Europe

USA Methanol plant capacity, MT. thousands 2020



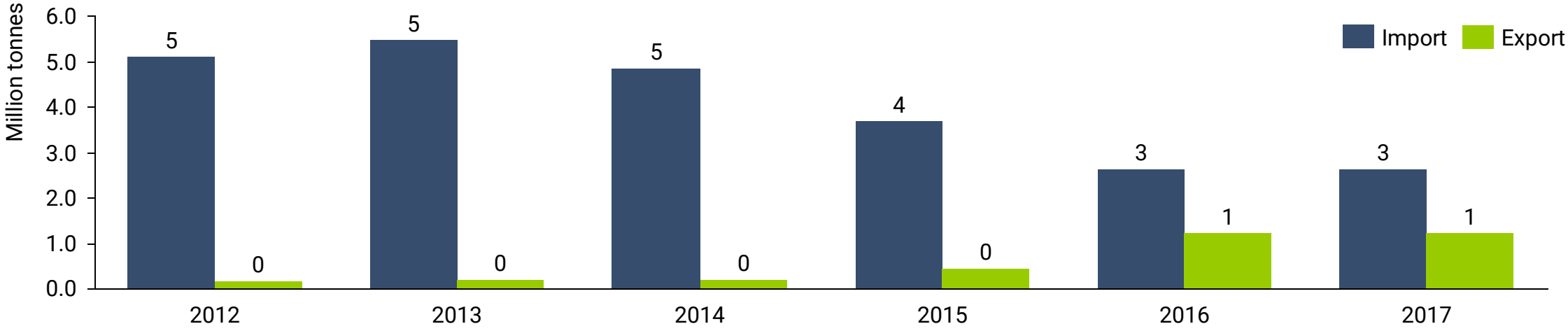
	Plant	2020 Capacity, MT thousands	Route	Start-up year
1	La Porte	600	Natural Gas	1968
2	Channel View	780	Coal	1983
3	Kingsport	165	Natural Gas	1983
4	Beaumont	915	Natural Gas	1986
5	Geismar	32	Natural Gas	1994
6	Clear Lake	1,300	Natural Gas	2015
7	Geismar	2,000	Natural Gas	2015
8	Pampa	65	Natural Gas	2015
9	Natgasoline	1,750	Natural Gas	2018
10	Institute	200	Natural Gas	2018
11	Lake Charles	1,400	Natural Gas	2019
12	Yuhuang	1,800	Natural Gas	2019
Σ	Total	Existing[1]: 5 857 New: 5 150 (+88%)		

1. Finished in 2016 or earlier

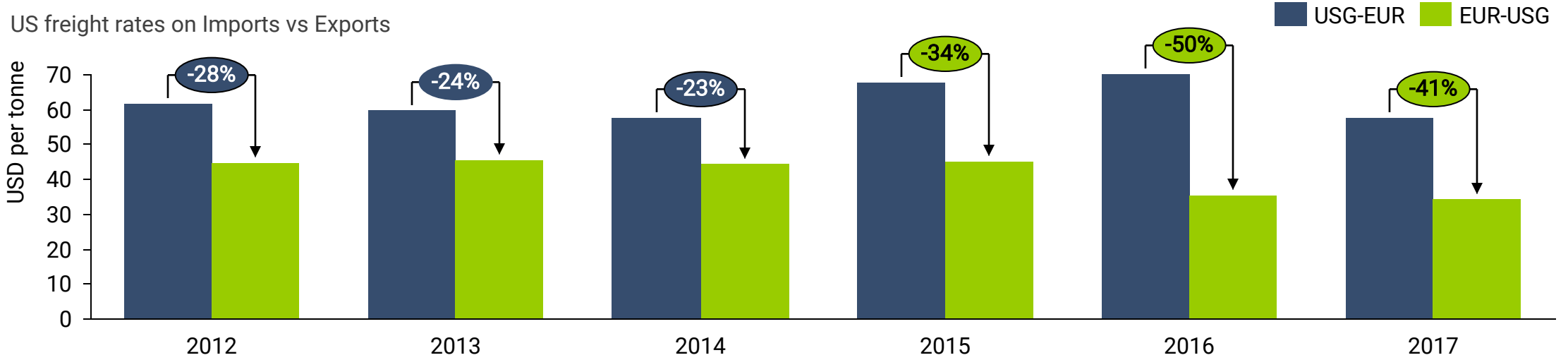
Source: Odfjell, ICIS

New capacity has so far had a negative effect on shipping demand through reduced imports – This is expected to turn from 2018 and onwards

US import/export development of Methanol (Million tonnes)



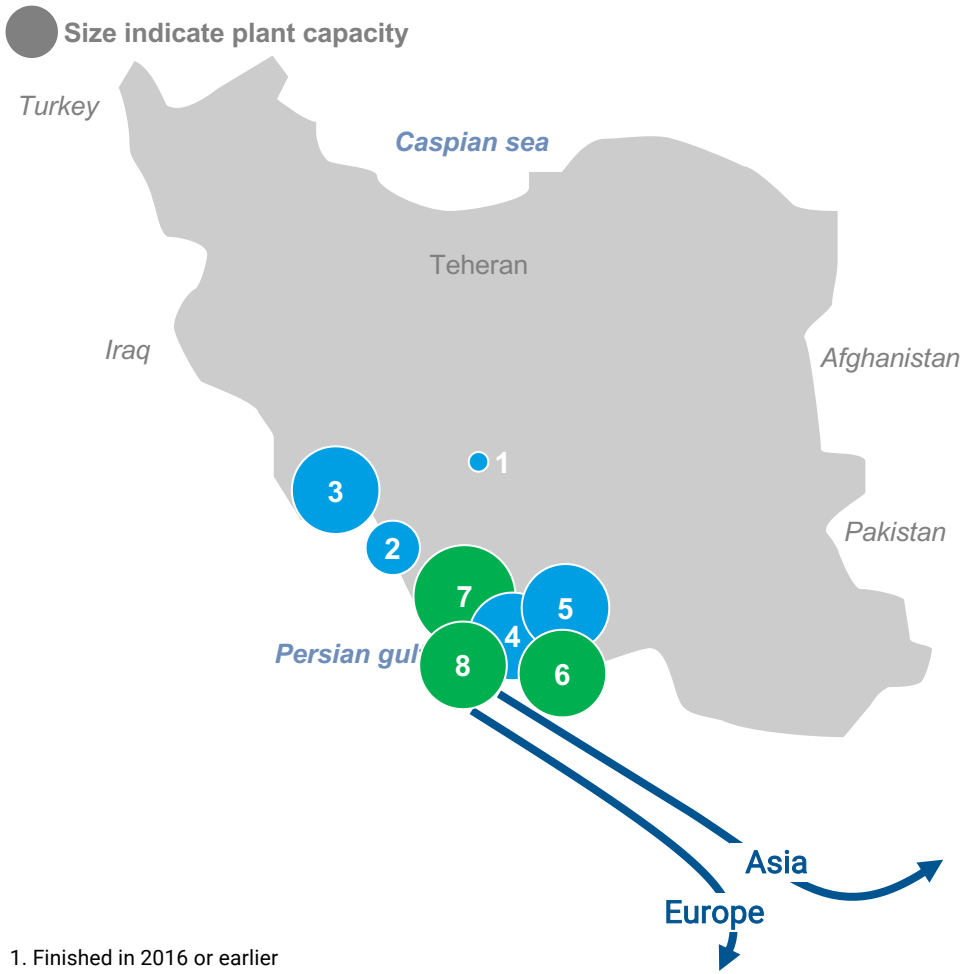
US freight rates on Imports vs Exports



Source: Customs data, Clarksons Platou, Odfjell

Iranian Methanol exports are expected to increase with a ~97% growth in plant capacity in 2018

Iran Methanol plant capacity, MT. thousands 2020



Plant	2020 Capacity, MT thousands	Route	Start-up year
1 Shiraz	84	Natural Gas	1991
2 Kharg Island	660	Natural Gas	1999
3 Bandar Imam	1 700	Natural Gas	2004
4 Asaluyeh (Zagros)	1 650	Natural Gas	2007
5 Asaluyeh (Zagros)	1 650	Natural Gas	2010
6 Asaluyeh (Marjan)	1 650	Natural Gas	2018
7 Dayer (Kaveh)	2 300	Natural Gas	2018
8 Asaluyeh (Arman)	1 650	Natural Gas	2019
Σ Total	Existing[1]: 5 744 New: 5 600 (+97%)		

1. Finished in 2016 or earlier

Source: Company data, Odfjell, ICIS

Majority of Chinese Methanol production facilities are coal plants located in inland regions

China Methanol plant capacity, MT. thousands 2020

Coal - Existing | Synthesis Gas | Natural Gas | Coal - New

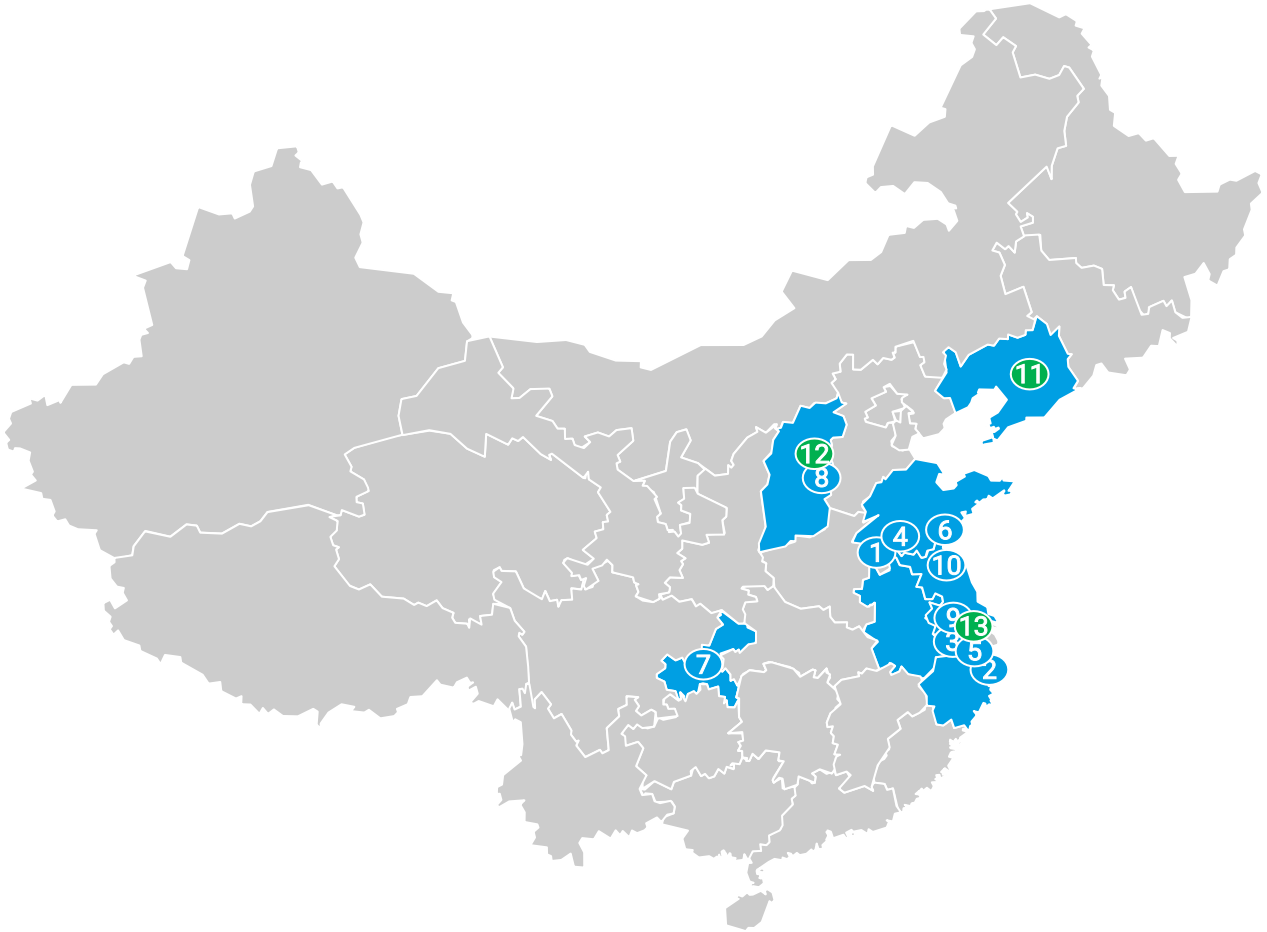
	Region	2020 Capacity, MT millions	New plants
1	Inner Mongolia	20	2
2	Shaanxi	14	-
3	Shandong	10	2
4	Henan	7	-
5	Ningxia	7	-
6	Shanxi	6	-
7	Xinjiang	5	-
8	Hebei	4	-
9	Anhui	4	1
10	Qinghai	3	-
	Other	17	-
Σ	Total	Existing[1]: 84 New: 12 (+14%)	5

1. Finished in 2016 or earlier

Source: Odfjell, ICIS

Majority of Chinese import demand stems from Methanol-to-olefins plants (MTO) currently in a recovery driven by higher oil prices

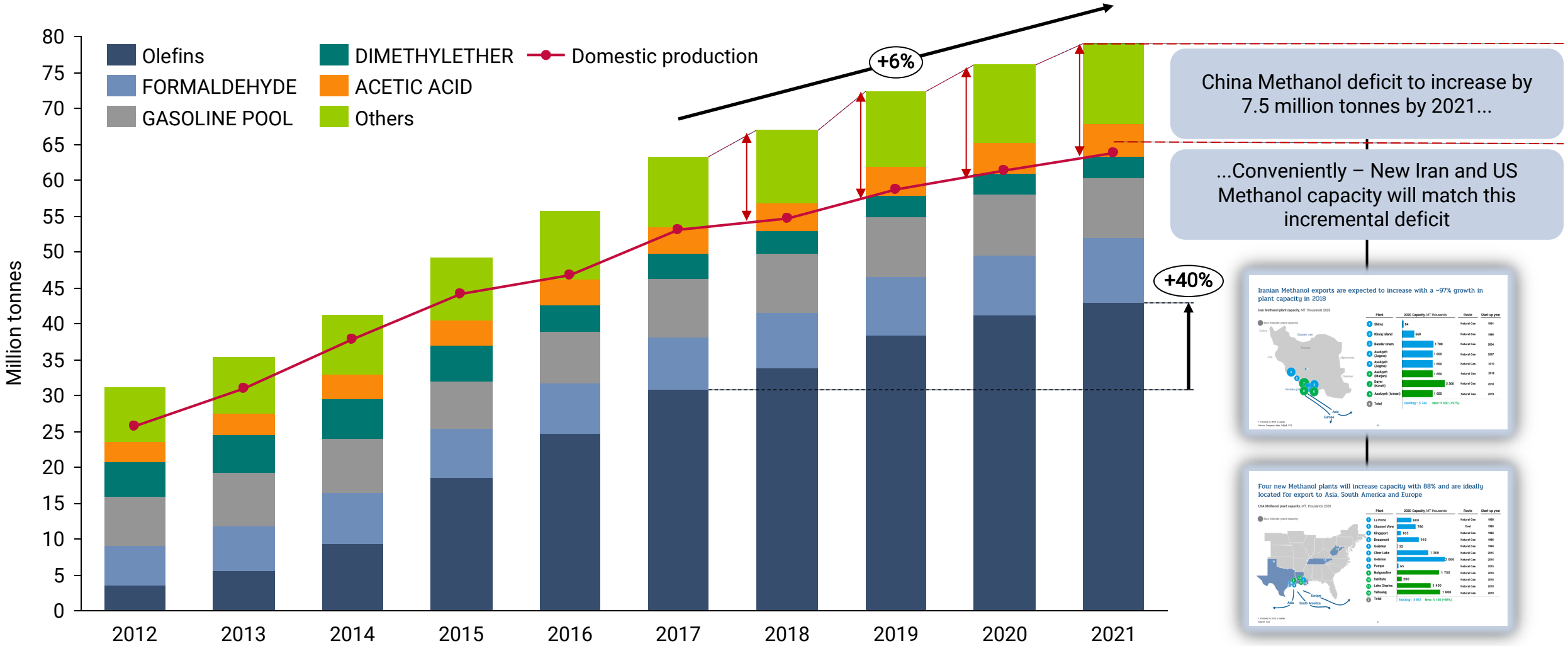
China Methanol-to-olefins plant capacity, MT. thousands



