

BILFINGER EMS GMBH



BILFINGER

Engineering and Technologies for Liquefied Gas

General Presentation

April 2020



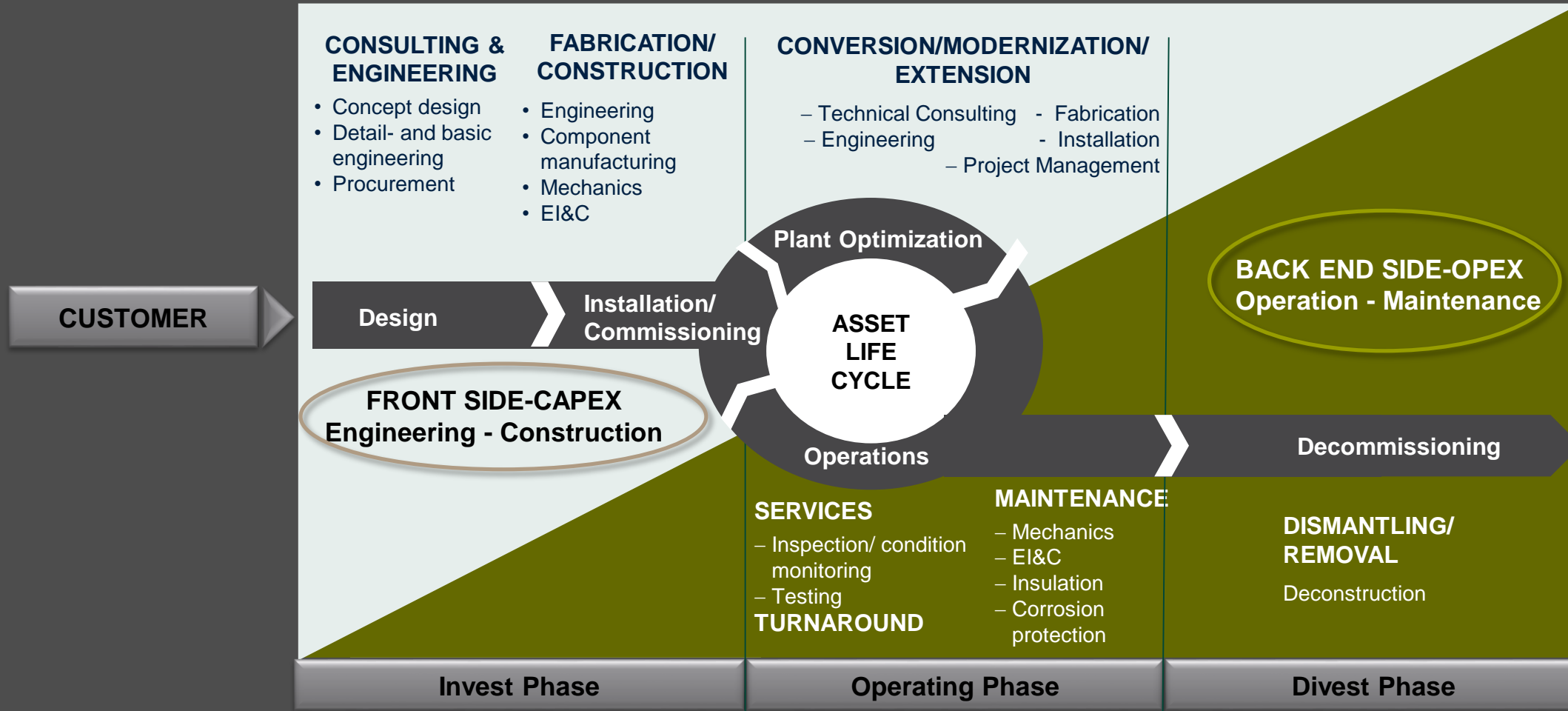
BILFINGER EMS strives to achieve continuous improvement in HSEQ performance.

HEALTH The health of our employees is our highest priority.

SAFETY LTI = 0 (no lost time incident) is possible.

ENVIRONMENT Environmental protection is both an obligation and a guarantee of earnings.

QUALITY We stand for guaranteed quality and provide our clients with products and services in a timely manner.

