

# Whessoe FEED & Technology



For the development of LNG, LPG and refrigerated gas storage and handling facilities

## What we do:

- Pre-feasibility and scoping studies
- Feasibility studies
- Front End Engineering Design (FEED)
- FERC application support for U.S. based LNG projects
- Technology development.

## Why we add value:

- We are fundamentally an EPC company with a core business of successfully designing and building terminals and storage facilities for the oil and gas industry
- We exploit our knowledge, substantial experience, strong engineering skills and commercial and economic awareness gained in executing EPC projects, and utilise this in our Front End business to achieve economic results
- We are motivated and flexible, offering our services across a wide range of diverse projects in terms of size and technical complexity
- We work closely with our clients to ensure their requirements are met.

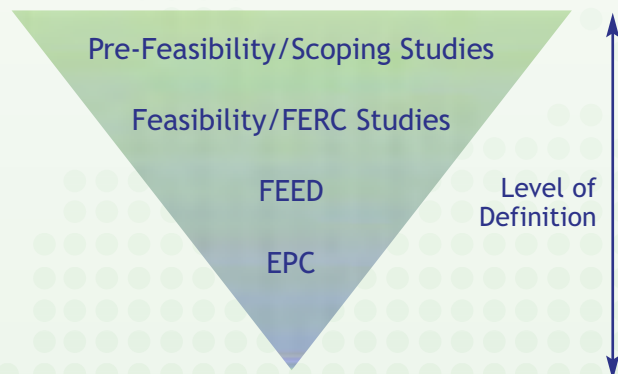
## Our capabilities:

- Concept definition and development
- Process design from initial concept through to detail design phase
- Plant layout and optimisation
- Storage tank specialists
- Equipment selection, specification and optimisation
- Civil and structural design
- Seismic design specialists
- Technical services including material selection, welding, painting and insulation systems
- Process SHE including HAZID, HAZOP, SIL assessment, risk assessment, dispersion modelling, fire and gas detection systems and ESD systems
- Instrumentation and control systems design
- Electrical systems design
- Piping system design.

## Who we work for:

Independent developers, global oil and gas companies, national utilities, investors and major contractors.

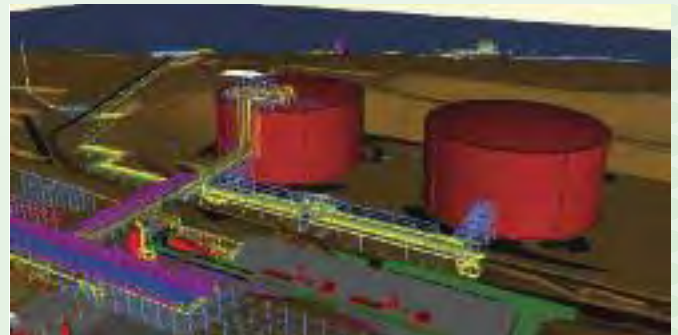
Expertise across the full range of front end spectrum



## Recent experience/track record

### Pre-feasibility/scoping studies

- Dragon LNG terminal at Milford Haven, UK
- Isle of Grain LNG terminal upgrade, UK
- Browse LNG tank concepts, Australia
- Mashal LNG terminal, Karachi Port, Pakistan.



*Dragon LNG terminal - from concept to construction; workscope included pre-FEED study for complete terminal, indicative cost estimate and project schedule, and support during permitting application process.*

Delivering  
Innovation  
& Excellence

## Feasibility studies

- Icthus modular LNG storage, Australia
- Guangdong LNG terminal, China
- Jiangsu LNG terminal, China
- Zhuhai LPG terminal upgrade, China
- Ratnagiri revival (formerly Dhabol LNG terminal), India
- Lebanon LNG terminal
- CMS LNG, offshore GBS LNG terminal, Gulf of Mexico
- Taiwan LNG terminal
- GASCO LPG plant conversion, UAE
- Refrigerated LPG tank revalidation and life extension, BP Grangemouth, UK.

## FERC application full terminal scope, U.S.

- Cameron LNG, Louisiana - first FERC application for LNG terminal for over 20 years
- Bradwood Landing LNG, Oregon
- UGI Temple, Pennsylvania
- Calais LNG, Maine.

## FERC application storage tank scope, U.S.

- Golden Pass LNG, Texas
- Pascagoula LNG, Texas
- Downeast LNG, Maine
- Sparrows Point LNG, Maryland.

## FEED

- Hackberry LNG (Cameron), Louisiana, U.S.
- Costa Azul LNG, Baja, Mexico
- Liongas, Netherlands
- Manzanillo LNG storage tanks, Mexico for Samsung.

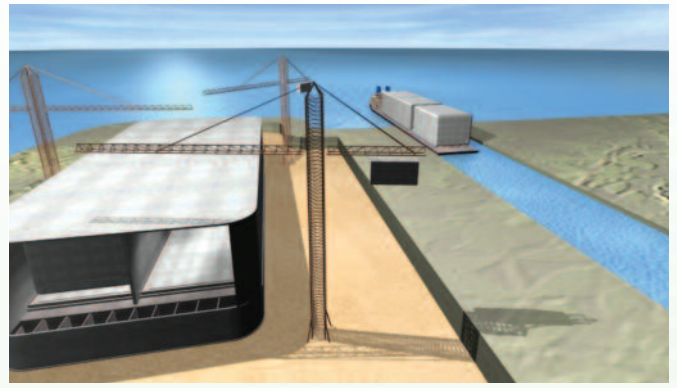
## Technology

### Modular LNG tank

- Member of original concept design team brought together by Mobil in 1996
- Contributed significantly to the development of this technology over several years with ExxonMobil, resulting in participation in a FEED competition



Guangdong LNG feasibility study



Modular LNG tanks, Adriatic LNG - from concept to construction.

- against rival technologies.
- Selected technology in FEED competition for Adriatic LNG (ALNG) project
- Licensee from ExxonMobil for the modular tank technology
- EPC contractor responsible for the detail design, procurement, fabrication, installation, testing and commissioning of the modular storage tanks for ALNG.

### Pre-stressed concrete cryogenic storage tank

- License holder of the preload Cryocrete technology
- Several PC-PC tanks of this type previously constructed and with operational history
- Currently undertaking detailed study of next generation PC-PC storage tanks for Shell Global Solutions.

### Very large LNG storage tanks

- Design studies carried out confirming possibility of cryogenic tanks up to 300,000m<sup>3</sup> useable capacity for Statoil and BP.

### Offshore GBS storage and regasification

- Design studies for integrated offshore GBS LNG storage and regasification facility.

## Whessoe

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