	Producer	Capacity	Start-up	Utilisation % Dec-17	Utilisation % May-18
1	Sinopec Zhongyuan	200,000t	2011	80	100
2	Ningbo Fund Energy	600,000t	2013	93	80
3	Nanjing Chengzhi	300,000t	2013	100	100
4	Shandong Shenda	340,000t	2014	60	100
5	Zhejiang Xingxing	690,000t	2015	0	100
6	Yangmei Hengtong	300,000t	2015	65	80
7	Shenhua Yulin	600,000t	2015	100	90
8	China Coal Mengda	600,000t	2016	100	95
9	Changzhou Fund	330,000t	2016	0	0
10	Jiangsu Sailboat C.	840,000t	2016	90	90
11	Jilin Connel Chem.	300,000t	2018	-	-
12	Jituai Energy	550,000t	2019	-	-
13	Nanjing Chengzhi	600,000t	2019	-	-
Σ	**Total**	6,250,000t	Oil price:	$62	$78

Source: Argus, Odfjell, Company data

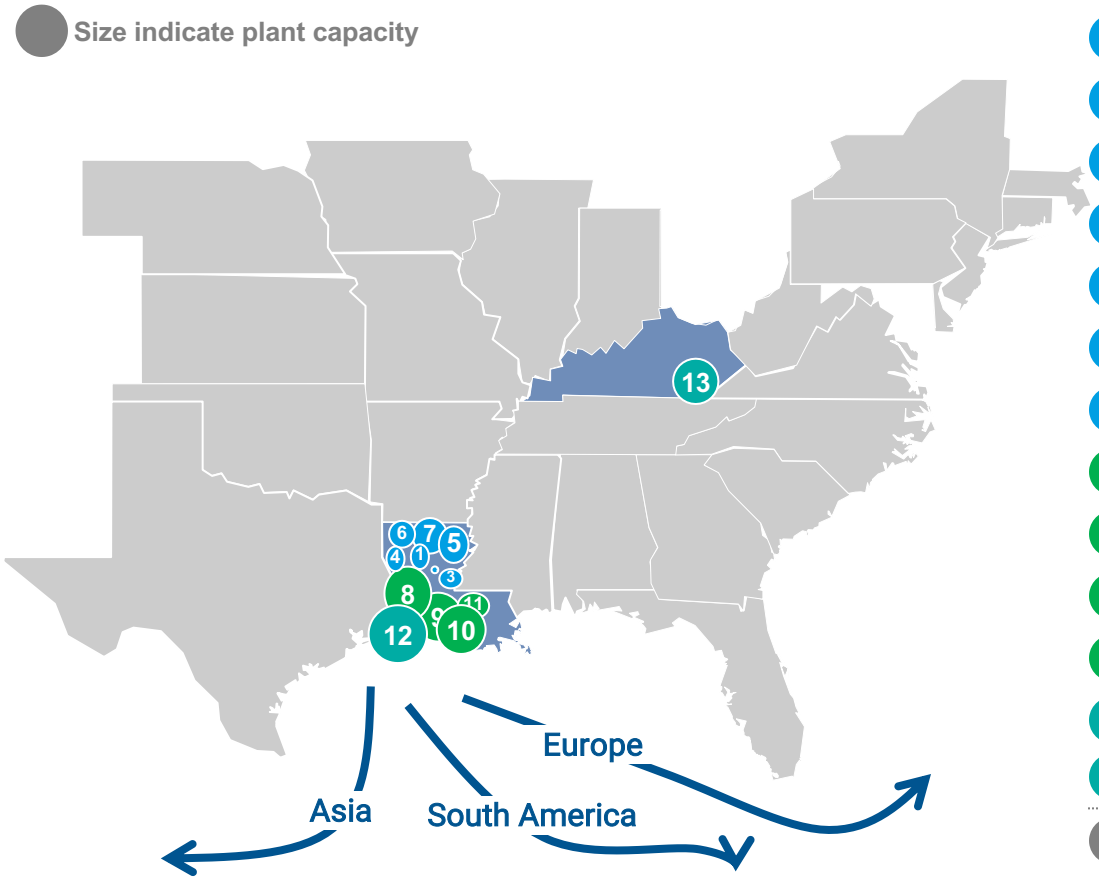
The driver of Chinese Methanol demand is olefin production – The Methanol will have to be sourced from abroad due to mentioned logistics constraints



Source: ICIS, Odfjell

Four new Ethylene Glycol plants will increase capacity with 105% and are ideally located for export to Asia, South America and Europe

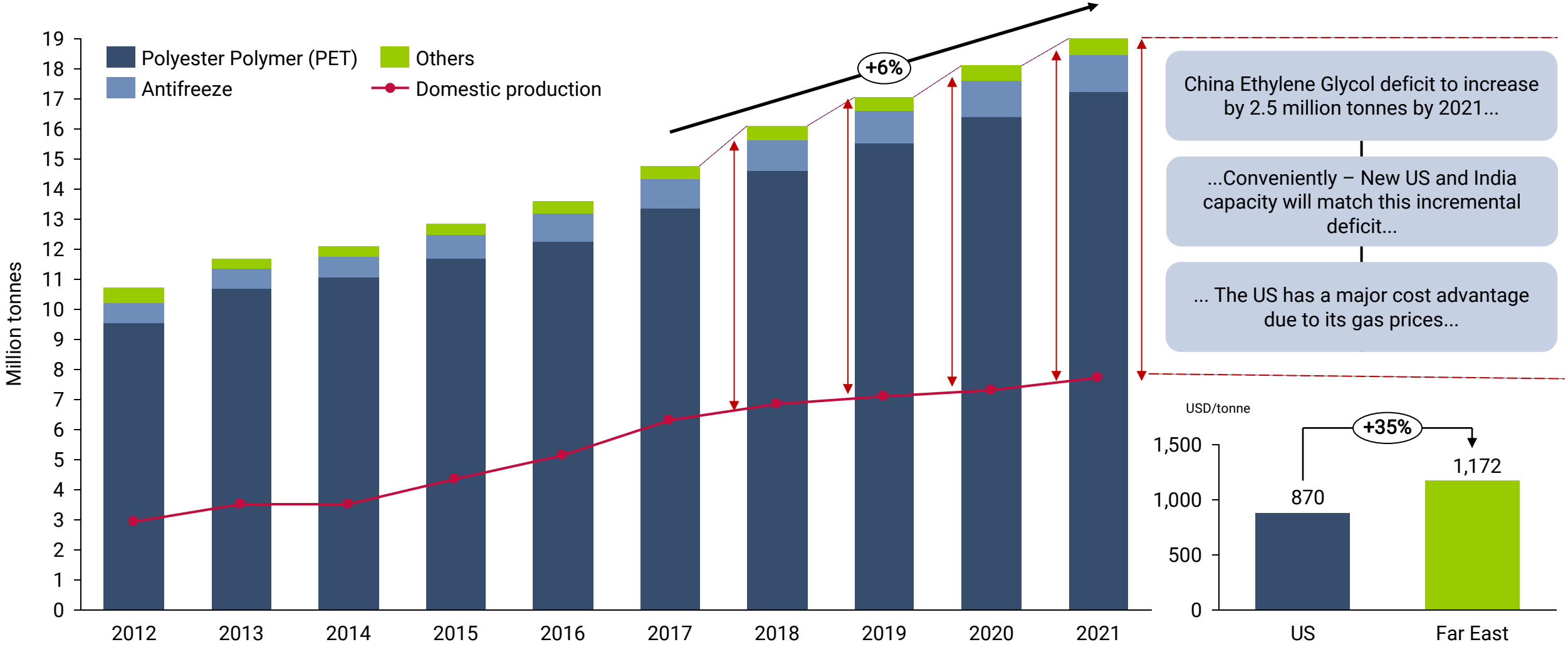
USA Methanol plant capacity, MT. thousands 2020



	Plant	2020 Capacity, MT thousands	Route	Start-up year
1	Seadrift	300	Ethylene	1969
2	Longview	120	Ethylene	1965
3	Bayport	265	Ethylene	1982
4	Point Comfort	370	Ethylene	1994
5	Port Neches	450	Ethylene	1959
6	Clear Lake	355	Ethylene	1969
7	Geismar	410	Ethylene	1995
8	Point Comfort	740	Ethylene	2019
9	Lake Charles	700	Ethylene	2019
10	Freeport	700	Ethylene	2019
11	Lake Charles 2	250	Ethylene	2020
12	St. James	1 200	Ethylene	2021
13	Belmont County	500	Ethylene	2021
Σ	Total	Existing[1]: 2 270 New: 2 390 (+105%) Potential: 1 700 (+239%)		

Source: Company data, Odfjell, ICIS

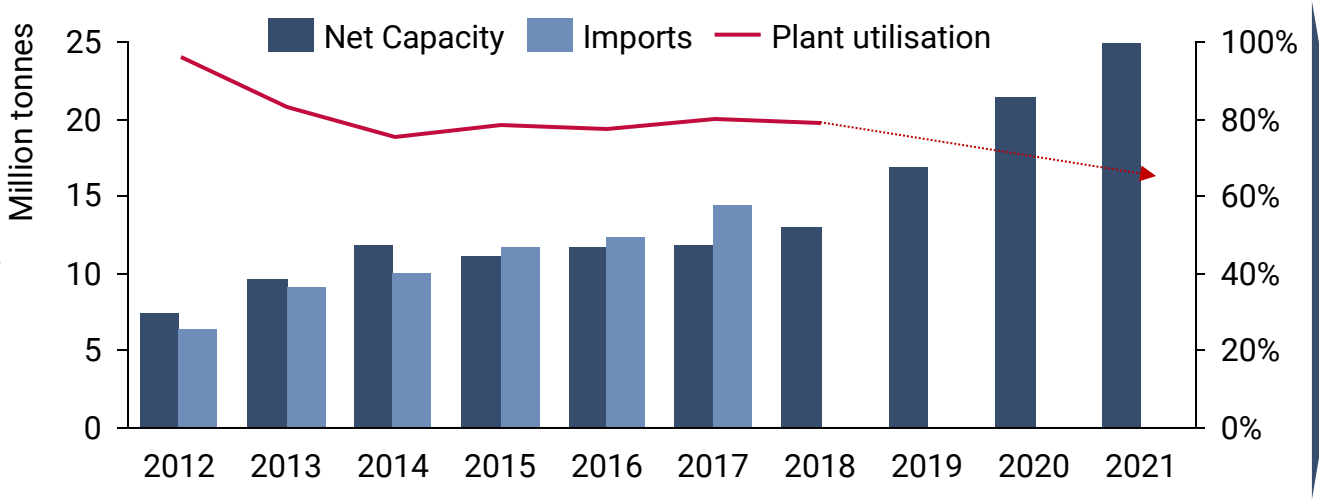
Chinese Ethylene Glycol deficit is forecasted to increase by 2.5 million tonnes by 2021



Source: ICIS, Odfjell

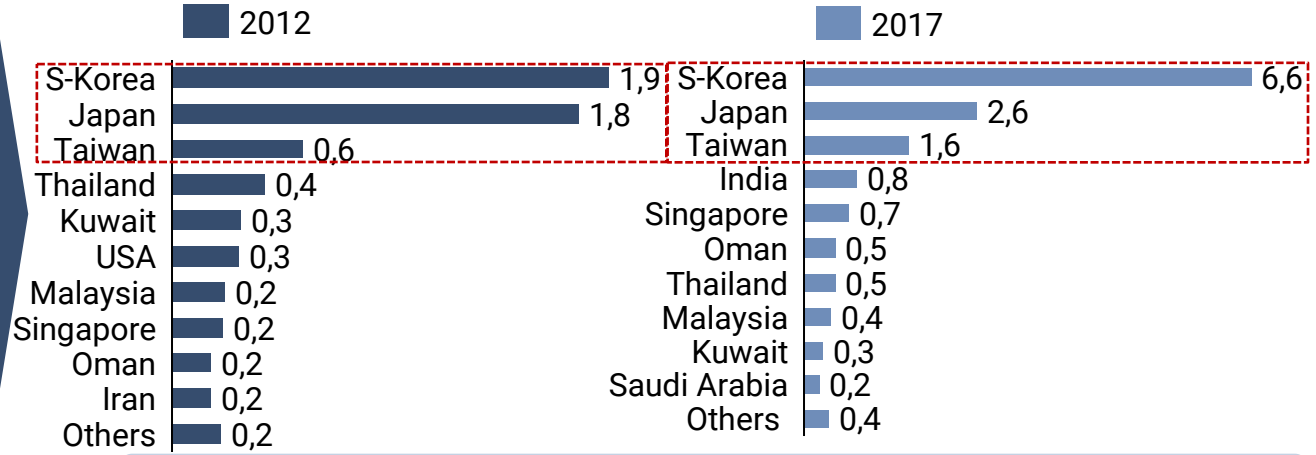
Para-xylene volumes forecasted to decline from 2020 – New capacity from Middle East and Far East exporters finding new buyers to dampen effect when miles are taken into account

China Para-xylene capacity expansions and imports



- Gradual pick-up in Para-xylene capacity in China to limit import growth
- Biggest impact to be felt from 2020
- New expansions to be countered by low utilisation and shut-down potential