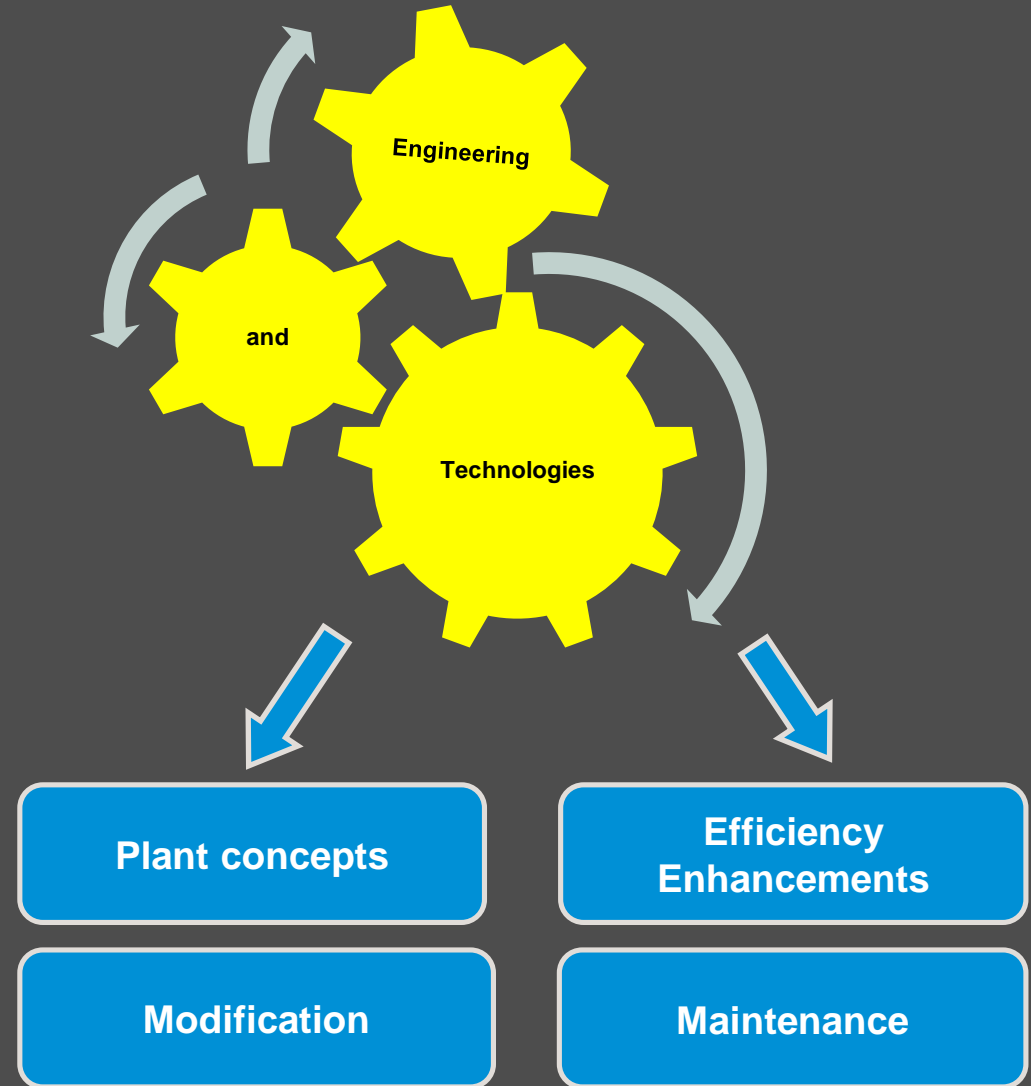


Bilfinger EMS GmbH

Solution-oriented engineering and plant design



Petrochemical,
chemical, gas, oil,
energy



Bilfinger

Long experience in the gas value chain



UPSTREAM

- 1 Upstream E&P offshore well
- 2 Upstream E&P onshore well
- 3 Gas-oil separation plant
- 4 Gas processing plant

