January 27th, 2016

Full Report

OIL & GAS MARKET ANALYSIS
Disclaimer

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The top-down analysis is based on information publicly available online, from leading international sources. SupplHi Projects Database is proprietary by SupplHi and can be shared only based on dedicated agreement.
We thank Mr. Andrea Guerini Rocco for his contribution to this study
Objective of this analysis

Provide an actionable tool to their members – especially the Small and Medium enterprises - involved in the Oil&Gas plant engineering, to better address their efforts in the global Oil&Gas market. Special focus on 3 products: Valves, Pressure Equipment, Switchboards.

- **SOLID APPROACH**
- **DRIVEN BY THE REAL PROJECTS**
- **COMPREHENSIVE** (ALL SEGMENTS, ALL GEOGRAPHIES)
- **SHARED WITH KEY CONTRACTORS**
- **UPDATABLE**

Shared by the Associations with their Members
Agenda

Approach

Demand for energy sources
Market estimates and trends
Focus on selected equipment
High-level approach

**Global Oil & Gas CAPEX market**

**TOP-DOWN**

**A**

**BOTTOM-UP**

**B**

**SUPPL HI**

Projects Database

**C**

Bottom-up, by historical vendors’ revenues

Global Oil & Gas Market for Valves, Static Equipment and Switchboards
Detailed approach for market estimate

1. Market definition
2. Analysis of market sources
3. Demand for energy sources
4. Top-down market estimate
5. Bottom-up market estimate through Projects
6. Key Trends and needs
7. EPC Contractors clusters
8. % of equipment on total CAPEX
9. CAPEX market for selected equipment
10. Bottom-up market, by historical vendors’ revenues
11. Sensitivity

- **Global Oil & Gas CAPEX market**
- **Interviews with Industry Experts**

**Top-down market estimate**
- Long term trends, by type of source: Oil, Gas, Coal, Nuclear, Hydro, Other renewables
- Geopolitical trends
- Trends Upstream
- Trends Downstream
- End-users’ needs (IOC, NOC, Independent)
- Contractors’ needs

**Bottom-up market estimate through Projects**
- Leveraging on SupplHi Projects DB: capacity additions, CAPEX
- Quantification of % of market for valves, static equipment and switchboards

**Key Trends and needs**

**% of equipment on total CAPEX**

**CAPEX market for selected equipment**
Effectively leveraged 20+ public sources for the top-down, cross-checking information

<table>
<thead>
<tr>
<th>Segment</th>
<th>Capacity</th>
<th>CAPEX</th>
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<tbody>
<tr>
<td><strong>Upstream</strong></td>
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<td></td>
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<tr>
<td>Onshore Conventional</td>
<td>• BP Energy Outlook</td>
<td>• JP Morgan</td>
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<td></td>
<td>• IHS</td>
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<td></td>
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<td>• Press releases</td>
</tr>
<tr>
<td>Shale gas / Tight Oil</td>
<td>• BP Energy Outlook</td>
<td>• IHS</td>
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<td>• IHS</td>
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<td>Oil Sands</td>
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<td>• CAPP (Canadian Association of Petroleum Producers)</td>
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<td>• Rystad</td>
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<td>Offshore</td>
<td>• BP Energy Outlook</td>
<td>• Douglas-Westwood</td>
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<tr>
<td>(Shallow-water + Deepwater Subsea Development)</td>
<td>• Douglas-Westwood</td>
<td>• IHS</td>
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<td>• EMA (Energy Maritime Associates)</td>
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<td>FPSO/FPU/TLP</td>
<td>• Douglas-Westwood</td>
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<td><strong>Midstream</strong></td>
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<td>• Douglas-Westwood</td>
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<td>• Enerdata</td>
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<td>FLNG</td>
<td>• Press releases</td>
<td>• Douglas-Westwood</td>
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<td>FSRU</td>
<td>• Enerdata</td>
<td>• Douglas-Westwood</td>
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<td>• EIA</td>
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<td></td>
<td>• IGU</td>
<td></td>
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<td>Onshore Pipeline</td>
<td>• Oil &amp; Gas Journal</td>
<td>• Oil &amp; Gas Journal</td>
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<td></td>
<td>• CIA world factbook</td>
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<tr>
<td>Offshore Pipeline</td>
<td>• Oil &amp; Gas Journal</td>
<td>• Oil &amp; Gas Journal</td>
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<tr>
<td><strong>Downstream</strong></td>
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<td>Refining &amp; Petrochemicals</td>
<td>• OPEC</td>
<td>• Barclays</td>
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<td>• IHS</td>
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<td>• OPEC</td>
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<td>• Press releases</td>
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<tr>
<td>Gas-to-Liquid (GTL)</td>
<td>• Press releases</td>
<td>• Press releases</td>
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<tr>
<td><strong>Fertilizers</strong></td>
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<td>Fertilizers</td>
<td>• IFA</td>
<td>• IFA</td>
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<td>(Ammonia and UREA)</td>
<td>• PotashCorp</td>
<td>• Press releases</td>
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<td>• Yara</td>
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</table>
SupplHi Projects Database has been utilized for the bottom-up analysis

SupplHi Projects Database

A SINGLE, ACTIONABLE SOURCE FOR DECISION MAKING IN OIL&GAS

Global coverage, with FEED and EPC projects of 400+ Clients
2,100+ ongoing and planned Oil&Gas projects
Monthly updated and delivered in Excel format

ACCESS GLOBAL MARKET INTELLIGENCE
PRIORITIZE COMMERCIAL EFFORTS
ENHANCE YOUR OWN COMMERCIAL PIPELINE
CHECK PROJECT STATUS AND TIMING
FIND CLIENTS’ PROJECTS IN A PROACTIVE WAY
MONITOR TARGET GEOGRAPHIES AND SEGMENTS
The 2,100+ ongoing and planned projects cover the entire Oil&Gas value chain ...

<table>
<thead>
<tr>
<th>Upstream</th>
<th>Midstream</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onshore conventional</td>
<td>LNG onshore Liquefaction</td>
<td>Gas-to-Liquid (GTL)</td>
</tr>
<tr>
<td>Shale Gas / Tight Oil (available soon)</td>
<td>Floating LNG</td>
<td>Refining</td>
</tr>
<tr>
<td>Oil Sands</td>
<td>LNG Onshore Regasification</td>
<td>Petrochemicals</td>
</tr>
<tr>
<td>Offshore Shallow-Water</td>
<td>FSRU</td>
<td>Small LNG (available soon)</td>
</tr>
<tr>
<td>Subsea Field Development</td>
<td>Onshore Pipeline</td>
<td></td>
</tr>
<tr>
<td>FPSO / FPU / TLP / SPAR</td>
<td>Offshore Pipeline</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage and Terminals</td>
<td></td>
</tr>
</tbody>
</table>

# of projects in the database, as of January 2016

- Onshore conventional: 229
- Shale Gas / Tight Oil (available soon): 131
- Oil Sands: 131
- Offshore Shallow-Water: 262
- Subsea Field Development: 213
- FPSO / FPU / TLP / SPAR: 130
- LNG onshore Liquefaction: 109
- Floating LNG: 27
- LNG Onshore Regasification: 75
- FSRU: 16
- Onshore Pipeline: 142
- Offshore Pipeline: 36
- Storage and Terminals: 43
- Gas-to-Liquid (GTL): 18
- Refining: 321
- Petrochemicals: 263
- Small LNG (available soon): 126
- Ammonia and UREA: 126
... as well as all types of contracts and statuses

**Information by project**

<table>
<thead>
<tr>
<th>Number of projects in the DB as of January 2015</th>
<th>Conceptual / Basic design</th>
<th>FEED</th>
<th>Execution</th>
<th>Ops</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Pre-FEED and Licensing</td>
<td>FEED</td>
<td>PMC</td>
<td>EP/EPC</td>
<td>O&amp;M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>508</td>
</tr>
<tr>
<td>Bid Ongoing</td>
<td></td>
<td>2</td>
<td>4</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Just awarded</td>
<td></td>
<td>2</td>
<td>14</td>
<td>2</td>
<td>56</td>
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<tr>
<td>Ongoing</td>
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<td>30</td>
<td>50</td>
<td>29</td>
<td>665</td>
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<tr>
<td>Completed</td>
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<td>25</td>
<td>101</td>
<td>7</td>
<td>323</td>
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<tr>
<td>On Hold</td>
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<td>9</td>
<td>1</td>
<td></td>
<td>121</td>
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<tr>
<td>Cancelled</td>
<td></td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>27</td>
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<td><strong>Total</strong></td>
<td></td>
<td>63</td>
<td>184</td>
<td>41</td>
<td>1,733</td>
</tr>
</tbody>
</table>

Please visit [http://supplhi.com/web/portal/project-database](http://supplhi.com/web/portal/project-database) for more information on the Database

Source: SupplHi Projects database, January 2015
Agenda

Approach

Demand for energy sources

Market estimates and trends

Focus on selected equipment
We are in an Oil Shock

$27.36 / barrel

42 US gallons or ~159 litres

$29.99 / bucket

24 pieces Tailgate meal

Brent Spot Oil price as of Monday 18/01/2016 (source: EIA)
OPEC has always been very keen in defending its market shares in the recent decades

World oil production share, MBPD

<table>
<thead>
<tr>
<th>Year</th>
<th>OPEC</th>
<th>Non-OPEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>'95-'99</td>
<td>41%</td>
<td>59%</td>
</tr>
<tr>
<td>'00-'04</td>
<td>41%</td>
<td>59%</td>
</tr>
<tr>
<td>'05-'09</td>
<td>43%</td>
<td>57%</td>
</tr>
<tr>
<td>'10-'14</td>
<td>42%</td>
<td>58%</td>
</tr>
</tbody>
</table>

OPEC has always kept its share of world production above 40% in the last 20 years.

