Buy

8 February 2017

Quadrise Fuels International

MSAR®, HFO, the IMO, ECAs and the LONO

Should the next few months go to plan, Quadrise could achieve several key milestones in its main active projects in Marine and Power MSAR®. The signature of a binding contract with its Saudi partner (PHe H1 2017), along with an interim assessment of LONO progress from Maersk this spring ahead of full issuance in H2, would be significant events that would likely drive the shares higher. We reiterate our Buy recommendation and 30p target price.

# Corporate client of Peel Hunt
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**Marine:** Since December’s market update, we understand the ongoing LONO (Letter of Non-Objection) programme with Maersk continues to make good progress and that to date, feedback from Maersk has been positive. The outcome of the LONO trial is likely to be the most important share price driver in 2017 as a positive result will help establish MSAR® as a new standard marine bulk fuel. Our current expectation is that the trial will be completed in Q3 2017. However, management has indicated that an ‘interim assessment’ of progress could be made during spring. A reiteration of continued positive developments would be a significant de-risking event and in our view would be supportive for the shares. At this point the majority of the trial objectives will already have been carried out, meaning the balance of the programme should be more of a formality. Following a successful interim assessment, our expectation is that Quadrise will begin implementing plans for the likelihood of increased MSAR® demand and the start of its commercialisation.

**Saudi Arabia:** As in the marine programme, following the signature of an MoU with their Saudi partner, substantial progress has also been made towards finalising arrangements for the planned ‘production to combustion’ trial. We anticipate that contracts will be signed during H1 2017 ahead of project start up in H2. Formalisation of a binding agreement would be a significant milestone and would enable Quadrise to demonstrate the substantial economic/environmental benefits of producing and consuming MSAR® for power generation in the KSA.

**Valuation and recommendation:** Our valuation for Quadrise considers a sum-of-the-parts assessment of the DCFs from each of the company’s active projects. For the Marine project we derive an NPV of £163.4m or 18.5p/sh and for the Saudi project we calculate an NPV of £159.3m or 18.1p/sh. A further small contribution from the potential refinery refuelling project along with PHe end 2017 net cash of c£5m gives a total base case NAV of £358.7m or c41p/sh. Acknowledging there are still risks to achieving the full commercial success case, we keep our target price at 30p and reiterate our Buy recommendation.
The Quadrise business case

Quadrise Fuels is a leading oil-in-water emulsion fuels business that is attempting to make a significant positive disruptive impact on the marine shipping, thermal power generation and downstream refining sectors.

In partnership with Akzo Nobel, Quadrise has developed an IP-protected technology to produce an emulsion fuel that can be used as a direct substitute for Heavy Fuel Oil (HFO) in its various applications.

Quadrise is at an advanced stage with two main active projects, where the start of the commercial phase of production and sales ought to begin over the next 12 months. Below we summarise the current status of both projects and our expectations on forward work programmes and timelines.

Marine

With the letter of non-objection (LONO) Operational Trial having started in 2016, the Marine project is Quadrise’s most advanced and importantly continues to make positive progress. The trial is designed to provide 4,000 hours of operational data when the vessel engine is using Marine MSAR®. It is worth highlighting that an important element of the trial for Maersk is to gain operating experience confirming that ships burning MSAR® can be crewed more or less as they would under normal operations using existing conventional HFO.

So far multiple batches of MSAR® have been successfully manufactured at the San Roque refinery near Gibraltar and subsequent loading and consumption on-board Maersk’s designated vessel has resulted in positive initial feedback. Importantly, recent discussions with management indicated that an ‘interim assessment’ can be expected this Spring and it is hoped that ongoing positive results will be reiterated at this time.

Figure 1: MSAR® MMU within CEPSA’s San Roque refinery

Source: Quadrise Fuels
In our view, if this occurs as expected, it will represent a strong signal for the prospect of further orders for Marine MSAR® as Maersk switches additional vessels to MSAR® usage.

Saudi Arabia

During the recent industry downturn, the pace of progress in the Saudi power MSAR® programme was impacted by uncertainties within the KSA as it looked to implement its ‘Vision 2030’ strategy. The imperative for the KSA to reduce subsidies, lower its fuel import bill and cut the huge volumes of crude oil used for thermal power generation, are still the key drivers behind progressing MSAR® as a new alternative fuel within the Kingdom.

