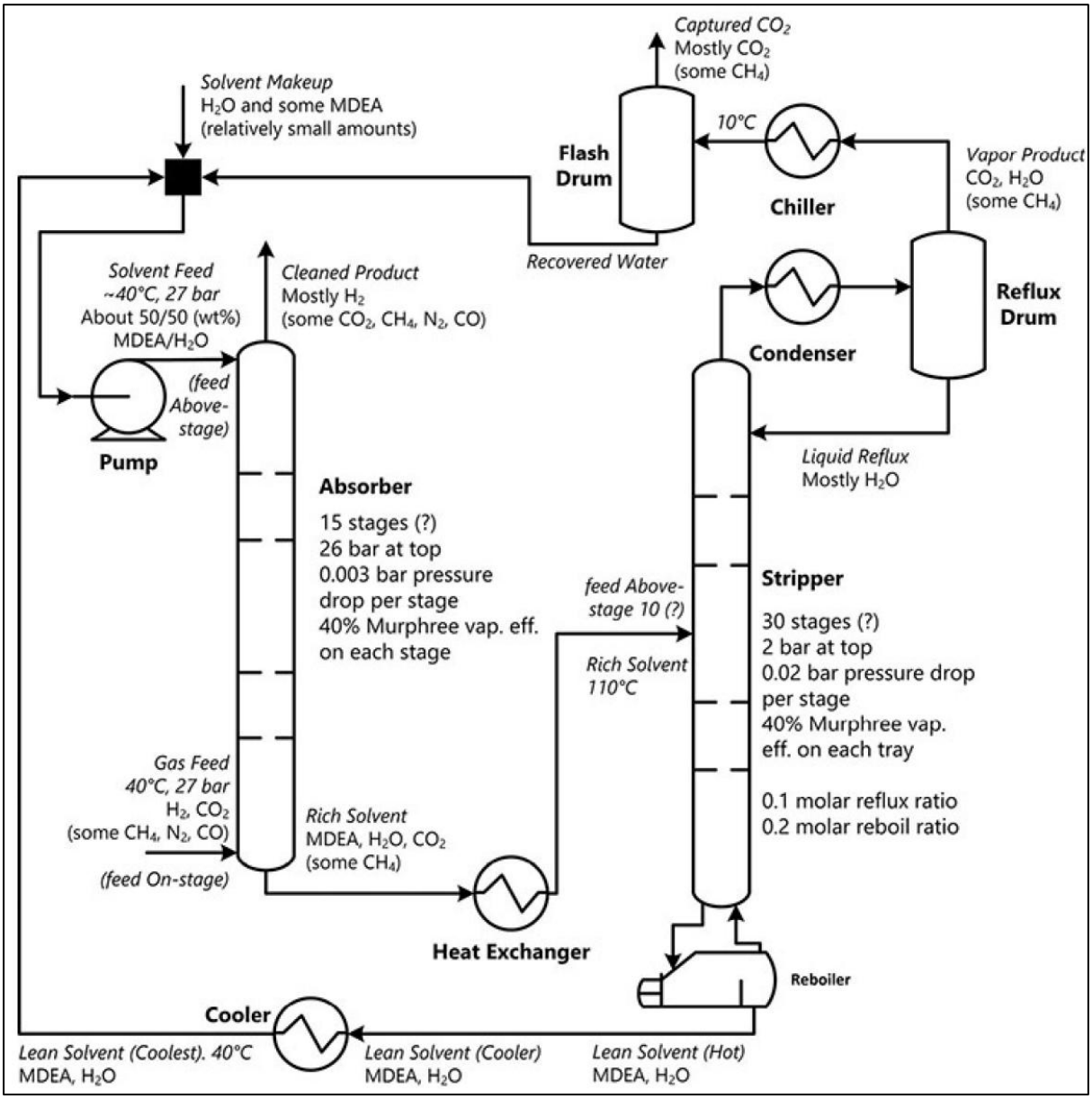
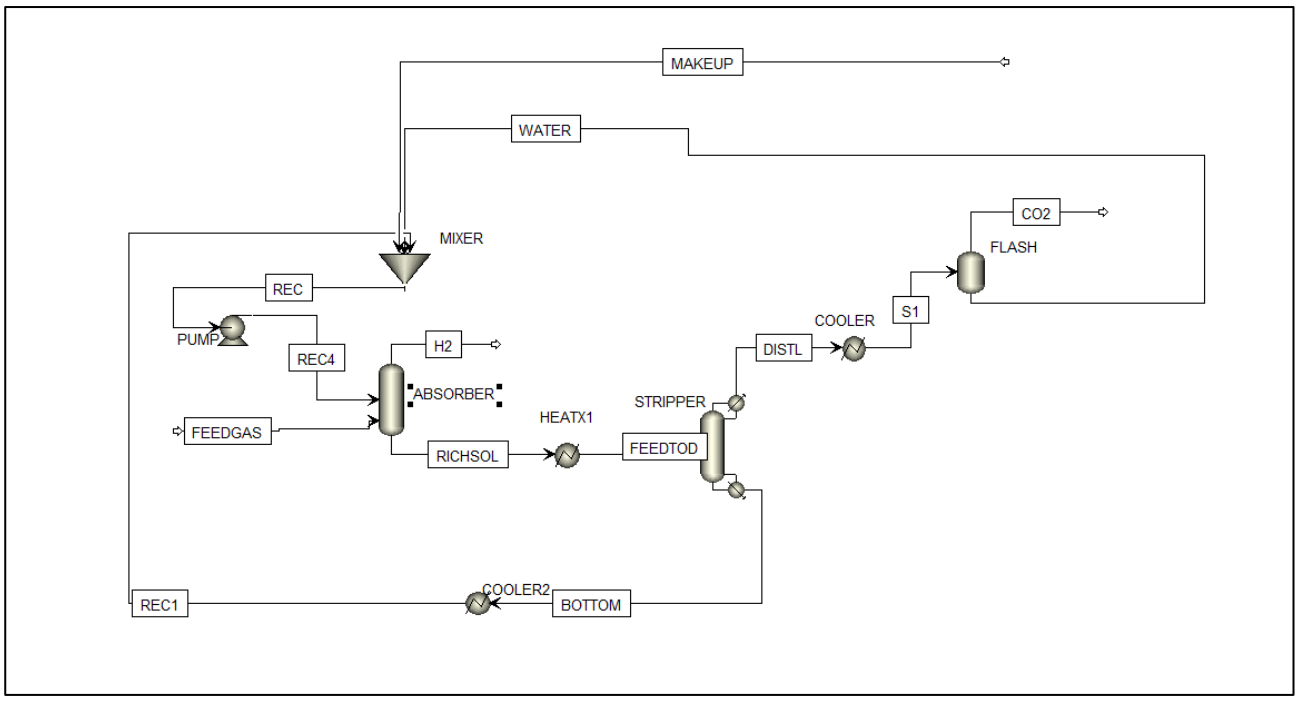
An Aspen Plus project on CO2 capture from flue gas by MDEA solvent