Historically OPEC has functioned as the world’s swing producer for crude oil. That strategy was essentially abandoned at the November 2014 meeting when OPEC announced they would defend market share that was being lost due to the rise of non-OPEC production, especially from the United States. It should be clear that with more than 40% of global production, OPEC maintains a position of dominance over the global crude supply.”

The last large oil price crisis took place in 1985-1986, driven by market share rationales.

- In the mid-1980s the OPEC sought to use low prices to undercut producers in the North Sea.
- OPEC enacted a policy to recoup market share from their Non-OPEC rivals, but ended up trying to defeat each other, further weakening prices.
- It took several years for Oil prices to recover.

We lived for ~13 years in the 20 to 40 USD/barrel scenario

Crude oil spot price (USD/bbl)

Note: Jan 2016 data include prices up to Jan 19
Source: Energy Information Administration (EIA), 2016, press clippings
~50 USD/bbl now seen as a “positive” scenario, after Oil prices failed to recover in June 2015

The oil market is even more oversupplied than we had expected and we now forecast this surplus to persist in 2016 ... the potential for oil prices to fall to such levels, which we estimate near $20/bbl, is becoming greater.”

“The Saudis’ long term bet is that by keeping oil prices low, they will squeeze American shale oil producers out of the game. That way, the Saudis can again regain market share lost to the U.S.

Just 10 years ago, Saudi Arabia was the world’s largest oil producing nation, churning out nearly twice as much crude oil as the U.S. But American output has skyrocketed in recent years thanks to the shale revolution, which has completely reshaped the global energy equation.”

Note: production of crude oil (including lease condensates), natural gas plant liquids, biofuels, other liquids, and refinery gains.

Source: Energy Information Administration, 2015, press clippings
Clear oversupply, ~1.9 M Bbl went into storage tanks each day (~Petrobras Oil production)

Oil and other liquids production and consumption, MBPD

- 2014: 93.3 MBPD
- 2015: 95.7 MBPD
- 2016: 95.9 MBPD

Inventory buildup
- 2014: 0.9
- 2015: 1.9
- 2016: 0.7

**Iran will further increase offer**, with its promises of an immediate boost to production of 500,000 b/d (however the target is overoptimistic)

Note: production of crude oil (including lease condensates), natural gas plant liquids, biofuels, other liquids, and refinery gains.
Source: SupplHi analysis on U.S. EIA Short-Term Energy Outlook - January 2016, press clippings
How did we get here?

Oil production, MBPD

- Canada: +1
- Russia: +0.5
- KSA: +1.4
- Iran: -0.7

The USA saw the biggest increment in Oil production, adding more than 4 MBPD (~5% of global production), and has had an outsized impact on the market.

- Russia and key members of OPEC such as Saudi Arabia and Iraq are pumping at record levels.
  - Russian volumes are mainly obtained exploiting the existing fields as fast as possible, and not from new fields coming online.

Source: SupplHi analysis on BP Statistical Review of World Energy, 2015, press clippings
The Shale Boom reshaped the US Oil&Gas industry and impacted the global markets ...

**Upstream**
- A “plant on trailers”
- **Strong Shale Gas / Tight Oil production**: US oil output has jumped by almost 50% since 2011
- The US remain a **net importer of crude**
  - West African producers like Nigeria and Angola, who saw their **exports to the US collapse**
  - US crude oil imports from Russia heavily fell but started to rise again in 2016

**Midstream**
- **9,000+ km of new Onshore Pipeline** in the USA and Canada
- **~113 B USD of LNG Liquefaction plants** completed and ongoing

**Export**
- ‘Theo T’ was the 1**st** oil tanker to sail from the US and on Jan 20**th** 2016 docked at the French port of Fos
- The most likely destination is the **Cressier refinery in Switzerland**

**Downstream**
- **~56 B USD of PetChem of new plants and revamping** completed and ongoing
- **~5B USD of Refinery improvements** completed and ongoing
- **~13 B USD of new Fertilizers plants** completed and ongoing

**Fertilizers** (Ammonia and UREA)

Source: SupplHi analysis, press clippings
... Shale has been resilient in 2015, is running out of “survival tricks”, but will be there

- Proved resilience of American shale producers in the face of falling prices
  - During 2015 the number of drilling rigs used in America fell by over 60%, but the number of well hydraulically fractured increased
  - Since mid-2015 shale firms have cut more than 400,000 b/d from output in response to lower prices
  - EIA forecasts a cut of production of 570k barrel in 2016

- The shale-men could become the world’s swing producers, adding to volatility
  - Unique cost structure and short business cycle, may undermine longer-term investment in high cost traditional oilfields

Source: SupplHi analysis, The Economist, press clippings
Current Oil price is not sustainable for many oil producing countries’ budgets

Government budgets’ break-even oil prices (USD/bbl)

<table>
<thead>
<tr>
<th>Country</th>
<th>Break-even Price (USD/bbl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UAE</td>
<td>69</td>
</tr>
<tr>
<td>Qatar</td>
<td>70</td>
</tr>
<tr>
<td>Kuwait</td>
<td>71</td>
</tr>
<tr>
<td>Oman</td>
<td>75</td>
</tr>
<tr>
<td>KSA</td>
<td>93</td>
</tr>
<tr>
<td>Angola</td>
<td>94</td>
</tr>
<tr>
<td>Russia</td>
<td>100</td>
</tr>
<tr>
<td>Libya</td>
<td>109</td>
</tr>
<tr>
<td>Iraq</td>
<td>115</td>
</tr>
<tr>
<td>Nigeria</td>
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<td>Algeria</td>
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<tr>
<td>Venezuela</td>
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<td>Ecuador</td>
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<tr>
<td>Bahrain</td>
<td>135</td>
</tr>
<tr>
<td>Iran</td>
<td>137</td>
</tr>
</tbody>
</table>

“Russia has said it will cut public spending by a further 10% in response to the latest drop in crude prices. The oil industry accounts for 70% of tax revenue in Nigeria. In June the country’s president, Muhammadu Buhari, said the treasury was “virtually empty”. Saudi Arabia has deeper pockets but, with a budget deficit that reached 15% of GDP last year, even it has been forced to cut public spending.”

“The last time oil prices dropped so low and stayed there, in the 1980s, the Soviet Union disintegrated. With the federal budget approved in December based on oil at $50 a barrel, Anton Siluanov, the Russian finance minister, announced that the country faced a budget deficit of about $40 billion.”

“In Russia, energy accounts for more than 50% of federal budget revenue and 18% of national GDP. In Saudi Arabia, the state relies on oil for about 80% of budget revenue, and it represents 45% of GDP. It’s true that the Saudis still have more than $620 billion in reserves, which they can use to maintain stability. But that’s about $100 billion less than they had last year. Unless oil rebounds—a lot—Saudi Arabia’s problems will grow.”

“Saudi Arabia’s deputy crown prince, Mohammed bin Salman, is driving through a sweeping economic reform program to counter the oil slump. The latest idea to come out of this environment is a possible stock market flotation of Saudi Aramco, the House of Saud’s main source of power and wealth.”

Source: The Economist, press clippings
Current Oil price doesn’t sustain the majority of the upstream CAPEX ...

Global liquids cost curve (USD/bbl)

- Avg. breakeven

Total 2020 liquid production, million boe/d

Note: The break-even price is the Brent oil price at which NPV equals zero using a real discount rate of 7.5%. The curve is made up of more than 20,000 unique assets based on each asset's break-even price and remaining liquids resources.

