Mission Critical Solutions: Carbon Capture

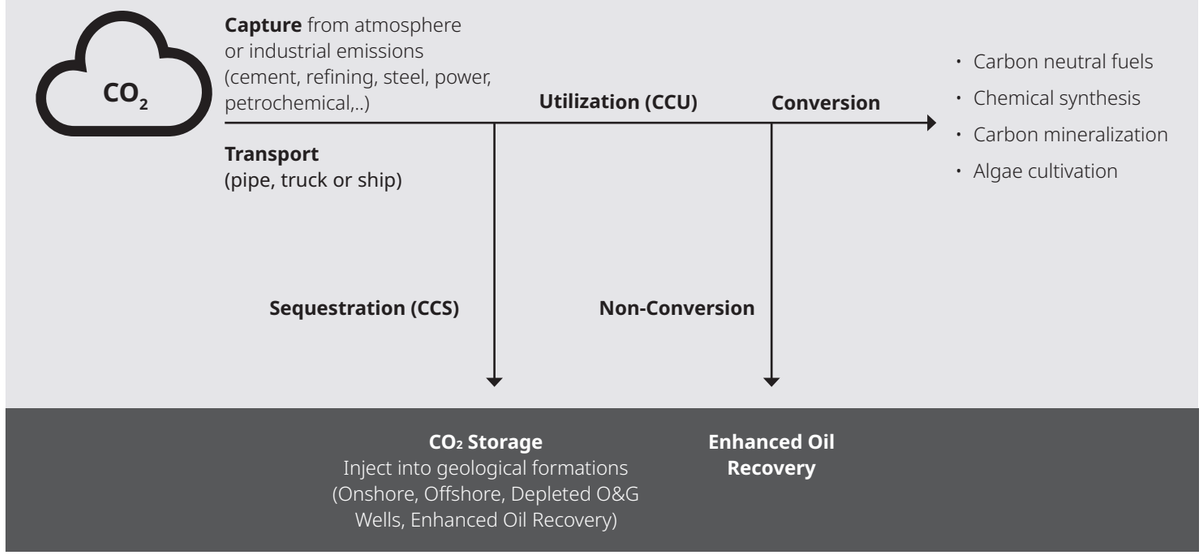
Raychem

In the last 40 years, human-induced CO2 emissions have surged by over 20%, directly contributing to the intensification of the Greenhouse Gas (GHG) effect and the alarming phenomenon of global warming.

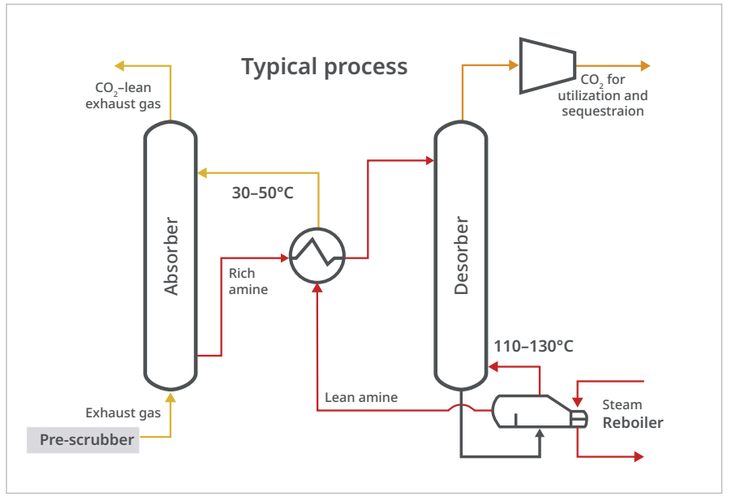
New governmental regulations to meet NetZero by 2050 require that many industries reduce CO2 levels drastically. Carbon capture (utilization) and storage technologies support this conversion.