China Para-xylene imports by source 2012 and 2017



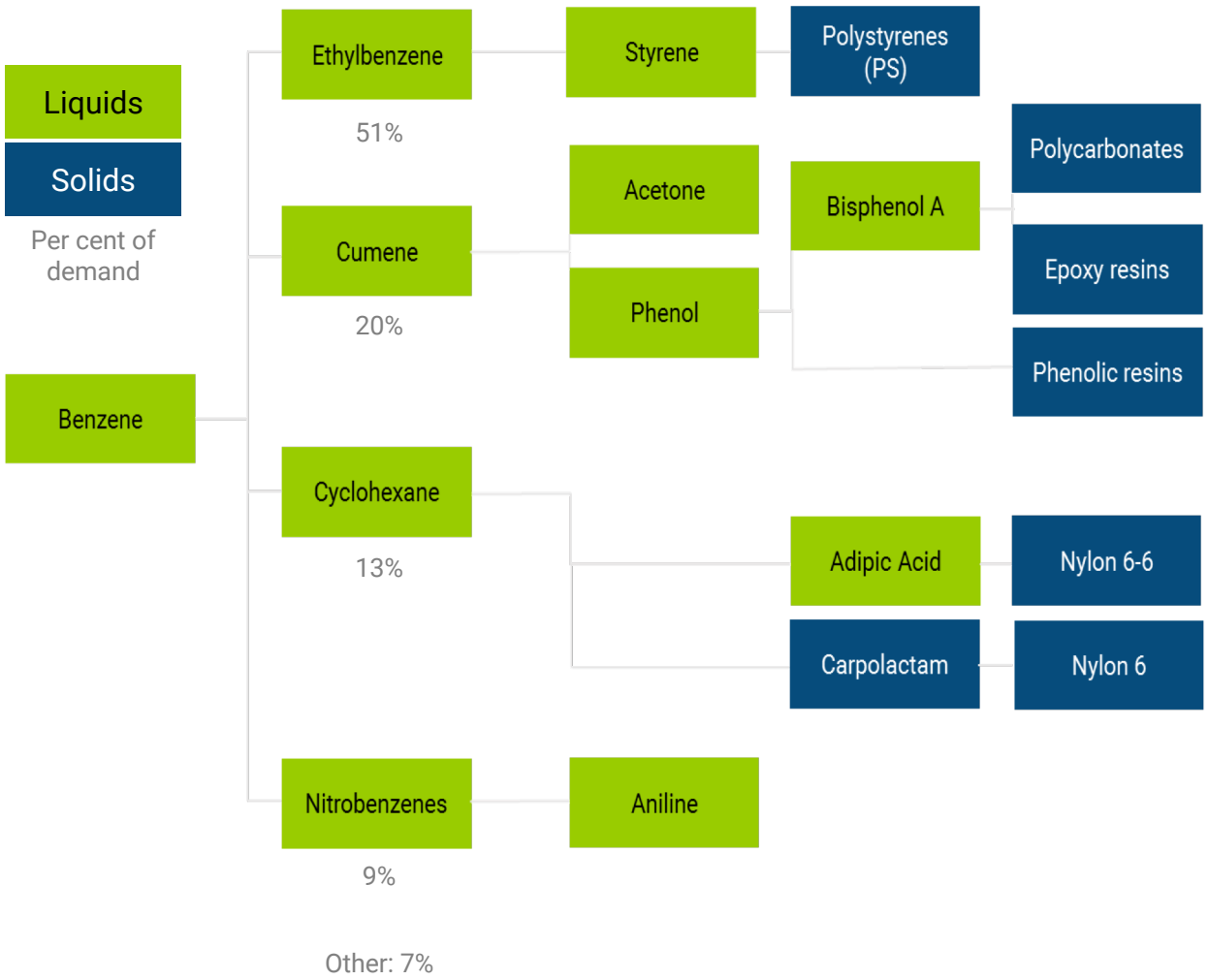
Average haul of global Para-xylene trade: 1,741 nautical miles

- Para-xylene is mainly being traded in North East Asia
- Korean and Japanese exporters are already considering their option
- We expect increased East-West exports
- Middle East expansions and miles to counter part of the lost volumes

= Impact mainly to hit smaller tonnage but limited impact on the overall market balance

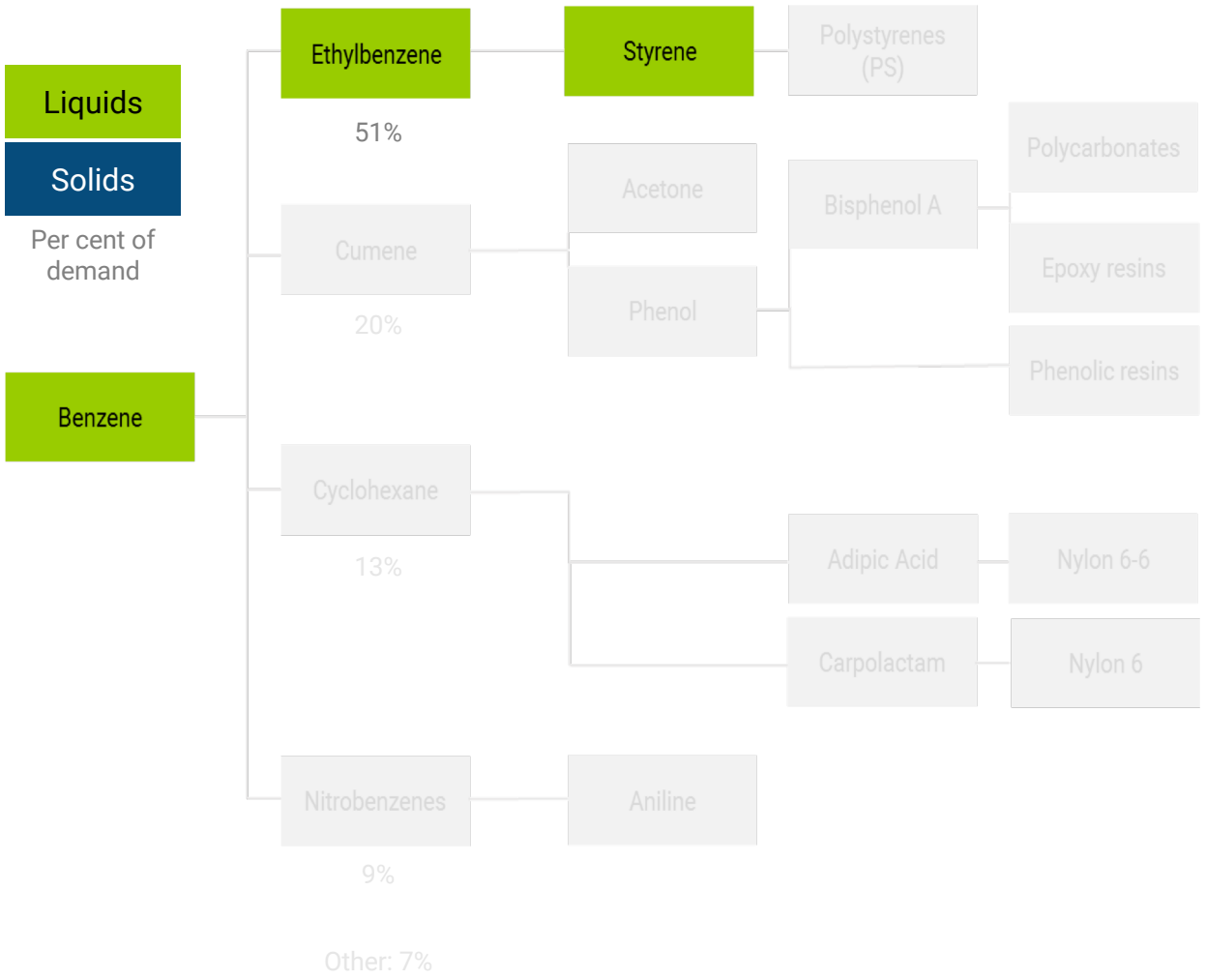
Source: Customs data, ICIS, Odfjell

Benzene is an important feedstock in a large variety of chemical products



Source: Odfjell

But the main focus should be limited to the Styrene chain

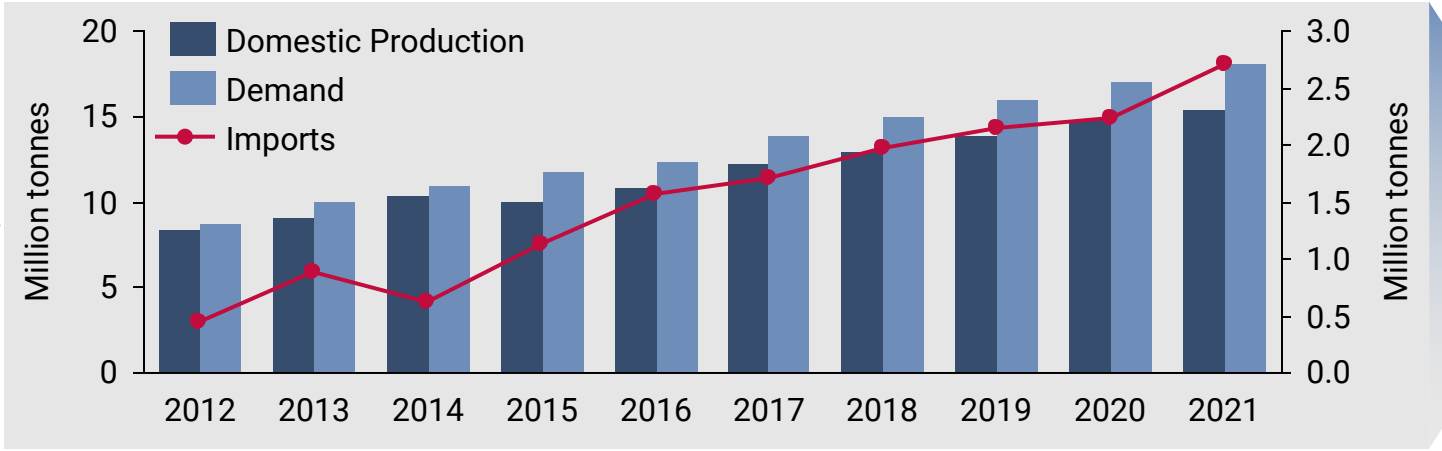


- Benzene is an important chemical feedstock
- This makes the product important for a large variety of chemical products globally
- 51% of Global Benzene production is used in Ethylbenzene of which all is used in production of Styrene.
- Benzene and Styrene demand is therefore closely linked with each other
  - I.e. If you are short Benzene or Styrene you can easily source the other as an alternative
  - This makes Benzene one of the products most arbitrage sensitive products in our markets
- Products with Benzene in them:
  - Paint, lacquer and varnish removers
  - Industrial solvents
  - Gasoline and other fuels
  - Glues
  - Paints
  - Furniture wax
  - Thinners
  - Thinners

Source: Odfjell

Chinese Benzene imports to slow down in 2020 before picking up in 2021 on strong underlying demand – US an alternative route for Korea and Japan

China Benzene outlook



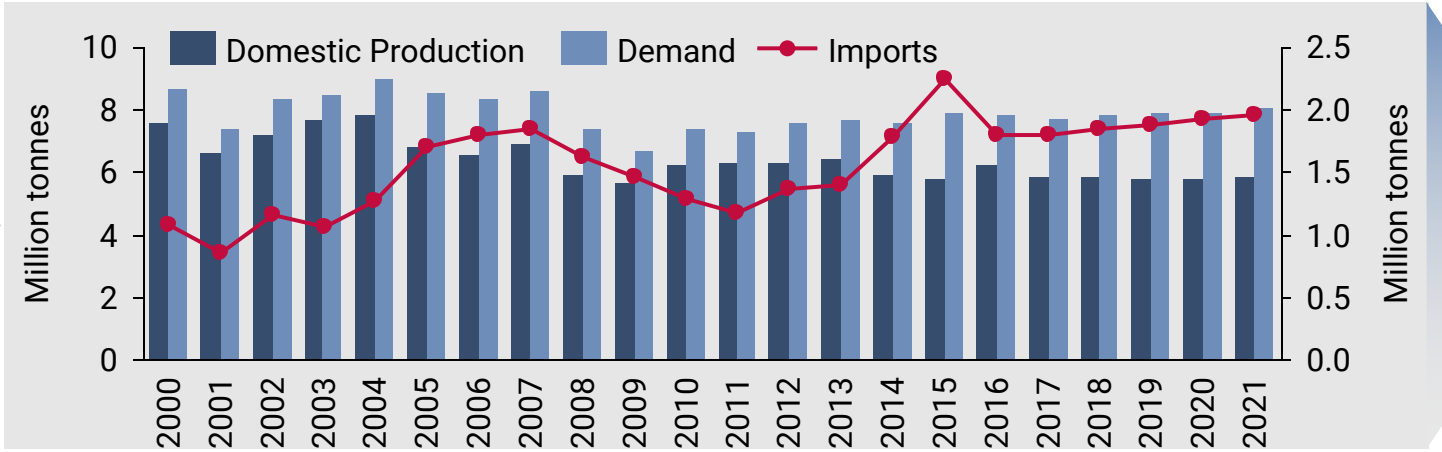
New Saudi capacity

Rabigh – 415,000 tonnes (2018)
Sadara – 280,000 tonnes (2018)
Jizan – 290,000 tonnes (2018)

Benzene production by source:

Py-gas – 4.1 million tonnes
Reformate – 2.7 million tonnes
Coal – 2.4 million tonnes

US Benzene imports by source and forecasted production growth

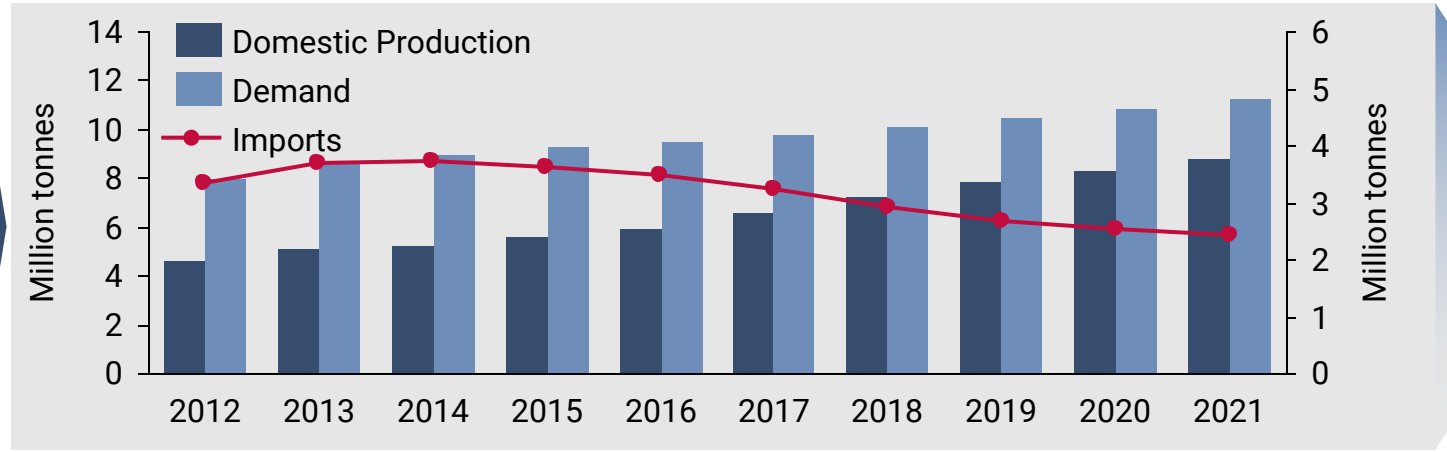


US Imports by source

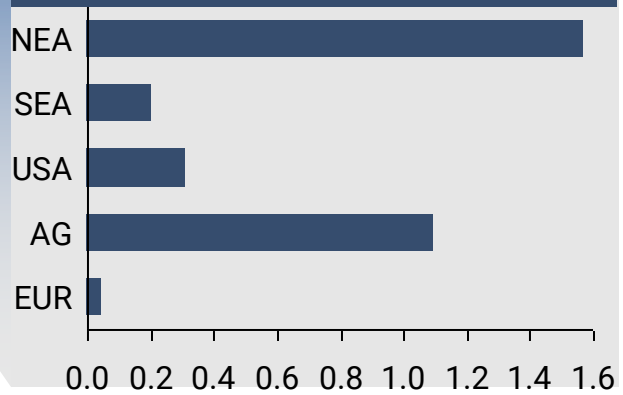
Source: ICIS, Odfjell

Chinese styrene imports have peaked and will gradually decline from 2019 and onwards – Benzene trade and long-haul Styrene trade to cover shortfall