Source: SuppHi analysis on Rystad 2015 (public data)
... but the cost curve of existing fields is below today’s price → risk of “lower for longer”

- Even at $30/barrel, only 6% of global production fails to cover its operating costs
  - It may be uneconomic to drill new Deepwater wells at prices under $60 a barrel, but once they are built it may still make economic sense to keep them running at prices well below that
  - Such resilience justifies prices are expected to remain “lower for longer”

- Projections for a meaningful recovery in the oil price have been pushed back until at least 2017
  - The oil price will eventually find a bottom and, if this cycle is like previous ones, shoot higher because of the level of underinvestment in reserves and natural depletion of existing wells

Note: includes royalties
Sources: The Economist, Wood Mackenzie, Citi Research, press clippings

"Projections for a meaningful recovery in the oil price have been pushed back until at least 2017”

January 2016
Oil&Gas will keep playing a fundamental role, notwithstanding its declining relative importance.

World primary energy consumption (Billion TOE)

Note: oil includes crude oil, tight oil, oil sands and NGLs
Source: SupplHI analysis on BP Energy Outlook 2015 (public data)
Oil demand tends to grow while oil fields incur in depletion

**OIL: Base production from current fields (MBPD)**

- **2015:** 90
- **2020:** 68
- **2025:** 51

-6% CAGR

**OIL: World consumption (MBPD)**

- **2015:** 86
- **2020:** 91
- **2025:** 96

+1% CAGR

Note: assumes 5.5% depletion rate for oil fields

New investments in oil production capacity are needed to substitute depletion and satisfy demand.

**OIL**: Base production from current fields, demand, and implied depletion and new production need (MBPD)

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Depletion</th>
<th>New Production</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>90</td>
<td>-39</td>
<td>45</td>
<td>96</td>
</tr>
</tbody>
</table>

Note: assumes 5.5% depletion rate for oil fields
Key takeaways

**CLEAR OVERSUPPLY** in the oil&gas global market, caused by a fight for market share, driven by OPEC. All main producers pumped at record - but not sustainable - highs. Iran is about to flow the market with additional volumes.

**Shale** has been resilient in 2015, is running out of “survival tricks”, but will be there, adding volatility to the market.

Current oil price is not sustainable for:
- Many oil producing countries’ budgets
- The large majority of upstream investments.

But could remain “lower for longer”: projections for a meaningful recovery of the oil price have been pushed back until at least 2017. In fact, the existing cost curve is below today’s price, with no cuts to production volumes expected.

Oil&gas will keep playing a fundamental role. New investments in oil production capacity will be needed to substitute field depletion and satisfy growing demand (further stimulated by global GDP growth).
Agenda

Approach

Demand for energy sources

Market estimates and trends

Focus on selected equipment
Segments of the Oil & Gas value chain

**Upstream**
- Onshore Conventional
- Onshore Unconventional
  - Shale gas/Tight oil
  - Oil sands
- Offshore
  - (Shallow Water Platform, Subsea Field Development, FPSO/FPU/TLP)

**Midstream**
- LNG (Liquefaction On/Off, Regas On, FSRU, LNG Storage)
- Pipelines (Onshore / Offshore)
- Storage and Terminals

**Downstream**
- Refining and Petchem
- GTL
- Small LNG
- Fertilizers (Ammonia and UREA)

**End-users**
- Car
- Ship
- House
- Tractor
- Building
CAPEX perimeter considered for this analysis

CAPEX relevant for components manufacturers (USD B, 2015)

- Total: 695
- Exploration: -50
- Drilling & Completion*: -288
- Plant: 357

*Includes fracking (shale) and excavation (oil sands)

Source: SupplHi analysis
Total 2015 CAPEX for Oil&Gas plant development (excluding Exploration and Drilling) is ~360 B USD

Note: not considering Exploration and Drilling CAPEX
Source: SupplHI analysis on public data, SupplHi Projects Database
Upstream, Midstream and Downstream will follow different trends in the immediate future.

Global CAPEX for Oil&Gas plant development, Billion USD

- **2014**: Upstream 187, Midstream 75, Downstream 101
- **2015**: Upstream 155, Midstream 79, Downstream 123
- **2016F**: Upstream 125, Midstream 82, Downstream 129
- **2017F**: Upstream 157, Midstream 84, Downstream 132
- **2018F**: Upstream 177, Midstream 85, Downstream 133

Note: not considering Exploration and Drilling CAPEX.
Source: SupplHi analysis on public data, SupplHi Projects Database.
THE CROMARTY Firth, North of Inverness, Scotland
Currently packed with uncontracted rigs.
The outlook for 2015-2016 varies significantly by area of the value chain

**UPSTREAM**

- **Significant downturn of new investments**
  - Steep fall of the number of projects due to *cutbacks and delays*
  - ~200B CAPEX fallout in 2015 and 2016
  - Customers asking for *bold discounts on existing contracts*
  - Cuts by large corporations but smaller Oil Co. with higher intensity

- **Major cuts in Exploration and Drilling**, but also in Plant development
  - “Deferring discretionary spending, in particular in exploration and predevelopment projects, is a quick win.” (Wood MacKenzie)
All main players have cut their overall Upstream budgets …

Delta Upstream investments of main NOCs, IOCs and Independents, 2015 vs. 2014 (%)

Source: JP Morgan, SupplHi Analysis

'14 CAPEX (B USD) 10 43 8 54 20 6 17 7 20 8 12 7 35 7 11 44 13 5 36 8 25 22 5 38 4 13 5 25 30 20 17 9 33

Average -25%
... with a dramatic collapse of Awards in Upstream, and projects reduced in size

BRENT, USD/barrel

Feb 14 - Jul 14

Aug 14 - Jan 15

Feb - Jul 15

Aug 15 – Jan 16

40

50

60

70

start of the decline

$50/60 scenario

missed rebound

further decline

Kaombo 2 FPSO 7.0 Angola
Fort Hills 1.9 Canada
Gehem FPU 1.5 Indonesia
Gendalo FPU 1.5 Indonesia
Rabab Harweel Integrated Project (RHIP) 1.0 Oman

Ratqa Lower Fars Heavy Oil Development 4.0 Kuwait
Randym – Khauzak-Shady Mega Project 2.6 Uzbekistan
OCTP Field FPSO Yinson Genesis 2.6 Ghana
Al-Nasr Full Field Dev. Project - Package 2 2.6 UAE
Kodiak Field - Subsea 1.7 USA

Johan Sverdrup Field Development 10.0 Norway
Safaniya Phase III Project 1.5 Saudi Arabia
Persephone Gas Project 1.2 Australia
Glenlivet Field 1.0 UK
Malampaya Gas Field Phase III (MP3) - Subsea 1.0 Philippines

Fadhili Gas Program 4.7 Saudi Arabia
Culzean Offshore Oil Field Development 4.5 UK
Madura Field FPSO 0.5 Indonesia

ON HOLD: 55 projects for 98 B USD
CANCELLED: 17 projects for 50 B USD

Source: SupplHi Projects Database, January 2016
But is also requesting challenging savings on existing projects.

**Triple negative effect in 2015**

<table>
<thead>
<tr>
<th>PROJECTS AWARDS</th>
<th>(20/30% LESS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COSTS (10/30%</td>
<td>DISCOUNTS AND</td>
</tr>
<tr>
<td>RENEGOTIATIONS)</td>
<td></td>
</tr>
</tbody>
</table>

“In such a cut-throat environment, the services companies are accepting heavy discounts for the few deals they can secure as customers have the upper hand at the negotiating table. North Sea oil producer Enquest, which hires services firms, said it had negotiated discounts of up to 50% on some contracts, while the industry consensus on new rates is around 20% below previous years.”

“BP revealed that it was deferring projects in order to benefit from falling supplier costs. By waiting longer before giving projects the green light, companies hope to force savings out of the service groups that carry out maintenance and repairs and supply labour, drilling rigs and other infrastructure. Bob Dudley, BP chief executive, says savings of 20/30% are being achieved.”

Source: press clippings
Oil prices drive Upstream Capital and Operational efficiencies

IHS Upstream Capital Costs (UCCI) and Operating Costs Index (UOCI); indexed Brent spot price

Further need of:
- Capital Efficiency
- OPEX costs reduction
- Enhanced Oil Recovery (EOR): 2/3 of remaining Oil reserves for fields in production are “mature” vs <1/3 of Gas

Note: Brent indexed price refers to the right axis; the UCCI and the UOCI to the left axis; Mature Fields are those which have produced >50% of reserves OR which are >25yrs old
Source: SupplHi analysis on IHS, 2016 and EIA, 2016 (public data)
2/3 of remaining Oil reserves for fields in production are “mature” vs <1/3 of Gas.

Global remaining reserves for fields in production, by maturity (MMboe):

- **Oil**
  - Mature: 1,432,500 (33%)
  - Not mature: 67%

- **Gas**
  - Mature: 766,000 (77%)
  - Not mature: 23%

Mature Fields are those which have produced >50% of reserves OR which are >25yrs old.

Note: doesn’t include unconventional resources.

