OIL AND GAS OPPORTUNITIES IN SINGAPORE

PRE-STUDY

December 2015
Singapore
CONTENT

- Background and introduction
  - Executive Summary
  - Industry overview
  - Rig building sector
  - Seminars and exhibitions 2016-2017
BACKGROUND AND INTRODUCTION

- Singapore is a large oil and gas hub, with numerous oil and gas companies present and with engagements in several parts of the value chain.
- In particular, Singapore is an engineering hub for rig building and stands for about 70% of the global market for oil rigs.
- The purpose of this pre-study is to look deeper into the oil and gas market in Singapore in general, and the status and potential business opportunities in the rig building sector in particular.
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With a strategic geographic location, efficient logistics and favourable business climate Singapore has developed into a major oil and gas hub.

In particular, Singapore is an engineering hub for oil rig building, holding 70% of the global market and two main players – Keppel Offshore and Marine and Sembcorp Marine.

Singapore has a crude oil refining capacity of 1.5m barrels per day, and the majority comes from three main refineries, Royal Dutch Shell, ExxonMobil and Singapore Refining Company (a joint venture between PetroChina and Chevron).

Singapore is heavily dependent on gas imports, and is focusing on decreasing this dependence by shifting to Liquid Natural Gas (LNG), both in order to feed domestic demand but also with an aim to become an area for LNG trading.

LNG trading would bring one more dimension to Singapore’s position as an oil and gas trading hub with numerous trading companies present.

The rig building sector in Singapore, with Keppel Offshore and Marine and Sembcorp Marine in the forefront, is experiencing challenges at present.

With 2014 order intakes still on healthy levels, the players are experiencing high pressure from dipping oil prices and decreasing demand, and several large contracts are at risk of being re-negotiated and/or cancelled.

In addition, competition from Korea and China is steadily increasing, and the rig building sector is likely to experience a change in the competitive landscape, putting pressure on profitability and margins.

Due to these findings, Business Sweden Singapore proposes not to dedicate in any major Oil and Gas activity in Singapore during 2016, but to rather use this pre-study as market information material targeting Swedish companies.
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SINGAPORE IS A MAJOR OIL AND GAS HUB WITH A LARGE DOWNSTREAM AND RETAIL SECTOR

- With no own reserves of natural resources, Singapore is a net importer of crude oil and natural gas. Crude oil is mainly imported from the Middle East, whereas natural gas is imported through pipelines from Malaysia and Indonesia.
- With Singapore’s geographically strategic location, efficient logistics and favourable business climate it has developed into a major oil and gas hub and is the world’s third largest country both in terms of refining exports and in oil and gas trading.
- Except for being one of the world’s major oil and gas- refining and trading hubs, Singapore is also an engineering hub for oil rig building holding 70% of the global market.
- The centre of Singapore’s oil and gas activities is Jurong Island – home to nearly 100 leading oil and gas-, petrochemicals- and specialty chemicals companies from around the world.

SINGAPORE FROM A GENERIC OIL- AND GAS VALUE CHAIN PERSPECTIVE

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Supporting services

SOURCE: BMI SINGAPORE OIL AND GAS REPORT Q4 2015, EDB CONTACT SINGAPORE
Singapore builds 70 per cent of the world’s oil rigs and it holds an equally large global market share in terms of the conversion of Floating Production Storage Offloading units (FPSOs)

The two main players within the field are Keppel Offshore and Marine and Sembcorp Marine

Keppel Offshore and Marine (O&M), part of the Keppel Group, is a global leader in offshore rig design, construction and repair, ship repair and conversion, and specialized shipbuilding

Keppel O&M has delivered almost half of the world’s new build jack up rigs and semi-submersibles in the past decade

In addition to its engineering groups for marine, offshore and deep water, the company established a corporate R&D centre in 2007 to boost its design and engineering capabilities

Sembcorp is a world leader in rig building, owns proprietary rig designs and has capabilities in the construction of deep-drilling offshore jack-up rigs

Just as Keppel O&M, Sembcorp established a corporate R&D centre in Singapore in 2007 for product development and innovation

The R&D centre is a major milestone in Sembcorp’s growth strategy and will serve as a centralized one stop shop for a wide range of maritime activities and vessels

SOURCE: EDB CONTACT SINGAPORE, EDB GOV.SG
Singapore’s crude oil refining capacity for 2015 has been forecasted to 1.47 million barrels per day, with a utilization level of 86%. Singapore is facing fierce competition from refiners in developing countries, and neither refining capacity nor the level of utilization is expected to grow in the upcoming years. There might however be a number of opportunities for technical refinements, which would affect the value of output positively.