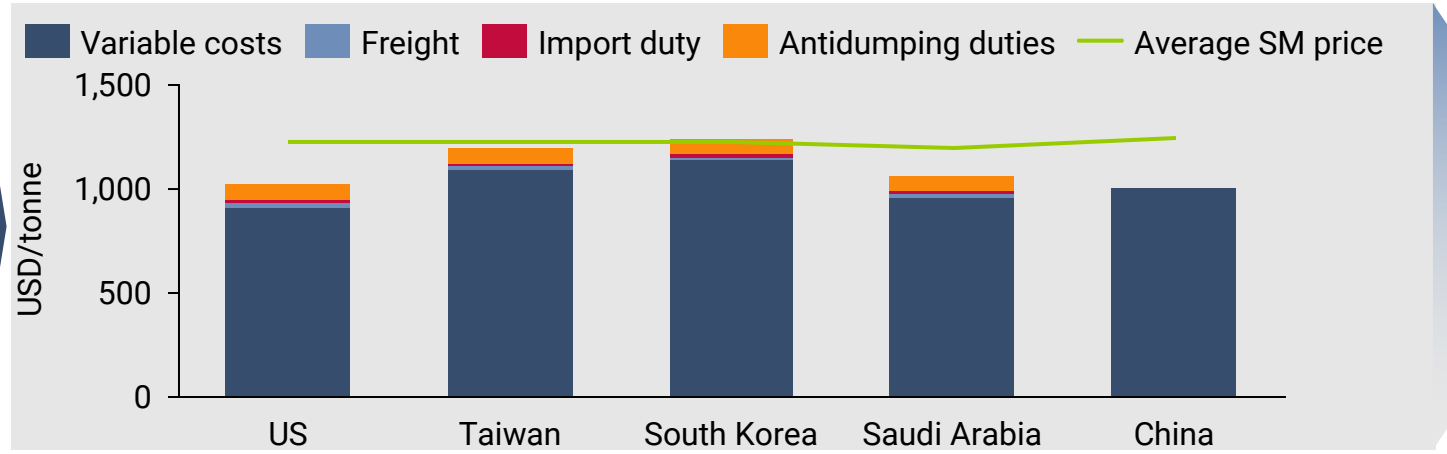
China Styrene dynamics



China imports by region (2017)



Global Styrene production cost (USD/tonne)



Chinese trader comment on ADD:

"I don't care. I can source Styrene from elsewhere and if thats not possible, I'll just buy Benzene instead"

Chinese trader when asked what he thought about potential ADD on Styrene back in January 2018

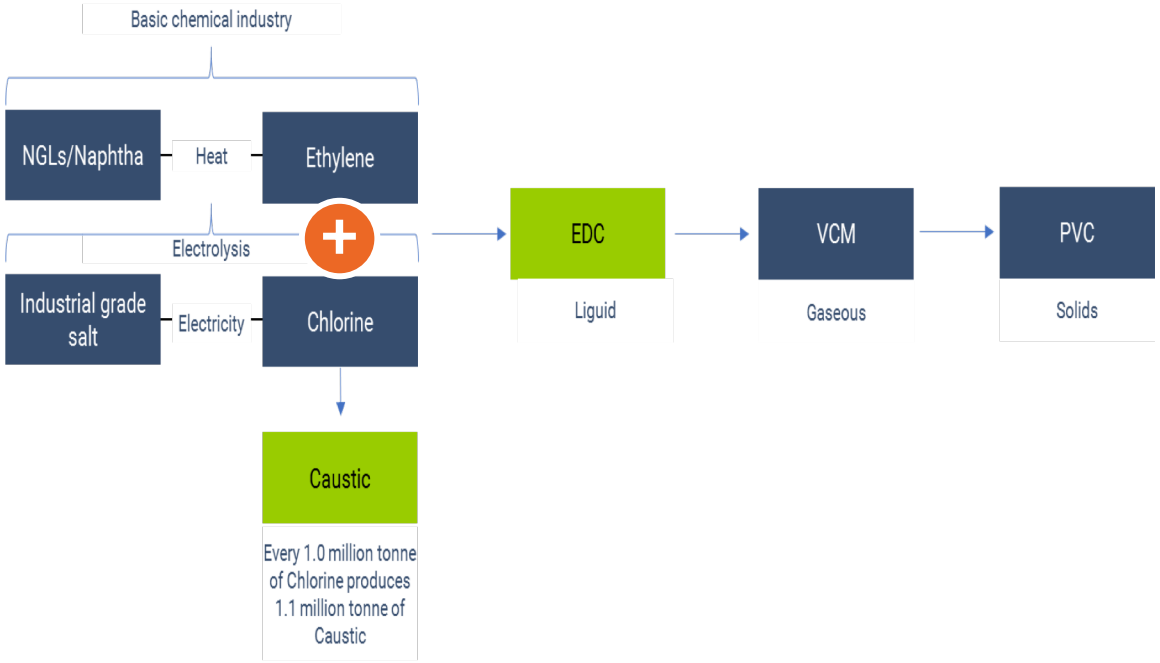
Source: ICIS, Argus, Odfjell

Agenda

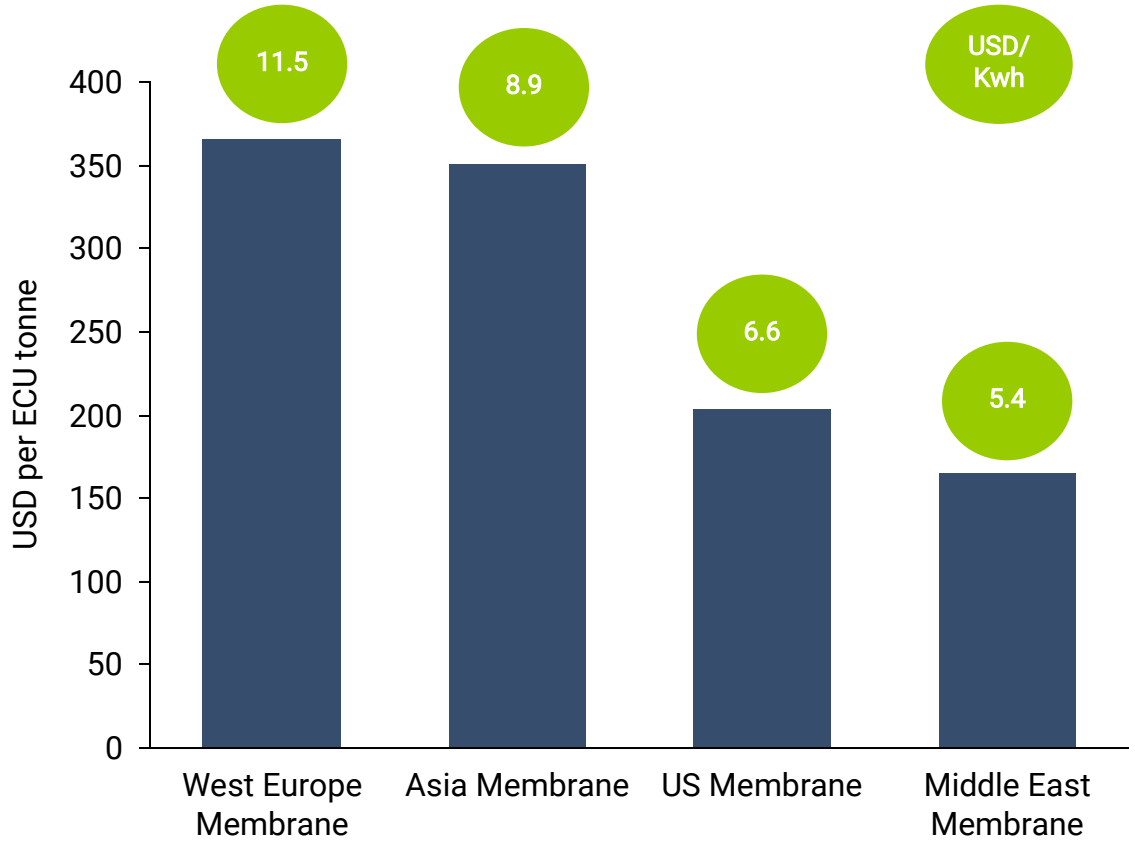
- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
- Product studies
  - Organics: Methanol, Ethylene Glycol, Para-xylene, Benzene, Styrene
  - Inorganics: Caustic Soda
  - Vegetable Oils: Palm Oil
  - Other: Ethanol
- Chemical tanker supply
- Key conclusions

Caustic soda is primarily produced locally for domestic use, and just ~11% of capacity end up in seaborne trade

Caustic Soda is produced as a part of the Chlorine process



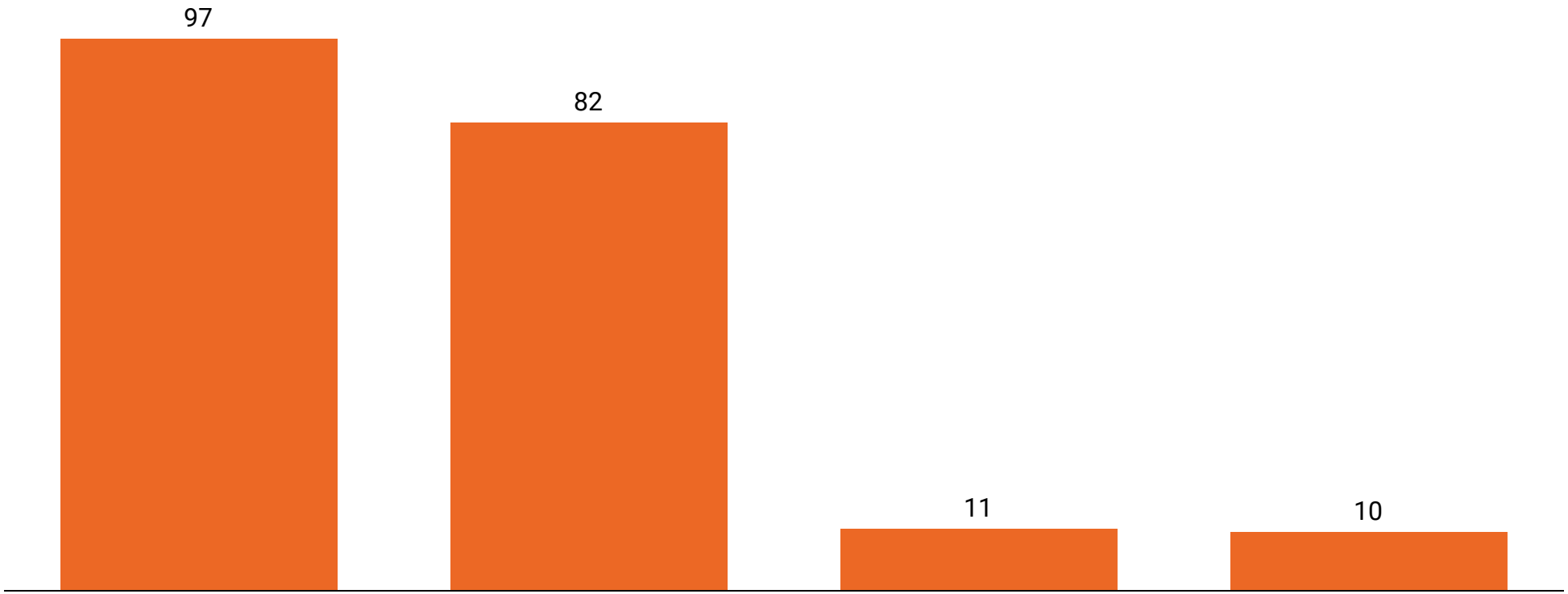
Some producers have an ethylene advantage, but also an electricity advantage



Source: Odfjell, various price sources for electricity

Caustic soda is primarily produced locally for domestic use, and just ~11% of capacity end up in seaborne trade

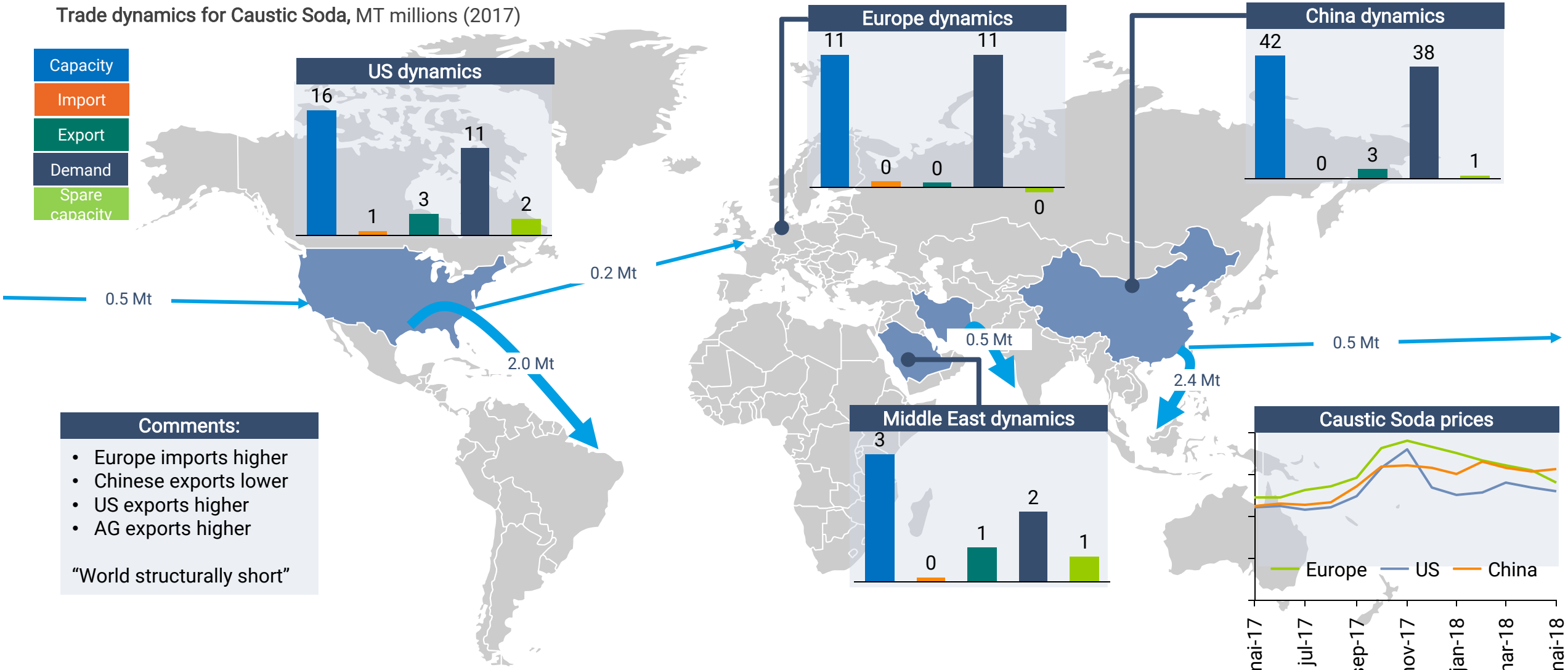
Caustic soda plant capacity, production, trade and seaborne trade 2016, MT millions



