Global Oil and Gas Update
March 2020
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Energy Industries Council
Content of presentation

- Introduction to EIC
- Current state of play globally
  - What will Energy Transition mean for the supply chain
- CAPEX by country and operator
- Project FIDs
- Major Contracting Activity
- Global O&G opportunities
  - New Discoveries and Developments
  - Decommissioning – UK and globally
- Opportunities in the emerging sectors – focus on CCUS & Hydrogen
- Summary
Introduction to the EIC

- Not-for-profit energy trade association, established in 1943
- For companies supplying goods and services to global energy industries
- Help our members identify where global business opportunities exist and to assist them in making connections with key operators and contractors
- Services that we provide include:
  - Market intelligence – EICDataStream, EICAssetMap, EICSsupplyMap, Reports, Newsbriefs
  - National Events – EIC Connect, Business Presentations, Export Showcases
  - Overseas Events – Delegations, Exhibitions
  - Global network of offices – Dubai, KL, Houston and Rio
- Approximately 60 staff in UK and overseas
- Over 700 members active in various energy sectors
Current state of play – Oil and Gas

• Energy Transition – impacts all parts of the O&G industry, Operator, EPC through to SME.
  • Major operators – now referring to selves as Energy companies, not Oil & Gas
  • SME’s will be asked to show how they are reducing Carbon Emissions as part of future tendering process. Could this inadvertently see the increase use of local suppliers vs overseas suppliers in the future?
  • Emergence of new sectors including Hydrogen/CCUS
  • Stranded oil in the future? Gas generally seen as the transition fuel……..oil still has an important role to play.
  • O&G supply chain has an important role to play with synergies across sectors. North Sea will be a breeding ground for new technologies
Current state of play – Oil and Gas

- Oil price volatility remains – geopolitics; global demand projections; US-China tensions; global economic slowdown......and now Covid-19......and now oil price crash
- Disciplined capital expenditure remains. Major projects are moving forward.
- Energy majors have mentioned possibility of an EPC cost and capacity crunch in 2020......impact of Covid-19 on projects/contracts rumour or fact?
- Subsea players see reduced backlog but rising levels of early engagement and tendering. Pipeline of opportunities seen to be positive. Offshore campaign increase 2020/21
- Rise of decommissioning opportunities in mature basins – reduction of costs and embracing of new technology
- Mergers & Acquisitions - majors continuing to sell up non-core assets, ExxonMobil
Oil and gas project CAPEX ($Billion) - country and operator 2020/2026

CAPEX by country through to 2026 ($million)

CAPEX by operator through to 2026 ($million)
Project FIDs – 2015 to 2019

Nos of Project FIDs 2015 to 2019

CAPEX ($million) on projects to reach FID in 2015 to 2019
### Project FIDs – Countries and projects (2019)

