Capital Markets Day
5th June 2018, Oslo
Agenda

- Welcome and introduction
- The Future
- Odfjell Terminals
# Today’s agenda

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

**Equity ratio**
- 2014: 31%, 1Q 18: 40%, +27%

**Opex per day**
- 2014: 9,841, 1Q 18: 7,600, -23%

**Predictability**
- Q1-2017: 5.7, Q4-2017: 4.4, -23%

**Cash balance**
- 2014: 105, 1Q 18: 181, 73%

**G&A % revenue**
- 2014: 8.9%, 1Q 18: 7.6%, -15%

**Port Efficiency**
- Historic: 100%, Actual: 93%, -7%

**Fleet development**
- 1Q 18 fleet: 84, Remaining newbuilds: 14, Future fleet: 98

8
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

17 x BB/TC to be renewed within June 2018

1-year TC 19.9k dwt StSt, USD per day

StSt newbuild prices, USD million

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 Mission**

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

**Our Vision**

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

1. **Safety performance**
   - Zero incidents

2. **Revenue / Top-line**
   - Average revenue growth of 10% per year (over time)

3. **Profitability**
   - Industry leading EBITDA margins

4. **Tankers**
   - Benefit from scale advantages. Towards customers by better service (cost, efficiency and predictability) and internally through efficiency gains and unit cost

5. **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 compromise 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

<table>
<thead>
<tr>
<th></th>
<th>Europe</th>
<th>US</th>
<th>Asia</th>
<th>Global</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rotterdam (OTR)</td>
<td>Antwerp (NNOT)</td>
<td>Houston (OTH)</td>
<td>Charleston (OTC)</td>
</tr>
<tr>
<td><strong>Storage capacity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In k CBM</td>
<td>1,622</td>
<td>348</td>
<td>380</td>
<td>79</td>
</tr>
<tr>
<td><strong>Mineral storage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In k CBM</td>
<td>937</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chemicals storage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In k CBM</td>
<td>685</td>
<td>348</td>
<td>380</td>
<td>79</td>
</tr>
<tr>
<td><strong>PID throughput</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual throughput</td>
<td>2,100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY 2017 (USD M)</td>
<td>USD 77.5M</td>
<td>USD 9.9M</td>
<td>USD 71.8M</td>
<td>USD 9.5M</td>
</tr>
<tr>
<td><strong>Odfjell SE ownership (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>51.00%</td>
<td>12.75%</td>
<td>51.00%</td>
<td>51.00%</td>
</tr>
</tbody>
</table>
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 likely accelerate the capex need
  – The terminal is mainly mineral oil focused, and Antwerp is consolidating 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**

- **Odfjell SE** 51%
- **Lindsay Goldberg** 49%
  - **Odfjell Terminals (OTBV)** 100%
    - **Rotterdam** 100%
    - **US Holding** 100%
    - **Asia Holding** 100%

**Future structure**

- **Odfjell SE** 100%
- **New partner 1** 49%
- **Odfjell Terminals (OTBV)** 51%
  - **US Holding** 51%
  - **Asia Holding** 51%
- **New partner 2** 49%

**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**

Setup if OTR is 100% sold - if not a new partner for OTR
Financial targets

Terje Iversen, CFO
Capital Markets Day 2018, Oslo
# Our finance strategy

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Have an efficient capital structure</strong></td>
<td>• 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</td>
</tr>
<tr>
<td><strong>Have access to attractive capital sources</strong></td>
<td>• A diversified portfolio of capital sources (and lending banks) to secure financial flexibility and a competitive cost of capital</td>
</tr>
</tbody>
</table>
| **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)

#### 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

#### 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

#### 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

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio</td>
<td>25.4x</td>
<td>16.1x</td>
<td>7.6x</td>
<td>4.0x</td>
<td>3.6x</td>
</tr>
</tbody>
</table>

### Equity ratio

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio</td>
<td>37.0%</td>
<td>31.0%</td>
<td>33.0%</td>
<td>38.0%</td>
<td>41.0%</td>
</tr>
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</table>

### Odfjell SE cash position

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount</td>
<td>162</td>
<td>105</td>
<td>126</td>
<td>165</td>
<td>207</td>
</tr>
</tbody>
</table>

### Return on capital employed

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return</td>
<td>-3%</td>
<td>-1%</td>
<td>2%</td>
<td>8%</td>
<td>8%</td>
</tr>
</tbody>
</table>

### Share price development (NOK per share)

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount</td>
<td>41</td>
<td>28</td>
<td>28</td>
<td>29</td>
<td>31</td>
<td>31</td>
</tr>
</tbody>
</table>

### Comments

- Key ratios has improved since 2015
- Equity instalments on newbuilding programme limited to USD 24 million
- 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.

* Year-end closing prices
## IFRS 16 will impact our P&L and Balance sheet as of January 2019

### Item

<table>
<thead>
<tr>
<th>Item</th>
<th>Impact 2017</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net revenue</td>
<td>Unchanged</td>
<td></td>
</tr>
<tr>
<td>TC expenses</td>
<td>189</td>
<td></td>
</tr>
<tr>
<td>Other costs (G&amp;A, Opex)</td>
<td>-78</td>
<td></td>
</tr>
<tr>
<td>EBITDA</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td>D&amp;A</td>
<td>-109</td>
<td></td>
</tr>
<tr>
<td>EBIT</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Net finance</td>
<td>-11</td>
<td></td>
</tr>
<tr>
<td>Taxes</td>
<td>Unchanged</td>
<td></td>
</tr>
<tr>
<td>Net result*</td>
<td>Unchanged</td>
<td></td>
</tr>
</tbody>
</table>