Source: ICIS, Drewry, Odfjell

US and China are large exporters of Caustic Soda – China reducing exports and US and Middle East to replace lost Chinese volumes

Trade dynamics for Caustic Soda, MT millions (2017)



Comments:

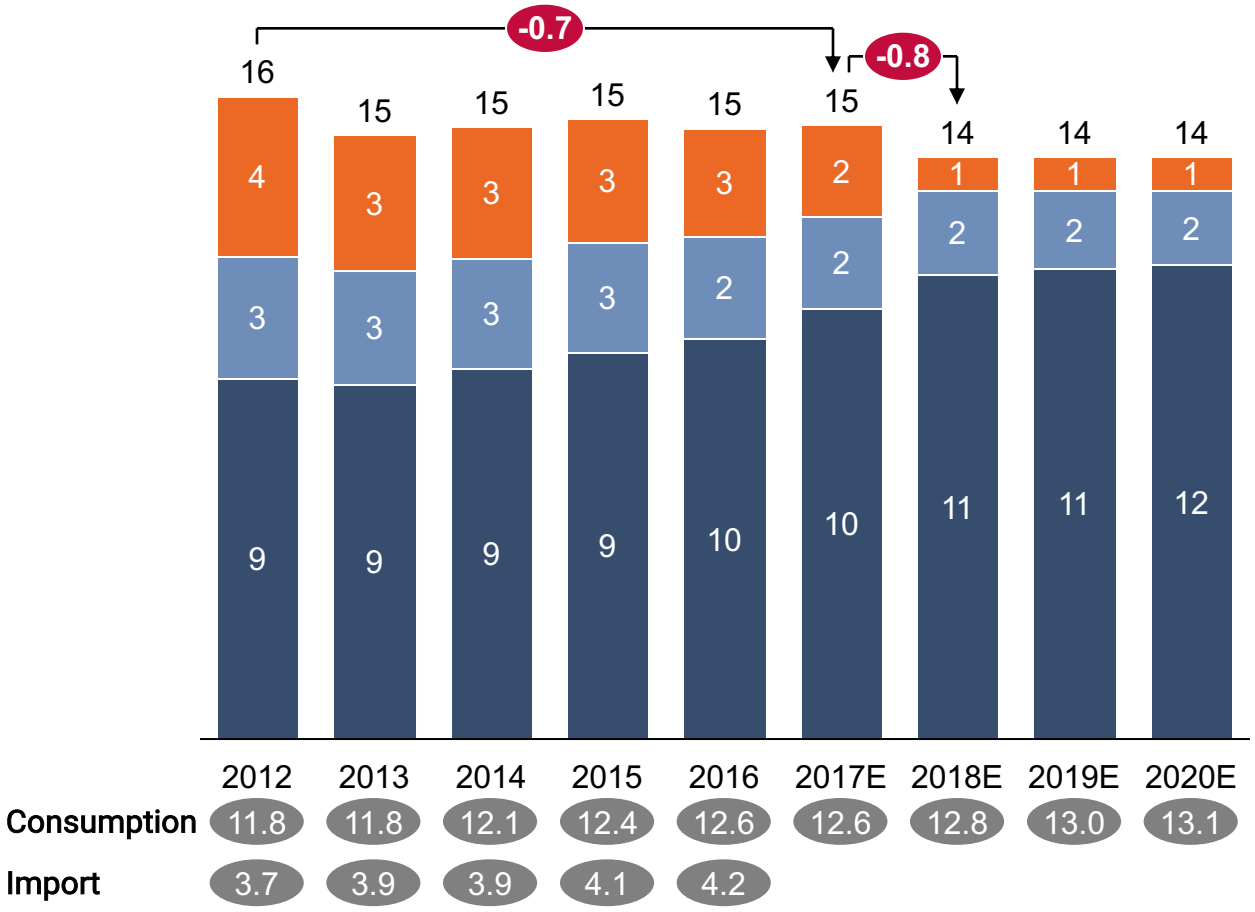
- Europe imports higher
- Chinese exports lower
- US exports higher
- AG exports higher

"World structurally short"

Source: Customs data, Odfjell, Argus, * only key routes highlighted

European shut-down of Caustic Soda capacity is likely to add an additional 1 MT mill. to seaborne trade

Europe and Eurasia[1] Caustic soda production, MT millions



- Europe phased out the Mercury Cell technology for producing Caustic Soda from January 2018 (pollutive and expensive)
- This capacity will not be replaced and Europe ends up being short up to 1 MT mill. of Caustic Soda
- Deficit most likely to be met by US and/or Middle Eastern producers with sufficient spare capacity and cost advantages
- This change of dynamic will add roughly 10% to Caustic Soda seaborne trade currently at 10.7 MT mill. (FY2016)
- On top of this, Chinese caustic soda consumption is growing fast, making the country exporting less to neighboring countries
- This makes Asia Pacific short and in need to seek supplies from deep-sea areas
- Limited new capacity being built outside of China, high prices on global shortage should lead to investments likely in the US or Middle East

1. Including Russia which is not scheduled to shut down 0.6 MT mill. Mercury capacity

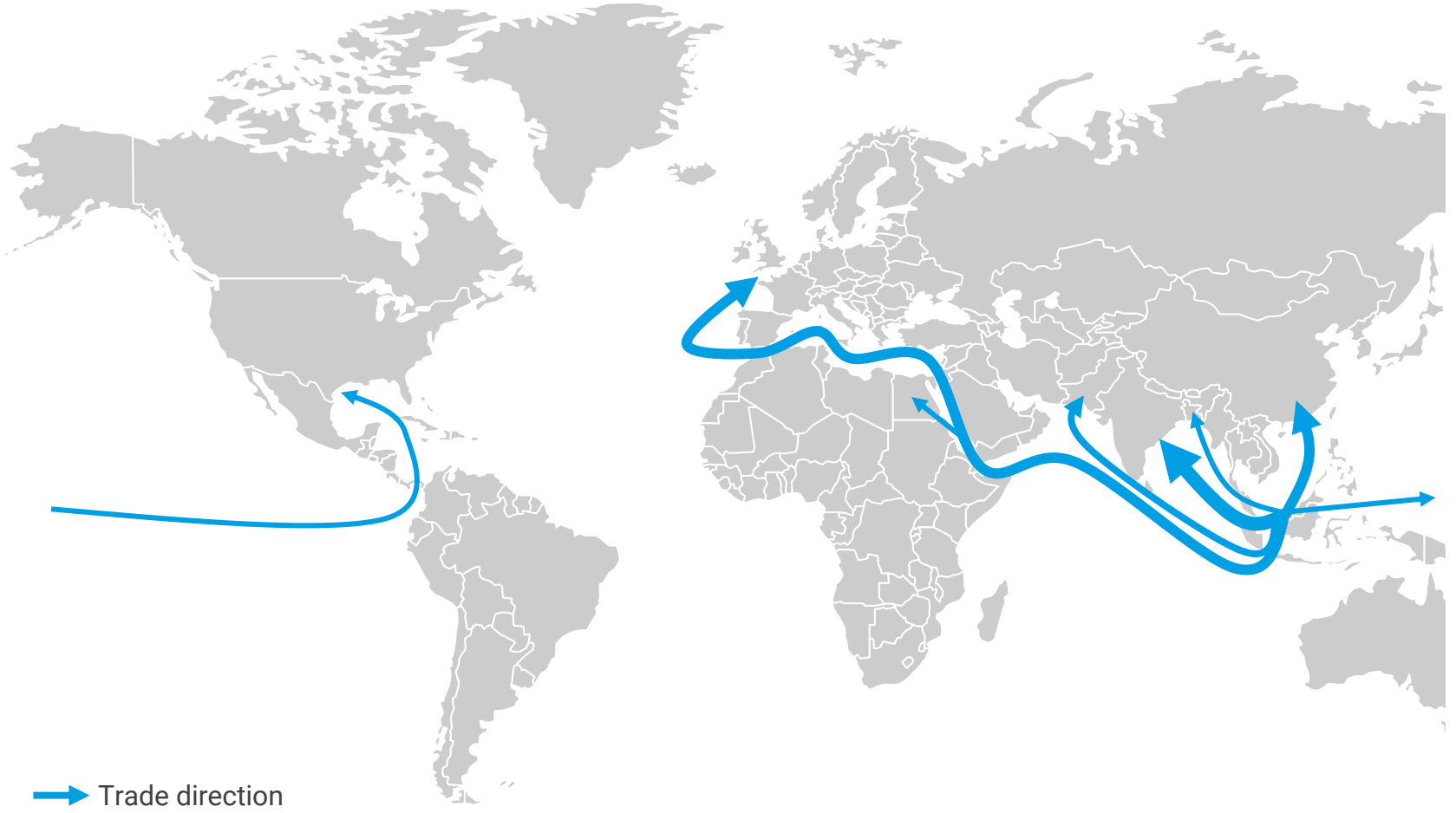
Source: ICIS, Odfjell

Agenda

- Introduction to chemical tanker fundamentals
- Chemical mega trends
- Chemical tanker demand by product categories
- Product studies
  - Organics: Methanol, Ethylene Glycol, Para-xylene, Benzene, Styrene
  - Inorganics: Caustic Soda
  - Vegetable Oils: Palm Oil
  - Other: Ethanol
- Chemical tanker supply
- Key conclusions

Majority of the palm oil trades are shorter hauls in Asia - China imports where hit the hardest by El Niño

Palm oil trade, MT millions



2014/15
2015/16

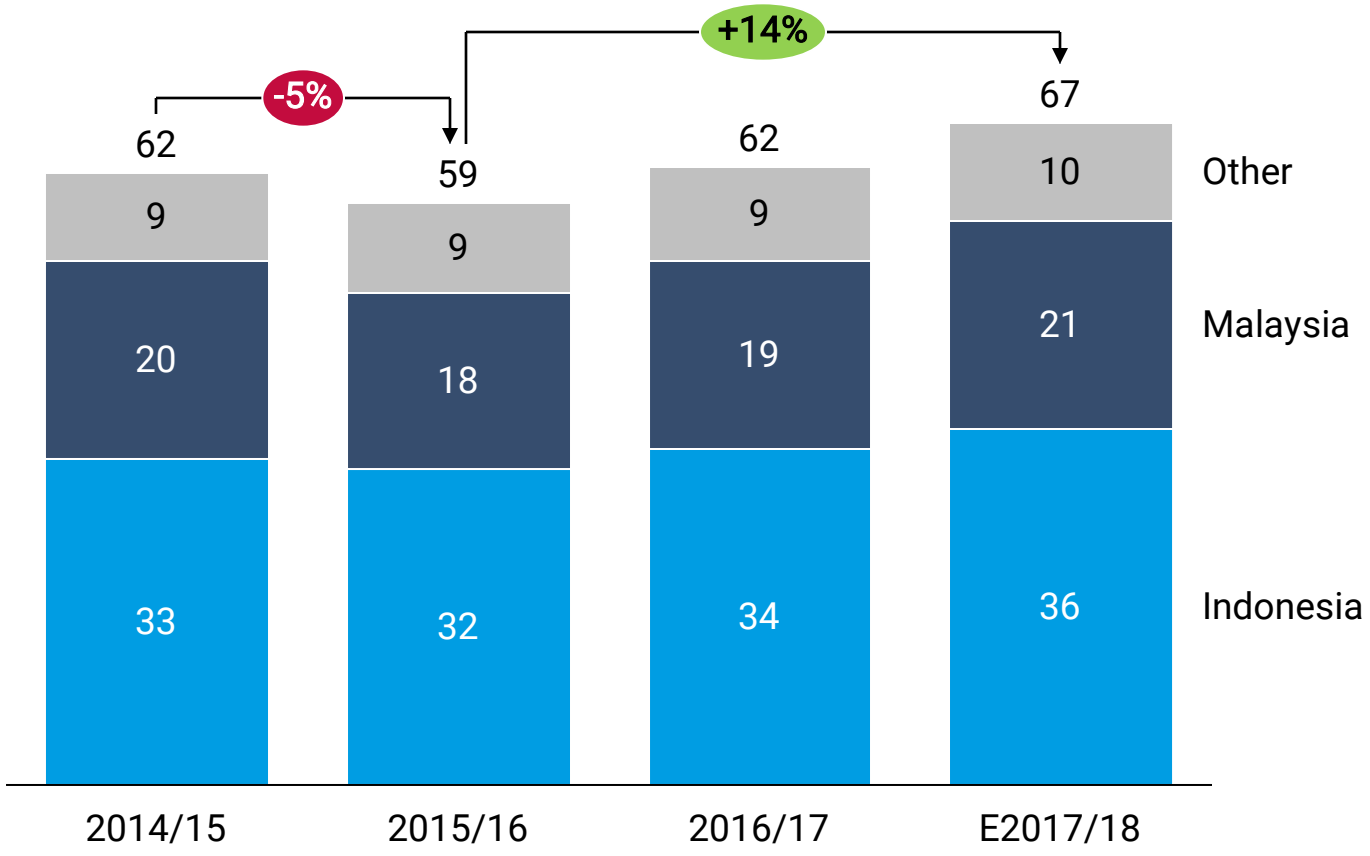
Largest palm oil importers

	Import, MT mill		**Haul length**, miles
India	9.1 / 8.9	-3%	1.600
EU	6.9 / 6.6	-4%	8.200
China	5.7 / 4.7	-18%	1.800
Pakistan	2.8 / 2.7	-4%	2.800
Bangladesh	1.3 / 1.5	+18%	1.500
USA	1.1 / 1.3	+14%	12.000
Egypt	1.5 / 1.0	-30%	4.800
Other	18.7 / 18.5	-1%	

