Energy generation using CO2 - Closed loop thermodynamic system

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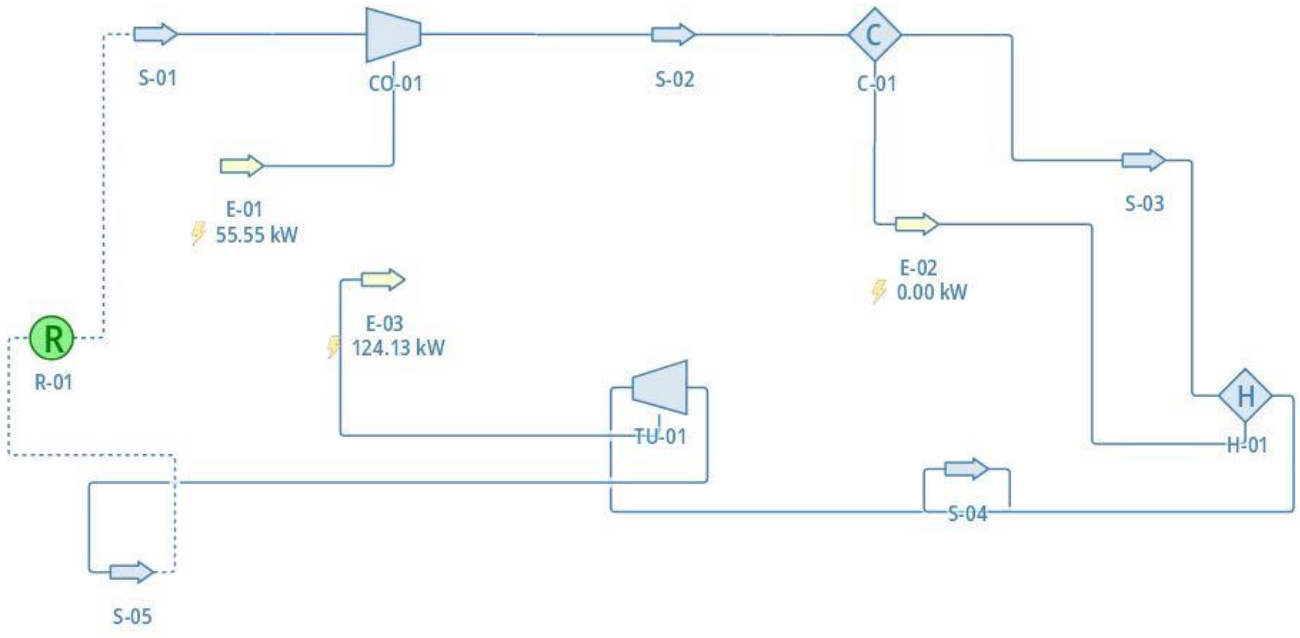
Background & Description:

Energy Dome is a company working on creating cost-effective, renewable and green technologies to produce energy. Their recent innovation is a closed-loop thermodynamic system that uses CO2 as a working fluid to generate energy. This project explains how the system works using DWSIM.

CO2 at first is stored in a huge inflatable dome under ambient conditions. When the process starts, the system uses surplus energy from the renewable energy grid to run the compressor which liquefies the CO2. Then the heat produced in the compression process will be removed from CO2 and stored away. The now cooled and liquified CO2 is stored in cylinders. When all the CO2 in the dome is liquified, the energy generation phase starts. Here, the liquified CO2 is pumped back to a column where the initially removed and stored heat is given back to CO2. The liquid CO2 at this point will be in the vapour phase and at high pressure. This CO2 is then directed to a turbine. The high-pressure CO2 gas rotates the turbine generating energy. Then the CO2 is stored back in the inflatable dome and the cycle repeats except for the energy it uses in further phases to run the compressor will be part of the energy generated in the previous cycle. CO2 is recycled in flowsheet to depict closed loop system.

Flowsheet:



Results:

E-01	Energy Flow	55.545 kW
E-03	Energy Flow	124.131 kW
CO-01	Outlet Pressure	19 bar
TU-01	Outlet Pressure	1.01325 bar

Reference:

https://youtu.be/GSzh8D8OfOk