New solutions for monetizing Natural Gas

Pyramid E&C has expanded its portfolio of modular solutions to include a range of low cost, pre-engineered facilities for monetizing surplus associated or stranded natural gas and produce high value products, e.g. LNG, Hydrogen and Methanol. The new solutions include:

- Gas Sweetening, Dehydration and Compression
- Gas Turbine-based Power Generation
- NGL Recovery and Cryogenic fractionation
- LNG Unit
- Methanol Unit
- Ammonia Unit
- Hydrogen Unit

These units are designed to serve onshore as well as offshore applications. These plants are engineered and manufactured in our US and Asian modular fabrication facilities to provide high reliability plants at competitive pricing and global after-sales support.
Pyramid E&C is a multicultural global company with our core competence in delivering Engineering, Procurement, Construction and Operation management services for oil & gas production, storage, transportation and refining facilities.

Founded in 1995, we have executed more than 500 projects in the Eastern hemisphere and in 2016, with acquisition of TSI, we have now gained a foothold in the midsize EPC market in the US, substantially increasing our global delivery capability.

We have strong engineering capability, experienced project management teams, modular fabrication facilities and reliable supply chain with operations certified to global standards i.e. ISO 9001, 14001, 18001 and 27001 as well as relevant US and European technical standards.

Today, we are proud to serve the hydrocarbon industry in all geographic regions through all stages of project development, from feasibility studies through engineering, project execution, delivery and operation of facilities.
Pyramid E&C Group key operations comprises Engineering Centers of Excellence, Modular Fabrication yards and Project Management offices strategically located to deliver projects globally.

**Mumbai, India**
Established in 1995, the past 25 years have seen this engineering centre mature into a world-class facility for design of Hydrocarbon and Chemical processing Plants.

This centre of excellence has all the engineering disciplines and state-of-the-art design infrastructure and capacity of more than a million man-hours.

**London, United Kingdom**
Established in 2006 as our European regional headquarters and specialist engineering center for offshore oil & gas industry, our London office provides technical expertise and specialist services to handle fixed and floating production systems, subsea engineering, human resources and strategic partnerships in Europe and Scandinavia.

**Dubai, UAE**
Abu Dhabi is the regional head quarter for MiddleEast and Africa. From here we provide services for corporate management, business development, proposals, front-end engineering and construction management for the region.

**Mundra, India - Modular Fabrication**
Located in a Special Economic Zone, our Mundra facility in Western India is spread over an area of 200,000 square feet. We can deliver large process packages of up to 800 tonnes in single modules of up to 10m x 10m x 30m. The facilities include modular assembly, pipe fabrication, structural fabrication, electrical & instrument hook-up, blasting, painting, heat treatment, testing and shipping capabilities.

**Houston, USA**
Pyramid E&C, Houston provides Process & Technology expertise for Hydrocarbon Processing. The acquisition of Turnkey Specialists Inc. in 2016 brought significant Midstream expertise in Compression stations and NGL recovery systems to the group.
<table>
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<tr>
<th>Expertise</th>
<th>Description</th>
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<tr>
<td><strong>Upstream</strong></td>
<td>The solutions for upstream oil &amp; gas operations we provide at Pyramid E&amp;C cover gas-oil separation plants, early production facilities (EPF) and central processing facilities (CPF). In the midstream segment, we provide tank farms and pipelines for various types of hydrocarbons ranging from heavy oils to volatile fluids. For downstream processing, we offer solutions for production of fuels, e.g., gasoline, kerosene, jet fuel, diesel and fuel oil. Our portfolio also includes development of chemical &amp; industrial facilities for producing chemicals and petrochemicals, bulk drugs, steel, cement, tyres etc. Our engineering teams have a capability of about a million man-hours annually, with seasoned project management teams and a modular fabrication facility suited for midsize to large projects. Our fabrication facility has access to port and process modules can be quickly shipped in sizes to suit site logistics. We also carry out financial engineering and offer equity participation for qualified energy projects. To further support project development, we invest in generic process plants for oil &amp; gas production and refining, which are pre-engineered and pre-fabricated modular units, and can be deployed on a fast-track basis.</td>
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<td><strong>Midstream</strong></td>
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<td><strong>Downstream</strong></td>
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<td><strong>Chemicals &amp; Bio-chemicals</strong></td>
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Onshore:
For two decades, we have been serving hydrocarbon asset owners in all stages of asset development, from feasibility studies through engineering, project execution, delivery and operation of facilities.

We can offer standard solutions which can be deployed on a fast-track basis to accelerate monetization of assets and avoid the expensive and time consuming traditional route of developing the project by FEED and then EPC tender.