### Balance sheet:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>167</td>
<td>PV of BB element of lease obligation – reduced year on year by change in PV</td>
</tr>
<tr>
<td>Net debt</td>
<td>167</td>
<td>PV of BB element of lease obligation – reduced year on year by linear D&amp;A</td>
</tr>
<tr>
<td>Off balance sheet items</td>
<td>86</td>
<td>Sum of nominal opex element of time charter</td>
</tr>
</tbody>
</table>

*Estimated based on today’s TC commitments*
### High level targets

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Safety performance</td>
<td>Zero incidents</td>
</tr>
<tr>
<td>Revenue / Top-line</td>
<td>Average revenue growth of 10% per year (over time)</td>
</tr>
<tr>
<td><strong>Profitability</strong></td>
<td><em>Industry leading EBITDA margins and returns</em></td>
</tr>
<tr>
<td>Tankers</td>
<td>Benefit from scale advantages. Towards customers by better service (cost, efficiency and predictability) and internally through efficiency gains</td>
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<tr>
<td>Terminals</td>
<td>Operate terminals in key locations, ideally where operational synergies with Odfjell Tankers are possible</td>
</tr>
</tbody>
</table>
Markets have not treated us well the last 10 years but we still outperform more commoditized shipping segments

Odfjell Tankers Average 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 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.

Average ROIC lifted to 8% when adjusting for Project Felix

* Felix adjustments do 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.

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**Odfjell SE ROIC adjusting for OTR**

<table>
<thead>
<tr>
<th>Year</th>
<th>ROIC Before Adjustments</th>
<th>ROIC After Adjustments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>-3.2%</td>
<td>3.9%</td>
</tr>
<tr>
<td>2014</td>
<td>-1.3%</td>
<td>2.1%</td>
</tr>
<tr>
<td>2015</td>
<td>-1.3%</td>
<td>1.7%</td>
</tr>
<tr>
<td>2016</td>
<td>-1.3%</td>
<td>2.9%</td>
</tr>
<tr>
<td>2017</td>
<td>-1.3%</td>
<td>7.9%</td>
</tr>
</tbody>
</table>

**Odfjell SE EBIT adjusting for OTR**

<table>
<thead>
<tr>
<th>Year</th>
<th>EBIT Before Adjustments</th>
<th>EBIT After Adjustments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>-57</td>
<td>59</td>
</tr>
<tr>
<td>2014</td>
<td>-22</td>
<td>32</td>
</tr>
<tr>
<td>2015</td>
<td>-22</td>
<td>28</td>
</tr>
<tr>
<td>2016</td>
<td>-22</td>
<td>43</td>
</tr>
<tr>
<td>2017</td>
<td>-22</td>
<td>136</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>EV/EBITDA multiple (x)</th>
<th>Equity gain (USD mill)</th>
<th>Cash gain (USD mill)</th>
<th>Equity IRR (%)</th>
<th>Equity gain per share (NOK)</th>
<th>Ownership (Odfjell SE share %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0</td>
<td>40.0</td>
<td>14.0</td>
<td>22.0</td>
<td>4.1</td>
<td>14.9</td>
</tr>
</tbody>
</table>

### Singapore transaction

<table>
<thead>
<tr>
<th>EV/EBITDA multiple (x)</th>
<th>Equity gain (USD mill)</th>
<th>Cash gain (USD mill)</th>
<th>Equity IRR (%)</th>
<th>Equity gain per share (NOK)</th>
<th>Ownership (Odfjell SE share %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.0</td>
<td>136.0</td>
<td>153.0</td>
<td>23.0</td>
<td>15.6</td>
<td>25.0</td>
</tr>
</tbody>
</table>

### Houston terminal Key facts

<table>
<thead>
<tr>
<th>EBITDA (USD mill)</th>
<th>Capacity ('000 tonnes)</th>
<th>Expansion possibilities ('000 tonnes)</th>
<th>ROIC (%)</th>
<th>Ownership (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.0</td>
<td>380.0</td>
<td>125.4</td>
<td>15.0</td>
<td>51.0</td>
</tr>
</tbody>
</table>

- 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*

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**

- Super segregators: 2.7%
- Suezmax: 2.1%
- Handysize Tanker: 0.8%
- VLCC: 0.0%
- MR: -0.4%

- 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**

- Super segregators: 11.2%
- Suezmax: 5.2%
- VLCC: 2.2%
- Handysize Tanker: 1.9%
- MR: 0.3%

- 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.
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 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

<table>
<thead>
<tr>
<th>Margin</th>
<th>Mortgage funding</th>
<th>Sale/lease back</th>
<th>Bonds</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.3%</td>
<td>3.9%</td>
<td>6.3%</td>
<td></td>
</tr>
</tbody>
</table>

### Equity

<table>
<thead>
<tr>
<th>Odfjell Tankers external fleet valuation Dec-17 (USD mill)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market value fleet</td>
</tr>
<tr>
<td>Equity instalments NB</td>
</tr>
<tr>
<td>Excess market value NB</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>Odfjell Tankers vessel debt</td>
</tr>
<tr>
<td><strong>Net fleet value</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Odfjell SE historical price-to-book value (pre/post OTR shutdown)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.7.2005</td>
</tr>
<tr>
<td>1.7.2009</td>
</tr>
<tr>
<td>1.7.2013</td>
</tr>
<tr>
<td>1.7.2017</td>
</tr>
<tr>
<td>P/BV</td>
</tr>
<tr>
<td>3.2</td>
</tr>
<tr>
<td>2.2</td>
</tr>
<tr>
<td>1.2</td>
</tr>
<tr>
<td>0.2</td>
</tr>
</tbody>
</table>