MIDSTREAM

- 5 Compression station
- 6 Metering station
- 7 Deodorizing unit
- 8 Underground storage & gas treatment
- 9 Gas treatment
- 10 Odorizing unit
- 11 LNG terminal, regasification & storage
- 12 Storage tanks
- 13 Blending station

DOWNSTREAM

- 14 Fuelgas conditioning & gas station
- 15 Gas pipeline system
- 16 SSLNG liquefaction and storage
- 17 Biogas production
- 18 Refinery
- 19 Power plant

Bilfinger EMS GmbH

EPC Projects



EPC / Turn key project target size

- < 100m €

Disciplines

- Process, mechanical, E&I, automation, civil

Industry sectors

- Oil & gas
- Chemical
- Petrochemical
- Energy

Bilfinger EMS scope

- Engineering (process, mechanical, E&IC, civil)
- Procurement
- Manufacturing (skid, vessels, control system)
- Construction (pipeline, mechanical, electrical, civil)
- Commissioning & start-up

Geographical area

- Europe



Bilfinger EMS GmbH

Engineering & Technologies for Liquefied Gas Infrastructure



BILFINGER



Multidisciplinary turn-key solutions to process different types of natural gas sources till distribution of LNG to end consumers.

- Treatment of various gas sources
- Liquefaction technology
- Truck loading facilities
- Refueling stations
- Utilities/Auxiliaries

Bilfinger EMS has developed a concept for processing small gas volumes into LNG in collaboration with Cryotec Anlagenbau. This includes treating gas derived from various sources, supplying the corresponding liquefaction technology and providing LNG for further use in Europe.

LNG frequently is in demand at locations that are far from a major import terminal. Accordingly, facilities that are able to produce the fuel locally in smaller quantities and to deliver it where it is needed will play an ever more important role in the future.

This is because small, modular liquefaction facilities enable a reliable and uninterrupted supply chain, from the gas source straight to the end consumer.

Bilfinger EMS GmbH

Small Scale LNG Plant – Gas Sources



Biogas from corn

Biogas from waste



Landfil gas



Natural gas dry

Natural gas + Impurities

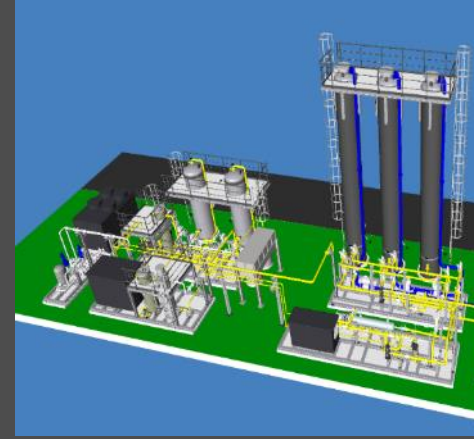
Natural gas wet





Natural Gas Treatment

Inlet facilities, like filters/separators, pressure control and metering take care of good feed quality. Impurities, like mercury and hydrogen sulfide (H₂S) are removed from the gas by using scrubbing or adsorption processes.



Natural Gas Purification / Drying

The treated gas is purified and dried to remove carbon dioxide and moisture in molecular sieve adsorbers to achieve liquefaction requirements.



The Coldbox

The gas enters the Cold Box. Inside the Cold Box the gas gets cooled and finally liquefies.



The closed loop N2 cycle (refrigerant)

The coldness is provided by compressed nitrogen and expansion turbine in the Claude's process.



Gas Liquefaction

The coldness turns gas into liquid, this cold is produced by the nitrogen (-155 °C to -196 °C) in counter current flow inside the main HEX.

The gas enters the main HEX and liquified natural gas (LNG) (-163 °C) is produced.



Bilfinger EMS GmbH

Small Scale LNG Plant – Storage and Distribution



Storage

The product LNG is transferred from inside the Cold Box to the LNG storage unit via an insulated pipe system.

Boil-off gas is handled and utilized for power generation.



