



كلية الهندسة  
College of Engineering

# SYNGAS PRODUCTION FROM BIOMASS GASIFICATION PROCESS

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COLLEGE OF ENGINEERING  
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رؤية  
2030  
المملكة العربية السعودية  
KINGDOM OF SAUDI ARABIA

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## OBJECTIVES:



Convert biomass  
into clean energy.



Produce low-  
emission CO<sub>2</sub>



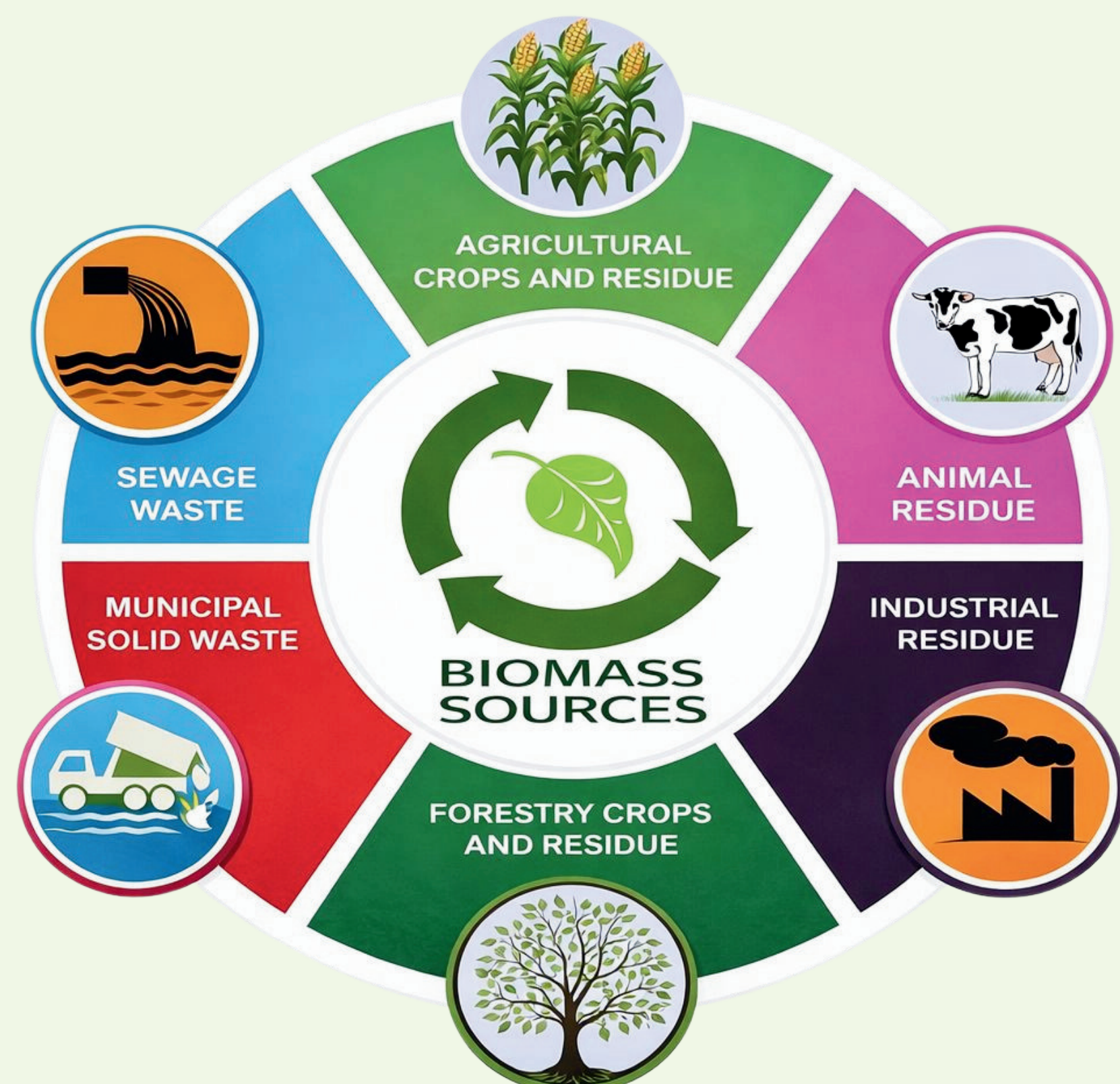
Reduce  
environmental  
impact.



