Unlocking Remote Oilfield Development

Latin Oil Week: 16th to 18th April 2012
Rio de Janeiro
Iain Baxter – Director of Business Development
Safe, operable & industry approved technology

Access & develop remote oilfields onshore & offshore

Increase NPV of oilfield developments
3 Proven & Operational GTL Processes Today

World Scale GTL Gas Monetization 300MMscf/d ++

Modular GTL Oilfield Access <= 50MMscf/d
Conventional GTL vs CompactGTL

Shell Pearl - Qatar
140,000 bbl/d GTL Products
450 Football Fields

< 5,000 bbl/d
<< 1 Football Field
Stranded Oil!
What makes some oil “stranded”? 

- Remote oilfields with enforced gas flaring legislation
- No infrastructure
- Gas re-injection is:
  - Not feasible or..
  - Expensive or..
  - A risk to the reservoir
- Gas export is:
  - Not feasible or..
  - Expensive or..
  - Has no fair gas buyer

STOP!
≈ 800 Oilfields with Problematic Associated Gas @ <50MMscf/d

Analysis by Wood Mackenzie & Fugro Robertson
Options for Associated Gas

Distance to market for converted product [km]

- Reinjection & Flaring
- Gas to Wire
- CNG
- FLNG
- Pipeline

Associated Gas MMscf/d

- 50
- 500
- 150
- 75
- 400
Revolutionary Solution for Remote Oilfields

Modular GTL:
Convert Associated Gas to syncrude then
Co-mingle and transport with the natural crude

Image courtesy of SBM Offshore
25MMscf/d GTL Integrated FPSO – SBM Offshore

- Fully Integrated Design
- Up to 50,000 bbl/d Crude Production
- 2,000 bbl/d GTL Liquids Production

Image courtesy of SBM Offshore
Facility Flow Scheme

- Feed Water
- Gas
- Waste Water
- Separators
- Oil & Liquids Processing
- Syncrude
- Crude Export
- No Oxygen Required!

High CO$_2$ Possible!
Modular Plant – Critical for Oilfield Projects

- Inherent Reliability
- Scaleability
- Operability
- High Turn Down
- Access to Site
- Reactor Changeout

The number of active reactor modules can be adjusted to match the associated gas production profile over time.
GTL Economics vs Re-injection or Gas Export

Gas Re-Injection or Pipeline to Market

- Facilities Capital Cost PV
- Gas Disposal
- Operations & Tax PV
- Penalties or Delay

Integrated CompactGTL

- Facilities Capital Cost PV
- Crude Revenue PV
- GTL Plant
- Operations & Tax PV
- GTL Opex
- Syncrude PV

10MMscfd ANG Processed to 1,000 bpd Syncrude
GTL Economics: Liberating Shut-In Production

Existing or Planned Field subject to ANG Flaring Cap

Integrated CompactGTL

10MMscfd ANG Flaring cut liberates 10,000 bpd Production @ GOR=1,000
Case Study – Onshore West Africa Overview

- Existing oilfield operation
- GOR = 1,000  >15 years life remaining
- Flaring reduction targets restricting production
- Re-injection prohibitive
- Terrain & distance prevent gas gathering

CompactGTL Solution

- 10MMscf/d plant gives 1,000 bpd syncrude
- 10,000 bpd liberated crude production
- Incremental NPV US$80MM
- Low sensitivity to CAPEX & OPEX
### Case Study – Onshore West Africa Incremental Cash Flow

#### Economic Metrics

<table>
<thead>
<tr>
<th>Economic Metrics</th>
<th>Undiscounted Profit $MM</th>
<th>NPV 10 $MM</th>
<th>Reserves MMboe</th>
<th>NPV10/Boe $/Boe</th>
<th>DPIR $$</th>
<th>Payback Year</th>
<th>Maximum Exposure $MM</th>
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<tbody>
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<td>-0.8</td>
<td>81.4</td>
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<td>2015</td>
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#### Full Field Gross Cash Flow

- **$ Million (Nominal)**
- **Year**

- **Full Field Annual Gross Cash Flow**
- **Full Field Cumulative Gross Cash Flow**

Economics by Fugro Robertson
World’s first modular fully integrated GTL facility!

- Gas pre-treatment
- Pre-reforming
- Reforming
- Waste heat recovery
- Process steam generation
- Syngas compression
- Fischer Tropsch synthesis
- FT cooling water system
- Tail gas recycling

Plant commissioned in December 2010. CompactGTL technology now approved by Petrobras for deployment.
Delivery – World Class Clients & Partners

Clients Include
Majors & IOC’s

Reactors Manufacture

FEED & PM / Execution

FPSO Integration & PM / Execution

World Class Catalyst Company: under NDA until Q2 2012
A ‘Win-Win’ for IOC’s, NOC’s & Governments

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