

Abbreviations

AR	Annual Revenue
CaL	CaCO ₃ /CaO cycling
CaL-CPP	Calcium Looping integrated with a Coal-Fired Power Plant
CCUS	Carbon capture, utilization, and storage
CSP	Concentrated Solar Power
DRM	Dry reforming of methane
EG	Electric generator
HEN	Heat Exchange Network
HTR	High-temperature recuperator
IGCC	integrated gasification combined cycle
IRR	Internal Rate of Return
LCOE	Levelized cost of electricity, ¥/kWh
LTR	Low-temperature recuperator
LMTD	Logarithmic mean temperature difference, K
M¥	Million CNY
MW	Megawatt
NPV	Net Present Value
PtX	Power-to-X
sCO ₂	Supercritical CO ₂
SEC	Specific energy consumption
TAC	Total Annualized Cost
TPC	Total Plant Cost

Greek symbols

β	Compression flow split ratio
λ	CO ₂ capture rate of the flue gas
ΔH	Reaction enthalpy, J/mol
η	Efficiency

Nomenclature and letters

A	Heat transfer area, m ²)
c	Normalized cost coefficient, ¥/(W/K)
CaCO ₃	Calcium carbonate
CaO	Calcium oxide
CH ₄	Methane
CO	Carbon monoxide
CO ₂	Carbon dioxide
c_p	Constant-pressure specific heat, J/kg
E	Energy/Exergy, J
F	Molar flow, mol/s
h	Sensible enthalpy, J/kg
H	Sensible enthalpy, J/kg
H ₂	Hydrogen
I	Exergy loss, J
m	Mass flowrate, kg/s
P	Pressure, ba
Q	Heat, J
r	Discount rate
S	Entropy, J/kg/K
syngas	Synthesis gas
T	Temperature, K
U	Heat transfer coefficient, W/(m ² ·K)
W	Power flux, W
X	CaO conversion
y	Mole fraction of inlet flue gas

Subscripts

C1	Main compressor
calc	Calciner
carb	Carbonator
chem	Chemical
comp	Compressor
elec	Electricity cost
H	Brayton cycle's maximum pressure
i	Component i
R	Reaction
recup	Recuperator
ref	Reference
unr	Unreaction
max	Maximum values

MH	Intermediate turbine pressure
min	Minimum value
ML	Intermediate compressor pressure
OLC	Operating labor cost
turb	Turbine
WH	Waste heat