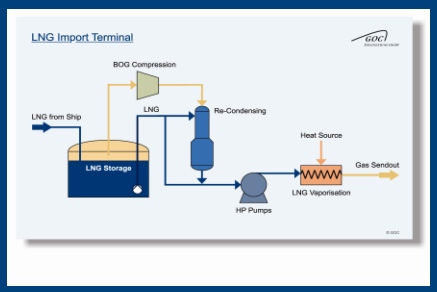
GOC
ENGINEERING GMBH



REFERENCE PROJECTS

LNG

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LNG

PROJECT	*Project name:* **LNG Carrier Costing Study** *Country:* Australia *Client:* BHP-Melbourne *Year:* 2001 *GOC project:* 7005

Source: KILGAS

PROJECT DESCRIPTION	Study of a uniue trade pattern with semi-pressurized LNG carrier for short-term coastal services in Europe Cargoes: LNG/Ethylene/LPG Capacity range: 7,000 - 20,000 m³
PROJECT PHASES	Technical/commercial study
GOC DISCIPLINES	Process Marine engineering Commercial
GOC WORK SCOPE	Industry benchmark of semi-ref gas carrier Vessel description Prices breakdown Required deviations for LNG suitability Price breakdown for LNG/LEG/LPG carrier Price breakdown for LNG carrier Ship draft sensitives

LNG

PROJECT	*Project name:* **LNG Terminal** *Puerto Altamira* Country: *Mexico* Client: WISL *Year:* 2001 *GOC project:* 7011
PROJECT DESCRIPTION	LNG import terminal in Mexico LNG cryogenic storage tanks Marine loading facilities LNG regasification system BOG handling Metering
PROJECT PHASES	Tender phase
GOC DISCIPLINES	Process
GOC WORK SCOPE	Technical consultancy Process simulation by using HYSIS and DESIGN II software tools Process Design

LNG

PROJECT	*Project name:* **LNG Peak Shaving Plant** *Country:* Germany *Client:* Thyssengas RWE Gasspeicher GmbH *Year:* 2002 *GOC project:* 7018/7021

PROJECT DESCRIPTION	Existing LNG Peak Shaving plant in Germany 1 x 23,000 m³ double wall LNG storage tank NG gas treatment NG liquefaction system with mixed refrigerant (MRL) cycle Plate fin heat exchanger (PFHX) LP and HP LNG pumps Submerged combustion LNG Vaporizer (SCV) LNG truck loading facility LIN plant for conditioning of gas Boil off gas handling with HP compressor Utility system
PROJECT PHASES	Feasibility study Costing study

GOC DISCIPLINES	Process	Mechanical & Rotating Equipment
	LNG Tanks	Piping
	E&I	Civil

GOC WORK SCOPE	Technical consultancy and safety engineering Review of entire cyogenic and untility system with respect to safety considerations and compliance with latest rules and regulations Review of instrumentation and control system Advise of modications and revamping activities Costing study

LNG

PROJECT	*Project name:* **Hammerfest LNG** *Country:* Melkoya, Norway *Client:* Linde Owner: Statoil *Year:* 2003 - 2007 *GOC project:* 7019

Source: Statoil

PROJECT DESCRIPTION	First LNG Export Terminal under artic conditions The storage & loading package of the Hammerfest LNG Plant includes the following main equipment: Two LNG cryogenic storage tanks with a capacity of 125,000 cbm One LPG refrigerated storage tank with a capacity of 45,000 cbm One Condensate tank with a capacity of 75,000 cbm All tanks are full containment, inner steel, and outer pre-stressed concrete tanks Intank pumps, external pumps, blowers, heat exchangers Marine loading arms Tank flare system, incinerator, fiscal metering system
PROJECT PHASES	Tender phase
GOC DISCIPLINES	Process
GOC WORK SCOPE	Engineering support during bid evaluation period including: Review of technical bids Member of Owner´s bid evaluation team Project review meetings

LNG

PROJECT	*Project name:* **Hammerfest LNG Project** *Country:* Owner: *Client:* Linde Owner: Statoil *Year:* 2003 - 2007 *GOC project:* 7022/7027/7030/7033