Loading

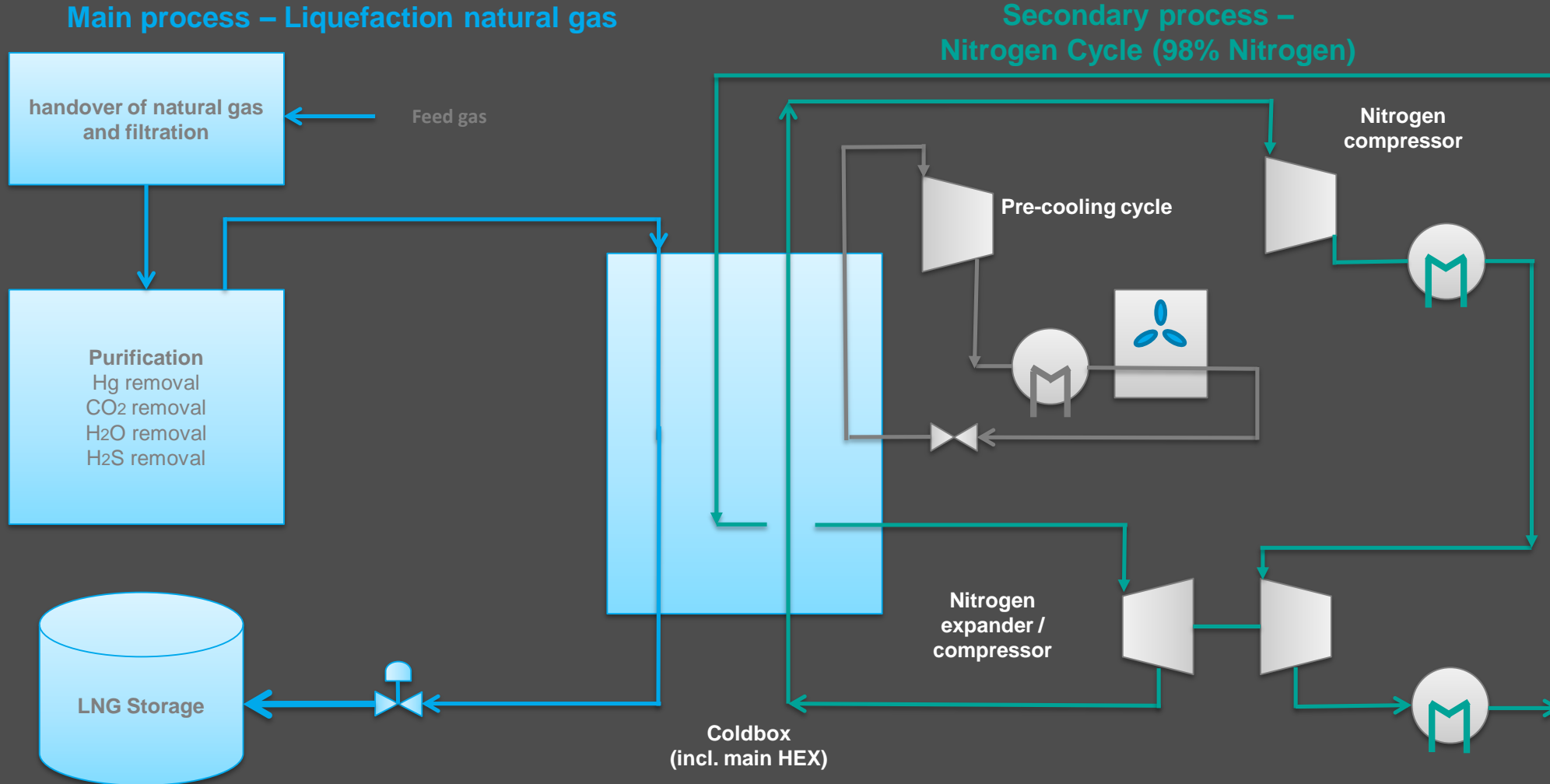
The LNG is transferred to the trailer loading station.



Fueling

LNG fueling stations for vehicles enables direct access to final customers.





