



NATURAL GAS LIQUEFACTION

Natural gas plays an increasingly important role in meeting today's energy demands. The most cost effective way to transport gas over long distances to the end user is to reduce its volume by liquefaction, either onshore or offshore.

Costain offers a complete capability for the delivery of full lifecycle solutions for safe and reliable plants and processes for the liquefaction of natural gas.

Costain has extensive international experience in cryogenic gas processing on new liquefaction plants and LNG terminals as well as for the modification of existing assets. Our design solutions and consultancy services provide improved performance, simplicity of operation, increased safety and low overall project cost.



Image courtesy of FLEX LNG and Samsung Heavy Industry

LONG HISTORY OF CRYOGENIC GAS PROCESSING EXPERTISE

CUSTOM DESIGNS TO ENSURE HIGH EFFICIENCY, SIMPLICITY AND ROBUSTNESS

EXPERIENCE EXTENDS FROM SMALLER-SCALE PLANTS TO BASE-LOAD FACILITIES

COSTAIN'S CAPABILITY

Costain's experience extends to all types of liquefaction technology, including expander cycles, multi-stage mixed refrigerant cycles and optimised cascade processes.

We can take an independent view of small, medium and large base-load projects worldwide, both for onshore and floating facilities. We can also assess, upgrade and optimise performance of existing plants, as demonstrated on the delivery of three major LNG train overhauls on Das Island in the Arabian Gulf.

Our rich heritage in cryogenic gas processing enables us to offer effective solutions to the challenges associated with natural gas liquefaction, including nitrogen removal from LNG and LPG recovery in LNG plants.

PROPRIETARY TECHNOLOGY

Our portfolio of patented technologies is continually extended to offer innovative solutions that meet and exceed our customers' needs.

One of Costain's recent patents is the safe, flexible and highly operable double nitrogen expander cycle, which provides a reliable process that improves liquefaction efficiency. We have extensive experience of this technology from industrial gas processing as well as LNG.

Costain has also developed a simple, reliable, low capital cost process removing nitrogen from LNG to <1 mol%, enabling management of nitrogen in LNG flash gas streams and producing a pure nitrogen stream suitable for venting.

RELEVANT EXPERIENCE

FLEX LNG

Floating LNG Production



Image courtesy of FLEX LNG and Samsung Heavy Industry

- World's first floating LNG project to proceed into FEED, with a capacity in excess of 1.7 million tonnes of LNG per annum
- Engineering services in joint development with Kanfa Aragon, specialist in FPSO topside solutions
- Provided experience in the detailed design of specialist cryogenic plants and equipment, using nitrogen expander cycle technology

- ✓ CONCEPTUAL STUDIES
- ✓ FEED
- ✓ DETAILED ENGINEERING
- ✓ PRE-FEED
- ✓ DESIGN
- ✓ PROJECT MANAGEMENT

BHP Billiton

Floating LNG Terminal



- Study for the Cabrillo Port floating LNG storage and regasification unit in California
- Selected submerged combustion vaporiser (SCV) type heat exchangers
- Supervised testing work at Heriot-Watt University, Scotland, to assess SCV performance under a range of vessel motions

- ✓ CONCEPTUAL STUDIES
- ✓ REPORTED ON ENGINEERING STUDIES
- ✓ PHYSICAL TESTING OF SCV'S

Isle of Grain, UK

LNG Import Terminal



- Conditioning of imported LNG to meet UK gas specifications
- Design of recondenser, integrated with nitrogen injection, at the 3.3 million tonnes per annum terminal
- Previously built the two original peak shaving LNG plants at Isle of Grain (205 tonnes per day of LNG each)

- ✓ PROCESS STUDIES
- ✓ PROCUREMENT
- ✓ CONSTRUCTION
- ✓ DESIGN
- ✓ CONSTRUCTION MANAGEMENT

RWE DEA, Egypt

Base-Load LNG Facilities



- Consultancy services for independent review of third-party technology for gas conditioning facilities upstream of the proposed LNG plant.
- Techno-commercial evaluation of two plants to identify the better choice for future LNG trains
- Assessed performance of the liquefaction technology at Idku (7.2 million tonnes per annum) and Damietta (5 million tonnes per annum)

- ✓ CONCEPTUAL STUDIES