GAS PROCESSING AND CCUS TECHNOLOGIES

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ABOUT US

SERVICES

- Technology Selection
- Conceptual Design
- Detailed Engineering
- Project Management
- Procurement
- Construction Supervision
- Start-up & Operation

OPTIMIZED PROCESS SOLUTIONS
ONSHORE & OFFSHORE
REVAMP GRASS-ROOT FACILITIES

CLIENTS

- Oil & Gas Companies
- International EPC Contractors

GAS PROCESSING TECHNOLOGIES

ADVANCED DESIGN

Advanced glycol-based line-ups include owned process technologies such as Drigas and EcoTeg.

GAS-LIQUID SEPARATION

A basic step of each oil & gas process unit with the important purpose of segregating liquid and gas streams for further processing or recovery or for protecting the process media and equipment treating the process gas.

GAS DEHYDRATION

A fundamental step in gas treatment included in nearly all gas processing units in order to prevent the formation of hydrates in high pressure natural gases during gas transmission or during cryogenic gas processing (such as LPG / NGL recovery or in LNGs). Dehydration is also applied to prevent corrosion from condensed water in sour gas streams.

DEW POINT CONTROL

Control of water and hydrocarbon dew points of natural gas streams is required for both safe transportation and safe use of natural gases. Depending on market specifications, the typical natural gas dew points range from -5ºC to -20ºC as water dew point and from 0ºC to -10ºC as hydrocarbon dew point while lower values can be required for subsea pipeline transportation.

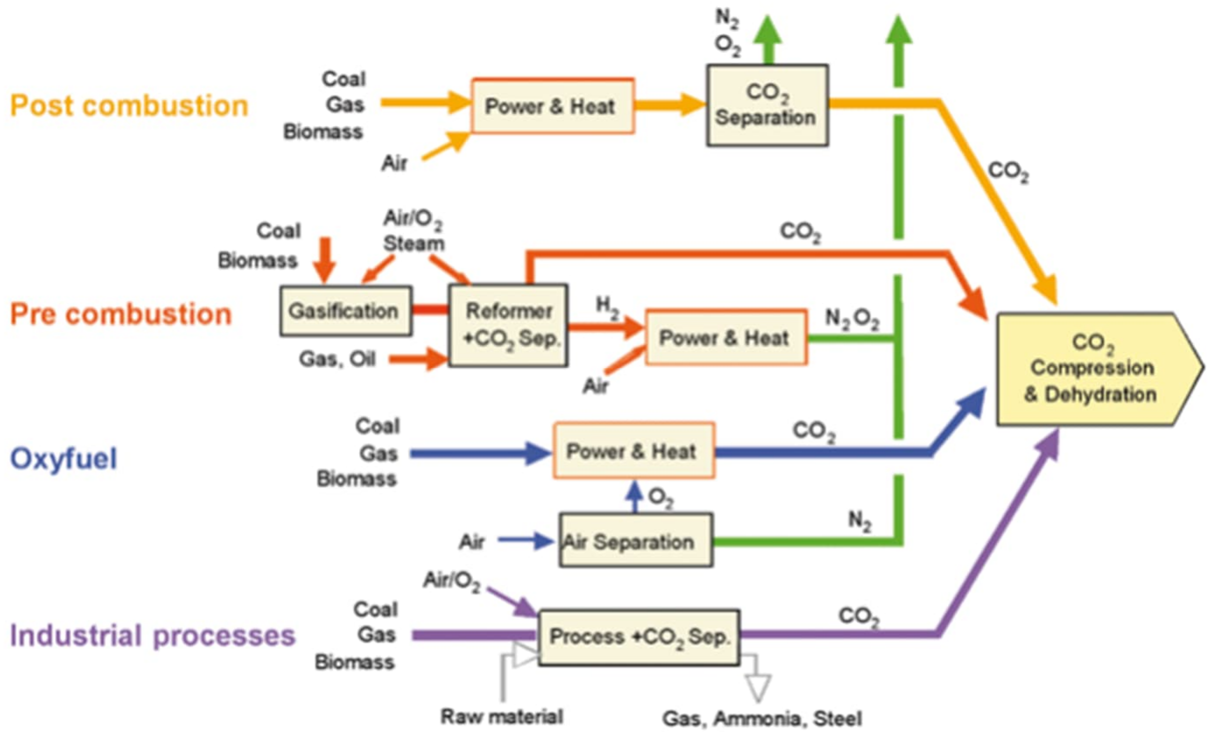
NGL/LPG CRYO RECOVERY

Recovery of NGL/LPG is normally achieved by means of cryogenic processing, with minimum temperatures that can be as low as -80ºC (NGLs) or -110ºC (high efficiency C_2 recovery). Cryogenic processing requires proper gas dehydration, which for lower temperatures is normally achieved by means of mol. sieves.