Bilfinger EMS GmbH

Small Scale LNG Plant – Technical Specifications

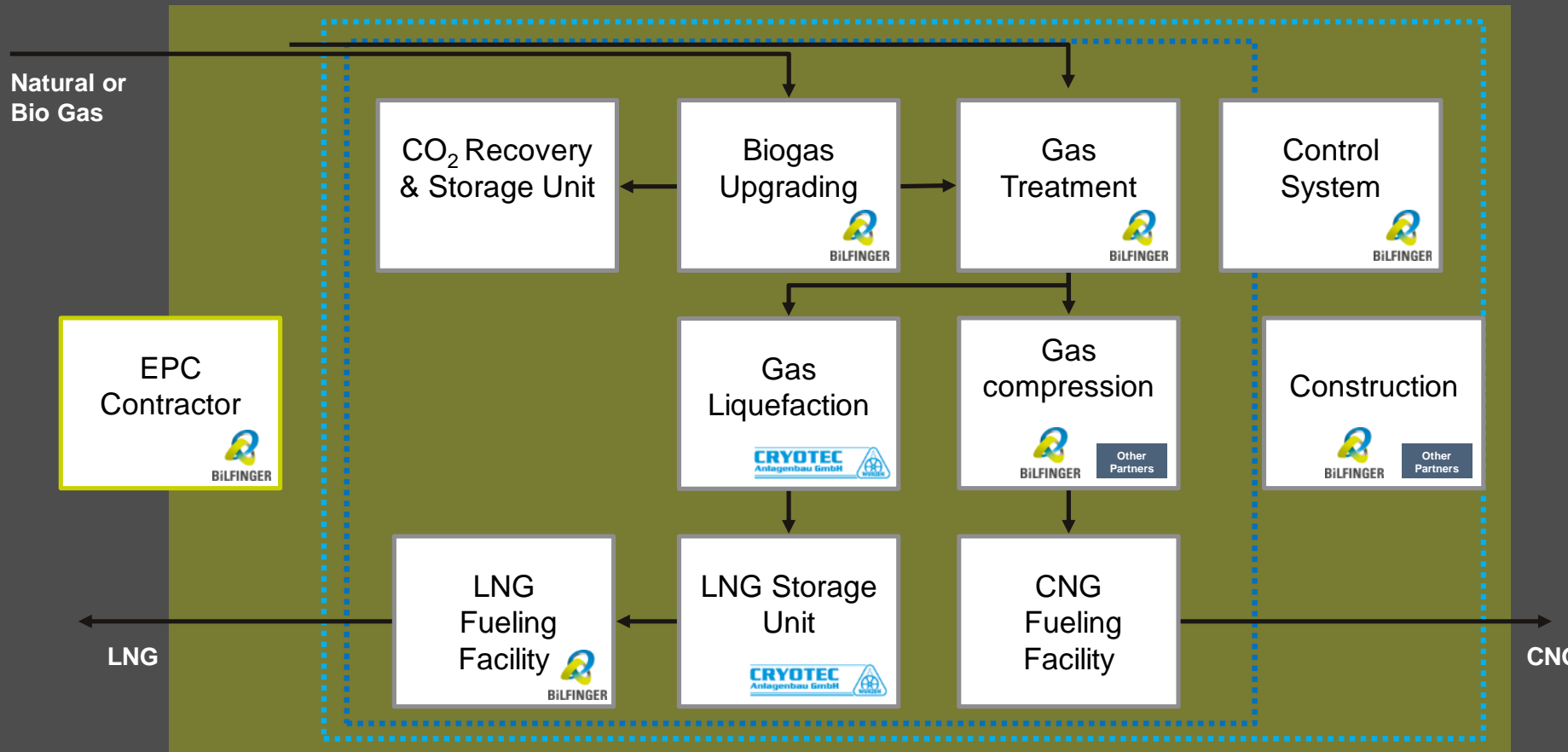


- Fully modularized skid mounted plant
- High degree of pre-fabrication
- Fast construction and commissioning time to reduce installation cost
- Complete turn-key solution
- Fully integrated control system for easy plant start-up and operation
- Customized if required
- Production capacities 20 – 150 tons per day LNG