Source: IHS EDIN (public data)

Norway, UK, Indonesia and Algeria with 60%+ of producing fields with depletion >50%.
Majority of producing fields are “mature”, driven by Norway, UK, Algeria

Maturity of remaining reserves for Oil & Gas fields in production

Note: doesn’t include unconventional resources
Source: IHS EDIN (public data)
Upstream End-Users to qualify with, by region

End-Users incidence on projects with **Just Awarded, Bid Ongoing and Planning** statuses, Jan 2016

Note: based on Operatorship (not on the Equity in the project). Incidence is adjusted according to the estimated probability assigned to the single projects.

Source: SupplHi Projects Database, January 2016
Unconventional fields are still expected to continue growing in 2015-2035

**OIL&GAS: World production (MBOE/d)**

- Condensate
- Oil Sands
- Tight Oil
- Shale Gas
- NGLs
- Other Oil
- Other Gas

**CAGR '15-'35**
- Condensate: 0.9%
- Oil Sands: 3.8%
- Tight Oil: 3.4%
- Shale Gas: 2.0%
- NGLs: 0.1%
- Other Oil: 5.7%
- Other Gas: 1.0%

Source: SupplHi analysis on BP Energy Outlook 2015; Canadian Crude Oil Production Forecast 2015 - 2030, June 2015 (public data)
Key takeaways

**SIZE OF UPSTREAM PROJECTS IS BEING REDUCED**, CREATING **MORE OPPORTUNITIES FOR MEDIUM AND SMALL FOCUSED AND/OR LOCAL CONTRACTORS.**

**OIL PRICES DRIVE UPSTREAM CAPITAL AND OPERATIONAL EFFICIENCIES. ESPECIALLY IN OFFSHORE OIL&GAS, VENDORS NEED TO SUPPORT CLIENTS TO ACHIEVE AN INTENSE FOCUS ON CAPITAL DISCIPLINE, WHICH WILL BE THE MANTRA OF THE INDUSTRY LOOKING FORWARD.**

**SHALE GAS AND TIGHT OIL ARE STILL EXPECTED TO CONTINUE GROWING IN 2015-2035, BUT STRONGLY DEPEND ON OIL AND GAS PRICES. TIGHT OIL PRODUCTION OUTSIDE NORTH AMERICA WILL GRADUALLY EMERGE BUT AT A SLOW PACE.**

**OIL SANDS CAPEX EXPECTED TO START RECOVERING IN 2018, CONDITIONAL TO THE RECOVERY OF OIL PRICES: OUT OF THE 113 CANADIAN OIL SANDS PROJECTS IN PLANNING PHASE, 36 ARE CURRENTLY SUSPENDED OR CANCELLED.**

**CAPEX FOR SHALLOW WATER IS BEING IMPACTED IN THE MEDIUM TERM AND WILL SHOW ~0% CAGR 2014-2019.**

**THE TOP-3 PLAYERS IN DEEPWATER (PETROBRAS, TOTAL AND SHELL) DRIVE 50% OF EXPECTED SPENDING IN THE 2016-2018 PERIOD. INDEPENDENT OIL&GAS CO.'S (E.G. MAERSK, DANA OFFSHORE, TULLOW, PREMIER OIL, ...) ARE UNDERTAKING LARGE PROJECTS AND ARE GROWING THEIR INCIDENCE IN DEEPWATER.**
MIDSTREAM
The outlook for 2015-2016 varies significantly by area of the value chain

**UPSTREAM**

- Significant downturn of new investments
  - Steep fall of the number of projects due to cutbacks and delays
  - ~200B CAPEX fallout in 2015 and 2016
  - Customers asking for bold discounts on existing contracts
  - Cuts by large corporations but smaller Oil Co. with higher intensity

- Major cuts in Exploration and Drilling, but also in Plant development
  - “Deferring discretionary spending, in particular in exploration and predevelopment projects, is a quick win.” (Wood MacKenzie)

**MIDSTREAM**

- LNG continues to grow, but less than expected before
  - More Regasification rather than Onshore Liquefaction
  - Less but larger projects in Onshore Liquefaction (e.g. Kuwait)
  - Confirmed growth of Floating LNG, representing however <10% of total Midstream CAPEX
  - Limited growth of pipeline capacity, mainly due to geopolitical issues

- Possible “threat”
  - Japan is re-activating its nuclear plants
“Despite the current low oil prices, most LNG projects remain economically robust over the long term. IHS Energy has calculated the oil-price thresholds required to cover life-cycle costs and provide an appropriate return for LNG projects. A typical greenfield project — for example in East Africa or Western Canada — requires a “free on board” (FOB) price of around $10-12 per MMBtu. With pricing at the historically normal ratio to oil, such projects would require oil prices in the range of $70-82 per barrel to break even. This is within the range of most anticipated long-term oil prices.”

“The longer the current oil price environment remains in place, the smaller the US LNG sector is likely to be in the medium term. That could be important for the Australian producers because the implications of the capital investment strike generated by the decline in the oil price — about $US170bn of planned investment has already been cancelled or deferred — could support a scenario where there were supply shortages in the oil and gas sector in the not-too-distant future and a consequent rebound in prices.”

“Plunging Oil Prices Stall Demand for Pipelines: Royal Dutch Shell has lost $5 billion so far in 2015, TransCanada Corp. is staring at a $2-billion write-off following the U.S. rejection of its Keystone XL pipeline, and Baker Hughes said it took a 43% hit to earnings compared to last year, a measurement almost identical to the decline of North American oil-rig drilling over the same time.”
The influence of the two largest gas producers has been declining, but they still account for ~40% of world output.

GAS: World production (Billion Cubic Meters - BCM)

Source: SupplHi analysis on BP Statistical Review, June 2015 (public data)
Gas prices from 2010 started diverging and are expected to continue to do so

“In theory a long period of low oil [and gas] prices should benefit the global economy. The economies that have enjoyed the strongest GDP growth in the past year have indeed been oil importers: India, Pakistan and countries in east Africa. It is hard to explain the Consumer-led recovery in the euro area without assuming a positive impact from lower oil prices. In the US, JPMorgan estimates the outcome was between a contraction of 0.3% and a boost of a measly 0.1%. Consumers may have saved more of the windfall than had seemed likely and the share of oil-related capital spending in total business investment in America has fallen by half”.

January 2016

Note: considers Natural Gas, Russian Natural Gas border price for Germany, Indonesian Liquefied Natural Gas in Japan, Herny Hub for the US Source: SupplHi analysis on EIA, 2015, press clippings
LNG presents a fast-growing demand

LNG base production from current fields, demand, and implied depletion and new production need (MTPA)

2015 Liquefaction capacity: 300
Depletion: -31
New capacity needed: 131
Liquefaction demand 2025: 400

Note: assumes 1% depletion rate for LNG
Source: SupplHi analysis on Galp Energia “Capita Markets Day” presentation (public data)
Midstream awards are highly driven by jumbo LNG and Pipeline projects in 1H15

**BRENT, USD/barrel**

- **Feb 14 - Jul 14**: start of the decline
- **Aug 14 - Jan 15**: $50/60 scenario
- **Feb - Jul 15**: missed rebound
- **Aug 15 – Jan 16**: further decline

**MAIN EPC AWARDED CAPEX, B USD**

<table>
<thead>
<tr>
<th>Project Description</th>
<th>B USD</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameron LNG Export Terminal</td>
<td>6.0</td>
<td>USA</td>
</tr>
<tr>
<td>Edmonton to Hardisty Pipeline Project</td>
<td>1.8</td>
<td>Canada</td>
</tr>
<tr>
<td>Govind Linde Yaoude Oil Pipeline</td>
<td>1.0</td>
<td>Cameroon</td>
</tr>
<tr>
<td>Muara Bakau (Jangkrik) Pipeline</td>
<td>0.8</td>
<td>Indonesia</td>
</tr>
<tr>
<td>Los Ramones II Sur Gas Pipeline</td>
<td>0.7</td>
<td>Mexico</td>
</tr>
<tr>
<td>Lelu Island, Prince Rupert LNG Export Terminal</td>
<td>11.0</td>
<td>Canada</td>
</tr>
<tr>
<td>Golden Pass LNG Export Terminal</td>
<td>10.0</td>
<td>USA</td>
</tr>
<tr>
<td>Gasoducto Peruano del Sur (GPS)</td>
<td>4.2</td>
<td>Perú</td>
</tr>
<tr>
<td>Eni Ghana FLNG</td>
<td>2.5</td>
<td>Ghana</td>
</tr>
<tr>
<td>Los Ramones II Norte Gas Pipeline</td>
<td>0.9</td>
<td>Mexico</td>
</tr>
<tr>
<td>Trans Anatolian Natural Gas Pipeline (TANAP)</td>
<td>11.7</td>
<td>Turkey</td>
</tr>
<tr>
<td>Corpus Christi LNG</td>
<td>9.5</td>
<td>USA</td>
</tr>
<tr>
<td>Rio Grande LNG Project</td>
<td>8.0</td>
<td>USA</td>
</tr>
<tr>
<td>GNEA Pipeline</td>
<td>3.3</td>
<td>Argentina</td>
</tr>
<tr>
<td>Sabal Trail Gas Pipeline</td>
<td>3.0</td>
<td>USA</td>
</tr>
<tr>
<td>Magnolia Lake Charles LNG Export Terminal</td>
<td>2.2</td>
<td>USA</td>
</tr>
<tr>
<td>Norlite Pipeline Project</td>
<td>1.4</td>
<td>USA</td>
</tr>
<tr>
<td>Mariner East Ethane Storage</td>
<td>0.3</td>
<td>USA</td>
</tr>
</tbody>
</table>