#### FIDs reached by country 2019 & 2020 (to date) (Top 10)

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Country</th>
<th>CAPEX $million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amur Gas Processing Plant</td>
<td>Russia</td>
<td>22,400</td>
</tr>
<tr>
<td>Arctic LNG-2</td>
<td>Russia</td>
<td>21,000</td>
</tr>
<tr>
<td>Mozambique LNG Project (Phase 1)</td>
<td>Mozambique</td>
<td>15,000</td>
</tr>
<tr>
<td>Golden Pass Products LNG Expansion Liquefaction Plant &amp; Export Pipeline</td>
<td>USA</td>
<td>10,000</td>
</tr>
<tr>
<td>Gulf Coast Growth Ventures Project (GCGV) - San Patricio PetChem Facility</td>
<td>USA</td>
<td>7,300</td>
</tr>
<tr>
<td>Sitra Refinery - Upgrade</td>
<td>Bahrain</td>
<td>6,300</td>
</tr>
<tr>
<td>Pachpadra (Barmer) Refinery and Petrochemical Complex - Rajasthan</td>
<td>India</td>
<td>6,061</td>
</tr>
<tr>
<td>Azeri Central East Project</td>
<td>Azerbaijan</td>
<td>6,000</td>
</tr>
<tr>
<td>Liza Oil Field (Phase 2)</td>
<td>Guyana</td>
<td>6,000</td>
</tr>
<tr>
<td>VG Calcasieu Pass LNG Export Plant</td>
<td>USA</td>
<td>5,800</td>
</tr>
<tr>
<td>Anchor uHPHT Field Development - Phase 1</td>
<td>USA</td>
<td>5,700</td>
</tr>
<tr>
<td>Sebastopol Refinery</td>
<td>Colombia</td>
<td>5,000</td>
</tr>
<tr>
<td>NLNG: Train 7 - Bonny Island</td>
<td>Nigeria</td>
<td>4,500</td>
</tr>
<tr>
<td>Sangomar Field Development (formerly SNE Development) Phase I</td>
<td>Senegal</td>
<td>4,200</td>
</tr>
<tr>
<td>Area 1 - Golfinho-Atum Development</td>
<td>Mozambique</td>
<td>4,000</td>
</tr>
<tr>
<td>Assa North/Ohaji South Gas Plant</td>
<td>Nigeria</td>
<td>3,500</td>
</tr>
<tr>
<td>Alberta Propane Dehydrogenation and Polypropylene Plant</td>
<td>Canada</td>
<td>3,428</td>
</tr>
<tr>
<td>OML 13 Cluster Development (7CGDP)</td>
<td>Nigeria</td>
<td>3,150</td>
</tr>
<tr>
<td>Beaumont Refinery Expansion - Third Crude Distillation Unit (&quot;Crude C&quot;)</td>
<td>USA</td>
<td>3,000</td>
</tr>
<tr>
<td>Mero Oil &amp; Gas Field (Phase 2 - Sepetiba FPSO)</td>
<td>Brazil</td>
<td>3,000</td>
</tr>
</tbody>
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Project FID potential – 2020/21

Number of FIDs expected in 2020/2021 by country (Top 15)