Early Production Systems
Early Production Systems are the fastest way to monetize investment with an optimal solution for oil field. We offer both pre-built and custom-built designs for fast-track delivery. With our vast experience in designing crude oil treatment facilities, we have pre-engineered solutions for a wide range of crude oils, both heavy and light, sour (high sulphur) and sweet (low sulphur) with our ability to design and manufacture most equipment in-house, we can provide optimized facilities quickly.

Gas Plants
Our solutions include standard pre-engineered as well as tailored systems for treating sweet as well as sour gas. We offer plants for recovery of NGL and LPG together with acid gas treatment using Joule-Thomsor refrigeration or turbo-expanders and Claus or biological sulphur recovery units.

Central Production Facilities
We offer complete Central Production Facilities comprising oil, gas and produced water treatment trains as well as required infrastructure, storage, utilities and sophisticated instrumentation. These facilities are generally stick-built but we can also offer modular solutions up to a certain size to reduce site engagement.

Offshore:

Topsides
Topsides for FPSO, MOPU and NUI can be delivered on an EPC or EPCM basis. With strong engineering capability combined with our fabrication partners or our own facility, we are poised to deliver the topsides on a fast-track basis.

MOPU Conversion
To tap marginal wells in shallow waters, we offer a unique fast-track solution with minimal investment. Process modules are installed on refurbished jack-up drilling rigs, minimizing project schedule and cost, making marginal field developments economically viable. We also offer modular early production solutions, which can be installed on offshore drilling rigs for production operations.

FPSO Conversion
With our EPC strength combined with our modular fabrication facility, we can offer comprehensive conversion and installation solutions for FPSO topsides production systems, with a single point of project responsibility.
We provide comprehensive EPC services for transportation and storage of complete range of hydrocarbons, starting from the Methane to the heavy fuel oil and bitumen.

△ Compression Stations
Compression stations complete with NGL recovery units and fractionators for applications ranging from well site to main gas transmission systems, and from high pressure turbine driven systems to low pressure vapor recovery systems.

△ Cryogenic Storage
Low temperature cryogenic facilities for gaseous hydrocarbons, e.g., natural gas, propane, butane, LPG, ammonia and ethylene. We supply the facilities furnished with boil-off refrigeration and regasification systems.

△ Pressurized Storage
Horton sphere or mounded bullet based plants for LPG, propylene and butylene for storage of pressurized liquefied hydrocarbons at atmospheric temperatures.

△ Atmospheric Storage
Fixed or floating roof installation for liquid hydrocarbon storage designed as per API 650 or low pressure storage based on API 620. Our experience includes storage terminals for crude oil, light petroleum products and heavy fuel oils.
Pyramid E&C provides EPC delivery with performance guarantees for the open-art units and works closely with reputed technology partners for licensed units and provides a single point solution for Integrated Refinery and Petrochemical facilities.

For smaller installations, we have standard modular designs which reduce the project delivery time and cost. These units can be strategically deployed to fulfill local market needs and provide motor fuel security to small and isolated populations.

△ Performance Improvements and Revamps

Pyramid E&C carries out site audits to ensure if the refinery units are performing optimally and provide solutions to improve product quality and reliability of operations. We also conduct techno-economic feasibility of the suggested improvements and provide full EPC/EPCM services for the revamps and modifications.

△ Modular Refineries

We provide modular refineries with Crude Distillation and secondary treatment units to produce high octane gasoline along with other straight run products e.g. LPG, Diesel, Kerosene, Jet Fuel and Fuel Oil. These refineries include additional units for naphtha reforming, hydrotreating, FCC, hydrocracking, hydrogen generation and sulphur removal to meet specifications of Euro V and IMO 2020.

△ Aromatic and Olefin units

Pyramid E&C conducts process studies to improve refining margins by adding Steam Cracker or utilising FCC to produce more valuable petrochemicals e.g. BTX, Propylene and derivative. Once feasibility is established, Pyramid E&C would proceed with EPC delivery of the new units in modular construction and supervise the brownfield modification on an EPC/EPCM basis.
Pyramid E&C delivers state-of-the-art technologies and best-in-class Engineering, EPC and EPCM services backed by an ISO certified quality and safety management system for greenfield as well as brownfield chemical, fertilizer and Biochemical projects in US and overseas locations.