PROJECT DESCRIPTION	First LNG Export Terminal under artic conditions The storage & loading package of the Hammerfest LNG Plant includes the following main equipment: Two LNG cryogenic storage tanks with a capacity of 125,000 cbm One LPG refrigerated storage tank with a capacity of 45,000 cbm One Condensate tank with a capacity of 75,000 cbm All tanks are full containment, inner steel, and outer pre-stressed concrete tanks Intank pumps, external pumps, blowers, heat exchangers Marine loading arms Tank flare system, incinerator, fiscal metering system
PROJECT PHASES	EPC
GOC DISCIPLINES	Process Safety Instrumentation
GOC WORK SCOPE	Process Manager within Linde/Statoil Storage&Loading package Follow-up team responsible for: Process design Equipment process design Safety design P&ID design Participation on HAZOP studies HAZOP follow up Instrument basic and detail engineeing Battery limits

LNG

PROJECT	*Project name:* **LNG Peak Shaving Plant** *Country:* Germany *Client:* Thyssengas RWE Gasspeicher GmbH *Year:* 2003 *GOC project:* 7026

Source: RWE

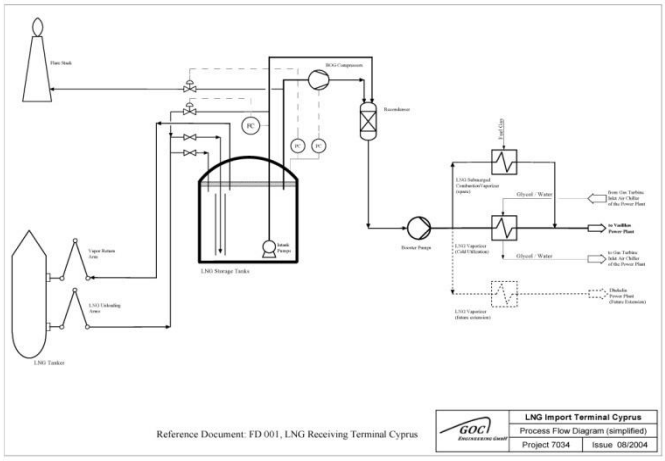
PROJECT DESCRIPTION	Modification and upgrade of an existing LNG peak shaving plant 1 x 23,000 m³ double wall LNG storage tank NG gas treatment NG liquefaction system with mixed refrigerant (MRL) cycle Plate fin heat exchanger (PFHX) LP and HP LNG pumps Submerged combustion LNG Vaporizer (SCV) LNG truck loading facility LIN plant for conditioning of gas Boil off gas handling with HP compressor Utility system
PROJECT PHASES	Basic engineering Safety engineering Tender engineering
GOC DISCIPLINES	Process LNG Tanks E&I Mechanical & Rotating Equipment Piping
GOC WORK SCOPE	Basic engineering of LNG tank modification Tender engineering of entire revamping activities including LNG tank, instruments & control, piping, mechanical equipment Safety Engineering Authority Engineering HAZOP Study (chairman & disciplines)

LNG

PROJECT	*Project name:* **LNG Peak Shaving Plant** *Country:* Germany *Client:* RWE Energy RWE Gasspeicher GmbH *Year:* 2004 - 2008 *GOC project:* 7032	
PROJECT DESCRIPTION	Modification and upgrade of an existing LNG peak shaving plant 1 x 23,000 m³ double wall LNG storage tank NG gas treatment NG liquefaction system with mixed refrigerant (MRL) cycle Plate fin heat exchanger (PFHX) LP and HP LNG pumps Submerged combustion LNG Vaporizer (SCV) LNG truck loading facility LIN plant for conditioning of gas Boil off gas handling with HP compressor Utility system	
PROJECT PHASES	Detailed engineering Permitting	Front end engineering design (FEED) Site Supervision Start up
GOC DISCIPLINES	Process LNG Tanks E&I Civil	Mechanical & Rotating Equipment Piping
GOC WORK SCOPE	Feasibility study Detailed engineering Owner´s engineer Pre-commissioning Commissioning Start-up Safety Engineering Authority Engineering Preparation/Participation of a risk-orientated hazard assessment based on PAAG/HAZOP techniques (ROGA)	Warming up of LNG Tank LNG tank modifications Installation of new submerged LNG pumps Installation of a new PLC system Installation of new field instruments Revamping of mechanical equipment Process optimization