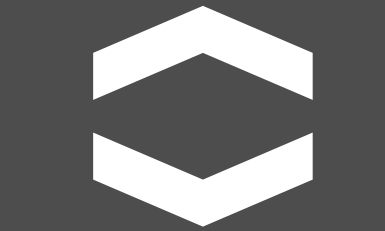
| Liquefaction requirements | Composition | |
|---------------------------|-------------|------|
| CO2 | < 50 | ppm |
| H2O | < 1 | ppm |
| C6+ | < 1 | % |
| N2 | < 1 | % |
| Operating pressure | ~ 10-20 | barg |

Bilfinger EMS GmbH

Small Scale LNG Plant - EPC Approach



Bilfinger EMS & Sister Companies



Technological Partner

Other Partners

Services

- Basic Engineering
- Authority Engineering
- Procurement Engineering
- Expediting
- Scheduling/Coordination
- Commissioning
- EPCM / Owner's Engineer



Technical Scope

- Dispenser
- LNG Supply
- Counter/Payment Systems
- Lighting System
- Underground Works
- Foundations
- Utilities

Services

- Basic Engineering
- Authority Engineering
- Procurement Engineering
- Expediting
- Scheduling/Coordination
- Commissioning
- EPCM / Owner's Engineer



Technical Scope

- Dispenser
- LNG Supply
- Counter/Payment Systems
- Lighting System
- Underground Works
- Foundations
- Utilities

Additional Services

- Conceptual Engineering
- Feasibility Studies
- Consulting
- Authority Engineering
- Supervision



After Sales

- Maintenance Concept & Manuals
- Regular Inspections and Maintenance
- On demand Services
- Calibrations
- Trainings



Plant Model LNG 1500 (kg/h)

Perm, Russian Federation

- Basic Engineering
- Detail Engineering
- HAZOP and HSE Concept
- Preparation of Authority Engineering
- Manufacturing of Equipment
- Supervision of Erection
- Commissioning / Start-Up
- After Sales Service
- Implementation: 2013 - 2014

CO2 absorption pilot plant

University of Duisburg, Germany

- Skid design and construction
- Volume: 1,5m EUR
- Year: 2012





WELTEC Biopower GmbH

Arneburg, Germany

- Biogas upgrading plant, desulfurization of biogas
- Gas flow rate of 1,400 Nm³/h (raw biogas)
- Biomethane for the annual needs of approximately 3,500 households
- Volume: 1,7m EUR



Energiedienst

Germany

- Concept study and basic engineering of a methanol production from hydrogen and carbon dioxide





TENP GmbH & Co KG

Schwörstadt, Germany

- Turn-key design, fabrication, delivery and commissioning of deodorizing plant
- Volume: 37m EUR
- Year: 2018 - 2020

Bilfinger EMS GmbH

References

OMV Petrom

Burcioia and Madulari, Romania

- Gas field consisting of 10 wells
- EPCC engineering and commissioning of two natural gas production units
- Project realisation with Max Streicher S.R.L. (Joint Venture)
- Volume: 65m EUR
- Commissioning: 2017





OMV Petrom S.A.

Madulari, Romania

- Turn-key design, fabrication, delivery and commissioning of two H₂S removal units
- 1 million Nm³/day
- Volume: 2m EUR
- Year: 2013

Bilfinger EMS GmbH

References

Siemens

- Pilot plant NSF for crude oil-refinery for the removal of heavy metal
- EPC Turn Key Delivery
- Year: 2017



Bilfinger EMS GmbH

References

Exxon Mobil Production Deutschland GmbH (EMPG)

Großenkneten, Germany

- Flexsorb desalination / deionization plant
 - Engineering, procurement, production and commissioning (skid, vessels, control system)
- Volume: 0,5m EUR
- Year: 2014





BILFINGER

Karsten Hoffhaus
CEO

Bilfinger EMS GmbH
Hohe Tannen 11
49661 Cloppenburg/Germany

Phone +49 4471 182-256
Mobile +49 172 459 5571

karsten.hoffhaus@bilfinger.com
www.ems.bilfinger.com

Ulrich Trebbe
Sales Director

Bilfinger EMS GmbH
Hohe Tannen 11
49661 Cloppenburg/Germany

Phone +49 4471 182-257
Mobile +49 172 458 8619

ulrich.trebbe@bilfinger.com
www.ems.bilfinger.com