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

- Super segregators: 26 vessels, 61%
- Large StSt 27-36k dwt: 10 vessels, 6%
- Medium StSt 19-26k dwt: 21 vessels, 7%
- Coated: 8 vessels, 19%
- Regional: 15 vessels, 7%

* 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

- Opex, G&A & voyage expenses
- Efficiency gains
- Newbuildings
- TC costs
- Renew/replace timing

Industry leading returns

- Cost control
- Bottom of the cycle
- “New” platform
- Adjusted for Felix & OTRT
- Higher higs & higher low’s

Industry leading EBITDA margins

- 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 returns

- Cost control
- Bottom of the cycle
- “New” platform
- Adjusted for Felix & OTRT
- Higher higs & higher low’s

Efficiency gains

- Higher higs & higher low’s
- Industry leading TCE

Investments

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

Newbuildings

- Newbuildings (OTR, Felix & OTRT)

TC costs

- TC costs
- Renew/replace timing

Renew/replace timing

- Newbuildings (OTR, Felix & OTRT)

Bottom of the cycle

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

“New” platform

- “New” platform

Adjusted for Felix & OTRT

- “New” platform

Adjusted for Felix & OTRT

- “New” platform

Industry leading TCE

- Industry leading TCE

Higher higs & higher low’s

- Higher higs & higher low’s

Industry leading returns

- Industry leading returns

Chemical tanker rates was affected to developments in product tankers (lining tonnage) that is again linked to crude tankers. The industrial nature of our business leads to less volatility to our top line.
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**

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
</table>
| 🏃‍♂️ | **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
• 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
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...

<table>
<thead>
<tr>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm clock</td>
</tr>
<tr>
<td>Shower</td>
</tr>
<tr>
<td>Clothing</td>
</tr>
<tr>
<td>Cup of coffee or bottle of water</td>
</tr>
<tr>
<td>Elevators</td>
</tr>
<tr>
<td>Computer</td>
</tr>
<tr>
<td>Drive a car</td>
</tr>
<tr>
<td>Phone call</td>
</tr>
<tr>
<td>Conference room</td>
</tr>
<tr>
<td>Bathroom</td>
</tr>
<tr>
<td>Subway/tram/bus</td>
</tr>
<tr>
<td>Meeting rooms</td>
</tr>
</tbody>
</table>

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...

<table>
<thead>
<tr>
<th>Product</th>
<th>Seaborne trade (MT mill.)</th>
<th>Average nautical miles</th>
<th>Tonne-miles (Billions)</th>
<th>Tonne-mile growth (%)</th>
<th>Trend 2018-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanol</td>
<td>25.4</td>
<td>27.8</td>
<td>27.9</td>
<td>3,753</td>
<td>3,984</td>
</tr>
<tr>
<td>Para-xylene/Xylenes</td>
<td>18.1</td>
<td>19.4</td>
<td>19.7</td>
<td>1,758</td>
<td>1,858</td>
</tr>
<tr>
<td>Ethylene Glycol</td>
<td>13.3</td>
<td>12.2</td>
<td>13.1</td>
<td>4,233</td>
<td>4,414</td>
</tr>
<tr>
<td>Styrene</td>
<td>8.9</td>
<td>8.1</td>
<td>7.6</td>
<td>2,800</td>
<td>3,304</td>
</tr>
<tr>
<td>Benzene</td>
<td>8.0</td>
<td>6.9</td>
<td>7.6</td>
<td>3,410</td>
<td>3,055</td>
</tr>
<tr>
<td>MTBE</td>
<td>5.8</td>
<td>6.3</td>
<td>6.0</td>
<td>4,048</td>
<td>4,211</td>
</tr>
<tr>
<td>Ethylene Dichloride</td>
<td>2.8</td>
<td>2.9</td>
<td>3.0</td>
<td>5,960</td>
<td>6,100</td>
</tr>
<tr>
<td>Toluene</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
<td>1,823</td>
<td>1,926</td>
</tr>
<tr>
<td>Sulphuric Acid</td>
<td>12.9</td>
<td>12.6</td>
<td>13.0</td>
<td>2,753</td>
<td>2,575</td>
</tr>
<tr>
<td>Caustic Soda</td>
<td>9.6</td>
<td>10.4</td>
<td>11.6</td>
<td>4,272</td>
<td>4,455</td>
</tr>
<tr>
<td>Phosphoric Acid</td>
<td>4.6</td>
<td>5.1</td>
<td>5.1</td>
<td>4,544</td>
<td>4,926</td>
</tr>
<tr>
<td>Palm oil</td>
<td>45.5</td>
<td>40.4</td>
<td>41.0</td>
<td>3,593</td>
<td>3,608</td>
</tr>
<tr>
<td>Soybean Oil</td>
<td>11.0</td>
<td>10.7</td>
<td>9.8</td>
<td>6,506</td>
<td>6,431</td>
</tr>
<tr>
<td>Sunflower Oil</td>
<td>7.2</td>
<td>8.4</td>
<td>10.5</td>
<td>3,603</td>
<td>3,670</td>
</tr>
<tr>
<td>Ethanol</td>
<td>6.1</td>
<td>6.8</td>
<td>7.7</td>
<td>4,902</td>
<td>5,373</td>
</tr>
<tr>
<td>Molasses</td>
<td>5.1</td>
<td>5.2</td>
<td>5.2</td>
<td>3,168</td>
<td>3,069</td>
</tr>
<tr>
<td>Others</td>
<td>45.5</td>
<td>46.3</td>
<td>48.5</td>
<td>3,046</td>
<td>2,933</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>232.7</strong></td>
<td><strong>232.4</strong></td>
<td><strong>240.2</strong></td>
<td><strong>3,668</strong></td>
<td><strong>3,735</strong></td>
</tr>
</tbody>
</table>