Source: Oil World, Drewry, Odfjell

El Niño reduced global palm oil production by ~5% in 2015/16. Strong growth expected as crop yields return to normal levels

201/15-E2017/18 Global Palm oil production, MT millions



- Production growth has been depressed since El Niño destroyed plants in 2015/16 crop season (Crop season from September to October)
- It takes ~30 months for a palm oil tree to start bearing fruits, so its expected that lost production following El Niño return in 2018
- Odfjell is not heavily involved in Palm oil trade, but a revival of Palm oil volumes would be positive both directly and indirectly
- A high share (60-70%) of the palm oil production is exported at sea
- Palm oil is the most single most important product for chemical tankers:
  - 50-60% of seaborne trade of vegoils
  - 15-20% of seaborne trade of chemicals

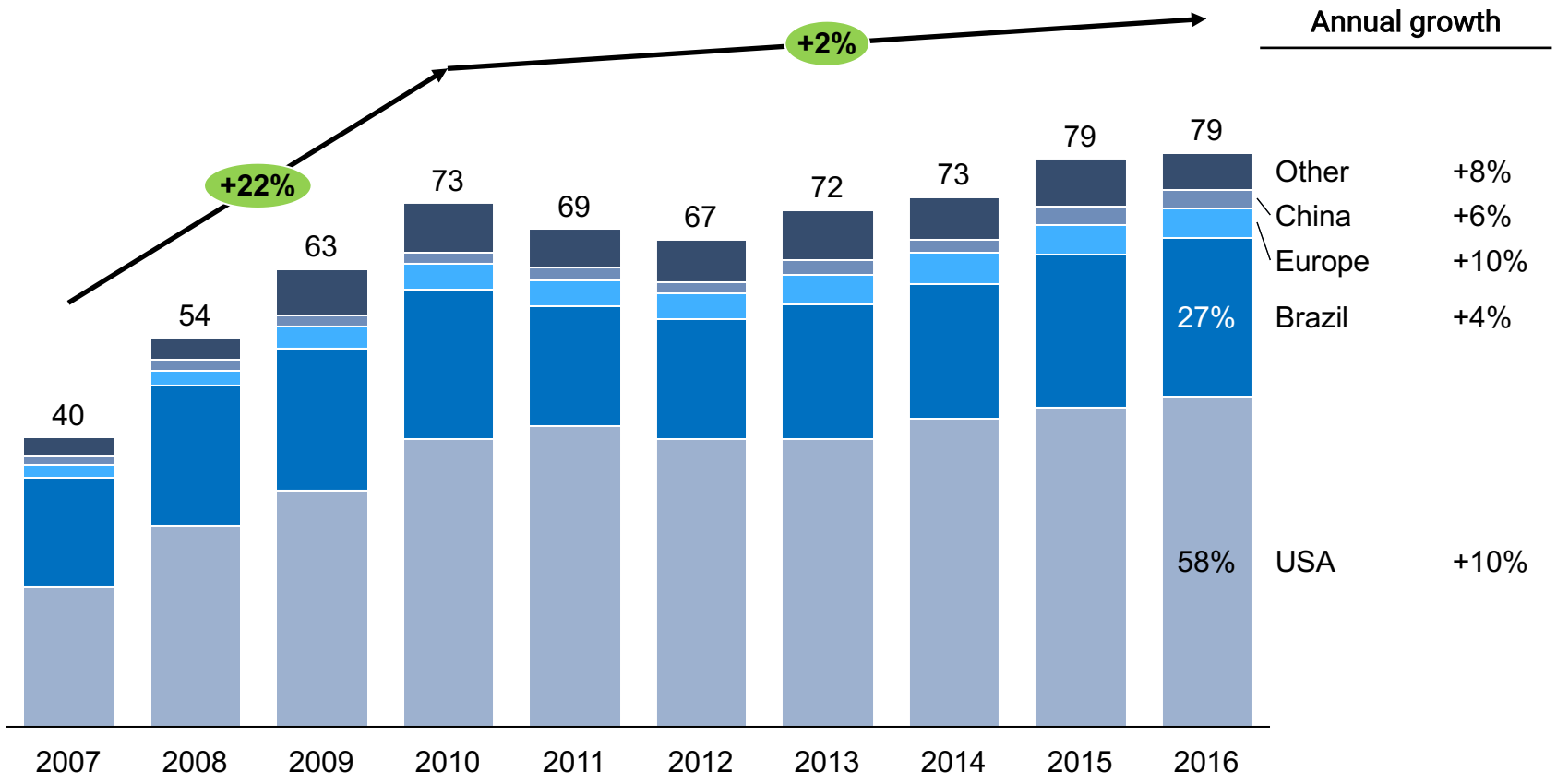
Source: Drewry, Oil World, MPOC, Odfjell

Agenda

- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
- Product studies
  - Organics: Methanol, Ethylene Glycol, Para-xylene, Benzene, Styrene
  - Inorganics: Caustic Soda
  - Vegetable Oils: Palm Oil
  - Other: Ethanol
- Chemical tanker supply
- Key conclusions

Ethanol production increased significantly until 2010 as it became a widely used biofuel

Historic development in global Ethanol production, MT mill.

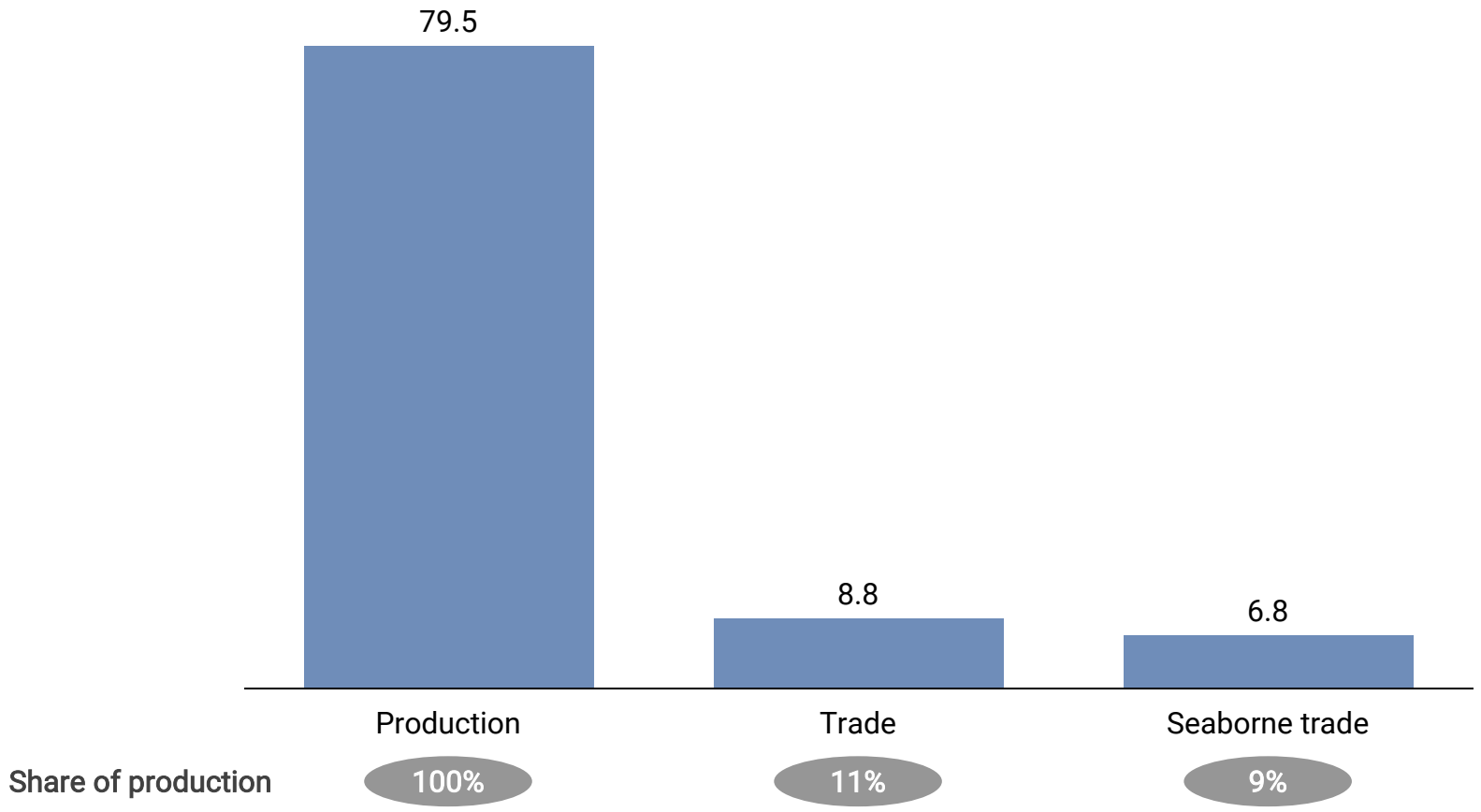


- Ethanol is the most widely used biofuel in the world
- Ethanol fuel blends vary from 5% to 100% pure ethanol
- United States, Brazil and the European Union are leading the change in fuel usage, producing and consuming approximately 80% of the world's total
- Majority (~90%) of consumption is produced domestically

Source: Renewable Fuels Association, Odfjell

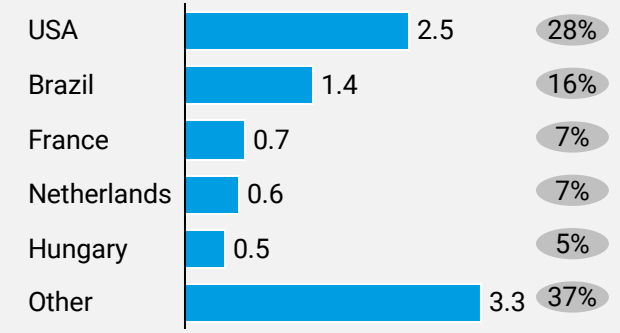
~10% of the global Ethanol production end up in seaborne trade – USA and Brazil are the big producers and exporters

Ethanol production, trade and seaborne trade 2016, MT millions



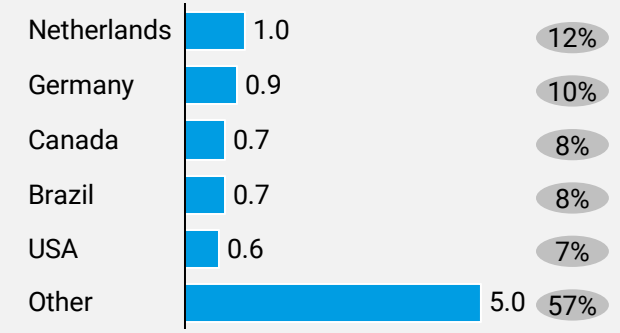
Ethanol exporters

Largest exporters (2016), MT mill.



Ethanol importers

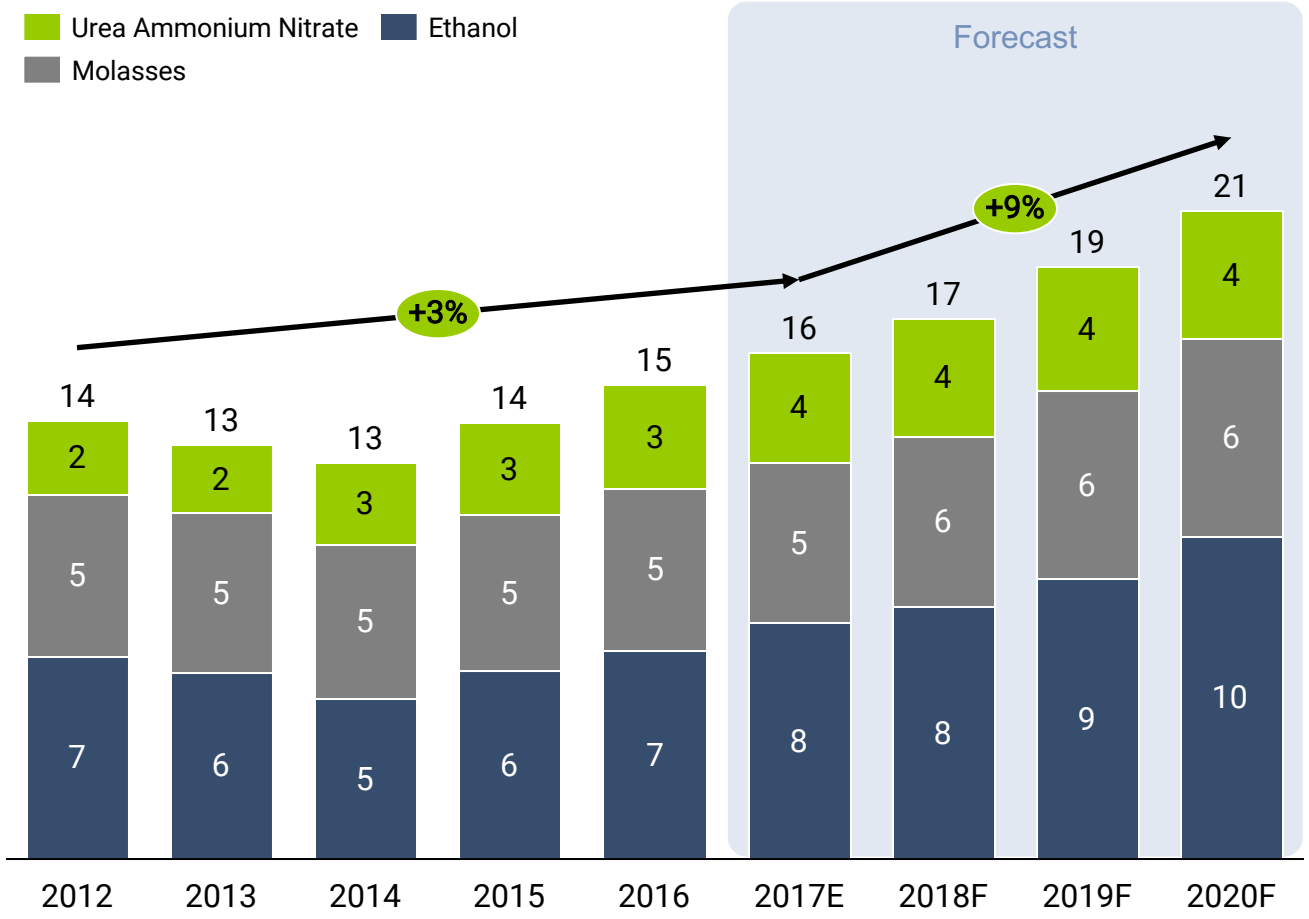
Largest importers (2016), MT mill.



Source: Renewable Fuels Association, Drewry, Odfjell, United Nations

We expect strong growth in seaborne trade of other chemicals driven primarily by increased ethanol consumption in China

Expected development in seaborne trade of Other Chemicals, MT mill.



