Modular GTL
global solutions and projects
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3 proven and 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
Why is this now possible?

Conventional Tubular steam Reformer / ATR

Conventional FT reactor e.g. slurry phase

10x increase in specific throughput

Compact SMR Reactor

Compact FT Reactor

CompactGTL reactors using brazed plate & fin construction
Mini-channel CompactGTL reactors

- Brazed plate-fin reactor construction minimises metal content and weight
- Complete set of GTL reactors despatched by air-freight to Brazil
- Corrugated metallic catalyst inserts maximise active surface area per channel
- Automated catalyst insertion and removal
Process overview

**Gas treatment**
- pre-wash
- mercury removal
- heating
- sulphur removal

**Syngas production**
- pre-reformer
- SMR 1 reactor modules
- SMR 2 reactor modules
- steam generation (WHB)
- syngas compressor
- water treatment

**FT synthesis**
- FT cooling System
- FT 1 reactor modules
- FT 2 reactor modules
- product flash

- **No Oxygen Required!**
- **High CO₂ Possible!**

**Processes**
- Gas feed
- Steam
- Syngas production
- FT synthesis

**Products**
- HC rich tail-gas
- GT drivers
- H₂ rich tail-gas
- Syncrude
25MMscf/d GTL integrated FPSO – SBM Offshore

- Fully integrated design
- Up to 32,000 bbl/d crude production
- 2,000 bbl/d GTL liquids production

Image courtesy of SBM Offshore
50MMscfd onshore GTL plant

Utilities and Water Treatment

CompactGTL FT reactor modules

CompactGTL SMR reactor modules

NGL Recovery and Gas Clean-up

Power Generation

Air Compressors

Fuel Gas Compressors

Syngas Compression and Clean-up

Utilities and Water Treatment

Fuel Gas Compressors
Project delivery – exclusive partners

Project Timeline

FEED stage
EPC stage

Offshore project

Onshore project

Qualified EPC Contractor
Johnson Matthey Catalysts

SPP
Kawasaki
Strong functional organisation
## Project examples

<table>
<thead>
<tr>
<th>Client</th>
<th>Region</th>
<th>Feed gas rate</th>
<th>Project driver</th>
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<td>IOC</td>
<td>Asia-Pacific</td>
<td>30 MMscfd</td>
<td>Eliminate flaring</td>
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A ‘Win-Win’ for IOCs, NOCs and Governments

**IOCs**
- Enhance production
- Unlock new discoveries
- Increase recoverable reserves
- Add gas reserves to balance sheet

**NOCs**
- Increase in PSC profit oil
- Greater tax revenues
- Environmental “Kudos”

**Governments**
- Preserve and utilise National natural resources
- Gain access to World Bank finance
Global interest - Americas

- Onshore North America and GOM
- Mexico and Central America
- Developed regulatory framework
- 53 oilfields

CGTL regional activity: 3 projects

- Onshore and Offshore South America, Atlantic and Pacific Ocean and Caribbean
- Developed regulatory framework
- 62 oilfields
Global interest - Middle East and Africa

- Onshore and offshore Indian and Atlantic Oceans and Arabian Sea
- Mixture of emerging and developed regulatory frameworks
- 245 oilfields

CGTL regional activity: 2 projects
Global interest - Russia and CIS

- Onshore and offshore Barents Sea, Caspian Sea
- Mixture of emerging and developed regulatory frameworks
- 352 oilfields

CGTL regional activity: 2 projects
Global interest - South Asia and Asia Pacific

- Onshore and offshore Indian Ocean, South China Sea, Pacific Ocean
- Developed regulatory framework
- 47 oilfields

CGTL regional activity: 1 project
FAQs

- What is the Company’s background? How did you get here?
- What skills and experience does CompactGTL have that enables you to deliver commercial plants?
- How committed are your supply chain partners and manufacturers?
- A GTL process is more than FT synthesis. Does CompactGTL have an entire GTL process?
- What 3rd party independent verification or review of your process exists?
History and Achievements

Lab Scale Development
- 12 Years rig operations & modelling
- Reactor & catalyst development
- Independent verification

2000 -

Client funded project studies
- GAZPROM onshore Russia
- Other IOC’s & NOC’s under NDA
- Plants @ 200bpd to 10,000bpd

2008 -

Brazil Commercial Demonstration Plant
- 20 months operations
- Process approval by BR Dec 2011

2010 -

UK Pilot Plant
- 4 years operations
- Reactor & catalyst manufacturer selection
- Now an operator training centre

Present -
Experience to deliver commercial projects

- 95 man years managing multi $billion upstream projects
- 45 man years world scale GTL plant design
- 20 man years world scale GTL commissioning
- 25 man years world scale GTL operations
- 125 man years upstream experience

Number of man years in house experience
### Supply chain commitment

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Entire GTL process

Modular SMR Reactor

61,000 hours SMR reactor & SMR catalyst in operation

Modular FT Reactor

52,000 hours FT reactor & FT catalyst in operation
Independent verification of our process

More than 4 parties have verified our technology, process, engineering and plant cost basis

Public endorsement by Petrobras in January 2012. World’s 1\textsuperscript{st} and only small scale GTL process approved for commercial deployment