**Offshore concept development**

Concept development studies are at the heart of field development planning for both onshore and offshore developments. Identification and assessment of development options for offshore facilities, whether they are based on fixed or floating structure concepts, is crucial in the selection of the most cost effective solution to take forward to the subsequent project phases and to support client’s investment decisions.

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**Onshore concept development**

We undertake these studies for both greenfield/new and brownfield/existing developments.

**Feasibility phase**

The objective is to demonstrate both technical and economic viability.

Petrofac recognises that every project is unique and we develop specific solutions considering issues such as: hydrocarbon properties, impurities (e.g. H₂S, wax, sand, salt), production gathering system architecture, plant and camp location, processing scheme, refinery configuration, export & storage of products (oil/ gas / NGL/ LPG/ LNG, gasoline, diesel, kerosene), power generation, utility systems integration and enhanced oil recovery methods. Our cost estimates at this stage are developed at screening level.

**Concept phase**

On completing feasibility assessment, the objective would be to select the best option(s) and further define to reduce risk and improve project cost estimate accuracy.

From Petrofac’s experience typical issues include: multi-phase or single phase production flowlines, optimum facilities location, conceptual plant layout, materials selection for plant and pipelines, process plant technology selection (oil, gas, LNG, refining and GTL), process and safety studies, operability, control, overpressure protection, power generation/ supply, machinery selection, long lead item identification, environmental and disposal issues.

The cost estimate will consider market conditions, construction methodology and country specific infrastructure, and labour productivity.

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Petrofac’s consultancy team has a broad mix of skills required to support conceptual development for offshore developments from drilling and production technology through facilities to export options. In addition this skill base is supported by other Petrofac capabilities in fabrication and operations that enable conceptual designs to be developed that address buildability and operability issues at the earliest stage of engineering development.

From both company and individual experience, Petrofac is able to offer development expertise from a range of geographic areas, from the North Sea and offshore Malaysia to the calmer waters of the Mediterranean.

In addition we have experience of a wide range of development options including fixed platforms, floating installations, mobile production units and subsea installations. Our core facilities design expertise is supplemented with specialist offshore capability that includes: installation design (transportation and lifting), mooring analysis, riser design, offshore piling design, vessel motion analysis and flow assurance.
Petrofac has extensive experience in the design of onshore/offshore facilities for both oil & gas treatment facilities and, therefore, is able to produce designs that are fully integrated with any downstream facilities.

Our concept development work is supported by a cost estimating function that reflects the very latest cost information through our worldwide procurement capability.

At the concept level our design teams provide robust and practical solutions which incorporate Petrofac’s extensive EPC and operations experience both onshore and offshore. This experience has been gained through executing projects in some of the most environmentally and climatic challenging regions of the world. Using this approach ensures that the correct level of experience is mobilised at the earliest opportunity within a project where its influence can add the most value.

Group synergies
In addition to the experience and capability within Petrofac Engineering Services, we can call upon a range of Petrofac group companies in order to deliver an optimised development service.

These include:

- Plant Asset Management (PAM)
  - maintenance and structural integrity
  - operational and project management consultancy
- well construction and operations (SPD)
  - well construction, well engineering and drilling consultancy
- petroleum technology (Eclipse)
  - field development optimisation
  - production modelling
  - well life cycle risk management
  - production optimisation software - PetroAtlas™

Global support
The Engineering Services consultancy is a company centre of excellence for conceptual development studies. Its experienced personnel provide consultancy and support from feasibility through all phases of project to all aspects of operation, maintenance and inspection to its customers around the world as well as to other Petrofac offices in Sharjah, Chennai, Mumbai, Indonesia, London and Aberdeen.

Offshore design experience
Petrofac has been involved in a variety of projects that include the following:

Norwegian North Sea: conceptual development of floating production facilities
Conceptual development of facilities to support 60 - 100,000 bopd production in a 400m water depth in the Norwegian North Sea. Options considered covered both new build and using an existing FPSO.

Tunisia: conceptual design of normally unmanned facilities
Concept development followed by FEED for normally unattended facilities to support new 150 MMSCFD gas processing and treatment plant. Scope included a 110km 18" multiphase subsea pipeline.

Malaysia: concept development using mobile production unit
Concept development in 65m water depth using wellhead tower, converted mobile production unit and tanker offloading system.

UK North Sea: concept development for Southern North Sea
Concept development for shallow water gas development that included the use of an innovative subsea cooler system.

UK North Sea: concept development of tie-back facilities
Additional module for single well tie-back to support 15 MMSCFD production together with compression facilities and 10km subsea pipeline.

Nigeria: Concept and FEED development for shallow water fixed platforms
Near shore facilities for production of 60,000 bopd. The facilities included separation, utilities and power generation and were bridge linked to existing facilities. Petrofac subsequently undertook the detail design of the facilities.
Onshore design experience
Petrofac has been involved in a variety of projects that include the following:

**Algeria:** concept study for LPG extraction system
Study to investigate technology options and development of optimised LPG extraction system with a minimum recovery of 75 mol% of C3/C4 from 700 MMscfd.

**Iran:** conceptual design of oil and gas production facilities
Oil and gas facilities from over 13 wells. Scope included: offsites (well pads, production flow lines), central processing facility (oil gas separation and stabilisation, gas dehydration and compression), infrastructure (civil works including roads, buildings and export pipelines).

**Turkmenistan:** conceptual design of early production phase
Concept study and design of 5BCMA treated gas export from future 20BCMA project gathered from operating wells.

**Oman:** concept engineering on four fields
Study to identify and cost a minimum equipment development scheme for the production of 170 MMscfd gas with minimum overall cost fit for purpose gas receipt facilities to transfer gas and condensate from the fields to the Gas Plant.

**United Kingdom:** conceptual and feasibility studies for oil and gas field developments
Field development planning studies, pre-FEED and FEED engineering, technical assurance, risk, safety and environmental engineering.

**Tanzania:** conceptual development of onshore facilities
Conceptual development of facilities fed from 3 offshore and 12 onshore wells, to increase production from 70MMscfd to 110MMscfd. Scope included preparation of a capacity test procedure, test of the existing facility, debottlenecking the facility and recommendation of options for development.

**Gabon:** conceptual design for gas treatment and compression facilities
Concept for gas treatment and compression systems with water make-up, treatment and injection facilities including associated pipelines/flowlines. This involved maximising the use of ‘free-issue’ turbo-machinery (LP & HP compressors, power generators and water injection pump).