FIDs (CAPEX $million) expected in 2020/2021 by country (Top 15)
<table>
<thead>
<tr>
<th>Project Name</th>
<th>Operator</th>
<th>Country</th>
<th>Sector</th>
<th>Estimated CAPEX (Smillion)</th>
<th>Estimated FID</th>
</tr>
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<tbody>
<tr>
<td>Maharashtra Grassroots Refinery and Petrochemical Complex</td>
<td>Ratnagiri Refinery and Petrochemicals Ltd</td>
<td>India</td>
<td>Downstream</td>
<td>70,000</td>
<td>H2 2021</td>
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<tr>
<td>Abadi Gas Field (Masela)</td>
<td>Inpex</td>
<td>Indonesia</td>
<td>Upstream</td>
<td>20,000</td>
<td>Q4 2021</td>
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<tr>
<td>Ras Laffan - Qatargas - NFE - LNG Four Liquefaction Trains</td>
<td>Qatar Gas</td>
<td>Qatar</td>
<td>Midstream</td>
<td>18,000</td>
<td>Q4 2020</td>
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<tr>
<td>Browse Upstream Development (Torosa, Brecknock &amp; Calliance Fields)</td>
<td>Woodside</td>
<td>Australia</td>
<td>Upstream</td>
<td>15,000</td>
<td>H2 2021</td>
</tr>
<tr>
<td>Abu Dhabi North West Development - Hail and Ghasha Sour Gas Development</td>
<td>ADNOC</td>
<td>United Arab Emirates</td>
<td>Upstream</td>
<td>15,000</td>
<td>H1 2020</td>
</tr>
<tr>
<td>Main Pass Energy Hub (MPEH) LNG Export Terminal</td>
<td>Global LNG Services AS</td>
<td>USA</td>
<td>Midstream</td>
<td>15,000</td>
<td>H1 2021</td>
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<tr>
<td>Lake Charles LNG Liquefaction Plant - Trunkline LNG Export</td>
<td>Shell</td>
<td>USA</td>
<td>Midstream</td>
<td>12,300</td>
<td>H2 2020</td>
</tr>
<tr>
<td>Rovuma LNG Liquefaction Plant</td>
<td>Mozambique Rovuma Venture</td>
<td>Mozambique</td>
<td>Midstream</td>
<td>12,000</td>
<td>H1 2020</td>
</tr>
<tr>
<td>Bonga Southwest &amp; Aparo Oil Fields - OML 118, OML 132 &amp; OML 140</td>
<td>Shell</td>
<td>Nigeria</td>
<td>Upstream</td>
<td>10,000</td>
<td>H2 2020</td>
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<tr>
<td>Jordan Cove LNG Liquefaction Plant</td>
<td>Jordan Cove Energy Project LP</td>
<td>USA</td>
<td>Midstream</td>
<td>10,000</td>
<td>H1 2020</td>
</tr>
<tr>
<td>Cameron LNG Liquefaction Plant Expansion (Trains 4 and 5)</td>
<td>Cameron LNG</td>
<td>USA</td>
<td>Midstream</td>
<td>10,000</td>
<td>H2 2021</td>
</tr>
<tr>
<td>Port Arthur LNG Liquefaction Facility (Sempra)</td>
<td>Sempra Energy</td>
<td>USA</td>
<td>Midstream</td>
<td>10,000</td>
<td>H2 2020</td>
</tr>
<tr>
<td>Belmont County Ethane Cracker</td>
<td>PTTGC</td>
<td>USA</td>
<td>Downstream</td>
<td>10,000</td>
<td>H1 2020</td>
</tr>
<tr>
<td>Corpus Christi LNG Liquefaction Plant, Train 4 and 5</td>
<td>Cheniere Energy</td>
<td>USA</td>
<td>Midstream</td>
<td>10,000</td>
<td>H2 2020</td>
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<tr>
<td>Port Arthur LNG Liquefaction Facility Expansion (Sempra)</td>
<td>Sempra Energy</td>
<td>USA</td>
<td>Midstream</td>
<td>10,000</td>
<td>H1 2021</td>
</tr>
<tr>
<td>Port Arthur Integrated Petrochemical and Chemical Complex</td>
<td>Motiva Enterprises LLC</td>
<td>USA</td>
<td>Downstream</td>
<td>9,720</td>
<td>H2 2021</td>
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<tr>
<td>Duqm - DRPIC Petrochemicals Complex</td>
<td>DRPIC</td>
<td>Oman</td>
<td>Downstream</td>
<td>9,000</td>
<td>H2 2020</td>
</tr>
<tr>
<td>Elk-Antelope LNG Liquefaction Project (Papua LNG)</td>
<td>Total</td>
<td>Papua New Guinea</td>
<td>Midstream</td>
<td>8,000</td>
<td>H1 2021</td>
</tr>
<tr>
<td>Payara Oil Field</td>
<td>ExxonMobil</td>
<td>Guyana</td>
<td>Upstream</td>
<td>6,500</td>
<td>H1 2020</td>
</tr>
<tr>
<td>Indonesia Deepwater Development (Gendalo, Gehem and Gandang Fields)</td>
<td>Chevron</td>
<td>Indonesia</td>
<td>Upstream</td>
<td>6,000</td>
<td>H2 2020</td>
</tr>
</tbody>
</table>
Current state of play – Contract activity 2019

Major contract awards 2014 - 2020

Top 20 countries - Major Awards since 1 January 2019

Top 20 contractors since 1 January 2019
Early Stage Projects

- **Core Bay du Nord (Core BdN)**
  - Operator: Esenor
  - Project Stage: FEED
  - Value: $4,080 million
  - Startup Year: 2029

- **Cambo North Field Development (Phase 1)**
  - Operator: Silver Point Energy
  - Project Stage: FEED
  - Value: $500 million
  - Startup Year: 2023

- **Garanilino Oil Field - Subsea Tie-Back**
  - Operator: Equinor
  - Project Stage: FEED
  - Value: $1,000 million
  - Startup Year: 2024

- **Idal Shergi North Domain (ISD) Offshore Oil Field, Phase 5**
  - Operator: Qatar Petroleum (QPH)
  - Project Stage: FEED
  - Value: $1,000 million
  - Startup Year: 2021

- **Ras Laffan - Qatar - LNG Facility Expansion 2**
  - Operator: Qatar Petroleum
  - Project Stage: Feasibility
  - Value: $16,000 million
  - Startup Year: 2027

- **Senkla Oil Field (Far East) LNG Project (ExxonMobil)**
  - Operator: ExxonMobil
  - Project Stage: FEED
  - Value: $15,000 million
  - Startup Year: 2027

- **ElShallah Gas Hub (ElShallah and Qarq solar farms)**
  - Operator: BP
  - Project Stage: Conceptual Design
  - Value: $2,000 million
  - Startup Year: 2023