**AVERAGE EPC PROJECT SIZE (B USD)**

- Feb 14 - Jul 14: 2.5
- Aug 14 - Jan 15: 1.4
- Feb - Jul 15: 3.8
- Aug 15 – Jan 16: 0.6

**ON HOLD: 26 projects for 151 B USD**

**CANCELLED: 13 projects for 40B USD**

Source: SupplHi Projects Database, January 2016
End-Users to qualify with, by region

End-Users incidence on projects with **Just Awarded, Bid Ongoing and Planning** statuses, Jan 2016

Note: based on Operatorship (not on the Equity in the project). Incidence is adjusted according to the estimated probability assigned to the single projects

Source: SupplHi Projects Database, January 2016
Key takeaways

Massive proposed increase in North American liquefaction capacity in but high project mortality rate is expected, with risk of oversupply. Moreover, North America requires a strong knowledge of the needs of the local market (regulations, modularization, ...).

Midstream requires qualification with EPC contractors (North American, European, Japanese, ...) rather than focusing only on the ~100 medium and large end-users spread on a global level.

In midstream, co-presence of jumbo and medium/small projects, with cost and completion overruns on recent megaprojects. Financial weakness of some investors puts at risk some of the projects.

6 Floating LNG projects scheduled to come online between 2015 and 2018, the most relevant being Shell’s Prelude. Characterized by a multi-site execution strategy, with global procurement.

TransCanada is dominating the strong growth in North American onshore pipelines with ~40% of expected spending, mainly driven by the shale boom. The slowdown of unconventional production in North America may delay some projects.
The outlook for 2015-2016 varies significantly by area of the value chain

**UPSTREAM**

- Significant downturn of new investments
  - Steep fall of the number of projects due to **cutbacks and delays**
  - ~200B CAPEX fallout in 2015 and 2016
  - Customers asking for **bold discounts on existing contracts**
  - Cuts by large corporations but smaller Oil Co. with higher intensity
- Major cuts in **Exploration and Drilling**, but also in Plant development
  - “Deferring discretionary spending, in particular in exploration and predevelopment projects, is a quick win.” (Wood MacKenzie)

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- LNG continues to grow, but less than expected before
  - More Regasification rather than Onshore Liquefaction
  - Less but larger projects in Onshore Liquefaction (e.g. Kuwait)
  - Confirmed growth of Floating LNG, representing however <10% of total Midstream CAPEX
  - Limited growth of pipeline capacity, mainly due to geopolitical issues
- Possible “threat”
  - Japan is re-activating its nuclear plants

**DOWNSTREAM AND FERTILIZERS**

- **Positive outlook**
  - CAPEX mainly driven by **greenfield** projects in APAC
  - growth of **brownfield** refining, mainly in OECD
- **Main drivers**
  - Reduction in feedstock costs increases Downstream margins
  - Demand for oil products is recovering, linked to GDP
  - “Clean Fuels” legislation a major driver everywhere
  - Bottom-of-the-barrel processing (marine fuel oil)
  - Flexibility for **broader crude choice**, emphasis on conversion and residue upgrading
  - **Growth in Gas** drives further PetChem CAPEX
- **Possible “threat”**
  - **Chinese crisis** to eventually impact PetChem growth
Downstream is benefitting from a temporary boost

“On the other hand, demand for oil products is recovering. One theme in the second quarter results was the resilience of the majors’ refining operations, which ameliorates the impact of lower revenues from crude, as there was strong demand for refined gasoline and diesel fuel, especially in Europe. The boost to downstream businesses may be temporary, however. And, for now, there is unlikely to be any let-up in cutting costs.”

FINANCIAL TIMES
September 2015

"Reliance Industries Ltd., operator of the world’s largest crude-oil refining facility, beat market estimates Tuesday to post its highest-ever quarterly profit. The company’s gross refining margin climbed to a seven-year high of $11.50 per barrel during the quarter, it said. “Our portfolio of world-class refining and petrochemical assets are paying off handsomely,” Chairman Mukesh Ambani said in a statement. The petrochemical business also delivered amongst its best quarterly performance, driven by robust polymer margins,” he added. The “benefits of low crude oil and energy prices for our downstream businesses clearly outweigh the impact of [crude oil prices] on our upstream segment,” reflected in the record earnings for the quarter, Mr. Ambani said."

THE WALL STREET JOURNAL
January 2016

“Exxon is an integrated oil and gas company, and its earnings reflect this advantage. Despite historic low oil prices, it reported a net income of $4.24 billion. Its upstream earnings declined from $6.42 billion in third quarter of fiscal 2014 (3QFY14), to $1.36 billion in 3QFY15. Contrary to this, its downstream earnings increased from $1.02 billion to $2.03 billion, with an increase in the chemicals segment. With oil prices expected to remain low in FY16 as well, Exxon can stand strong and survive tough times by recording stable performance dominated by its downstream segment.”

BUSINESS FINANCE NEWS
December 2015

Source: press clippings
2015 is seeing increasing refining margins in Europe, the US and Singapore

REFINING: Margins by region USD/bbl

Source: SupplHi analysis on Barclays Research, March 2015
Downstream Awards in ‘14 was at historical high levels and in 2H15 reduced the avg project size

- **BRENT, USD/barrel**
  - Feb 14 - Jul 14: Start of the decline
  - Aug 14 - Jan 15: $50/60 scenario
  - Feb - Jul 15: Missed rebound
  - Aug 15 – Jan 16: Further decline

**MAIN EPC AWARDED CAPEX, B USD**
- (# of awarded projects)
- **MAIN EPC AWARDS**
- **AVERAGE EPC PROJECT SIZE (B USD)**

- **ON HOLD**: 50 projects for 141 B USD
- **CANCELLED**: 13 projects for 97 B USD

Source: SupplHi Projects Database, January 2016
Downstream Capital Cost Index has declined for 4 consecutive quarters, driven by Oil prices.

**DOWNSTREAM**: IHS Downstream Capital Costs Index (DCCI); indexed Brent spot price

Note: Brent indexed price refers to the right axis; the DCCI to the left axis
Source: SupplHi analysis on IHS, 2016 and EIA, 2016 (public data)
End-Users to qualify with, by region

End-Users incidence on projects with **Just Awarded, Bid Ongoing and Planning** statuses, Jan 2016

Note: based on Operatorship (not on the Equity in the project). Incidence is adjusted according to the estimated probability assigned to the single projects

Source: SupplHi Projects Database, January 2016
Key takeaways

GROWING FUEL DEMAND IN NON-OECD NATIONS (MOSTLY IN ASIA, MIDDLE EAST). IN REFINING, DEVELOPING COUNTRIES HAVING THE HIGHEST SPENDING (2/3 OF TOTAL) WITH LESS END-USERS (LARGER PROJECTS). OECD ECONOMIES FOCUS ON REVAMPING.

FOR POLYETHYLENE (PE), CHINA DECREASING IMPORTS WHILE DEVELOPING NEW TECHNOLOGIES (CTO, MTO). MIDDLE EAST IS THE TRADITIONAL AND GROWING MARKET.

FOR POLYPROPYLENE (PP), CIS IS GROWING, NEW PROJECTS ARE MAINLY IN CHINA, WHILE MIDDLE EAST IS FACING SHORTAGE OF ETHANE.

FOR POLYOLEFINES, IN THE SHORT TERM, CONSIDERABLE UNCERTAINTIES IN NEW INVESTMENTS (TEMPORARY OVERCAPACITY TILL 2017?), BUT, IN THE SHORT-MEDIUM TERM PROJECTS IN NEWLY INDUSTRIALIZED COUNTRIES (OMAN, MALAYSIA, CIS, ...) AND SOME PLANT MODERNIZATION OPPORTUNITIES IN EUROPE.

THE CIS AREA IS EXPERIENCING A HIGH GROWTH IN FERTILIZERS, DRIVEN BY 8 END-USERS THAT ARE INVESTING IN ONGOING AND PLANNED PROJECTS.

ASIA-PACIFIC EXPECTED SPENDING IN PETCHEM IS HIGHLY FRAGMENTED AMONG 40+ END-USERS WITH AT LEAST 300 M USD OF BUDGET FOR THE NEXT THREE YEARS. HOWEVER IT’S VERY COMPLEX TO COMPETE IN CHINA WITHOUT A LOCAL PRODUCTION.