In this process, we have 100 tonne/hr of gas at 40°C and 27 bar from the upstream dewatering step, containing 74.5 mol% H2, 18.9% CO2, and then small remainders like 5.8% CH4 (unreacted natural gas left over from our original feed), 0.4% CO (unreacted gas left over from the water gas shift reactor), 0.2% H2O, and 0.2% N2 (natural gas can sometimes contain a little nitrogen).

Flowsheet:



Results:

94-95 % CO_2 captured

	Units	FEEDGAS	H2	CO2	
Mass Density	kg/cum	11.2992	3.54893	3.64738	
Enthalpy Flow	Gcal/hr	-172.878	-19.0665	-156.599	
Average MW		10.9543	3.64153	42.4566	
− Mole Flows	**kmol/hr**	**9128.87**	**7437.48**	**1736.67**	
H2O	kmol/hr	18.2577	52.5583	10.9747	
MDEA	kmol/hr	0	0.0123029	1.06809e-11	
H2S	kmol/hr	0	0	0	
CO2	kmol/hr	1725.36	86.275	1639.08	
CH4	kmol/hr	529.474	443.728	85.7465	
CO	kmol/hr	36.5155	35.9238	0.59164	
N2	kmol/hr	18.2577	17.9809	0.276794	
H2	kmol/hr	6801.01	6801	0.00557778	
HCO3-	kmol/hr	0	0	0	
MDEA+	kmol/hr	0	0	0	
CO3-2	kmol/hr	0	0	0	
HS-	kmol/hr	0	0	0	
S-2	kmol/hr	0	0	0	
H3O+	kmol/hr	0	0	0	
OH-	kmol/hr	0	0	0	
+ Mole Fractions					
− Mass Flows	**kg/hr**	**100000**	**27083.8**	**73733.1**	

Stripper composition profile