- **Trion Offshore Oil Discovery (Perdido Field Block)**
  - Operator: BP Billion
  - Project Stage: Pre FEED
  - Value: $11,000 million
  - Startup Year: 2029

- **Hammerhead Oil Field**
  - Operator: ExxonMobil
  - Project Stage: Commercial
  - Value: $2,000 million
  - Startup Year: 2023

- **Valero and Toranza Gas Fields (Cayar Offshore Platform)**
  - Operator: Ineos Energy
  - Project Stage: Conceptual Design
  - Value: $1,000 million
  - Startup Year: 2023

- **West Cape Three Points Block 2 (WCTP2): Alfas Oil & Gas Discovery**
  - Operator: Spinnaker Exploration & Production
  - Project Stage: Exploration
  - Value: $150 million
  - Startup Year: 2023

- **Block 31: South East Development Area (SEDA) Phase 1**
  - Operator: ENI Angola
  - Project Stage: FEED
  - Value: $2,000 million
  - Startup Year: 2023

- **Block 1506: Afoye Oil Discovery - Subsea Tie-Back**
  - Operator: Eni Angola Production & Development
  - Project Stage: Conceptual Design
  - Value: $1,000 million
  - Startup Year: 2027

- **Indonesia Deepwater Development (Gundal, Gohun and Gandang Fields)**
  - Operator: Chevron
  - Project Stage: FEED
  - Value: $8,000 million
  - Startup Year: 2025

- **Browse Upstream Development (Torosa, Richwood & Calliance Fields)**
  - Operator: Woodside Petroleum
  - Project Stage: FEED
  - Value: $16,000 million
  - Startup Year: 2024
Late Stage Projects

- Woodfibre LNG Export Plant
  - Operator: Woodfibre LNG Ltd
  - Project Stage: EPC
  - Value: $1.20 billion
  - Startup Year: 2022

- Islandmagee Energy - Larne Lough
  - Operator: Islandmagee Storage Limited
  - Project Stage: EPC
  - Value: $300 million
  - Startup Year: 2022

- Zulfad Field Development Program
  - Operator: Saudi Aramco
  - Project Stage: EPC
  - Value: $2.00 billion
  - Startup Year: 2023

- Saudi Aramco Unconventional Gas Development - Phase 2
  - Operator: Saudi Aramco
  - Project Stage: EPC
  - Value: $1.00 billion
  - Startup Year: 2024

- Block M9 Exploration - Zawitika, Zaoutika, Zatila, Gaunthacks & Kakzena Discoveries
  - Operator: PTT Exploration and Production PTTEP
  - Project Stage: EPC
  - Value: $1.40 billion
  - Startup Year: 2021

- Pengerang Energy Complex (PEC)
  - Operator: Comeng
  - Project Stage: EPC
  - Value: $3.40 billion
  - Startup Year: 2024

- St. James Petrochemical Complex (Formosa) - Phase I
  - Operator: Formosa Plastic Corporation
  - Project Stage: EPC
  - Value: $8.50 billion
  - Startup Year: 2024

- Corpus Christi LNG Liquification Plant, Train 4 and 5
  - Operator: Cheniere Energy
  - Project Stage: EPC
  - Value: $10.00 billion
  - Startup Year: 2026

- Prevos Field - OML 130 - Subsea Tie-Back
  - Operator: Total
  - Project Stage: FEED
  - Value: $1.70 billion
  - Startup Year: 2022

- Anchor gasPHT Field Development - Phase 1
  - Operator: Chevron
  - Project Stage: EPC
  - Value: $5.70 billion
  - Startup Year: 2024

- Bonga Southwest & Apapa Oil Fields - OML 118, OML 132 & OML 140
  - Operator: Shell Petroleum Development Company of Nigeria (SPDC)
  - Project Stage: EPC
  - Value: $10.00 billion
  - Startup Year: 2024

- IM, Isongo E (EE) and Isongo F (FF)
  - Marine Gas & Condensate Fields (Blocks MLHP-5, MLHP-6 & MLHP-7)
  - Elunde Permit
  - Operator: Neem Age (African Global Energy Ltd)
  - Project Stage: FEED
  - Value: $900 million
  - Startup Year: 2023

- Rovuma LNG Liquification Plant
  - Operator: Mozambique Rovuma Venture
  - Project Stage: FEED
  - Value: $2.40 billion
  - Startup Year: 2024