CARBON CAPTURE

CARBON CAPTURE, UTILIZATION AND STORAGE

Carbon Capture, Utilization and Storage (CCUS) is a proven and safe technology that prevents **carbon dioxide** (CO_2) from being released from point sources into the atmosphere.



SUMMARY OF AVAILABLE TECHNOLOGIES

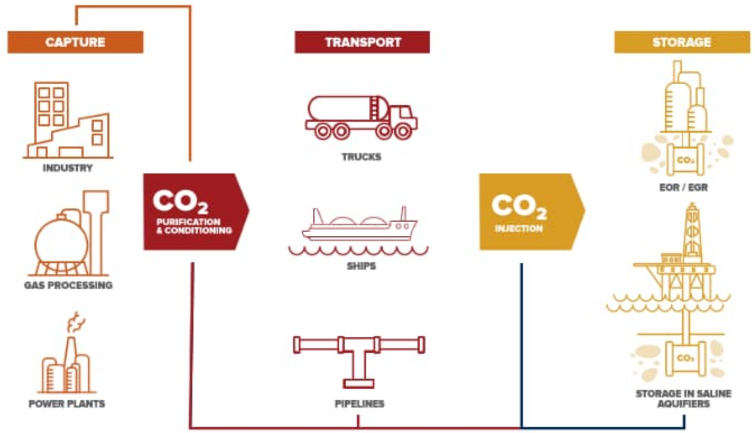
- Absorption with solvents
- Solid adsorbents
- Separation with membranes
- Cryogenic Distillation

CARBON CAPTURE

CARBON CAPTURE, UTILIZATION AND STORAGE

Through our experience in **acid gas treatment** we can approach CCUS processes and technologies where we can easily channel our engineering capabilities to create value.

Siirtec Nigi offers its know-how in **pre-combustion and post-combustion** acid gas treatment technologies and their application in the refinery and oil&gas industry.



CHALLENGE

Minimization of **energy requirements** for capture, together with improvements in the **efficiency** of energy conversion processes are continuing to be high priorities for technology development

LIQUID SOLVENTS

Siirtec Nigi's expertise cover the design of conventional solvent as well as the integration of formulated solvents through **strong partnerships** with major suppliers.

CARBON CAPTURE

CARBON CAPTURE, UTILIZATION AND STORAGE

Through our experience in **oxygen-enriched burner design** we can approach CCUS processes and technologies where we can easily channel our engineering capabilities to create value.

A new approach to CCS, the OXY-FUEL COMBUSTION uses **oxygen** instead of air for combustion, eliminating nitrogen and producing a flue gas that is mainly H_2O and CO_2 which is **readily captured**.

HIGH EFFICIENCY

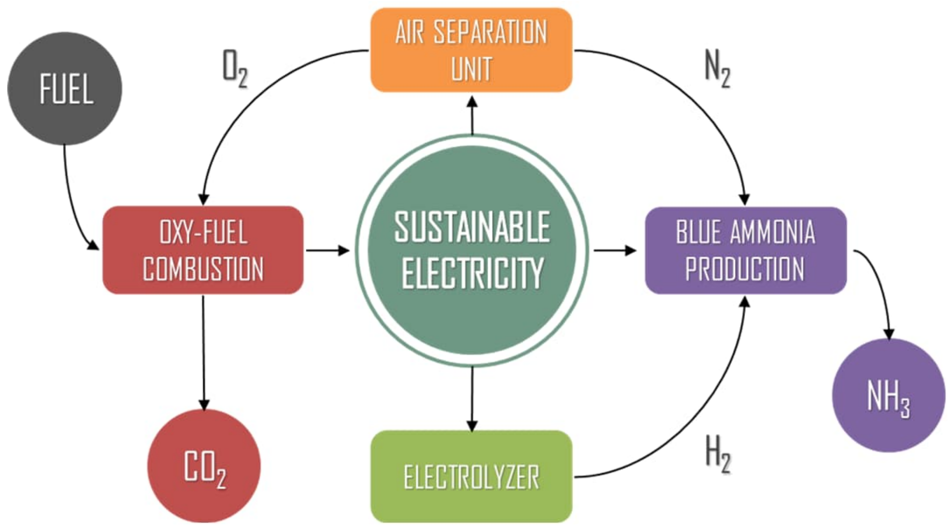
The net flue gas, after cooling to condense water vapor, contains from about 80-98% CO_2 depending on the fuel used and the particular oxy-fuel combustion process. This concentrated CO_2 stream can be compressed, dried and further purified before delivery into a pipeline for storage

INTEGRATED APPROACH

Siirtec Nigi's CCUS Integrated Plant Approach

Applying CCUS technologies means building a profitable energy product portfolio while achieving net-zero greenhouse gas emissions.
This provides another **solution** to the global shift towards clean energy.