**Chemicals**
1. Methanol & Derivatives
2. Urea
3. Ammonia
4. Hydrogen
5. Carbon Black
6. Bio Ethanol
Our track record includes more than two decades of serving the energy markets across the value chain at every stage of asset development. Our infrastructure and resources are aligned to deliver projects from concept stage to execution and operation. With our experience and extensive capabilities, we minimize external factors and mitigate project uncertainties whilst improving delivery and quality. Our offerings include the following services for the energy industry:

- Engineering
- Modular Fabrication
- EPC Services
- Build Own Operate

Services

- 25 years of Experience
- 700+ Projects Delivered
- Modular Fabrication yard with port access
- Global Delivery Capabilities
- Robust Quality Management
- More than a million man-hours capacity for Engineering and Project Management
Hydrocarbon processing is a high-risk business which needs a robust engineering capability to deliver performance and operate safely. We have gained substantial experience in our 20 years of operation and we have an annual capacity of over one million high-quality engineering man-hours covering all aspects of oil, gas and refining business.

FEASIBILITY STUDIES
Our business experts evaluate the strengths and weaknesses of the proposed project and provide options to achieve optimal technical solution and profitability. We create bankable techno-commercial feasibility reports covering the following aspects critical for investment decisions:

- Development Planning
- Technology Selection
- Execution Model Development
- Economic Modeling
- Recommendations for Financial Investment

CONCEPTUAL STUDIES
Our experience and extensive project database helps to make the right early decisions and more quickly narrow down the viable concepts by referencing technical and commercial information from past projects without the need to conduct extensive engineering work or to scour the market for cost data. Our specialist engineers carry out development planning, basic engineering, process simulation, infrastructure requirement assessment and preliminary cost estimation to enable stakeholders choose the most suitable development option.

FRONT END ENGINEERING & DESIGN (FEED)
Our multidiscipline engineering resources and experience allows us to develop conceptual studies into front-end engineering and design (FEED) packages suitable for EPC or EPCM tendering. During the FEED phase, the project schedule, tendering philosophy, risk mitigation strategy, work break down structure and detailed cost estimates are developed to plan the procurement and construction phase.

DETAILED ENGINEERING
We have a strong team of engineers, capable of conducting detailed engineering job for several billion dollars worth of EPC projects. The detailed engineering facilities are equipped with state-of-the-art office infrastructure, design software, information systems and communication facilities to seamlessly integrate with customer teams, vendors and construction sites.
Pyramid E&C offers Modular Process Plants and has full multidiscipline engineering, procurement and fabrication capability. The range includes:

1. Oil & Gas Process Modules
2. Field Diesel units
3. Crude Oil Topping units
4. Refinery Modules
5. Fired Heater Modules
6. Piperack and Structural Modules
7. Large Pressure Vessels

Infrastructure:
1. Total Facility Area 20,000 m², Covered Area 8,000 m²
2. Pressure Vessel Fabrication Shop
3. Pipe Spool Fabrication Shop
4. Structural Fabrication Shop
5. Electrical and Instrumentation Hook-up
6. Spool & Shop drawing office Spool & Shop drawing office
7. Shot Blasting, Heat treatment & Painting
8. Warehouse Shipping & Handling
9. Maximum Cargo size 12M W x 10M H x 30 M LG (750 T)
Pyramid E&C provides a single point Engineering, Procurement and Construction Solution for Hydrocarbon Processing facilities with following delivery models as below:

△ Lump-sum Turnkey
△ Cost Plus
△ FEED to EPC
△ Reimbursable
△ Build, Own, Operate

The force behind Pyramid E&C comprises a very committed and competent team of engineers and managers producing about a million hours of high quality work every year. With an extensive track record of over two decades, we have a mature delivery capability for medium to large EPC projects. Our EPC system is technology driven and all the operations are certified to ISO 9001, 14001, 18001 and 27001 standards.

△ Supply Chain Management
Our strength is drawn from a reliable supply chain comprising competitive, high quality suppliers with proven track records in the oil & gas business. Due to our geographical spread, we remain in close contact with qualified suppliers to keep them abreast of our evolving needs and support them to prepare for the future.

△ Modular Fabrication
Site work at many locations is expensive, lower in quality and creates a bottleneck in project execution. For such situations, we modularize the plant into smaller transportable skids and thus minimizing site work. Our module fabrication yard measuring 20,000 m² at Mundra port in Gujarat, Western India is located close to a jetty, making it possible to ship process equipment and modules weighing up to 800 tonnes in a single piece.

△ Construction Management
We deploy our internationally certified Health, Safety and Quality management systems to the construction sites along with a committed multidiscipline construction management team. The construction management team is supported by the information system connecting them to our specialist engineers, project, procurement and engineering offices to ensure seamless communication, steady flow of construction documents and 24/7 access to execution resources.