- Jutahah - Gas Processing Plant And Gas Terminal
  - Operator: Doha Gas Company (Qatar Gas Company) (ADNOC)
  - Project Stage: EPC
  - Value: $1.50 billion
  - Startup Year: 2024

- Pluto LNG Train 2
  - Operator: Woodside Petroleum
  - Project Stage: FEED
  - Value: $1.00 billion
  - Startup Year: 2023

- Abu Dhabi North West Development - Half and Ghousha Sour Gas Development
  - Operator: ADNOC Sour Gas
  - Project Stage: EPC
  - Value: $15.00 billion
  - Startup Year: 2024
Decommissioning overview – UK

- Operators to spend between £45 billion and £77 billion on decommissioning in the UKCS
- Well plug and abandonment 49% of total spend
- Aim to reduce cost of decommissioning by 35%
- Clear regulation allows for efficient decommissioning alongside early engagement with key players
- Evolution of supply chain offering
- Investing in new technology to reduce cost, specialist centres developed to support this
Decommissioning overview – Global

- Arabian Gulf - Over 1,000 structures and 3,000 wells in the Arabian Gulf which will be over 30 years old and in need of decommissioning by 2038. No regulation currently in place. In its infancy, Ramboll active to date.

- A-PAC – Over 2,600 platforms and 35,000 wells in the APAC region and that decommissioning could cost well over £77.7 billion. Over 380 fields in the APAC region are expected to cease production by 2028. Around 833 installations in the region are at or over 20 years old. Key markets, Brunei, Indonesia, Thailand, Australia and Malaysia.

- Latin America - The decommissioning pipeline in Latin America is estimated to contain over 700 structures and over 4,000 wells due to cease production by 2038. Brazil is the main market.
CCUS – UK Developments

Consensus that CCUS is essential to meet net zero
- Decarbonisation of power and heavy industry
- Enables production of low carbon hydrogen at scale for heat and transport sectors

UK government funding made available for CCUS projects
- Assist projects moving through feasibility, pre-FEED and FEED as well as into pilot demonstration

BEIS consultation on business models for CCUS and re-use of oil and gas assets for CCUS projects ended in September 2019. Key issues:
- T&S infrastructure, funding (RAB/CfD), cross-chain risks
- Decommissioning liability, period of suspension prior to decommissioning to consider assets for re-use?
CCS/CCUS – Global Developments

Norwegian Continental Shelf CCS Project
Operator: Gassco Energi
Project Stage: FEED
Value: $1.50 billion
Start-up Year: 2024

Lysvik Refinery Carbon Capture Utilisation Storage Project
Operator: Pemex AB
Project Stage: Feasibility
Value: $100 million
Start-up Year: 2030

Middelmar Carbon Capture and Storage Project
Operator: InterGen
Project Stage: Feasibility
Value: $150 million
Start-up Year: 2022

Port of Antwerp Carbon Capture, Utilisation and Storage Project
Operator: Port of Antwerp
Project Stage: Feasibility
Value: $50 million
Start-up Year: 2026

Carbon Capture and Storage Rotterdam Port
Operator: Port of Rotterdam Authority
Project Stage: FEED
Value: $200 million
Start-up Year: 2023

Elk Hills Carbon Capture plant
Operator: California Resources Corporation
Project Stage: FEED
Value: $1.5 billion
Start-up Year: 2024

Gerald Gentleman Carbon Capture Project
Operator: Northern Public Power District (NPPO)
Project Stage: FEED
Value: $1 billion
Start-up Year: 2025

Moomba Carbon Capture and Storage Project
Operator: Santos
Project Stage: FEED
Value: $443 million
Start-up Year: 2023

Hallem Portland Carbon Capture, Utilisation and Storage Project
Operator: Lafarge
Project Stage: Feasibility
Value: $200 million
Start-up Year: 2023
Hydrogen – Global Developments

Blue Hydrogen
• produced from natural gas, usually via steam-reforming, with carbon capture storage (CCS). Blue hydrogen has the potential of large-scale, CO2-lean hydrogen production with proven, high TRL technologies.

Green Hydrogen
• hydrogen that not only meets the low-carbon threshold but is generated using renewable energy sources such as solar or wind.