

**Clarke
Energy**[®]

A KOHLER COMPANY

Engineer - Install - Maintain



Carbon Capture Utilization
& Storage (CCUS)

Turning emissions
into *solutions*.

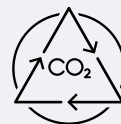


Carbon Capture, Utilization & Storage

Capture and reduce your carbon emissions to help deliver a more *sustainable future*.

Carbon capture, utilization & storage (CCUS) is the process of capturing CO₂ from energy intensive processes before it enters the atmosphere and finding a market use or transport to a storage facility. CCUS is now a key focus globally, with many government's offering incentives to encourage investment.

Clarke Energy has a history of innovation in power generation technologies and is now revolutionizing CO₂ recovery in the energy sector. We can help your business harness the transformative potential of CCUS for a variety of applications and integrate the technology under a reliable single supplier.



Emissions Reduction

Reduce / avoid carbon dioxide emissions from your business and align with global sustainability targets.



Improved Efficiency

Improving energy efficiency of operations can drive cost and carbon savings, boosting profitability.



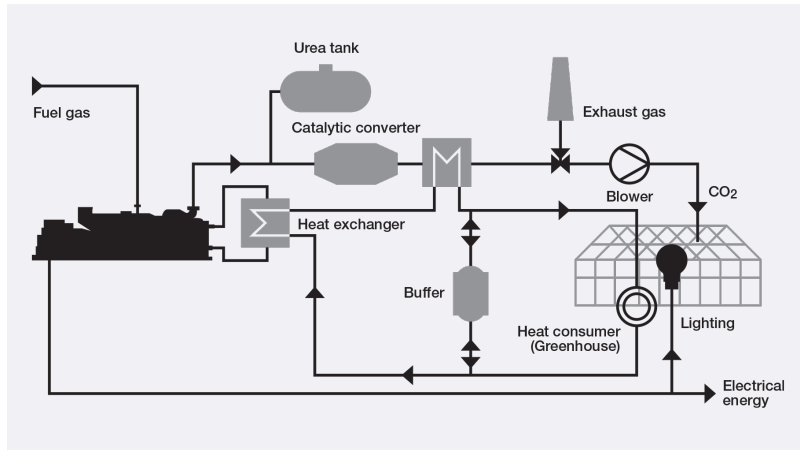
Flexible Future

Apply CCUS to new and existing energy assets to stay agile in a rapidly changing energy landscape.

Leveraging CO₂ for Greenhouse Fertilization

One approach for CCUS involves utilizing flue gas from power generation. This process, ideal for CO₂ fertilization in greenhouses, substantially boosts crop yields. Not only does it capture CO₂ but it also eliminates toxic elements such as NO_x and CO.

The CO₂ concentration matches that of the exhaust gas (around 5% for natural gas operation). However, it doesn't increase CO₂ concentration, making it unsuitable for liquefaction and transportation. Challenges arise when dealing with biogas due to contaminants like H₂S and the variability of feedstock materials. Furthermore, consumables, such as urea, must be considered.



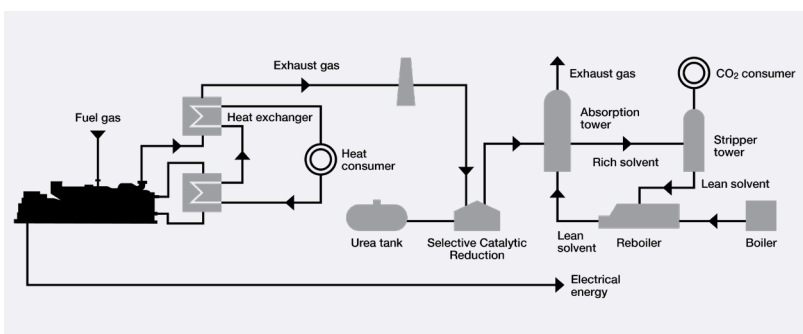
High Grade CO₂ for Food and Drink

Another efficient method focuses on flue gas from engines, particularly those with low CO₂ concentrations. This approach meets the high-purity CO₂ requirements of food and beverage standards.

However, toxic components, namely NO_x and CO, necessitate removal using equipment akin to the Selective Catalytic Reduction & CO Catalyst solution.

Solvents like amines or hot potassium carbonates are employed to capture CO₂. Although this system incurs substantial capital and operational costs, it currently stands as the sole commercially viable method for achieving high-purity CO₂ from hot flue gases.

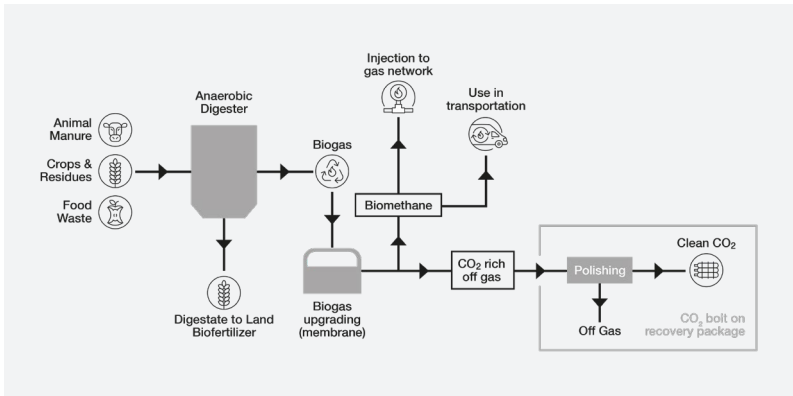
Keep in mind the need for consumables, including steam for solvent regeneration, electricity, and chemicals, as well as cooling water.



Reliably Monetize Your Biogas with CO₂ Recovery

This approach revolves around the off-gas generated during biogas upgrading, specifically the CO₂ separation process. It is particularly well-suited for gases with high CO₂ concentrations and can meet the stringent purity requirements of food and beverage standards.

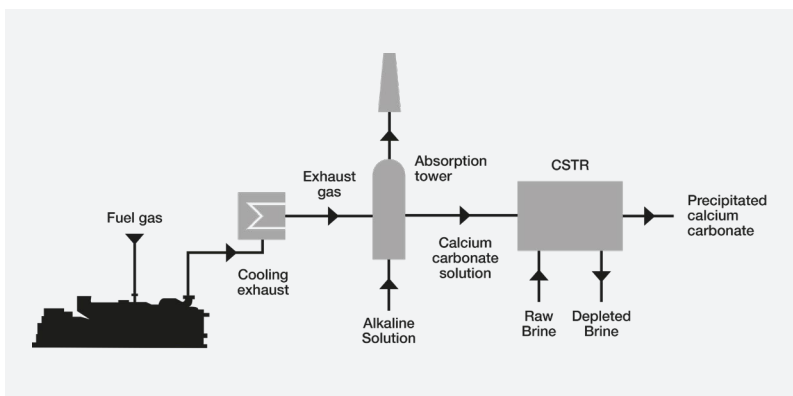
Notably, it enhances the overall efficiency of the biogas upgrading system by separating the remaining methane in the off-gas and recirculating it to the inlet of the upgrading system. Considerations include electrical consumption and absorbents for purification, albeit in minor quantities.



Calcium Carbonate from Advanced Mineralization

This technique transforms carbon dioxide into high-grade precipitated calcium carbonate. The process utilizes brine and alkaline solutions, offering a unique and promising approach to carbon utilization and storage.

Calcium carbonate can be used in various applications such as construction materials, aggregates and other industrial products.



To contact Clarke Energy
please visit our website:

www.clarke-energy.com