Growth drivers

- Use of Ethanol as fuel and fuel additive (ETBE) to drive volume of seaborne trade in "other chemicals"
  - China has proposed 10% ethanol-blend for nine regions, and is likely to restrict use of MTBE
  - Increasing use of ethanol as an automotive fuel
  - Several European countries with ambitious biofuels targets
- Limited growth expected in trade of Molasses and UAN

Potential upsides

- Stricter biofuel regulations would further drive trade of ethanol and potentially also molasses as a secondary effect
- MTBE to ETBE switch driver only applicable for China as it is the only major remaining consumer of MTBE

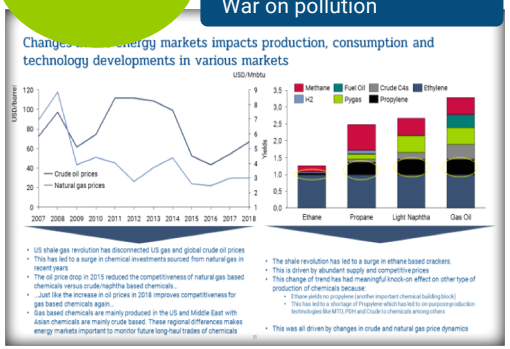
Potential downsides

- Declining oil prices would make conventional gasoline cheaper, with resulting reduced demand for biofuels

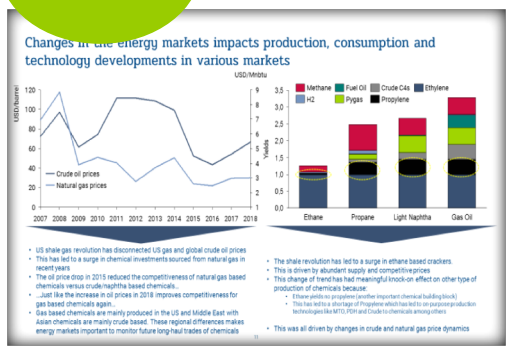
Source: Drewry, Odfjell

Final remarks: These eight products have the mentioned mega-trends as key demand drivers going forward with the exception of Palm Oil

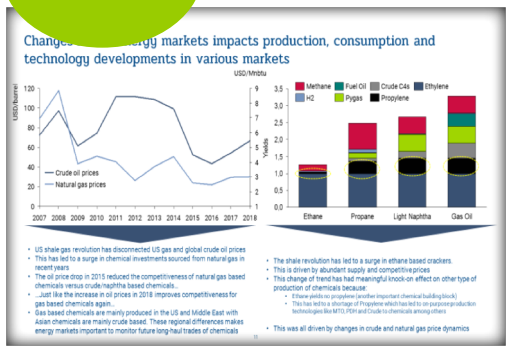
Methanol
- Natural Gas vs Oil prices
- US Shale
- War on pollution



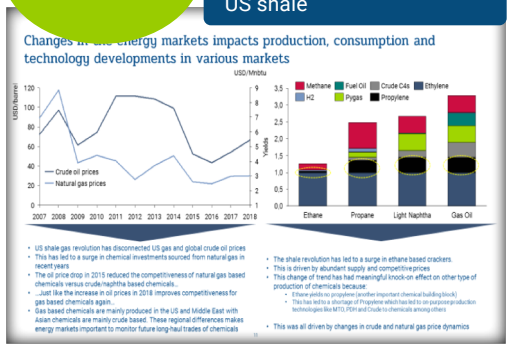
Ethylene Glycol
- Natural Gas vs Oil prices
- US shale



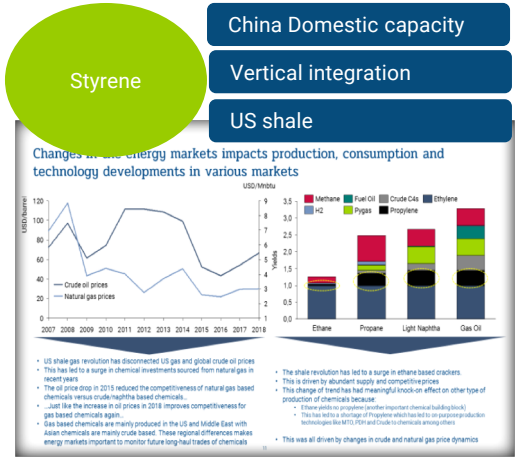
Para-xylene
- China Domestic capacity
- Vertical integration



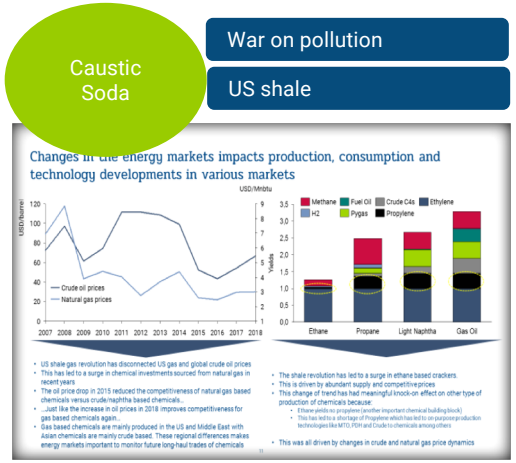
Benzene
- China Domestic capacity
- Vertical integration
- US shale



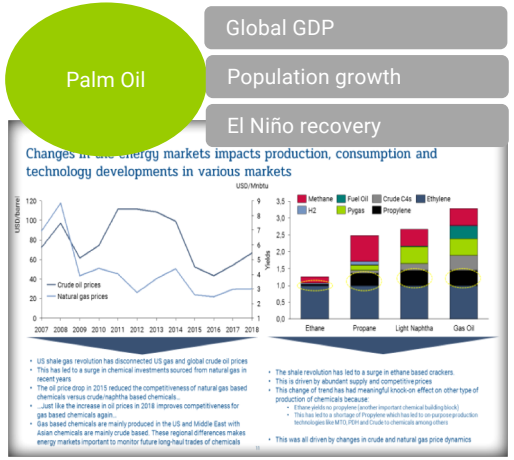
Styrene
- China Domestic capacity
- Vertical integration
- US shale



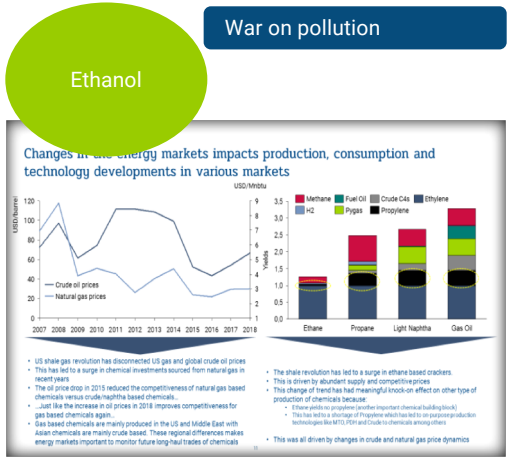
Caustic Soda
- War on pollution
- US shale



Palm Oil
- Global GDP
- Population growth
- El Niño recovery



Ethanol
- War on pollution

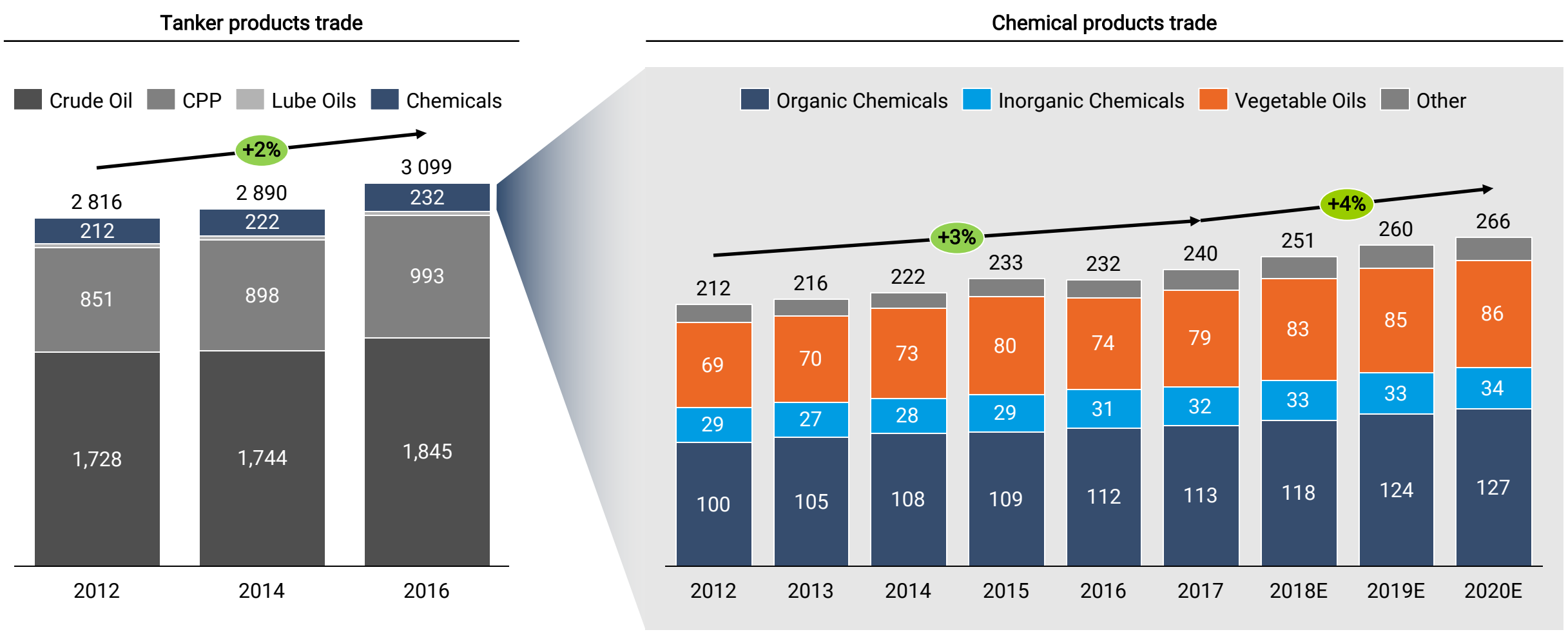


55% of Chemical tanker tonne-mile demand (FY 2017)

Source: Odfjell

We expect seaborne trade of chemical products to grow by 4% p.a. towards 2020, before tonne-miles are adjusted for

Historic development in seaborne trade, MT millions



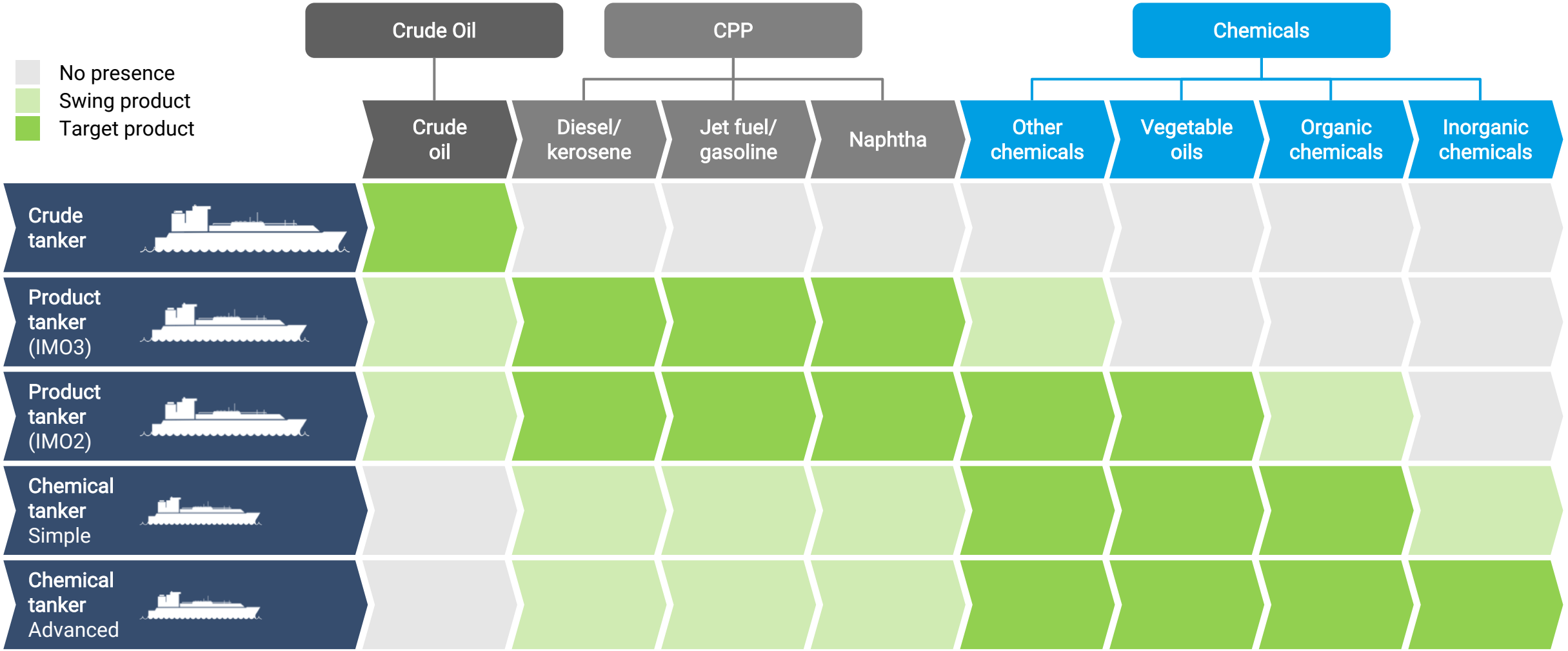
Source: ICIS, Clarksons Platou, Odfjell

Agenda

- Introduction to chemical tanker fundamentals
- Chemical industry mega trends
- Chemical tanker demand by product categories
- Product studies
- Chemical tanker supply
- Key conclusions

Chemicals mainly transported by chemical tankers, but product tankers "swing" into the chemical segment depending on market conditions