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

**Level 1:** Tanker products
- **Crude Oil** 60%
- **CPP** 31%
- **Lube Oils** 1%
- **Chemicals** 8%

**Level 2:** Chemical tanker products
- **Organic Chemicals** 48%
  - Bulk
    - Methanol
    - BTX
    - Ethylene Glycol
    - Styrene
    - MTBE
    - Ethylene Dichloride
  - Specialty
- **Inorganic Chemicals** 13%
  - Sulphuric Acid
  - Caustic Soda
  - Phosphoric Acid
- **Vegetable Oils** 32%
  - Palm Oil
  - Soybean Oil
  - Sunflower Oil
- **Other** 7%
  - Ethanol
  - Molasses

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”

Vessel time charter rates, USD per day

[Graph showing time charter rates for different types of tankers from 2012 to 2018]

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 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 Ethylene  
Far East Ethylene

• 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
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.

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

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

**Impacts 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

**Shutdown potential**
- Production capacity: 59.2 mtpa
- New capacity: 407,000
- Old capacity: 105,000

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

**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

<table>
<thead>
<tr>
<th>Polymers</th>
<th>Share of Polymer demand (Mill tonnes)</th>
<th>Of which is demand from the “waste chain”</th>
<th>Products</th>
<th>Implied impact on seaborne traded liquids (Mill tonnes)</th>
<th>Current conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene (PE)</td>
<td>93</td>
<td>50</td>
<td>• Milk, Juice, garbage/plastic bags, yogurt, plastic wraps, cereal boxes</td>
<td>N/A</td>
<td>Solids</td>
</tr>
<tr>
<td>Polypropylene (PP)</td>
<td>63</td>
<td>15</td>
<td>• Straws, ketchup bottles and various plastic containers</td>
<td>N/A</td>
<td>Solids</td>
</tr>
<tr>
<td>Polyvinyl Chloride (PVC)</td>
<td>41</td>
<td>8</td>
<td>• Food packaging, toys, shampoo bottles etc.</td>
<td>0.34 EDC</td>
<td>10-30 per cent reduction equals 30,000-100,000 t</td>
</tr>
<tr>
<td>PET</td>
<td>20</td>
<td>15</td>
<td>• Soft drinks, juice, beer cans, water bottles etc.</td>
<td>PX&amp;MEG 7.31</td>
<td>10-30 per cent reduction equals 730,000-2.2 mill t</td>
</tr>
<tr>
<td>Polystyrene (PS)</td>
<td>15</td>
<td>5</td>
<td>• Take-out food containers, egg cartons etc.</td>
<td>1.11 Styrene &amp; Benzene</td>
<td>10-30 per cent reduction equals 110,000-313,000</td>
</tr>
<tr>
<td>ABS</td>
<td>7</td>
<td>0</td>
<td>• Lego’s and mainly “harder plastics” like toys etc.</td>
<td>N/A</td>
<td>Solids</td>
</tr>
</tbody>
</table>

Source: Odfjell, IHS

Calculations are generic and final outcome is uncertain. Most plastic bans and targets for recycling involve 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:
- Door panels
- Instrument panel
- Center console
- Panoramic roof & roof modules
- Rear windshield glazing
- Door handles
- Wheelcovers
- Side mirror housings
- Engine Cover
- Oil pan
- Front grille
- Bumper, Bumper with integrated lighting
- A and B pillar
- Interior trim
- Headlight housings
- Headlight lens
- Air intake
- Engine Cover
- Door handles
- Wheelcovers
- Side mirror housings
- Instrument panel
- Center console
- Panoramic roof & roof modules
- Rear windshield glazing
- Door handles
- Wheelcovers
- Side mirror housings
- Door panels
- A and B pillar
- Interior trim
- Headlight housings
- Headlight lens
- Air intake

Impact examples...
- Less volumes?
- More volumes?
- New technologies?
- Share of EV?
- Share of Autonomy?
- Share of Mobility?

Market cap of auto manufacturers

Impact goes beyond car manufacturers and ultimately chemical shipping demand

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**
- **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**
- **“War on pollution”**
- **EV & Mobility**

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

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

**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**

**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**

**EV & Mobility could be the next disrupting factor for our markets – There will be both winners and losers**
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**

- **Level 1:** Tanker products
  - Crude Oil 60%
  - CPP 31%
  - Lube Oils 1%
  - Chemicals 8%

- **Level 2:** Chemical tanker products
  - Organic Chemicals 48%
    - Bulk
      - Methanol
      - BTX
      - Ethylene Glycol
      - Styrene
      - MTBE
      - Ethylene Dichloride
    - Specialty
  - Inorganic Chemicals 13%
    - Sulphuric Acid
    - Caustic Soda
    - Phosphoric Acid
  - Vegetable Oils 32%
    - Palm Oil
    - Soybean Oil
    - Sunflower Oil
  - Other 7%
    - Ethanol
    - Molasses

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:

- **Crude Oil and Natural Gas**
  - C1
  - C2
  - C3
  - C4
  - C6
  - C7
  - C8

**Petrochemical products**

- **Aromatics building blocks** are shipped onboard chemical tankers.
- **Olefins building blocks** are not shipped onboard chemical tankers.