Quadrise signed an important MoU in Q3 2016, which defined the basis of collaboration between Quadrise and its clients in the Kingdom to progress a ‘Production to Combustion’ trial. The MoU is anticipated to lead to the signature of contracts before the end of 1H 2017, which will define the scope and economic basis of the trial and the terms for commercialisation thereafter.

Given the scale of the Saudi opportunity (the designated power plant for the trial if fully converted to MSAR® usage has the potential to consume more MSAR® than Maersk’s entire fleet), the execution of a binding contract would be a significant achievement and would likely bring about a positive re-rating to the share price.

Outlook

MSAR® emulsion fuel has potential to have a significant disruptive impact on both the shipping and power generation sectors. It is a product that can be sold at a discount to current standard HFO and also has significant environmental benefits. The incentive for refiners, ship owners and thermal power generators to switch from conventional HFO production and usage to MSAR® is therefore substantial.

Illustrating the spread

The value-add in Quadrise’s business model is generated at the refining stage and comes about due to the spread between the HFO and diesel prices. This spread has remained broadly flat over the past 12 months and therefore continues to provide sufficient margin to incentivise all stakeholders. Quadrise’s business case therefore remains definitively valid in spite of the recent slower recovery in the diesel price versus HFO.
With the Operational Trial (LONO programme) now well advanced, management guidance suggests the Marine project is continuing to make positive headway. Our expectation is that Quadrise will aim to update the market during 1H 2017 on progress so far, ahead of completion of the programme and full LONO issuance from Wärtsila in Q3. At this point Marine MSAR® should become a new approved bulk fuel within the marine shipping industry and should prompt immediate steps to be taken towards the early stages of its commercialisation.

**The 2020 sulphur cap**

In Q4 2016 the decision was taken by the International Maritime Organization (the regulatory authority for international shipping) to implement a global sulphur cap of 0.5% in 2020. The decision will see sulphur oxide emissions from ships in open ocean reduced from the current 3.5% and will ensure ship owners use a fuel oil that has a considerably lower sulphur content.

**Chart 3: IMO Sulphur emission limits**

<table>
<thead>
<tr>
<th>Year</th>
<th>SOx Global</th>
<th>SOx ECA</th>
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<tr>
<td>2000</td>
<td>4.5</td>
<td>0.1</td>
</tr>
<tr>
<td>2005</td>
<td>4.0</td>
<td>0.1</td>
</tr>
<tr>
<td>2010</td>
<td>3.5</td>
<td>0.1</td>
</tr>
<tr>
<td>2015</td>
<td>3.0</td>
<td>0.1</td>
</tr>
<tr>
<td>2020</td>
<td>2.5</td>
<td>0.1</td>
</tr>
<tr>
<td>2025</td>
<td>2.0</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Ship owners can comply with the new limit either by burning low sulphur fuels or by using approved equivalent methods, such as introducing exhaust gas cleaning systems or “scrubbers”, or a combination of the two. Our conversations with Quadrise management indicate an expectation that burning Marine MSAR® and fitting exhaust gas scrubbers may be the lowest-cost means to achieve regulatory compliance in the future.

**Positive pricing dynamic**

Notwithstanding the practical considerations ship owners are going to have to make in order to remain compliant from 2020 onwards, due to expectations of increased demand for low sulphur fuel products such as marine gas oil (diesel), the introduction of the sulphur limit is also anticipated to apply upwards pressure on pricing. This dynamic would increase the important spread between HFO and diesel and would improve the economic argument to switch to a fuel that is not only lower in cost, but one that also has considerably better environmental credentials.
Environmental upside
Due to the formulation and manufacture of MSAR® as a stable emulsion (refinery residue, water and speciality chemicals), it can be transported, stored and pumped at ambient temperatures, compared to HFO which typically requires heating to be handled in the same way.

Chart 4: Inside an MSAR® Manufacturing Unit (MMU)
Source: Quadrise Fuels

The water content in MSAR® reduces the combustion temperature vs HFO and this has the effect of significantly reducing NOx emissions by up to 50% within the exhaust gases.

The manufacturing process for MSAR® pre-atomises the residue content in the emulsion and results in almost complete carbon burn-out, thereby delivering significant advantages over conventional HFO. This results in: (1) improved exhaust gas content by significantly reducing particulate/black soot emissions close to zero; and (2) increased energy extraction from the fuel.
Valuation

Our approach to valuation for Quadrise considers a sum-of-the-parts assessment of the DCFs from each of the company’s active projects. Below we present a summary of our estimated NAV.