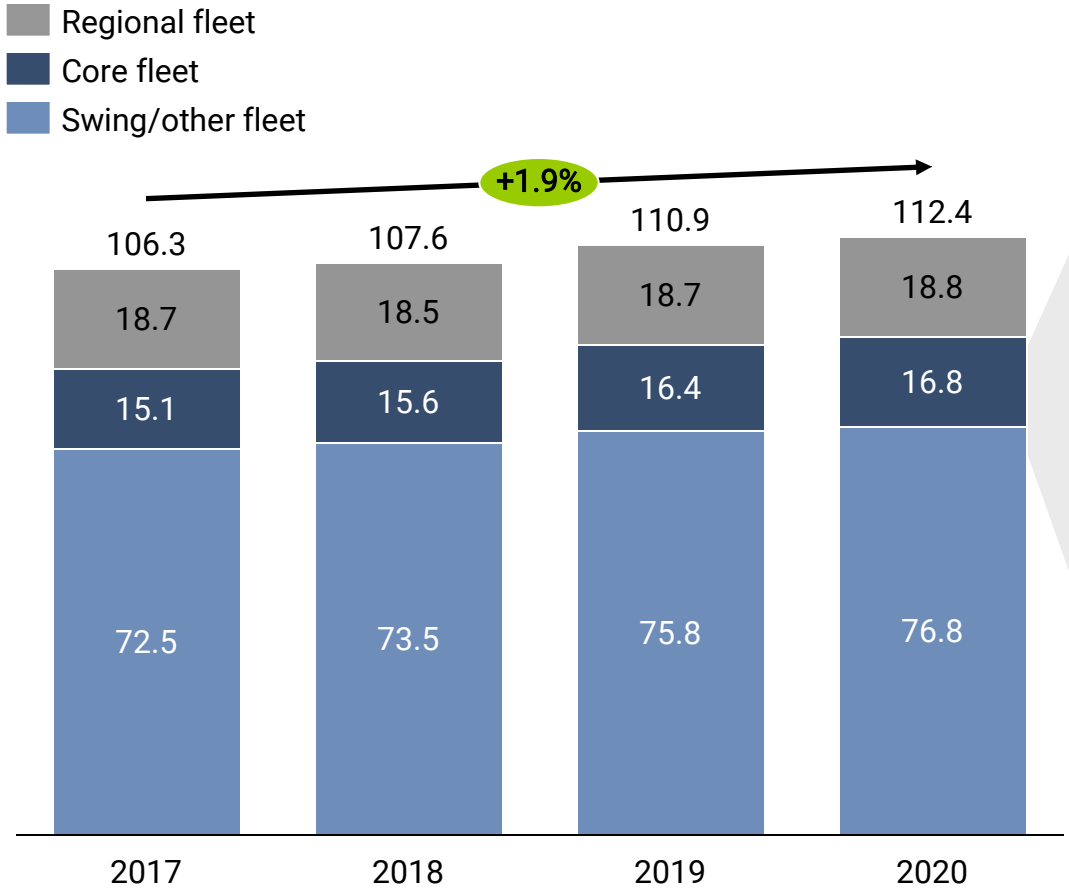
Overview of product capabilities for various tanker types (illustrative)

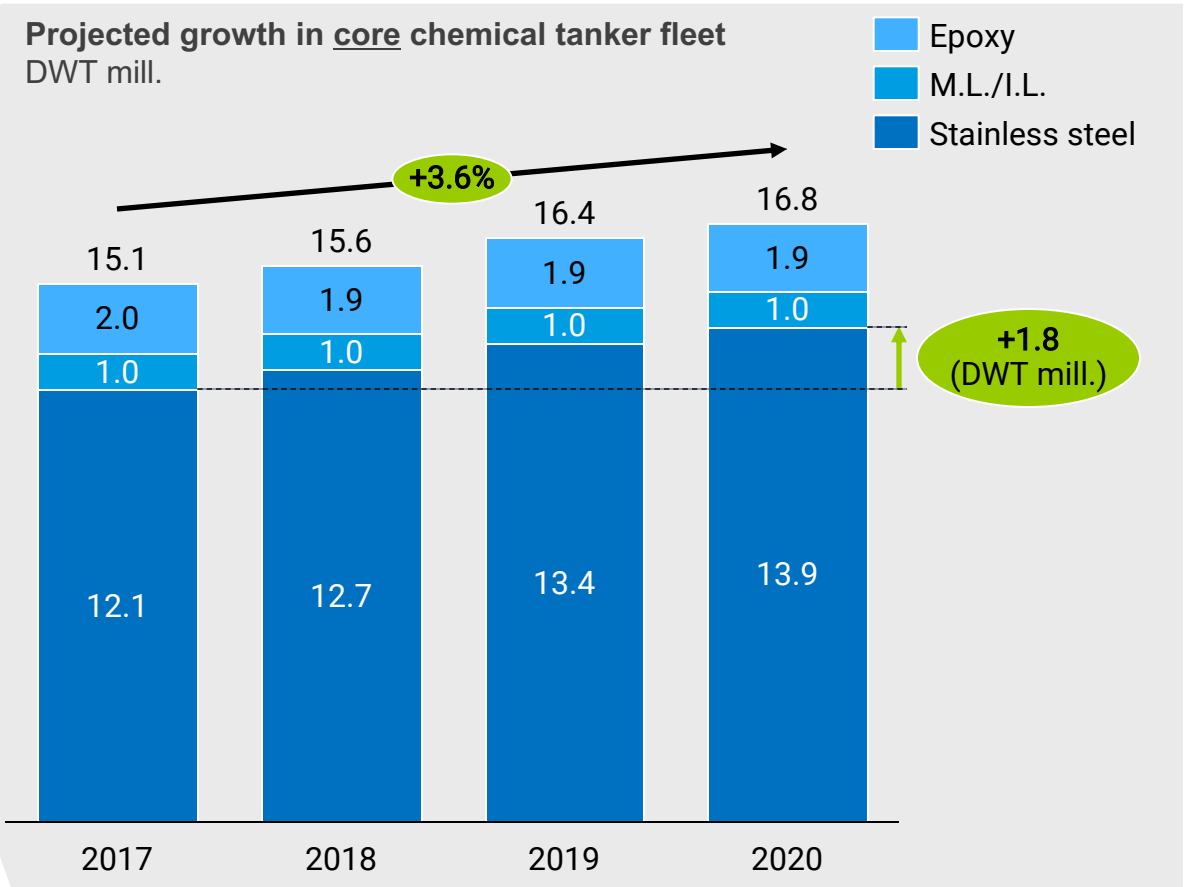


Source: Odfjell

Expected growth in chemical tanker fleet is 1.9% p.a. towards 2020 – largest growth in core fleet with 3.6% growth p.a.

Projected growth[1] in chemical tanker fleet, DWT mill.

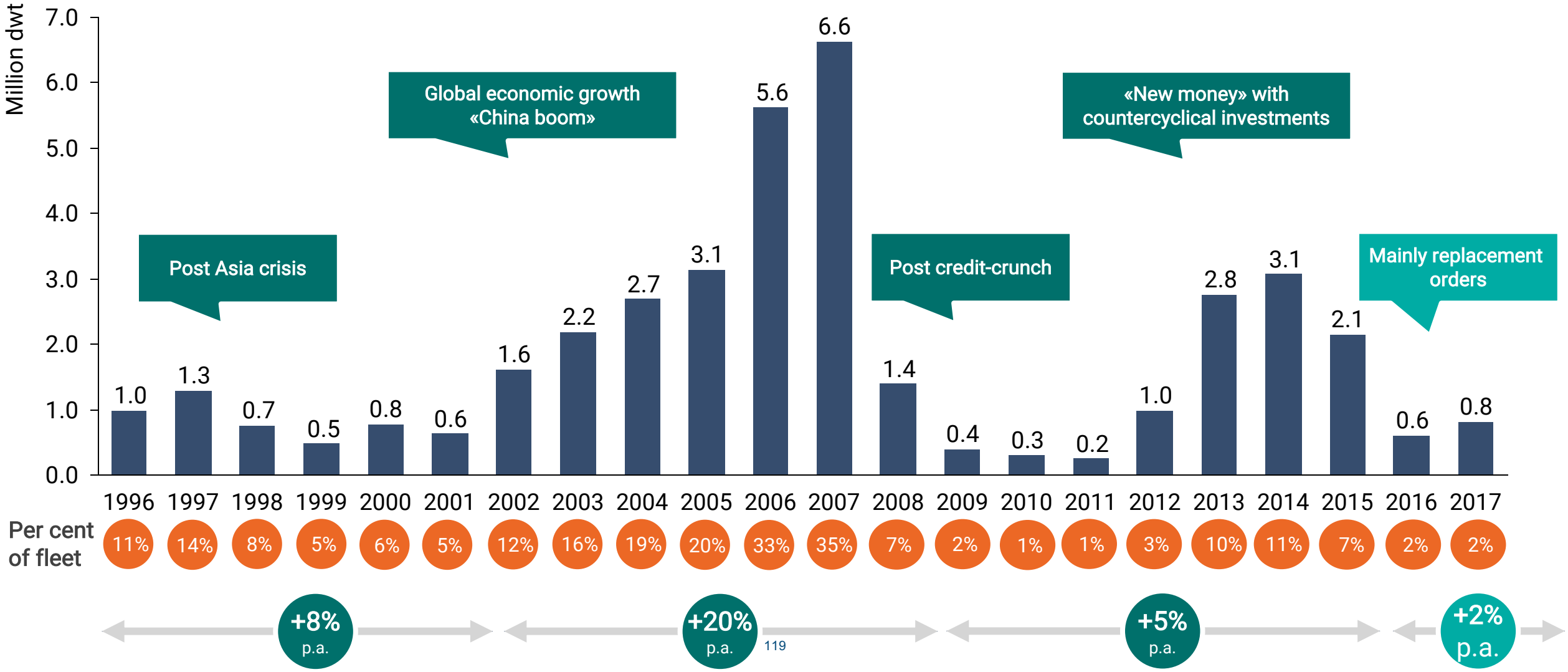




1. Fleet size 2018-2020 represent average tonnage volume available during year 2. Expect tonnage to be scrapped at 25 years age, and general delivery slippage of 1 month for new builds

Source: Odfjell FleetBase

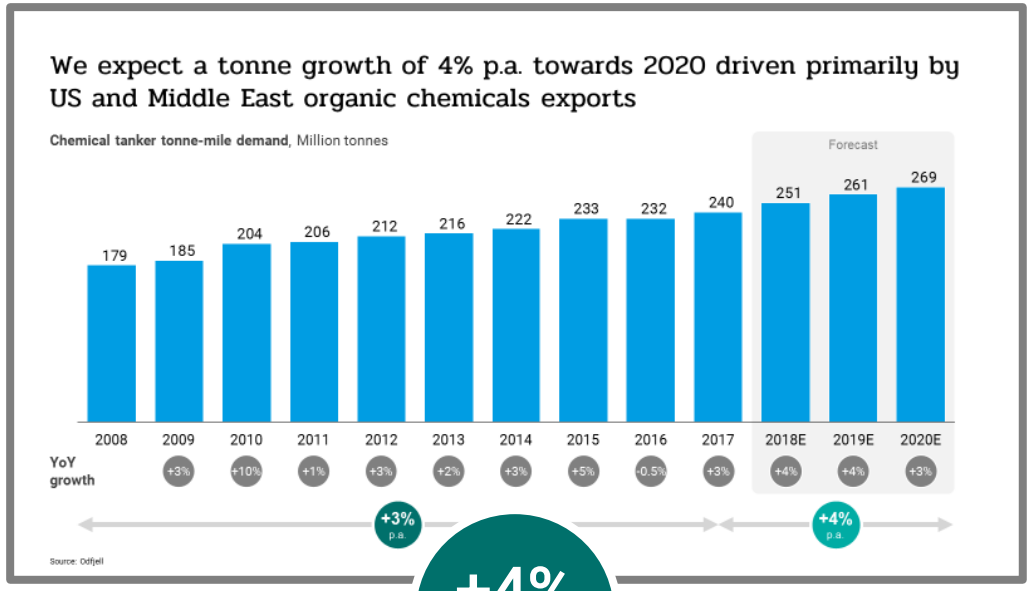
Chemical tanker orders has slowed down and orders are limited to replacements. Limited fleet growth 2018-2020



Source: Clarksons Platou, Odfjell* Orders as per cent of fleet reflects Clarksons Platou's defnitions of the chemical tanker fleet

We expect fundamental demand growth to outpace supply growth towards 2020 and tonne-miles could fuel further upside to seaborne traded demand

We expect volumes to grow by 4% p.a. primarily driven by organic chemicals…

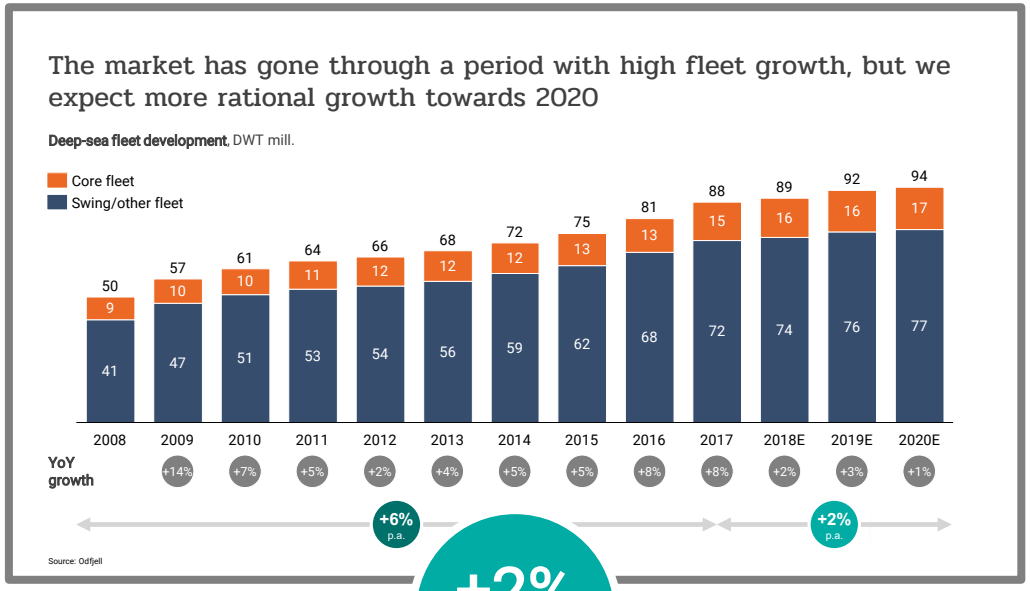


+4% p.a.

+ tonne-mile effect

Degree of Chinese self-sufficiency could impact this picture in both directions

…while supply growth is reduced to 2% p.a. following a period of rapid growth



+2% p.a.

Core fleet +3.6% p.a

Potential downside from CPP markets (swing tonnage)

Source: Odfjell

Final remarks and key takeaways from this market section

End-user demand

- Many products, but 18 products accounts for 80% of chemical tanker trade and several share end-user demand dynamics
- End-user demand is GDP driven but not chemical tanker demand

Mega trends

- Various disruptive factors are changing the chemical tanker market
- Majority leads to more miles – meaning tonne-mile demand dislocating from end-user demand

Categories

- Organic chemicals is the fastest growing category of chemicals due to the mega trends

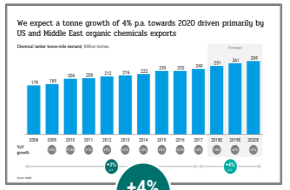
Key products

- Majority of the largest liquid chemicals have a positive outlook and will support tonne-mile demand in the years to come

Demand vs supply

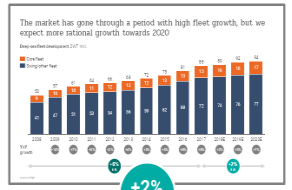
We expect fundamental demand growth to outpace supply growth towards 2020 and tonne-miles could fuel further upside to seaborne traded demand

We expect volumes to grow by 4% p.a. primarily driven by organic chemicals...



Degree of Chinese self-sufficiency could impact this picture in both directions

...while supply growth is reduced to 2% p.a. following a period of rapid growth



Potential downside from CPP markets (swing tonnage)

" Demand growth accelerating at the same time as supply growth is abating"

Source: Odfjell