- **Syngas**
- **Ethylene**
- **Propylene**
- **C4 Olefins**
- **Benzene**
- **Toluene**
- **Xylenes**

**NGL’s/Naphtha/on-purpose technologies**

**Crude Oil and Natural Gas**

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 world’s largest liquefaction capacity in Qatar and LNG carrier demand grows 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)

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Use</th>
<th>Global production MT mill.</th>
<th>Seaborne trade MT mill.</th>
<th>IMO-type requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanol</td>
<td>CH₃OH</td>
<td>• Colourless, flammable, volatile and poisonous</td>
<td>88</td>
<td>28</td>
<td>IMO 3</td>
</tr>
<tr>
<td>Xylenes</td>
<td>(CH₃)₂C₆H₄</td>
<td>• Colourless, nonviscous, flammable, insoluble in water</td>
<td>93</td>
<td>19</td>
<td>IMO 2</td>
</tr>
<tr>
<td>Ethylene Glycol</td>
<td>C₂H₂O₂</td>
<td>• Colourless, odorless, syrup-like toxic liquid, miscible with water</td>
<td>26</td>
<td>12</td>
<td>IMO 3</td>
</tr>
<tr>
<td>Styrene</td>
<td>C₆H₈</td>
<td>• Colourless, oily liquid</td>
<td>29</td>
<td>8</td>
<td>IMO 3</td>
</tr>
<tr>
<td>Benzene</td>
<td>C₆H₆</td>
<td>• Colourless, highly flammable and volatile, gasoline-like odour</td>
<td>47</td>
<td>7</td>
<td>IMO 3</td>
</tr>
<tr>
<td>MTBE</td>
<td>C₅H₁₂O</td>
<td>• Colourless, flammable volatile</td>
<td>22</td>
<td>6</td>
<td>IMO 3</td>
</tr>
<tr>
<td>Ethylene Dichloride</td>
<td>C₂H₄Cl₂</td>
<td>• Colourless, oily and flammable</td>
<td>50</td>
<td>3</td>
<td>IMO 2</td>
</tr>
<tr>
<td>Toluene</td>
<td>C₇H₈</td>
<td>• Clear, water-insoluble with the odor of paint thinner</td>
<td>28</td>
<td>3</td>
<td>IMO 3</td>
</tr>
<tr>
<td>Acetic Acid</td>
<td>C₂H₄O₂</td>
<td>• Acid with antibacterial and antifungal properties</td>
<td>14</td>
<td>2</td>
<td>IMO 3</td>
</tr>
<tr>
<td>Vinyl Acetate</td>
<td>C₄H₈O₂</td>
<td>• Colourless liquid with sweet odour</td>
<td>6</td>
<td>2</td>
<td>IMO 3</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>• Several other organic chemicals exist, but seaborne trade is primarily concentrated around the major products</td>
<td>1 008</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

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.
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

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 2017-2020

<table>
<thead>
<tr>
<th>Case</th>
<th>Assumptions</th>
<th>Demand impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Majority of volumes on longest routes</td>
<td>+3% +4% Tonne Demand</td>
</tr>
<tr>
<td>Base</td>
<td>Equal export split based on length of routes</td>
<td>+2% +4% Tonne Demand</td>
</tr>
<tr>
<td>Low</td>
<td>Export split favouring shorter routes</td>
<td>+1% +4% Tonne Demand</td>
</tr>
</tbody>
</table>

Average distance 2017: 3,736 miles

Source: ICIS, Drewry, Odfjell

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

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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

- **Level 1:** Tanker products
  - Crude Oil 60%
  - CPP 31%
  - Lube Oils 1%
  - Chemicals 8%

- **Level 2:** Chemical tanker products
  - Organic Chemicals 48%
    - Bulk
      - Methanol
      - BTX
      - Ethylene Glycol
      - Styrene
      - MTBE
      - Ethylene Dichloride
    - Specialty
  - Inorganic Chemicals 13%
    - Sulphuric Acid
    - Caustic Soda
    - Phosphoric Acid
  - Vegetable Oils 32%
    - Palm Oil
    - Soybean Oil
    - Sunflower Oil
  - Other 7%
    - Ethanol
    - Molasses

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)

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Use</th>
<th>Global production, MT mill.</th>
<th>Seaborne trade, MT mill.</th>
<th>IMO-type requirement¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphuric acid</td>
<td>• Mineral acid (H₂SO₄)</td>
<td>• ~55% of sulphuric acid is used for production of phosphate fertilizers</td>
<td>272</td>
<td>13</td>
<td>IMO 3</td>
</tr>
<tr>
<td></td>
<td>• Produced from reaction between sulphur, water</td>
<td>• ~15% of sulphuric acid is used as feedstock for production of chemicals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>and oxygen</td>
<td>• ~10% goes into metal industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caustic soda</td>
<td>• Ionic compound (NaOH)</td>
<td>• ~25% used as feedstock for other inorganic (and organic) chemicals</td>
<td>82</td>
<td>10</td>
<td>IMO 3</td>
</tr>
<tr>
<td></td>
<td>• Produced using chloralkali process on NaCl</td>
<td>• ~15% used in pulp and paper industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphoric acid</td>
<td>• Mineral acid (H₃PO₄)</td>
<td>• The fertilizer industry consume ~90% of phosphoric acid produced</td>
<td>43</td>
<td>5</td>
<td>IMO 3</td>
</tr>
<tr>
<td></td>
<td>• Produced from phosphate rock</td>
<td>• Also used as a food additive and in rust-removal products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>• Several other inorganic chemicals exist, but</td>
<td>• Several other inorganic chemicals exist, but seaborne trade is</td>
<td>N/A</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>seaborne trade is primarily concentrated</td>
<td>primarily concentrated around the major products</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

¹ IMO-type requirement: IMO 3
Seaborne trade of Inorganic Chemicals has grown by ~2% p.a. since 2007

Historic development in seaborne trade of Inorganic Chemicals, 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

Main seaborne trade countries

Exporters (2016), MT mill.

- United States: 6 (18%)
- Japan: 4 (14%)
- South Korea: 4 (13%)
- China: 2 (6%)
- Morocco: 2 (6%)
- Other: 13 (43%)
- Total: 31 (100%)

Importers (2016), MT mill.

