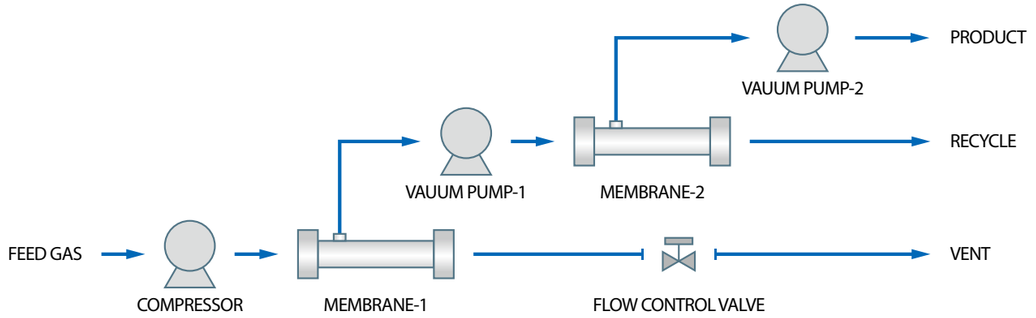
CCUS & Clean H_2

Schematic Diagram



In order to prevent global climate change, technologies to reduce greenhouse gas emission is widely studied in the world. Airrane has been conducting research and development for many years to commercialize a membrane technology for CO_2 captures from flue gas emitted through stacks of various industries. As a result, Airrane commenced a project to supply a CO_2 separation membrane system to a commercial facility that collects 200,000 tons of CO_2 per year from a petrochemical plant flue gas. Based on this experience, we are expanding CO_2 capture business to power plants, steel mills, hydrogen production facilities and fuel cell power stations. The captured CO_2 through this process is liquefied and supplied to fresh food distributors, home shopping companies, and shipbuilders.

Top CO_2 Disposal Industries

Fossil fuel power plant

Steel industry

Cement industry

Petrochemical industry

Advantages of Membrane CCUS Technology

The CO_2 capture technologies are largely categorized in water-lean solvent method using liquid absorbent like amine or ammonia and membrane separation method. Each technology has advantages and disadvantages depending on the conditions of CO_2 emitting source. Membrane method is generally considered for higher CO_2 concentration source, while amine method is applied to lower CO_2 concentration. In reality, most of CCUS candidate locations need a retrofit designing because of the limited space to install. Membrane CCUS facility requires only 1/6 of the area compared to amine CCUS facility. On top of it, membrane is advantageous for resident acceptance and regulations like REACH.

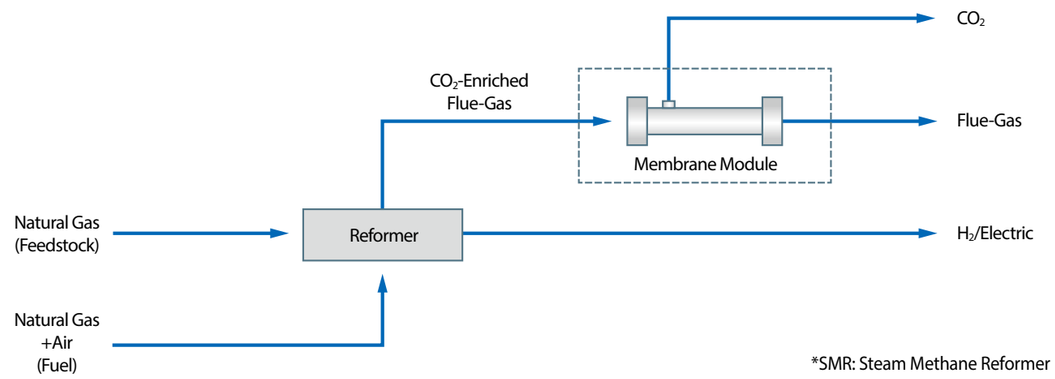
Korea District Heating Corp.

Lotte Chemical

Membrane CCUS Demonstration Cases

Item		Coal Power Plant Flue gas	LNG Power Plant Flue gas	Cement Kiln Flue gas	NCC Flue gas
Site		Daejeon	Pangyo, Suseo	Okgye	Yeosu
Membrane Process Design		2stage	3stage	3stage	3stage
Feed	Feed gas amount	110m^3/hr	400m^3/hr	2,000m^3/hr	300m^3/hr
	CO_2 Conc.	13.6~15%	4.5~8%	15~22.6%	13~14%
	O_2 Conc.	0.7~3.4%	5.5~12.8%	9.9~14.3%	4~5%
	NOx	-	-	45~54ppm	~ 50ppm
	DUST	15~22mg/m^3	~2mg/m^3	serious	< 1mg/m^3
Product	CO_2 Conc.	83.9~84.2%	65~84.9%	85.4~90.4%	90~95%
	CO_2 recovery(%)	84~86.5%	69~82%	71~92%	80%

Schematic Diagram of CO_2 Capture for SMR/H_2 Fuel Cell System



*SMR: Steam Methane Reformer