FORECASTED CRUDE OIL DEVELOPMENT

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SOURCE: BMI SINGAPORE OIL AND GAS REPORT Q4 2015, EDB CONTACT SINGAPORE
THE MAJORITY OF CAPACITY COMES FROM THREE MAIN REFINERIES, ALL LOCATED IN JURONG ISLAND

Royal Dutch Shell
- Shell's largest fully-owned refinery is situated in Singapore, with a capacity of 500' barrels per day
- Since 2010 the refinery is an integrated oil and petrochemical site, with manufacturing facilities for fuels, lubricant base oils and specialty chemicals

ExxonMobil
- ExxonMobil has its largest refinery located on Jurong Island, with a capacity of 592' barrels per day
- The refinery is integrated with the Singapore Chemical Plant (SCP) and they together form ExxonMobil’s largest integrated manufacturing site globally

Singapore Refining Company (SRC)
- Singapore Refining Company (SRC) is a joint venture between PetroChina and Chevron
- SRCs refinery on Jurong Island has a crude oil capacity of 290' barrels per day

The downstream sector in Singapore has experienced significant consolidation in recent years, and the dominant international investors are now limited to Royal Dutch Shell, Exxon Mobile, PetroChina and Chevron

In addition to the major players above, some recent investments have also been made by foreign groups

- Jurong Aromatics Corporation (JAC) is one example, a Singapore based cooperation jointly owned by players in Korea, Schweiz, China, etc. including a small stake owned by Singapore EDB investments

SOURCE: BMI SINGAPORE OIL AND GAS REPORT Q4 2015, EDB CONTACT SINGAPORE, COMPANY HOMEPAGES
Singapore is heavily dependent on gas imports, and in 2014 gas constituted more than 90% of Singapore’s domestic energy demand.

As a non-producer Singapore imports all its natural gas, and this has traditionally been done through pipelines from Malaysia and Indonesia.

These supply contracts however all expire in the mid 2020s, and Indonesia has explicitly announced that due to growing domestic use, they will not prolong the existing contract when expiring in 2023.

In 2013, Singapore’s first Liquid Natural Gas (LNG) terminal opened on Jurong Island, and Singapore started to import LNG in order to diversify and secure its energy sources.

LNG is a form of natural gas that can be transported by ship and thereby possible to import from all around the world.

Prime Minister Lee Hsien Long has stated that Singapore aims to meet all of its gas requirements via LNG in the future.

A second LNG import terminal is planned, probably to be located in east Singapore. More precise location, as well as who will be the operator of the second plant, is yet for the Singapore government to decide.
THE STRATEGY WITH LNG IS NOT ONLY TO FEED DOMESTIC DEMAND, BUT ALSO TO BOOST TRADING

- Singapore’s current strategy with increasing LNG imports is not only to feed domestic energy demand, but also with the aim to emerge as a LNG trading hub
- Singapore’s first LNG terminal on Jurong Island is the first in Asia with both import and export capabilities, allowing for the country to re-export LNG
- Supporting this strategy, several firms have established LNG trading desks in Singapore in the past few years, such as BG Group, Gazprom and Gail India
- There are however also challenges with Singapore’s ambition to become the Region’s top LNG trading hub, ranging from current dipping crude oil and natural gas prices to increased competition from countries like Qatar, currently the world’s top LNG exporter, United Arab Emirates and Malaysia, all with plans to become LNG trading hubs

SOURCE: ENERGY MARKET AUTHORITY (EMA), BMI SINGAPORE OIL AND GAS REPORT Q4 2015
SINGAPORE HAS SINCE LONG BEEN AN OIL TRADING HUB WITH NUMEROUS TRADING COMPANIES PRESENT

SINGAPORE - AN OIL AND GAS TRADING HUB

- The strategic geographic location, strong physical infrastructure for oil and gas businesses, sophisticated financial infrastructure and business friendly tax system are some of the main reasons for that Singapore has established as an oil and gas trading hub.

- Numerous companies active in oil and gas trading have their base or subsidiaries placed in Singapore, from multinationals like Exxon Mobil to more local ones like Singapore Petroleum Company and Kernel Oil.

- Singapore is expected to remain a major oil products trading hub, and within the next few years emerge as the region's gas trading hub with increased engagement in LNG re-exports and trading.