- India: 5 (15%)
- Brazil: 3 (9%)
- Australia: 3 (9%)
- Chile: 2 (7%)
- Philippines: 1 (5%)
- Other: 17 (55%)
- Total: 31 (100%)

• 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
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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Caustic Soda</th>
<th>Phosphoric Acid</th>
<th>Other inorganics</th>
<th>Sulphuric Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>2013</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>2014</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>2015</td>
<td>2</td>
<td>5</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>2016</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>2017E</td>
<td>2</td>
<td>5</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>2018F</td>
<td>2</td>
<td>5</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>2019F</td>
<td>2</td>
<td>5</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>2020F</td>
<td>2</td>
<td>5</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>

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**

**Level 1:**
- **Tanker products**
  - Crude Oil: 60%
  - CPP: 31%
  - Lube Oils: 1%
  - Chemicals: 8%

**Level 2:**
- **Chemical tanker products**
  - Organic Chemicals: 48%
    - Bulk: Methanol, BTX, Ethylene Glycol, Styrene, MTBE, Ethylene Dichloride
    - Specialty: Sulphuric Acid, Caustic Soda, Phosphoric Acid
  - Inorganic Chemicals: 13%
    - Vegetable Oils: 32%
      - Palm Oil, Soybean Oil, Sunflower Oil
    - Other: 7%
      - Ethanol, Molasses

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)

<table>
<thead>
<tr>
<th>Product</th>
<th>Production</th>
<th>Use</th>
<th>Global production, MT mill.</th>
<th>Seaborne trade, MT mill.</th>
</tr>
</thead>
</table>
| 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Other</th>
<th>Sunfl. Oil</th>
<th>Rapes. Oil</th>
<th>Soyb. Oil</th>
<th>Palm Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>53</td>
<td>15</td>
<td>25</td>
<td>42</td>
<td>54</td>
</tr>
<tr>
<td>2013</td>
<td>53</td>
<td>14</td>
<td>26</td>
<td>43</td>
<td>57</td>
</tr>
<tr>
<td>2014</td>
<td>54</td>
<td>16</td>
<td>27</td>
<td>45</td>
<td>60</td>
</tr>
<tr>
<td>2015</td>
<td>54</td>
<td>15</td>
<td>26</td>
<td>49</td>
<td>63</td>
</tr>
<tr>
<td>2016</td>
<td>53</td>
<td>16</td>
<td>25</td>
<td>52</td>
<td>59</td>
</tr>
</tbody>
</table>

### Annual growth

- Other: 0%
- Sunfl. Oil: +2%
- Rapes. Oil: 0%
- Soyb. Oil: +5%
- Palm Oil: +2%

### Vegoil production per producer country, 2016

54% of global production

Indonesia: 36
China: 27
Malaysia: 19
USA: 19
ARG: 10
BRA: 7
IND: 6
GER: 5
UKR: 5
CAN: 54

Other

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

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

<table>
<thead>
<tr>
<th>Country</th>
<th>MT mill</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>26</td>
<td>32%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>17</td>
<td>22%</td>
</tr>
<tr>
<td>Argentina</td>
<td>7</td>
<td>8%</td>
</tr>
<tr>
<td>Ukraine</td>
<td>5</td>
<td>6%</td>
</tr>
<tr>
<td>Canada</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>Other</td>
<td>22</td>
<td>28%</td>
</tr>
</tbody>
</table>

### Vegoil importers

<table>
<thead>
<tr>
<th>Country</th>
<th>MT mill</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>14</td>
<td>18%</td>
</tr>
<tr>
<td>China</td>
<td>8</td>
<td>10%</td>
</tr>
<tr>
<td>USA</td>
<td>5</td>
<td>6%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>Pakistan</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>Other</td>
<td>47</td>
<td>58%</td>
</tr>
</tbody>
</table>
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.

\[ y = 8.86 \ln(x^2) - 48.95 \]

\( R\text{-squared}=36\% \)

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 (-)

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

Level 1:
Tanker products

- Crude Oil (60%)
- CPP (31%)
- Lube Oils (1%)
- Chemicals (8%)

Product types transported by Odfjell

Level 2:
Chemical tanker products

- Organic Chemicals (48%)
  - Bulk
    - Methanol
    - BTX
    - Ethylene Glycol
    - Styrene
    - MTBE
    - Ethylene Dichloride
  - Specialty
- Inorganic Chemicals (13%)
  - Sulphuric Acid
  - Caustic Soda
  - Phosphoric Acid
- Vegetable Oils (32%)
  - Palm Oil
  - Soybean Oil
  - Sunflower Oil
- Other (7%)
  - Ethanol
  - Molasses

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)

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Use</th>
<th>Global production, MT mill.</th>
<th>Seaborne trade, MT mill.</th>
<th>IMO-type requirement</th>
</tr>
</thead>
</table>
| 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 | 61¹                         | 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 | 14¹                        | 3                          | IMO 3                  |

*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 it 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.**

- **Urea Ammonium Nitrate**
- **Ethanol**
- **Molasses**

**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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>Prod: 6 Net exp: 5</td>
<td>Prod: 7 Net exp: 5</td>
<td>7 7</td>
<td>-</td>
</tr>
<tr>
<td>United States</td>
<td>Prod: 6 Net imp: 1</td>
<td>Prod: 11 Net exp: 4</td>
<td>6 11</td>
<td>4</td>
</tr>
<tr>
<td>Trinidad</td>
<td>Prod: 5 Net exp: 5</td>
<td>Prod: 6 Net exp: 6</td>
<td>7 8</td>
<td>1</td>
</tr>
<tr>
<td>Iran</td>
<td>Prod: 5 Net exp: 5</td>
<td>Prod: 7 Net exp: 8</td>
<td>6 12</td>
<td>3</td>
</tr>
<tr>
<td>Venezuela</td>
<td>Prod: 2 Net exp: 1</td>
<td>Prod: 0.3 Net exp: 0</td>
<td>2 2</td>
<td>0</td>
</tr>
</tbody>
</table>