LNG

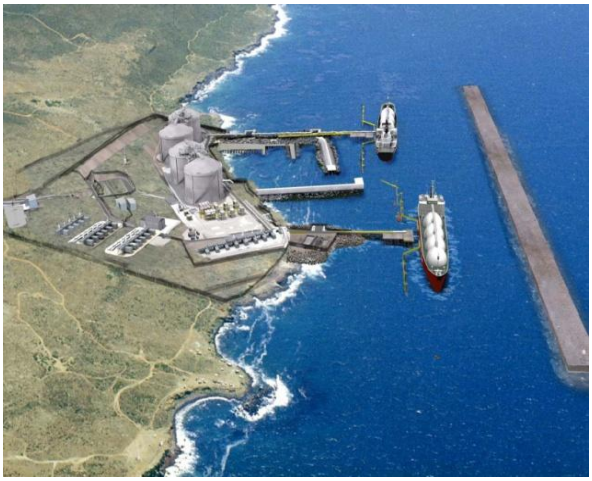
PROJECT	*Project name:* **LNG Terminal Cyprus** *Country:* Cyprus *Client:* ILF *Year:* 2004 *GOC project:* 7034



PROJECT DESCRIPTION	LNG import terminal Two LNG cryogenic storage tanks Marine loading facilities LNG regasification system BOG handling Metering
PROJECT PHASES	Study
GOC DISCIPLINES	Process Layout
GOC WORK SCOPE	Functional description Desgin recommandations Process flow diagram Plant layout

LNG

PROJECT	*Project name:* **Costa Azul** **LNG Import Terminal** *Country:* *Mexico* *Client:* GLO - Mexico Energia Costa Azul *Year:* 2004 *GOC project:* 7039



Source: CRE

PROJECT DESCRIPTION	LNG Import Terminal in Mexico LNG unloading facilities to allow unloading of LNG carriers up to 215,000m³ Two full containment tanks, each with a net capacity of 160,000m³ designed in accordance to EN 14620 and local Codes & Standards LNG boil off handling system with recondenser and LNG reliquefaction system LNG Send-out system with HP pumps and glycol-heated shell&tube vaporizer General plant facilities Design in compliances with German Codes & Standards and European e.g. EN 1473, PED, ATEX e.g. EN 1473, PED, ATEX
PROJECT PHASES	Front end engineering design (FEED)
GOC DISCIPLINES	Safety Engineering
GOC WORK SCOPE	FEED verification report Review of FEED documentation with respect to consider the main codes & standards in the safe design, fabrication and installation of the LNG Terminal

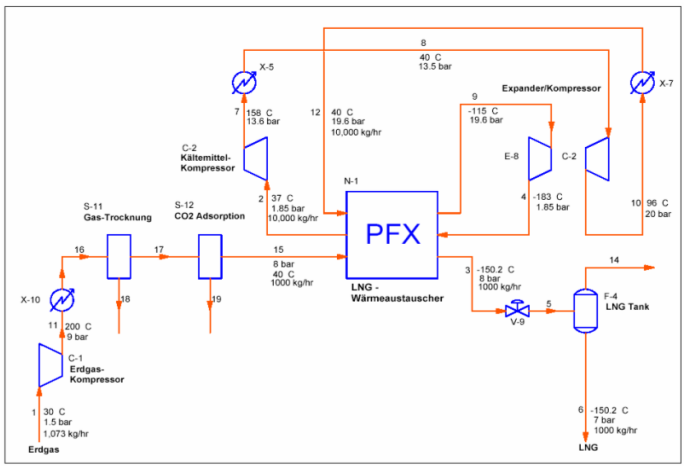
LNG

GOC ENGINEERING GMBH

PROJECT

Project name:
Small Scale LNG
Country:
Germany
Client:
German Energy Company

Year:
2006
GOC project:
7050



PROJECT DESCRIPTION

Small scale LNG plant in Germany
Gas liquefaction
LNG storage facilites
LNG regasification
Metering
Distribution

PROJECT PHASES

Study

GOC DISCIPLINES

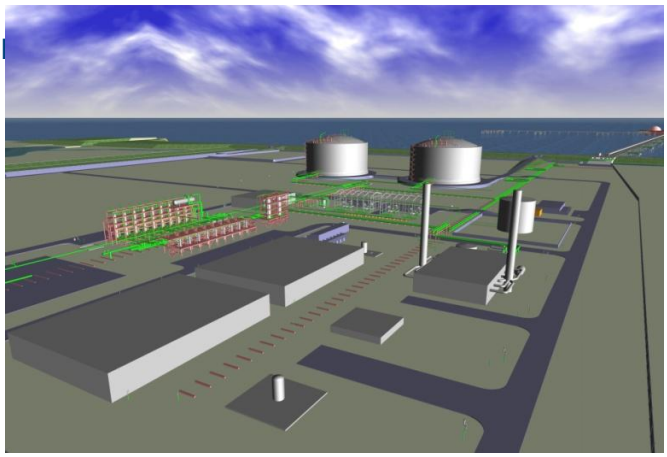
Process
Layout
Safety

GOC WORK SCOPE

Detailed technical/commercial study

LNG

PROJECT	*Project name:* **DFTG LNG Import Terminal** *Country:* Germany *Client:* EON-Ruhrgas/DFTG *Year:* 2006 - 2008 + *GOC project:* 7065