SOURCE: EDB, IE SINGAPORE
PROVIDERS OF VARIOUS OIL AND GAS SUPPORTING SERVICE ARE ALL PRESENT IN SINGAPORE

TECHNOLOGY, EQUIPMENT AND SERVICES

- The oil and gas industry in Singapore present opportunities for providers within oil and gas related technology, equipment and services
- Singapore’s has had a steady influx of large companies within this area, fostering the implementation of advanced refinery infrastructure and continued innovation
- Examples of global players in oil and gas related technology, equipment and services with a large presence in Singapore are Schlumberger (French), Halliburton (US), Baker Hughes (US), Abel Engineering (US) and FMC Technologies (US)

PROCESS MANAGEMENT AND LOGISTICS

- The oil and gas industry require highly sophisticated process management, supply chain and logistics solutions
- A number of companies within this field are present in Singapore, including Vopac (The Netherlands), WorleyParson (Australia) and Emerson Process Management (USA)

Example of oil and gas technology, equipment and services companies present in Singapore

Example of process management and logistic companies present in Singapore

SOURCE: EDB
CONTACT SINGAPORE, COMPANY HOMEPAGES
The Singapore Government has focused on promoting innovation within the offshore sector, and has set up a well-equipped research and development infrastructure on Jurong Island, including:

- The Maritime Research Centre (MRC), a initiative by the Maritime and Port Authority of Singapore (MPA) and the Nanyang Technological University (NTU) established in 2001
- The Centre for Offshore Research and Engineering (CORE), an initiative by the Singapore Development Board (EDB) and the National University of Singapore (NUS) launched in 2003
- The Marine & Offshore Technology Centre of Innovation, a joint initiative by SPRING Singapore and Ngee Ann Polytechnic (NP) launched in 2007

SOURCE: EDB CONTACT SINGAPORE, MPA, NUS
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**Rig building sector**

- Seminars and exhibitions 2016-2017
DESPITE A DECLINING OIL PRICE, 2014 ORDER INTAKES WERE ON SATISFACTORY LEVELS

- Singapore’s rig builders, with the main players Keppel O&M and Sembcorp Marine, hold about 70% of the world marked for jack-up rigs and 70% of the global floating production storage and offloading (FPSO) market
- Despite the steep decline in oil prices during 2014 replacements and repairs/upgrades as of 2014 were still on a satisfactory level

**Keppel Offshore & Marine**

2014 in figures
- USD5.5 billion in new orders, which according to the 2014 annual report was viewed as a "healthy" order intake
- The total net order book value at end of the year amounted to USD12.5 billion, with deliveries extending to 2019

**Sembcorp**

2014 in figures
- USD4.2 billion in new orders
- The total net order book value at the end of the year amounted to USD11.4 billion, with deliveries extending to 2019

SOURCE: KEPPEL OFFSHORE AND MARINE AR2014
SEVERAL LARGE CONTRACTS ARE HOWEVER AT RISK OF BEING RE-NEGOTIATED AND/OR CANCELLED

BRAZIL – DEMAND DIP AND CORRUPTION

- Not long ago Petrobras, Brazil’s state-controlled oil producer, was the largest user of deep water rigs and accounted for 20 per cent of global demand
- Now a combination of supply glut and investigations into allegations of corruption at Petrobras has resulted in that virtually all commissions of new orders have ground to a halt, and there is uncertainty about the fate of existing contracts
- Both Semcorp and Keppel have large contracts with Petrobras, and both deny any involvement in corruptive activities
- Both companies comment on the challenges, for instance Keppel: “Our yard in Brazil is responding to the challenges by carefully managing its resources and operational costs”

MEXICO – DEMAND DIP AND DOUBLE STAKES

- Pemex, the state-controlled Mexican oil explorer, began to modernise its equipment and lift productivity in 2011 because of safety, maintenance and efficiency challenges
- As part of that programme, both Semcorp and Keppel received major orders from two contractors to Pemex Oro Negro (Temasek big share holder) and Grupo R
- Now, Pemex is trying to renegotiate the terms and conditions of some of the existing contracts and asking for a discount on the agreed prices
- Both Semcorp and Keppel comment on these challenges but do not state any large worries

SOURCE: FINANCIAL TIMES
IN ADDITION, COMPETITION FROM KOREA AND CHINA IS STEADILY INCREASING

STRONG KOREAN PLAYERS MOVING FORWARD
- Korea is one of the largest ship building countries in the world, with the “big three”; Hyundai, Samsung and Daewoo Shipbuilding & Marine Engineering (DSME)
- Lower demand in the ship building sector in recent years has resulted in these players increasingly targeting the rig building sector, amplifying competition for the two main Singaporean players
- The Korea players are especially strong in deep water rigs and more complex/premium contracts

CHINESE PLAYERS TARGETING HIGH VALUE ORDERS
- Established Chinese yards such as China Ocean Shipping Company (Cosco), CIMC Raffles and Dalian Shipbuilding (DSIC) increasingly shift from the ship building into the rig building sector
- Strong government support, financing from Chinese banks, lower prices and more favorable payment terms and conditions are a number of reasons for that the Chinese players are becoming increasingly stronger
- The Chinese players also seem to move up the price and complexity ladder, winning not only low-cost and/or less complex contracts, but also high-value ones
  - An example is an order of deep water drilling units to CIMC Raffles, made by Frigstad Offshore in 2013