A **natural gas** feedstock is burned with pure oxygen. This creates CO_2 that is sent through the rest of the cycle, creating electricity to power adjacent units. Air separation unit provides nitrogen for blue ammonia production.
Excess CO_2 is piped for carbon capture, utilization and storage.



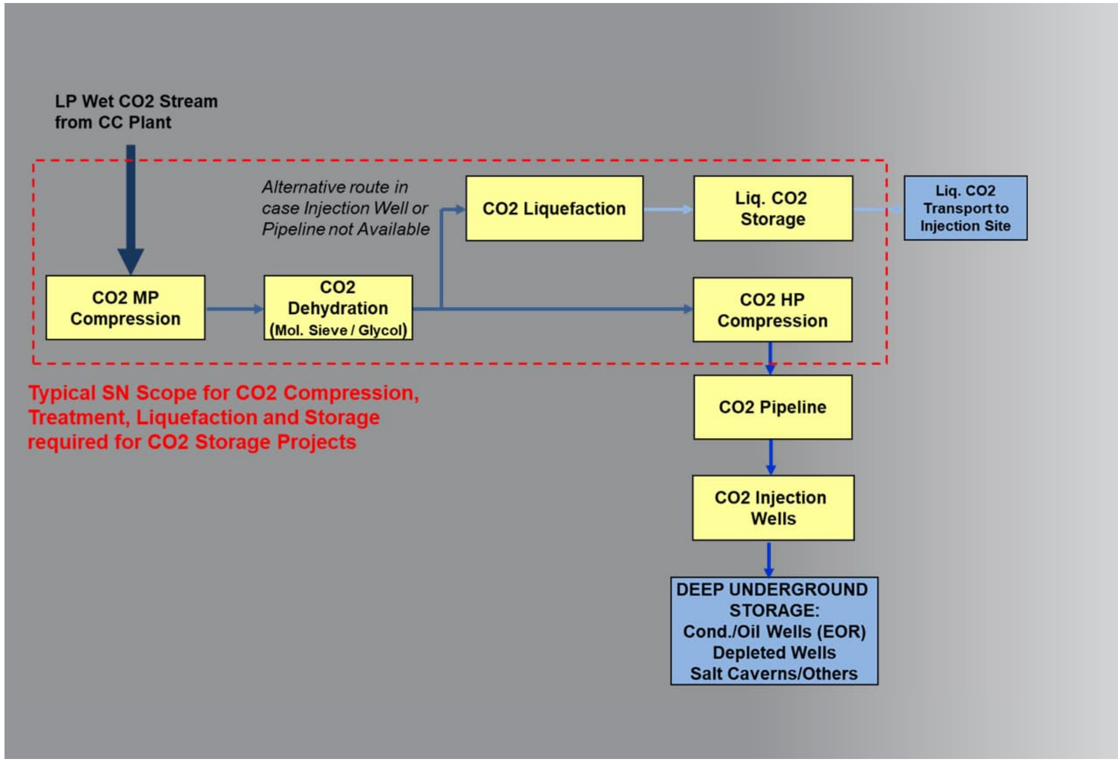
Net Efficiency close to 50%
as energy from Combustion+ASU available to H_2/NH_3 production units
with state-of-the-art Oxy-Fuel and CO_2 recycle technology