MOST OF THE LARGE GAS-TO-LIQUID (GTL) PROJECTS PLANNED FOR THE COMING YEARS WERE PUT ON HOLD OR CANCELLED DUE TO HIGH COSTS AND PRICE UNCERTAINTIES.
ONSHORE CONVENTIONAL

- Sustained growth in **Gas Treatment Capacity** by **small local players**, with growing popularity of pre-engineered solutions as regards Gas Treatment capacity

OIL SANDS

- Out of the **113 Canadian Oil Sands projects** in planning phase, **36 are currently suspended or cancelled**

SHALLOW WATER

- As shallow water developments on the East Coast of Canada reach completion, the only capacity increase in this segment is expected to come from **small developments in the Cook Inlet Basin, Alaska**

DEEPWATER

- No capacity additions are planned after completion of ongoing deepwater projects in the Gulf of Mexico

LNG

- The Shale Revolution has caused a massive shift from regasification to liquefaction projects, with many regasification plants conversions and even more grassroots plants planned

- However, stringent environmental regulations, conflict with local communities, oversupply risk and financial weakness of some investors suggest a **high degree of uncertainty about the projects’ future**

ONSHORE PIPELINE

- Most prominent geography, mostly due to projects connected with Shale Gas: US projects mainly to be developed by small, local companies; Canadian projects planned by larger companies and IOC’s

- High project uncertainty due to environmental concerns and political disputes, as well as possible decrease of Shale developments

OFFSHORE PIPELINE

- Offshore developments in the Gulf of Mexico explain all the 260 Km of planned offshore pipelines in North America, with Shell’s Mattox pipeline accounting for 50% of this figure

PETCHEM

- Driven by the availability of feedstock, investment in this geography should be sustained: relatively large average project size in the US, with a mix of local and international companies developing them

- The region is characterised by small developments, mainly by local players: execution of Canadian projects, related to tar sands exploitation, is highly unlikely at the moment: only minor developments are planned in the US

FERTILIZERS

- As existing projects, being developed by local players, are completed, investment is likely to continue, driven by the availability of feedstock the Shale Revolution has brought about

---

Source: SupplHi Projects Database, January 2016
## ONSHORE CONVENTIONAL
- In spite of the turbulent political and financial situation of the country, **Venezuelan projects remain the only relevant capacity increase prospect in this segment**, together with some minor field developments in the Andes and the Amazon region.

## SHALLOW WATER
- **Brazilian and Mexican NOC’s will drive growth in this region**, but capacity increase is expected to be minor in a geography focusing more and more on deepwater developments.

## DEEPWATER
- **Brazilian developments**, held either entirely or in JV by NOC Petrobras, represent the totality of future projects, with many others nearing completion.
- Even though some developments can be economical even at today’s prices, corruption scandals and, more recently, a 25% cut to 5-year investment budget bring considerable uncertainty over the future of this segment in this geography; Expected increase of partnerships with IOCs to sustain the developments.

## LNG
- After the suspension of **Venezuelan LNG Project** at San José Anzoategui, the only increase in liquefaction capacity should come from minor Mexican developments; **Two small plants** (in Uruguay and Jamaica) are the only planned additions to regasification capacity.

### ONSHORE PIPELINE
- ~3000 Km of new pipelines are expected to come from phases 2 and 3 of the “Oleoducto Bicentenario de Colombia” and the new Southern Perú Pipeline.
- In Mexico state-owned actors are planning and already executing a substantial increase in gas pipelines mileage.

### OFFSHORE PIPELINE
- Planned developments involve connecting offshore fields off the coast of Brazil to the mainland; **Projects suspended** after Petrobras scandal (Lula Pipeline) are likely to resume in the near future, but investment cuts pose a threat to further developments.

## PETCHEM
- Declining investments in Brazil translate into poor growth prospects in this region.
- **Venezuelan projects** suffer from the high political and economic uncertainty of the country.

## REFINING
- Refining investments in Latin America will see a decline in the near future; Petrobras cuts are in fact expected to hit mainly its downstream business; **Venezuelan projects execution** seems also highly uncertain.

## FERTILIZERS
- As Bolivia is developing a fertilizer industry, **further investments are quite likely**, However, Petrobras cuts make further investments in Brazil unlikely, thus making Bolivia the only feeble growth prospect in the region.

### Source: SupplHi Projects Database, January 2016
ONSHORE CONVENTIONAL
- As latest North Sea developments reach completion no further large increases in Gas Treatment capacity are planned

SHALLOW WATER
- North Sea developments will continue to drive growth in the region, however, due to very high costs, some projects have been delayed
- Decommissioning of depleted North Sea fields is expected to gain momentum through the next decade as well as brownfield of mature fields

DEEPWATER
- FPSO’s are being considered for a number of redevelopments in mature fields in the North Sea, however no decisions have been taken, up to now, and therefore there is considerable uncertainty about the only expansion prospect in this segment for this region

LNG
- Focus on regasification but minor planned increase in capacity most of which coming from Croatia LNG Project, still in earliest stages of development
- Small LNG as a new opportunity for the Mediterranean Sea

ONSHORE PIPELINE
- Future projects focusing on gas imports from Russia and Azerbaijan have sparked political debate
- Political situation is in fact likely to be the main determinant of projects such as the Turkish and Nord Stream, after cancellation of South Stream

OFFSHORE PIPELINE
- Future projects focus on North Sea developments and gas imports from Russia (offshore sections of Nord Stream and Turkish Stream), subject of political debate

PETCHEM
- Only minor developments are planned in this geography

REFINING
- As larger ongoing projects are completed by 2018, smaller brownfield developments are being planned

FERTILIZERS
- Eastern Europe (Hungary in particular) and Turkey are now driving investment in the region
- Growth prospects in the region are very poor, with no significant projects in the pipeline
**UPSTREAM**

**ONSHORE CONVENTIONAL**
- Minor developments in Sub-Saharan Africa are planned
- Algeria continues to invest, while political stabilisation in Libya may lead to re-start of suspended projects

**SHALLOW WATER**
- Development of fields off the West Coast of the continent, by a mix of Independent, National and a few International Oil Co’s will continue to add capacity both to the Gas and Oil sides

**DEEPWATER**
- Significant developments are expected to come online by the end of the decade offshore Angola, Namibia, Nigeria and South Africa
- However, some projects have been postponed and others are likely to follow unless prices recover

**MIDSTREAM**

**LNG**
- Liquefaction projects will target new field developments in South-East Africa with IOC’s planning two new plants in Mozambique and one in Tanzania and Ghana
- Instead, Nigerian projects face very high uncertainty as some IOC’s pull out due to long delays

**ONSHORE PIPELINE**
- Planned mileage increase in the region is minor and aims at connecting new field developments with existing infrastructure; new developments being discussed in Nigeria

**OFFSHORE PIPELINE**
- There is no further capacity planned in this region

**DOWNSTREAM**

**PETCHEM**
- Growth prospects in this region rely solely on execution of planned substantial Nigerian and Tanzanian projects
- However, uncertainty is high as usual in the region

**REFINING**
- Investment in the region will mainly focus on medium to large greenfield developments
- Most significant countries in this time horizon will be Algeria and Nigeria

**FERTILIZERS**
- Sub-Saharan Africa will see a strong growth in demand in the coming years, which may further stimulate investments
- Nigeria and Gabon lead the way as regards planned projects

---

Source: SupplHi Projects Database, January 2016
ONSHORE CONVENTIONAL
- Investment is expected to continue across the region, both to supply much needed gas for industrial and power generation purposes, and to outpace the consequences of depletion
- However, reputation for delays of some National Oil Co. (in particular Kuwait’s), together with exit of IOC from more costly projects, and prolonged political instability in the area do pose some threats to future developments
- Lifting of sanctions in Iran is expected to revive long suspended projects as well as to initiate a new wave of developments, as the country pushes production levels back to pre-sanctions levels and beyond

SHALLOW WATER
- Investment will continue on Red Sea and Persian Gulf Gas Projects, to provide gas for industrial and power generation purposes; Lift of sanctions could lead to full development of existing Iranian fields

DEEPWATER
- Recent gas discoveries in the Mediterranean (such as giant Zohr field) constitute the main growth prospect in the region

LNG
- Lifting of sanctions may soon revive Iran’s long suspended projects
- The increase in gas demand in Arab countries has sparked a substantial increase in planned regasification capacity, with many large scale projects due by the end of the decade

ONSHORE PIPELINE
- Planned mileage increase in the region is minor and aims at connecting new field developments with existing infrastructure

OFFSHORE PIPELINE
- Growth prospects for this segment in the Middle East rely on the Iran-Oman Pipeline project (260 Km) to be revived after sanctions lift

PETCHEM
- One of the regions with the largest projects, with Saudi Arabia leading the way; long-suspended Egyptian projects are now resuming

REFINING
- In the region with the largest average project size, as ongoing projects reach completion, a slowdown in investment is expected
- Projects will be spread across the region, with substantial brownfield developments in Saudi Arabia and UAE about to be awarded

FERTILIZERS
- Investment in fertilizers in the region is expected to substantially increase with the comeback of Iran: the political instability in Egypt has delayed the development of important projects, which are now more likely to resume

Source: SupplHi Projects Database, January 2016
ONSHORE CONVENTIONAL
- In a geography where the upstream onshore segment is focused on treatment plants for offshore fields, the only growth prospects rely on development of small fields in India and Myanmar.