- 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
- No new plants planned. Small increase in production/utilization
- Large increase in capacity and prod. From net importer to net exporter
- Growth in capacity and production
- High growth in capacity and production
- Loosing market share
- 2017 exports dropped 70%

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**

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

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)

<table>
<thead>
<tr>
<th>Year</th>
<th>Import</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>2016</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2017</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

US freight rates on Imports vs Exports

<table>
<thead>
<tr>
<th>Year</th>
<th>USG-EUR</th>
<th>EUR-USG</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>2013</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>2014</td>
<td>52</td>
<td>48</td>
</tr>
<tr>
<td>2015</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>2016</td>
<td>64</td>
<td>36</td>
</tr>
<tr>
<td>2017</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Plant</th>
<th>2020 Capacity, MT thousands</th>
<th>Route</th>
<th>Start-up year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shiraz</td>
<td>84</td>
<td>Natural Gas</td>
<td>1991</td>
</tr>
<tr>
<td>Kharg Island</td>
<td>660</td>
<td>Natural Gas</td>
<td>1999</td>
</tr>
<tr>
<td>Bandar Imam</td>
<td>1 700</td>
<td>Natural Gas</td>
<td>2004</td>
</tr>
<tr>
<td>Asaluyeh (Zagros)</td>
<td>1 650</td>
<td>Natural Gas</td>
<td>2007</td>
</tr>
<tr>
<td>Asaluyeh (Zagros)</td>
<td>1 650</td>
<td>Natural Gas</td>
<td>2010</td>
</tr>
<tr>
<td>Asaluyeh (Marjan)</td>
<td>1 650</td>
<td>Natural Gas</td>
<td>2018</td>
</tr>
<tr>
<td>Dayer (Kaveh)</td>
<td>2 300</td>
<td>Natural Gas</td>
<td>2018</td>
</tr>
<tr>
<td>Asaluyeh (Arman)</td>
<td>1 650</td>
<td>Natural Gas</td>
<td>2019</td>
</tr>
<tr>
<td>Total</td>
<td>5 744 (Existing) 5 600 (+97%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Region</th>
<th>2020 Capacity, MT millions</th>
<th>New plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Mongolia</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Shaanxi</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>Shandong</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Henan</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>Ningxia</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>Shanxi</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Xinjiang</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Hebei</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Anhui</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Qinghai</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Existing</strong>: 84 New: 12 (+14%)</td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Producer</th>
<th>Capacity</th>
<th>Start-up</th>
<th>Utilisation %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinopec Zhongyuan</td>
<td>200,000t</td>
<td>2011</td>
<td>80</td>
</tr>
<tr>
<td>Ningbo Fund Energy</td>
<td>600,000t</td>
<td>2013</td>
<td>93</td>
</tr>
<tr>
<td>Nanjing Chengzhi</td>
<td>300,000t</td>
<td>2013</td>
<td>100</td>
</tr>
<tr>
<td>Shandong Shenda</td>
<td>340,000t</td>
<td>2014</td>
<td>60</td>
</tr>
<tr>
<td>Zhejiang Xinxing</td>
<td>690,000t</td>
<td>2015</td>
<td>0</td>
</tr>
<tr>
<td>Yangmei Hengtong</td>
<td>300,000t</td>
<td>2015</td>
<td>65</td>
</tr>
<tr>
<td>Shenhua Yulin</td>
<td>600,000t</td>
<td>2015</td>
<td>100</td>
</tr>
<tr>
<td>China Coal Mengda</td>
<td>600,000t</td>
<td>2016</td>
<td>100</td>
</tr>
<tr>
<td>Changzhou Fund</td>
<td>330,000t</td>
<td>2016</td>
<td>100</td>
</tr>
<tr>
<td>Jiangsu Sailboat C.</td>
<td>840,000t</td>
<td>2016</td>
<td>90</td>
</tr>
<tr>
<td>Jilin Connel Chem.</td>
<td>300,000t</td>
<td>2018</td>
<td>-</td>
</tr>
<tr>
<td>Jituai Energy</td>
<td>550,000t</td>
<td>2019</td>
<td>-</td>
</tr>
<tr>
<td>Nanjing Chengzhi</td>
<td>600,000t</td>
<td>2019</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,250,000t</td>
<td></td>
<td>$62 $78</td>
</tr>
</tbody>
</table>

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.

China Methanol deficit to increase by 7.5 million tonnes by 2021...

...Conveniently – New Iran and US Methanol capacity will match this incremental deficit.

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.

Source: Company data, Odfjell, ICIS
Chinese Ethylene Glycol deficit is forecasted to increase by 2.5 million tonnes by 2021

Source: ICIS, Odfjell

China Ethylene Glycol deficit to increase by 2.5 million tonnes by 2021...

...Conveniently – New US and India capacity will match this incremental deficit...