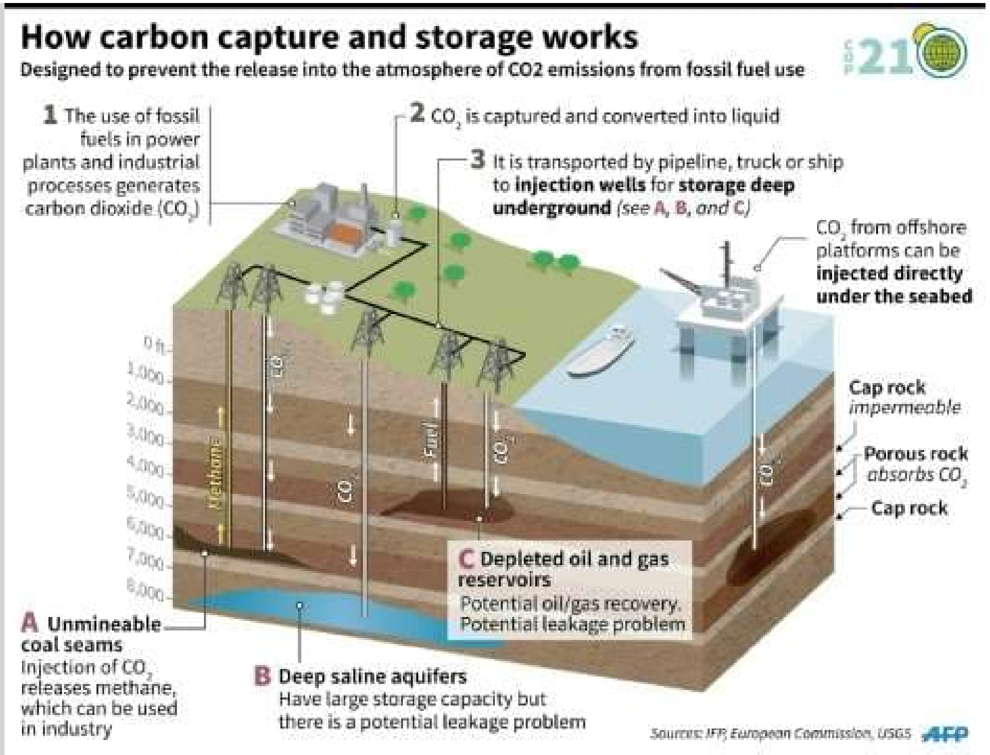
PRODUCT DIVERSITY
A wide array of industrial gases created through the cycle can be produced (e.g. O_2 and Ar), ready to be sold to crucial industries and enhancing the value of the power plant

CO_2 STORAGE

PROJECT REQUIREMENTS

CO_2 Storage Projects requires the mandatory steps of CO_2 **Compression** and CO_2 **Treatment**.
Liquefaction can be also required in case transfer pipeline or injection wells are not available





TECHNOLOGIES

CO_2 COMPRESSION and TREATMENT

Phase Separation & Gas Filtration
CO_2 Compression and Pumping

CO_2 Dehydration and Hydrate Prevention
Glycol Process (TEG, others), Mol. Sieve, Silica Gel

CO_2 Liquefaction
Direct Cooling (Propane Chiller), Cooling by Expansion: Joule-Thompson, Turbo-Expander, Combined Methods

Pressurized CO_2 Storage
Water Wash and Non Regenerative Adsorption
(for CO_2 purification if required for other uses)

EXPERIENCE

Siirtec Nigi has a considerable and consolidated experience in all Technologies involved in CO_2 Compression and Treatment and required for CO_2 Storage Projects with several references for Acid Gas Treatment Units (conceptually identical)

REFERENCES IN ACID GAS & ULTRA-SOUR GAS TREATMENT WITH SIMILARITY TO CO_2 TREATMENT REQUIRED FOR STORAGE PROJECTS

REFERENCES

- Feasibility Study for Acid Gas Treatment and Re-Injection for Kharg Island Project, Iran, IRASCO
  Treatment (TEG Dehydration) and Compression for an acid gas stream generated by the AGR Units of the Kharg Island Project (about 2 $MMSm^3/d$ of CO_2 60%, H_2S 40% at atm. pressure), in cooperation with SOFREGAZ (Client then decided to proceed without acid gas re-injection with the installation of a new SRU).

- Supply of Mol. Sieve Acid Gas Dehydration Plant, Iran, IRASCO
  Dehydration of acid gas stream generated by an AGRU (about 0,5 $MMSm^3/d$ of CO_2 70%, H_2S 30% at 30 bar), to be dehydrated to be delivered through pipeline to remoter SRU Plant (critical points: selection of acid resistant mol. sieve and corrosion).

- Supply of 3 TEG Dehydration Plants for Kashagan Offshore, Kazakstan, KPO
  For each Train: about 14 $MMSm^3/d$, ultra-sour gas stream with 20% CO_2, 22% H_2S at 100 bar, glycol circulation 27 m^3/h at 99,95% purity, required water dew point -40 ºC required for sour gas re-injection and limit for selected glycol process.