SHALLOW WATER
- In spite of gradual slowdown in the growth rate, Australian gas capacity should continue to increase in the near future.
- A number of small projects offshore Malaysia, Indonesia, and in the South China Sea are also expected to be online by the end of the decade, with many of them about to be awarded soon.

DEEPWATER
- Planned developments in the South China Sea, together with some minor developments off the Indonesian Coast, represent the main growth prospect in the region.

LNG
- The cancellation of planned LNG Plants in Australia suggests no further increase in liquefaction capacity as ongoing projects reach completion.
- Increase in Indian regasification capacity (around 16 MTPA additional planned capacity in 4 plants) continues at a slower pace.

ONSHORE PIPELINE
- China continues its massive West-East pipeline programme, which accounts for roughly 15,000 km of new gas pipelines.
- India-Myanmar long suspended pipeline project may soon resume after talks between the Indian and Bangladeshi governments.

OFFSHORE PIPELINE
- A massive Oman to India 1300 km pipeline is planned and could come on-stream in the second half of the next decade, with a possible Iran spinoff already planned.

PETCHEM
- In spite of a gradual slowdown, this geography will continue to grow with China driving the investments in the region, followed by India and Indonesia.
- However, China's economic slowdown may affect future projects' execution as well as completion of existing ones, and India's Oil companies still have a reputation for delays.

REFINING
- Large grassroots developments in China alongside smaller projects in India, will be the bulk of future investments in the region.
- The long delays, and the number of suspended projects, suggest a high mortality rate for Indian projects, while China's economic slowdown could affect project execution.

FERTILIZERS
- 60 Urea plants are expected to come on stream by the end of the decade, 20 of whom located in China to sustain domestic demand for fertilizers.
- Investment is then expected to continue at a slower pace, through smaller projects located in Indonesia and in the Indian subcontinent.

Source: SupplHi Projects Database, January 2016
ONSHORE CONVENTIONAL
- Development of Gazprom’s concessions in Russia continues in earnest, as Chayandinskoye Field is expected to come on stream by 2018.
- Low oil prices seem to have slowed down progress on the giant development of TengizChevron field.

SHALLOW WATER
- With giant Shah Deniz II development expected to come online by 2018, expansion prospects in this geography rely on higher gas prices to revive large suspended Russian projects.

DEEPWATER
- There are no planned additions to Deepwater capacity in this region.

LNG
- Russian NOC’s are planning a substantial increase in Liquefaction capacity.
- However, the number projects suspended or postponed due to geopolitical and economic situation makes this scenario highly unlikely.

ONSHORE PIPELINE
- Construction of the massive Chayandinskoye-Vladivostok pipeline has started, but completion of all its stages is subject to considerable uncertainty.
- Small projects focusing on boosting gas exports from Central Asia to China.

OFFSHORE PIPELINE
- Expansion prospects in the region hinge on the Shah Deniz development in Azerbaijan and its Caspian Sea pipeline.

PETCHEM
- Following completion of ongoing projects, main growth prospects will come from a series of Russian developments, often connected to upstream projects being developed.

REFINING
- Investments in CIS forecast to decline from 2017 on.
- Kazakhstan will be host the highest-value projects and will be the first geography, even though Russia has a larger project pipeline.

FERTILIZERS
- The trend in the region is now on the revamping of old facilities, especially in Russia where four important brownfield projects are ongoing or in planning phase.

Source: SupplHi Projects Database, January 2016
Key takeaways

IN 2015 AND 2016, THE OIL&GAS VALUE CHAIN IS MOVING AT DIFFERENT SPEEDS:
• A SIGNIFICANT DOWNTURN IN UPSTREAM
• MIDSTREAM CONTINUES TO GROW BUT LESS THAN PREVIOUSLY EXPECTED
• DOWNSTREAM HAS A POSITIVE OUTLOOK MAINLY DRIVEN BY BROWNFIELD PLAYERS ABLE TO ADDRESS THE ENTIRE VALUE CHAIN ARE MORE RESILIENT TO THE CURRENT SITUATION.

THE “MORTALITY” RATE OF PROJECTS INCREASED IN THE LAST MONTHS, WHILE THE AVERAGE SIZE DECREASED BY MORE THAN 30%, ESPECIALLY IN THE UPSTREAM.

MIDDLE EAST IS CONFIRMED AS THE MOST ATTRACTIVE OIL&GAS MARKET FOR EUROPEAN PLAYERS, GIVEN THE:
• LARGE CAPEX
• GROWTH IN ALL THE MAIN SEGMENTS
• HIGHER PREDICTABILITY ON THE MARKET EVOLUTION
• FUTURE BROWNFIELD NEEDS.
THE DELIVERY OF LOCAL CONTENT CAN MAKE THE DIFFERENCE IN WESTERN PLAYERS’ ABILITY TO WIN.

EGYPT, OTHER AFRICAN COUNTRIES AND SOME CIS COUNTRIES MAY BE ATTRACTIVE AS WELL. FOR THE OTHER MARKETS A MORE OPPORTUNISTIC APPROACH MAY BE ADVISABLE (LATIN AMERICA, RUSSIA, ...), GIVEN STRUCTURAL LACK OF FUNDING AT CURRENT OIL PRICES OR COMPLEX COMPETITION WITH ASIAN SUPPLIES.
CONTRACTORS AND TRENDS
The incidence of clusters of EPC Contractors strongly varies by segment

Contractors incidence on Projects currently in Execution phase, January 2016

Notes: considered full-life value of projects currently ongoing; for JV or Consortium, when not available, an equal split by participants has been considered; cluster assigned based on HQ country
Source: SupplHi Projects Database, January 2016
We identified 9 main trends in Oil&Gas ...

<table>
<thead>
<tr>
<th>NOC GROWTH IN RELEVANCE</th>
<th>LOCAL CONTENT CONSTRAINTS &amp; OPPORTUNITIES ARE GROWING, BUT DIFFICULT TO ADDRESS</th>
<th>FIERCER COMPETITION IN EPC BY FAST GROWING PLAYERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COST INFLATION HAS ALMOST DOUBLED CAPEX (COMPLEX PROJECTS, HIGH DEMAND)</td>
<td>FOCUS ON REDUCING OPEX COSTS</td>
<td>LARGE PROJECTS DIVIDED INTO SMALLER EPC PACKAGES (LESS MEGAPROJECTS)</td>
</tr>
<tr>
<td>POOR PROJECT EXECUTION PERFORMANCE</td>
<td>HIGHER TRANSFER OF RISKS TO CONTRACTORS (LSTK TO BE RE-AFFIRMED)</td>
<td>THE “BIG CREW CHANGE” ON RESOURCES</td>
</tr>
</tbody>
</table>
... that create a set of **Opportunities**

<table>
<thead>
<tr>
<th>Qualify with NOCs</th>
<th>Deliver Local presence – if SME together with other complementary players</th>
<th>Qualify also with abroad Contractors abroad. Continue <strong>supporting European E&amp;C</strong> that increased their competitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Capital Efficiency <strong>reducing costs and timing</strong>, increasing <strong>standardization</strong></td>
<td>Deliver value added through <strong>After Sale</strong> Design product for Total Life Product life extension</td>
<td><strong>Know the market and follow the projects</strong></td>
</tr>
<tr>
<td><strong>Foster PM capabilities</strong> <em>(Take Back Client)</em> Support End-User and Contractors since conceptual and bid phases <em>(e.g. Co-Engineering)</em></td>
<td><strong>Be the Partner of the Contractor</strong> in managing risks</td>
<td><strong>Leverage on Experts Transfer knowledge</strong> and invest on Juniors</td>
</tr>
</tbody>
</table>
Agenda

Approach

Demand for energy sources

Market estimates and trends

Focus on selected equipment
Market perimeter is very broad and comprehensive

Utilized in the Oil&Gas market for any application / type of plant

All main segments will be considered; however, **reduced focus in Exploration and Drilling phases** where these equipment play a marginal role (that will be out of scope for this analysis)

Mainly used for Greenfield / CAPEX projects and with limited after-sale and replacement as OPEX

Focus of the analysis will be **only on CAPEX-driven investments**
Valves is the largest component market among the three examined

Global Oil&Gas CAPEX spending by equipment, 2015, Billion USD

- Valves: 9.8 Billion USD
- Pressure Equipment: 9.0 Billion USD
- Switchboards: 3.1 Billion USD