“We believe a more structural concern is the change in the competitive landscape for rig-building, which is likely to place pressure on profitability and margins for established market leaders like Keppel Corp and Sembcorp Marine in the medium term”

SOURCE; RIGZONE; SINGAPORE BUSINESS REVIEW;
CONTINUED INNOVATION IS REQUIRED TO HANDLE INCREASING SECTOR CHALLENGES IN RIG BUILDING

- Keppel and Sembcorp’s response to the increasing sector challenges is among others an increased focus on technological progress and innovation.
- Both players aim to move upmarket, with equipment that can drill for oil and gas at greater depths and more extreme conditions than the shallow-water rigs they have earlier specialized in.

"To thrive, we must stay fighting fit and focused on adapting to the market challenges with innovating and value adding solutions."

Loh Chin Hua, Chairman
Keppel O&M, AR2014

"To develop innovative solutions that are geared to meet the evolving needs of customers, Sembcorp makes sustained investments in Research and Development to continually enhance its product and service offering."

Sembcorp Marine, AR2014

“Keppel will continue to improve in areas where it has good leverage to compete; technological progress, its ability to meet delivery schedules and its ability to provide customized rigs.”

Chow Yew Yuen, Chief Operating Officer
Keppel O&M, WSJ 2013
THE OIL AND GAS SUPPLY PYRAMID IN SINGAPORE

The oil and gas companies make the big investments and it is important to have a secure position in supplier pyramid.

EXAMPLES OF PLAYERS IN EACH STEP OF THE OIL AND GAS SUPPLY PYRAMID IN SINGAPORE
THE DISTRIBUTION CHANNEL TO RIG BUILDING IN SINGAPORE

For some projects the engineering and design of rigs may be outsourced.

End customer (rig-owners) *(dealer/vendor list)*

Rig builders *(makers list)*

Distributor/partner/JV/ Own company

Module-maker

Swedish company

Engineering/ Design company

SOURCE: MPA, KEPEL FELS, SEMBCORP MARINE, EDB, ASMI
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## OIL AND GAS SEMINARS AND EXHIBITIONS 2016-2017

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| APM, Asia Pacific Maritime | Singapore | 16-18/3 2016 | • APM, Asia Pacific Maritime, is one of Asia’s biggest maritime and offshore exhibitions and takes place for the 14th time in Singapore in 2016  
• The 2016 exhibition is expected to hold 1.500 companies from 60 countries including, more than 15.000 industry professionals and over 50 industry influencers |
| OTC Asia, Offshore Technology Conference Asia | Malaysia | 22-25/3 2016 | • OTC Asia, Offshore Technology Conference Asia, takes place every second year  
• The 2014 conference attracted 25.100 industry professionals from 88 countries and also included an exhibition showcasing the products and services of more than 240 companies  
• The 2016 theme of the conference is "Excellence in Asia" |
| IADC/SPE, Asia Pacific Drilling Technology Conference and Exhibition | Singapore | 22-24/8 2016 | • IADC/SPE, Asia Pacific Drilling Technology Conference and Exhibition, is the Asia Pacific leading drilling event and rotates biennially between countries in the region  
• The conference provides an opportunity for operators, suppliers, contractors, and service company professionals to meet, and includes executive sessions, panel discussions, exhibition halls etc. |
| OSEA, Offshore South East Asia | Singapore | 29/11-2/12 2016 | • OSEA, Offshore South East Asia, takes place every second year and is a well known oil & gas event  
• OSEA attracts a large number of oil & gas exploration and production companies and extensive international participation, making it a good platform for networking |
| OGA, Oil & Gas Asia | Malaysia | 11-13/7 2017 | • OGA, Oil & Gas Asia, has become a top regional show in the industry and presents the newest technologies in exploration, production and transportation  
• The OGA 2015 had over 23.000 trade visitors and more than 2.000 exhibiting companies from all over the world |
| Oil & Gas Indonesia 2017 | Indonesia | 20-23/9 2017 | • Oil & Gas Indonesia 2017, will be the 11th International Oil and Gas Exploration, Production and Refining Exhibition of this kind  
• Oil and Gas Indonesia is one of the most heavily attended events in Asia and provides a gateway to the opportunities offered by Southeast Asia's largest economy |

SOURCE: ALLWORLDEXHIBITIONS.COM, WEBSITES OF RESPECTIVE SEMINAR/EXHIBITION