By way of a reminder, in the early stages of commercialisation we assume both active projects operate in ‘licence mode’. This means Quadrise generates revenue through the supply of MSAR® technology licences, chemicals and services related to the volume of MSAR® produced, with the refinery retaining ownership of the installed processing plant and associated equipment, hydrocarbon residue and MSAR® product for sale.

In this mode of operation Quadrise’s capital outlay and operating costs are therefore limited; we consider this is an appropriate strategy during the early stages of commercialisation.

Within our valuation, assumptions are made with respect to the rate of commercial roll-out, vessels switching to MSAR®, Saudi take-up, etc. Using a discounted cash flow analysis approach to valuation, the precise timing and scale of these factors represent the main risks to our forecasts.

The table below shows our unrisked project NPVs. In terms of NAV contribution, the Marine MSAR® and Saudi Power MSAR® projects are clearly by far the largest.

<table>
<thead>
<tr>
<th>Project</th>
<th>Mode</th>
<th>NPV (£m)</th>
<th>NAV (p/sh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine</td>
<td>Licence</td>
<td>163.4</td>
<td>18.5</td>
</tr>
<tr>
<td>KSA</td>
<td>Licence</td>
<td>159.3</td>
<td>18.1</td>
</tr>
<tr>
<td>Refuelling</td>
<td>Licence</td>
<td>30.8</td>
<td>3.5</td>
</tr>
<tr>
<td>Cash</td>
<td></td>
<td>5.1</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Total NAV</strong></td>
<td></td>
<td><strong>358.7</strong></td>
<td><strong>40.6</strong></td>
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</table>

Our analysis shows that, should LONO issuance and subsequent MSAR® commercialisation in the Marine project occur according to our current projections, and the Saudi programme also delivers on the production-to-combustion trial in 2017/18, the potential upside to the current share price could be significant.
## Financial statements

### Table 1: Profit and loss

*Source: Company accounts, Peel Hunt estimates*

<table>
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<th></th>
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<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td>0.1</td>
<td>0.0</td>
<td>0.8</td>
<td>14.4</td>
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<tr>
<td>Costs of sales incl. DD&amp;A</td>
<td>(1.2)</td>
<td>(2.2)</td>
<td>(2.9)</td>
<td>(12.3)</td>
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<tr>
<td><strong>Gross income</strong></td>
<td>(1.2)</td>
<td>(2.2)</td>
<td>(2.1)</td>
<td>2.1</td>
</tr>
<tr>
<td>G&amp;A</td>
<td>(1.5)</td>
<td>(2.0)</td>
<td>(2.2)</td>
<td>(2.4)</td>
</tr>
<tr>
<td>Other</td>
<td>(0.4)</td>
<td>(0.0)</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>EBIT</td>
<td>(5.0)</td>
<td>(4.9)</td>
<td>(4.5)</td>
<td>(0.5)</td>
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<tr>
<td><strong>Net financials</strong></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>(0.0)</td>
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<tr>
<td>Tax</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>(0.2)</td>
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<tr>
<td><strong>Net income</strong></td>
<td>(4.9)</td>
<td>(4.8)</td>
<td>(4.5)</td>
<td>(0.8)</td>
</tr>
</tbody>
</table>

### Table 2: Cash flows

*Source: Company accounts, Peel Hunt estimates*

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<thead>
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<th></th>
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<tbody>
<tr>
<td>Pre-tax income</td>
<td>(5.0)</td>
<td>(4.9)</td>
<td>(4.5)</td>
<td>(0.5)</td>
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<tr>
<td>DD&amp;A</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other</td>
<td>2.3</td>
<td>0.8</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Operating cash flow pre-working capital</td>
<td>(2.6)</td>
<td>(4.0)</td>
<td>(4.3)</td>
<td>(0.3)</td>
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<tr>
<td>Changes in working capital</td>
<td>(0.2)</td>
<td>0.3</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Tax</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>(0.2)</td>
</tr>
<tr>
<td><strong>Net operating cash flow</strong></td>
<td>(2.7)</td>
<td>(3.5)</td>
<td>(4.2)</td>
<td>(0.5)</td>
</tr>
<tr>
<td>Purchase of PPE</td>
<td>(0.2)</td>
<td>(0.6)</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Other</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>(0.0)</td>
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<tr>
<td><strong>Net investing cash flow</strong></td>
<td>(0.2)</td>
<td>(0.6)</td>
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<td>(0.0)</td>
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<tr>
<td>Issue of share capital net of fees</td>
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<td>0.0</td>
<td>5.0</td>
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</tr>
<tr>
<td>Other</td>
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<td>0.0</td>
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<tr>
<td><strong>Net financing cash flow</strong></td>
<td>0.1</td>
<td>0.0</td>
<td>5.0</td>
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<tr>
<td><strong>Net increase in cash and equivalents</strong></td>
<td>(2.7)</td>
<td>(4.1)</td>
<td>0.8</td>
<td>(0.5)</td>
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<tr>
<td>Cash and cash equivalents</td>
<td>8.4</td>
<td>4.3</td>
<td>5.1</td>
<td>4.6</td>
</tr>
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</table>