Source: DFTG

PROJECT DESCRIPTION	First LNG Import Terminal in Germany LNG unloading facilities to allow unloading of LNG carriers up to 215,000m³ Two full containment tanks, each with a net capacity of 160,000m³ designed in accordance to EN 14620 and local Codes & Standards LNG boil off handling system with recondenser and LNG reliquefaction system LNG Send-out system with HP pumps and glycol-heated shell&tube vaporizer General plant facilities Design in compliances with German Codes & Standards and European e.g. EN 1473, PED, ATEX e.g. EN 1473, PED, ATEX

PROJECT PHASES	Feasibility study	Front end engineering design (FEED)
	Permitting	Bid preparation

GOC DISCIPLINES	Process	Safety Engineering
	LNG Tanks	Authority Engineering
		Mechanical & Rotating Equipment

GOC WORK SCOPE	Feasibility study review	Owner´s Representation
	FEED review	Preparation of bid documentation
	Review of EIA documents	EPC contractor evaluation & selection
	Cost study review	Review of permit application documents
	Design alternatives	Filing of permit application documents
	Lead public hearings	Follow up of Incidental Provisions
	Preparation of plant performance guarantee criteria	
	Preparation/Participation of a risk-orientated hazard assessment based on PAAG/HAZOP techniques	
	Participation HAZID/HAZOP review meetings	
	Follow up of HAZID/HAZOP findings	

LNG

PROJECT	*Project name:* **Antifer GNL Project** *Country:* France *Client:* EON-Ruhrgas/ GdN *Year:* 2008 *GOC project:* 7079

Source: GDN

PROJECT DESCRIPTION	LNG import terminal in France LNG cryogenic storage tanks Marine loading facilities LNG regasification system BOG handling Metering
PROJECT PHASES	Pre-FEED
GOC DISCIPLINES	Process
GOC WORK SCOPE	Design Review - Process

LNG

PROJECT

Project name:
OLT LNG Toskana
Country:
Italy
Client:
EON-Ruhrgas/
OLT Offshore

Year:
2009 - ongoing
GOC project:
7081

Source: OLT

PROJECT DESCRIPTION

Floating storage and regasification unit (FSRU)
Moored offshore Livorno, Italy and export gas to shore via a sub sea pipeline
Existing LNG carrier of MOSS design
Turret mooring
Side-by side mooring system
Loading arms
LNG regasification system
BOG handling
Metering

PROJECT PHASES

EPC

GOC DISCIPLINES

Process
Safety Engineering

GOC WORK SCOPE

Engineering Review
Participation HAZOP review meetings
Follow up of HAZOP findings
Review commissioning procedure
Preparation of plant performance guarantee criteria
Participation Test run BOG compressor as Owner´s representative

LNG

PROJECT	*Project name:* **German Gasport** *Country:* Germany *Client:* RWE Energy *Year:* 2008 *GOC project:* 7082

Source: Excelerate

PROJECT DESCRIPTION	Floating storage and regasification unit (FSRU) Excelerate Gas Port Facility
PROJECT PHASES	Study
GOC DISCIPLINES	Marine engineering Safety engineering Authority engineering
GOC WORK SCOPE	Feasibility study

LNG

PROJECT	*Project name:* **Adria LNG** *Country:* Croatia *Client:* Adria LNG EON-Ruhrgas/ *Year:* 2008 ongoing *GOC project:* 7075/7083

Source: ADRIA LNG

PROJECT DESCRIPTION	LNG import terminal in Croatia LNG cryogenic storage tanks Marine loading facilities LNG regasification system BOG handling Metering

PROJECT PHASES	Feasiblity study FEED

GOC DISCIPLINES	Process mechanical & rotating LNG tanks

GOC WORK SCOPE	Process review Tender engineering Member of backup expert team	Owner´s engineer