... The US has a major cost advantage due to its gas prices...
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

- 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

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.
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

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

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

Global Styrene production cost (USD/tonne)

China imports by region (2017)

Chinese trader comment on ADD:

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

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

Share of plant capacity

- Plant capacity: 100%
- Production: 85%
- Trade: 11%
- Seaborne trade: 11%

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 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
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  • 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

Largest palm oil importers

<table>
<thead>
<tr>
<th>Country</th>
<th>Import, MT mill</th>
<th>Haul length, miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>9.1</td>
<td>1.600</td>
</tr>
<tr>
<td>EU</td>
<td>6.9</td>
<td>8.200</td>
</tr>
<tr>
<td>China</td>
<td>5.7</td>
<td>1.800</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2.8</td>
<td>12.000</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1.3</td>
<td>1.500</td>
</tr>
<tr>
<td>USA</td>
<td>1.1</td>
<td>12.000</td>
</tr>
<tr>
<td>Egypt</td>
<td>1.5</td>
<td>4.800</td>
</tr>
<tr>
<td>Other</td>
<td>18.7</td>
<td>18.5</td>
</tr>
</tbody>
</table>

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.

2015/16-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 it’s 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
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- 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**

<table>
<thead>
<tr>
<th>Share of production</th>
<th>Production</th>
<th>Trade</th>
<th>Seaborne trade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>79.5</td>
<td>8.8</td>
<td>6.8</td>
</tr>
</tbody>
</table>

**Ethanol exporters**

Largest exporters (2016), MT mill.

<table>
<thead>
<tr>
<th>Country</th>
<th>Production, MT</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>2.5</td>
<td>28%</td>
</tr>
<tr>
<td>Brazil</td>
<td>1.4</td>
<td>16%</td>
</tr>
<tr>
<td>France</td>
<td>0.7</td>
<td>7%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.6</td>
<td>7%</td>
</tr>
<tr>
<td>Hungary</td>
<td>0.5</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>3.3</td>
<td>37%</td>
</tr>
</tbody>
</table>

**Ethanol importers**

Largest importers (2016), MT mill.

<table>
<thead>
<tr>
<th>Country</th>
<th>Import, MT</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherlands</td>
<td>1.0</td>
<td>12%</td>
</tr>
<tr>
<td>Germany</td>
<td>0.9</td>
<td>10%</td>
</tr>
<tr>
<td>Canada</td>
<td>0.7</td>
<td>8%</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.7</td>
<td>8%</td>
</tr>
<tr>
<td>USA</td>
<td>0.6</td>
<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>5.0</td>
<td>57%</td>
</tr>
</tbody>
</table>

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.
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**

<table>
<thead>
<tr>
<th>Year</th>
<th>Tanker products trade</th>
<th>Chemical products trade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude Oil</td>
<td>CPP</td>
</tr>
<tr>
<td>2012</td>
<td>2,816</td>
<td>212</td>
</tr>
<tr>
<td>2014</td>
<td>2,890</td>
<td>222</td>
</tr>
<tr>
<td>2016</td>
<td>3,099</td>
<td>232</td>
</tr>
</tbody>
</table>

Source: ICIS, Clarksons Platou, Odfjell
Agenda

• Introduction to chemical tanker fundamentals
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• 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)

<table>
<thead>
<tr>
<th>Crude Oil</th>
<th>Diesel/ kerosene</th>
<th>Jet fuel/ gasoline</th>
<th>Naphtha</th>
<th>Other chemicals</th>
<th>Vegetable oils</th>
<th>Organic chemicals</th>
<th>Inorganic chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude tanker</td>
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<td>Product tanker (IMO3)</td>
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<td>Product tanker (IMO2)</td>
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<tr>
<td>Chemical tanker Simple</td>
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<tr>
<td>Chemical tanker Advanced</td>
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</tbody>
</table>

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 in chemical tanker fleet, DWT mill.

- Regional fleet
- Core fleet
- Swing/other fleet

<table>
<thead>
<tr>
<th>Year</th>
<th>Regional fleet</th>
<th>Core fleet</th>
<th>Swing/other fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>106.3</td>
<td>15.1</td>
<td>72.5</td>
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<tr>
<td>2018</td>
<td>107.6</td>
<td>15.6</td>
<td>73.5</td>
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<tr>
<td>2019</td>
<td>110.9</td>
<td>16.4</td>
<td>75.8</td>
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<tr>
<td>2020</td>
<td>112.4</td>
<td>16.8</td>
<td>76.8</td>
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</tbody>
</table>

Projected growth in core chemical tanker fleet, DWT mill.

- Epoxy
- M.L./I.L.
- Stainless steel

<table>
<thead>
<tr>
<th>Year</th>
<th>Epoxy</th>
<th>M.L./I.L.</th>
<th>Stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>15.1</td>
<td>1.0</td>
<td>12.1</td>
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<tr>
<td>2018</td>
<td>15.6</td>
<td>1.0</td>
<td>12.7</td>
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<tr>
<td>2019</td>
<td>16.4</td>
<td>1.0</td>
<td>13.4</td>
</tr>
<tr>
<td>2020</td>
<td>16.8</td>
<td>1.0</td>
<td>13.9</td>
</tr>
</tbody>
</table>

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

- Global economic growth «China boom»
- «New money» with countercyclical investments

Post Asia crisis
- 1996: 1.0%
- 1997: 1.3%
- 1998: 0.7%
- 1999: 0.5%
- 2000: 0.8%
- 2001: 0.6%
- 2002: 1.6%
- 2003: 2.2%
- 2004: 2.7%
- 2005: 3.1%
- 2006: 5.6%
- 2007: 6.6%
- 2008: 1.4%
- 2009: 0.4%
- 2010: 0.3%
- 2011: 0.2%
- 2012: 1.0%
- 2013: 2.8%
- 2014: 3.1%
- 2015: 2.1%
- 2016: 0.6%
- 2017: 0.8%

Source: Clarksons Platou, Odfjell. Orders as per cent of fleet reflects Clarksons Platou's definitions 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...

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

Potential downside from CPP markets (swing tonnage)

Degree of Chinese self-sufficiency could impact this picture in both directions.
Final remarks and key takeaways from this market section

End-user demand
- Many products, but 18 products account 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

Source: Odfjell