### Table 3: Balance sheet

*Source: Company accounts, Peel Hunt estimates*

<table>
<thead>
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<th></th>
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<tbody>
<tr>
<td><strong>Assets</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Cash and cash equivalents</td>
<td>8.4</td>
<td>4.3</td>
<td>5.1</td>
<td>4.6</td>
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<tr>
<td>Accounts receivable</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
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</tr>
<tr>
<td>Inventory</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td><strong>Total current assets</strong></td>
<td>8.9</td>
<td>4.7</td>
<td>5.4</td>
<td>4.9</td>
</tr>
<tr>
<td>PP&amp;E</td>
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<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
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<tr>
<td>Intangible assets</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
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<tr>
<td><strong>Total assets</strong></td>
<td>12.6</td>
<td>8.8</td>
<td>9.5</td>
<td>8.9</td>
</tr>
<tr>
<td><strong>Liabilities and shareholders’ equity</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts payable</td>
<td>0.4</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Total current liabilities</strong></td>
<td>0.4</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
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<tr>
<td>Long-term borrowings</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td><strong>Shareholders’ equity</strong></td>
<td>12.1</td>
<td>8.2</td>
<td>8.9</td>
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Recommendation structure and distribution

Recommendation distribution at 7 February 2017

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<th>Corporate %</th>
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<th>%</th>
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<td>79</td>
<td>171</td>
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<td>6</td>
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<td>5</td>
<td>65</td>
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<tr>
<td>Reduce</td>
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<td>0</td>
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<tr>
<td>Sell</td>
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<td>Under Review</td>
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Peel Hunt’s Recommendation Structure is as follows:

- **Buy**, > +15% expected absolute price performance over 12 months
- **Add**, +5-15% range expected absolute price performance over 12 months
- **Hold**, +/-5% range expected absolute price performance over 12 months
- **Reduce**, -5-15% range expected absolute price performance over 12 months
- **Sell**, > -15% expected absolute price performance over 12 months
- **Under Review (UR)**, Recommendation, Target Price and/or Forecasts suspended pending market events/regulation

NB The recommendation is the primary driver for analyst views. The target price may vary from the structure due to market conditions, risk profile of the company and capital returns

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2. The Analyst has a shareholding in this Company
3. The Company holds >3% in Peel Hunt
4. Peel Hunt makes a market in this Company
5. Peel Hunt is Broker to this Company and therefore provides investment services to the Company
6. During the last 12 months Peel Hunt has received compensation from this company for the provision of investment banking services
7. During the last 12 months Peel Hunt has acted as a sponsor/broker/ N\O\MAD/ financial advisor for an offer of securities from this company
8. Peel Hunt holds >5% in Company (calculated under Market Abuse Regulation (EU) 596/2014)
9. 1% beneficial ownership (calculated for purposes of FINRA under Section 13(d)/(g) of the Securities Exchange Act of 1934 and IIROC Rule 3400)
10. Peel Hunt holds a net long position that exceeds 0.5% in the Company (calculated under Market Abuse Regulation (EU) 596/2014).
11. Peel Hunt holds a net short position that exceeds 0.5% in the Company (calculated under Market Abuse Regulation (EU) 596/2014).

Recommendation history

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<th>Company</th>
<th>Disclosures</th>
<th>Date</th>
<th>Rec</th>
<th>Price</th>
<th>Target Price</th>
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<td>Quadrise Fuels International</td>
<td>1,4,5,6,7</td>
<td>24 Aug 16</td>
<td>Buy</td>
<td>14p</td>
<td>30p</td>
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<tr>
<td></td>
<td></td>
<td>08 Jan 16</td>
<td>Buy</td>
<td>14p</td>
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