WHAT IS CC(U)S

CC(U)S= Carbon Capture (Utilization) & Storage



TYPICAL PRODUCTION PROCESS CARBON CAPTURE

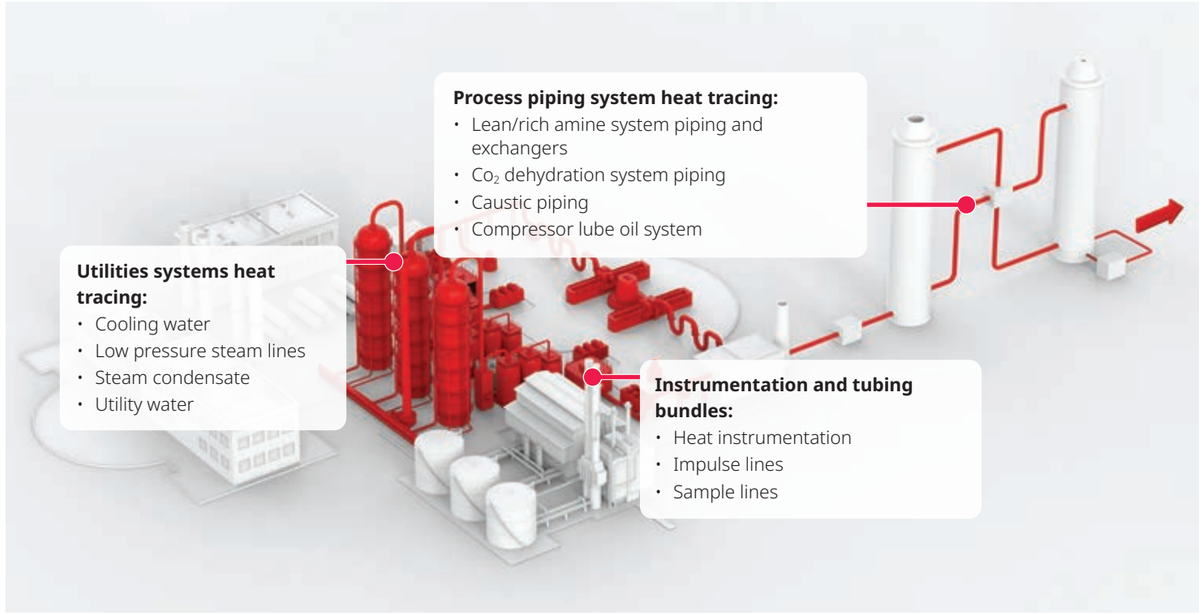


- **Pre-scrubber:** cooling + remove particles
- **Absorber (or scrubber):** CO_2 bonding to Amine, at 30°C–50°C
- **Desorber (or stripper):** CO_2 released from Amine, at 110°C–130°C
- **Reboiler:** 3–4 bar steam required to heat up the desorber
- **Amine:** Compound derived from ammonia e.g. monoethanolamine (MEA), diethanolamine (DEA), diglycolamine (DGA), ...

TYPICAL PRODUCTION CHALLENGES AND HEAT TRACING SOLUTIONS

	Challenges	Solutions
	The absorber requires the **correct temperature band** of the amines, for efficient CO_2 capturing.	• Temperature maintenance of amine process lines • Advanced control & monitoring saves energy and provides data insights to maximize productivity
	The boiler steam lines may require freeze protection to work reliably in cold environments.	• Freeze protection of water and steam lines
	Flue gas pre-treatment may include various technologies: wet/dry scrubbers, sorbent injection, fabric filters, electrostatic precipitators, catalytic reduction with a wide variety of temperature requirements.	• We offer heat-tracing solutions from 5°C to 650°C
	Accurate monitoring of CO_2 concentrations in the CCUS chain is crucial in reducing financial exposure (CO_2 trading schemes) and for safety. Instrument lines shall be traced at a correct temperature.	• We offer complete solutions from 5°C to 650°C, with advanced controls

TYPICAL HEAT TRACING APPLICATIONS



WHY CHOOSE RAYCHEM

Highest quality products	Expertise optimal system design & installation	Reliable performance & lower cost of ownership
• The **inventor** of self-regulating heating technology and High Power Retention (HPR) Technology • Up to +30 year design life • 10-year product warranty	• 200+ expert designers • 6000+ installers • 600,000+ optimized EHT circuits with 3D integrated design & project management software TRACERLYNX	• 600,000 km installed (15x around the globe) in the most remote and harshest environments • Advance control & monitoring • Wide temperature ranges from –200°C to +1000°C

North America
Tel +1 800 545 6258
info@chemelex.com

Latin America
Tel +1 713 868 4800
info@chemelex.com

Europe, Middle East, Africa, India
Tel +32 16 213 511
Fax +32 16 213 604
info@chemelex.com

Asia Pacific
Tel +86 21 2412 1688
infoAPAC@chemelex.com

CASE STUDIES

World's largest CCS project to save 18 million metric tons of CO_2 per year with the help of Raychem's self-regulating heating systems.

Location: Iowa, Minnesota, Nebraska, North Dakota, South Dakota (including 30 ethanol plants)

Completion date: Ongoing

Applications: Pipe freeze protection, Process temperature maintenance

Technology: Raychem Self-Regulating with High Power Retention cable (XTVR), Advanced Control & Monitoring (NGC-30 with PASC control), Supervisor Software

Contract scope: Engineering and Product supply

Major refinery builds Canada's first full-scale CCS facility to capture one million metric tons of CO_2 per year aided by Raychem's heat management systems.

Location: Scotford, Alberta Canada

Completion date: 2015

Applications: Pipe freeze protection, Process temperature maintenance, Longline heating, Instrument winterization

Technology: Raychem Skin-Effect Longline Tracing (STS), Self-Regulating (BTV, XTV), Mineral Insulated (XMI), Advanced Control & Monitoring (NGC-40)

Contract scope: Engineering, design and product supply

Raychem heat tracing: empowering World's first CO_2-capture facility in the cement industry.

Location: Brevik, Norway

Completion date: 2024

Applications: Pipe freeze protection, process temperature maintenance (50°C)

Technology: 6000 meter of HTV cable + 1000 meter of BTV and Raystat V5 digital thermostats

Contract scope: Engineering and Product supply

World's largest CCS test & technology center uses Raychem heat-tracing solutions since 2012.

Location: Mongstad refinery, Norway

Completion date: 2012

Applications: Freeze protection, proces temperature maintenance

Technology: XTV heating cables, advanced controllers

Contract scope: Engineering and Product supply

More information: chemelex.com

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