△ Build-Own-Operate-Transfer
On several occasions, the hydrocarbon asset owners choose to lease assets for reasons ranging from well performance, risk mitigation, political instability, capital limitations, marginal asset quality, stop gap for a permanent facility to name a few. Pyramid E&C assists asset owners to make production feasible in such situations by financial investments, delivery and operation of the facilities. With standard plants available with Pyramid E&C coupled with our manufacturing and warehousing facilities, it is possible to accelerate the monetization of assets and start operation revenues in the earliest possible time.
Customers look toward the project management skills of Pyramid E&C to deliver high-quality projects safely, within budget and on time.

We have domain specialists in upstream, midstream and downstream businesses and a structured project management organization comprising engineering, procurement, fabrication, health, safety, inspection, expediting, construction management, logistics departments for project delivery assurance.

With our capability to offer different management models we can allow customers to choose between project management only or complete engineering, procurement and construction management (EPCM) models, where the group capabilities of detailed engineering, supply chain and material management can be harnessed to deliver projects more efficiently and competitively.

To align and augment efforts, project management teams can draw from resources in the Pyramid E&C Knowledge Management System, which contains a wealth of information, including technical and commercial data, archived from previous projects.

Our state-of-the-art information system backbone supports the project teams, various offices, vendors and sites with necessary documents to conduct work. We use industry standard tools for document management, planning, scheduling and resource planning, e.g., Kronodoc™, Primavera™ and SAP™ with suitable customization.
Since its inception in 1995, Pyramid E&C has executed more than 500 projects in various locations in the Eastern Hemisphere from its offices in the UK, the Middle East and India. Our acquisition of TSI adds another 270 successfully delivered projects in North America to the experience list.

These successfully operating projects bear testimony to the engineering excellence and global ability to deliver projects with highest specification and impeccable safety record.
4.2

HYDROCARBON TERMINAL - FUJAIRAH, UAE

Pyramid E&C is setting up a 91,000 m³ capacity storage terminal for crude oil and refined petroleum products e.g. diesel, kerosene, naphtha and fuel oil at Fujairah, UAE.

The facility includes the following:
- Tank Farm
- Feed and Product Pipelines to/from port
- Marine Loading arm and Jetty Topsides
- Truck Loading Gantry
- Utilities System for air, nitrogen, diesel and dosing chemicals
- Fire Suppression System
- Effluent Treatment Plant
- Plant Buildings and infrastructure

7,500 BPD TOPPING UNIT - FUJAIRAH, UAE

Pyramid E&C is setting up a 7,500 BPD Crude Oil Refinery at Fujairah, UAE.

Major units are as below:
- Crude Oil Treatment Unit
- Desalter
- Atmospheric Distillation Unit
- Produced Water Treatment Unit
- Utilities
- Fire Fighting System
- Plant Buildings and other infrastructure

François Casimir

References

Case Studies

FPSO AOKA MIZU - NORTH SEA

Aoka Mizu FPSO is deployed in the North Sea with production capacities of 30,000 BPD of oil and 35 MMSCFD of gas.

The topsides have the following process modules:
- Three-phase Separation
- Crude Oil Treatment
- Gas Compression (HP & LP)
- Gas Dehydration
- Produced Water Treatment
- Flare Module (HP, LP & VOC recovery)
- Chemical Injection Utilities Module

FPSO JUBILEE - OFFSHORE GHANA

Jubilee FPSO is deployed in West Africa Offshore Ghana with production capacities of 120,000 BPD of oil and 160 MMSCFD of gas. The topsides have the following process modules:
- Three-phase Separation
- Gas compression (HP & LP)
- Gas Treatment
- Water Treatment and Injection
- Crude Oil Treatment
- Gas Injection
- Flare
- Chemical Injection
- Utilities
- Pipe Racks

CHURCH COMPRESSOR STATION - USA

Church compressor station was set up in Susquehanna County in Pennsylvania. The plant capacity is 450 MMSCFD.

Major units installed in the facilities are:
- Ariel Compressors
- Inlet Scrubbers
- Oil Scrubbers
- Dehydration trains
- Glycol scrubbers
- Fuel Gas Skid
- Air Compressors

PINECONE CENTRAL RECEIPT POINT - USA

Located in Marshall County, West Virginia, Pincecone Central Receipt Point includes gas compression, dehydration and metering with a capacity of 120 MMSCFD. The scope included detailed engineering.

Major units are as below:
- Ariel Compressors
- CAT 3606 Engines
- Vapour Recovery Unit
- Gas Dehydration Skid
- Metering Skid
- Flare
- Utilities