Note: valves include manual/on-off and control valves
Source: SupplHI analysis on public data
Total 2015 CAPEX for Valves is ~10 B USD

Source: SupplHi analysis on public data and SupplHi Projects Database
Expected 2-3% 2015-2018 CAGR for Valves CAPEX in Oil&Gas

Global Valves CAPEX, Billion USD

Note: size of bar chart is based on the expected value
Source: SupplHi analysis on public data and SupplHi Projects Database
Total 2015 CAPEX for Pressure Equipment is ~9 B USD

2015 Global Oil & Gas CAPEX, Billion USD

Source: SupplHi analysis on public data and SupplHi Projects Database
Expected 3-4% 2015-2018 CAGR for Pressure Equipment CAPEX in Oil&Gas

Global Valves CAPEX, Billion USD

- **2014**: 8.0
- **2015**: 9.0
- **2016F**: 8.8
- **2017F**: 9.1
- **2018F**: 10.0

**CAGR '15-'18**

- **UPSTREAM**: 2-4%
- **MIDSTREAM**: 4-6%
- **DOWNSTREAM & FERTILIZERS**: 3-5%

Note: size of bar chart is based on the expected value
Source: SupplHi analysis on public data and SupplHi Projects Database
Total 2015 CAPEX for Switchboards is ~3 B USD

2015 Global Oil&Gas CAPEX, Billion USD

Source: SupplHi analysis on public data and SupplHi Projects Database
Expected 3-4% 2015-2018 CAGR for Switchboard CAPEX in Oil&Gas

Global Valves CAPEX, Billion USD

<table>
<thead>
<tr>
<th>Year</th>
<th>Upstream</th>
<th>Midstream</th>
<th>Downstream &amp; Fertilizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>1.7</td>
<td>0.5</td>
<td>0.9</td>
</tr>
<tr>
<td>2015</td>
<td>1.4</td>
<td>0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>2016F</td>
<td>1.1</td>
<td>0.5</td>
<td>1.2</td>
</tr>
<tr>
<td>2017F</td>
<td>1.4</td>
<td>0.6</td>
<td>1.2</td>
</tr>
<tr>
<td>2018F</td>
<td>1.6</td>
<td>0.6</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Note: size of bar chart is based on the expected value
Source: SupplHI analysis on public data and SupplHI Projects Database
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OIL&GAS UNITS

**Upstream**
- **OIL RESERVES**
  - Billion barrels (B bbls)
- **OIL PRODUCTION**
  - Million barrels per day (M bbls/day)
- **OIL PRICE**
  - US dollars per barrel (US$/bbl)
- **GAS RESERVES**
  - Trillion cubic meters (Tcm)
  - Trillion cubic feet (Tcf)
- **GAS PRODUCTION**
  - Billion cubic meters (Bcm)
  - Billion cubic feet (Bcf)
- **GAS PRICE**
  - US dollars per Million British thermal units (US$/MBTU)
- **TO COMPARISON DIFFERENT ENERGY SOURCES**
  - M barrels of oil equivalent (M BOE)
  - Million tonnes of oil equivalent (M TOE)

**Midstream**
- **LNG PROCESSING**
  - Million tonnes per annum (MTPA)
- **LNG STORAGE**
  - Billion cubic feet (Bcf)
  - Billion cubic meters (Bcm)
- **GAS PIPELINES**
  - Million standard cubic feet per day (MMscfd)
  - Million cubic meters per day (Mcm/day)
- **GAS STORAGE**
  - Billion cubic feet (Bcf)
  - Billion cubic meters (Bcm)

**Downstream**
- **REFINING CAPACITY**
  - Million barrels per day (M bbls/day)
- **PETROCHEMICALS OUTPUT**
  - Million tonnes per annum (MTPA)
- **GTL PRODUCTION**
  - Thousand barrels per day (K bbls/day)

**End-users**
- **LNG PROCESSING**
  - Million tonnes per annum (MTPA)
- **LNG STORAGE**
  - Billion cubic feet (Bcf)
  - Billion cubic meters (Bcm)
- **GAS PIPELINES**
  - Million standard cubic feet per day (MMscfd)
  - Million cubic meters per day (Mcm/day)
- **GAS STORAGE**
  - Billion cubic feet (Bcf)
  - Billion cubic meters (Bcm)
- **OIL PIPELINES**
  - Million barrels per day (M bbls/day)
- **OIL STORAGE**
  - Million barrels (M bbls)

**Fertilizers**
- **AMMONIA / UREA PRODUCTION**
  - Million tonnes Nutrient (M tonnes N)
  - Million tonnes Product (M tonnes P)
<table>
<thead>
<tr>
<th>From</th>
<th>Metric Tonnes</th>
<th>Kilolitres</th>
<th>Barrels</th>
<th>US gallons</th>
<th>Tonnes / year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric Tonnes</td>
<td>-</td>
<td>1.165</td>
<td>7.33</td>
<td>307.86</td>
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<tr>
<td>Kilolitres</td>
<td>0.8581</td>
<td>-</td>
<td>6.2898</td>
<td>264.17</td>
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<tr>
<td>Barrels</td>
<td>0.1364</td>
<td>0.159</td>
<td>-</td>
<td>42</td>
<td>-</td>
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<tr>
<td>US gallons</td>
<td>325 \times 10^{-5}</td>
<td>0.0038</td>
<td>0.0238</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Barrels / day</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>49.8</td>
</tr>
</tbody>
</table>

Note: based on the worldwide average gravity
<table>
<thead>
<tr>
<th>From</th>
<th>B m³ NG</th>
<th>Bi ft³ NG</th>
<th>M TOE</th>
<th>M T LNG</th>
<th>T BTU</th>
<th>M BOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billion cubic meters NG</td>
<td>-</td>
<td>35.3</td>
<td>0.90</td>
<td>0.74</td>
<td>35.7</td>
<td>6.60</td>
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<tr>
<td>Billion cubic feet NG</td>
<td>0.028</td>
<td>-</td>
<td>0.025</td>
<td>0.021</td>
<td>1.01</td>
<td>0.19</td>
</tr>
<tr>
<td>Million tonnes oil equivalent</td>
<td>1.11</td>
<td>39.2</td>
<td>-</td>
<td>0.82</td>
<td>39.7</td>
<td>7.33</td>
</tr>
<tr>
<td>Million tonnes LNG</td>
<td>1.36</td>
<td>48.0</td>
<td>1.22</td>
<td>-</td>
<td>48.6</td>
<td>8.97</td>
</tr>
<tr>
<td>Trillion British thermal units</td>
<td>0.028</td>
<td>0.99</td>
<td>0.025</td>
<td>0.021</td>
<td>-</td>
<td>0.18</td>
</tr>
<tr>
<td>Million barrels oil equivalent</td>
<td>0.15</td>
<td>5.35</td>
<td>0.14</td>
<td>0.11</td>
<td>5.41</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: BP

GUIDE TO OIL&GAS UNITS OF MEASURE AND CONVERSION FACTORS

AUGUST 2015 v01
<table>
<thead>
<tr>
<th>For</th>
<th>Barrels to tonnes</th>
<th>Tonnes to barrels</th>
<th>Kilolitres to tonnes</th>
<th>Tonnes to kilolitres</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPG</td>
<td>0.086</td>
<td>11.6</td>
<td>0.542</td>
<td>1.844</td>
</tr>
<tr>
<td>Gasoline</td>
<td>0.118</td>
<td>8.5</td>
<td>0.740</td>
<td>1.351</td>
</tr>
<tr>
<td>Kerosene</td>
<td>0.128</td>
<td>7.8</td>
<td>0.806</td>
<td>1.240</td>
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<tr>
<td>Gas oil/diesel</td>
<td>0.133</td>
<td>7.5</td>
<td>0.839</td>
<td>1.192</td>
</tr>
<tr>
<td>Residual fuel oil</td>
<td>0.149</td>
<td>6.7</td>
<td>0.939</td>
<td>1.065</td>
</tr>
<tr>
<td>Product basket</td>
<td>0.125</td>
<td>8.0</td>
<td>0.786</td>
<td>1.272</td>
</tr>
</tbody>
</table>
### AMMONIA AND UREA

**Source:** IFA

<table>
<thead>
<tr>
<th>From</th>
<th>Urea M tonnes of Product</th>
<th>Urea M tonnes of Nutrient</th>
<th>Ammonia M tonnes of Product</th>
<th>Ammonia M tonnes of Nutrient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea M tonnes of Product</td>
<td>0.46</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Urea M tonnes of Nutrient</td>
<td>2.17</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ammonia M tonnes of Product</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.82</td>
</tr>
<tr>
<td>Ammonia M tonnes of Nutrient</td>
<td>-</td>
<td>-</td>
<td>1.22</td>
<td>-</td>
</tr>
</tbody>
</table>