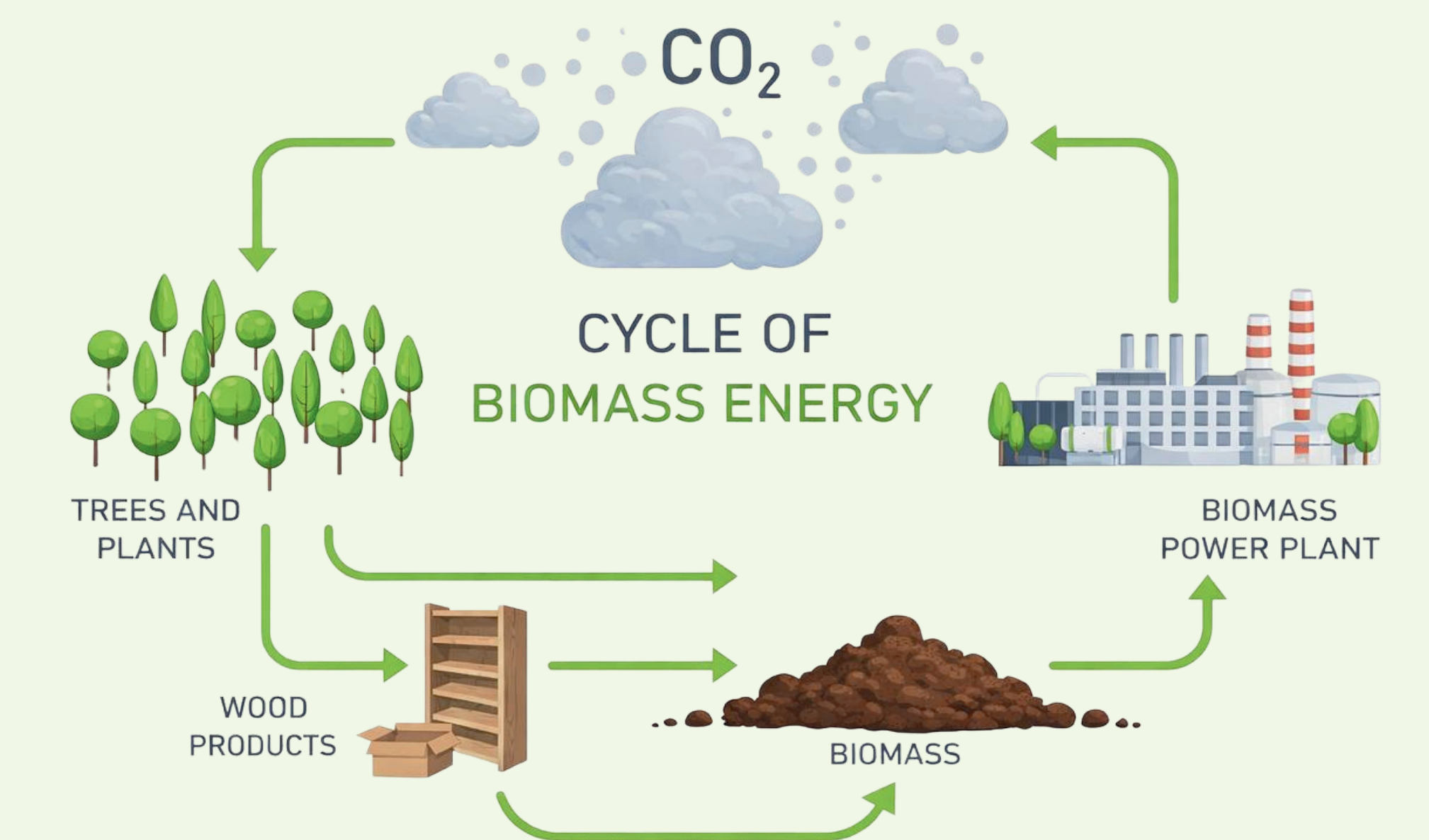
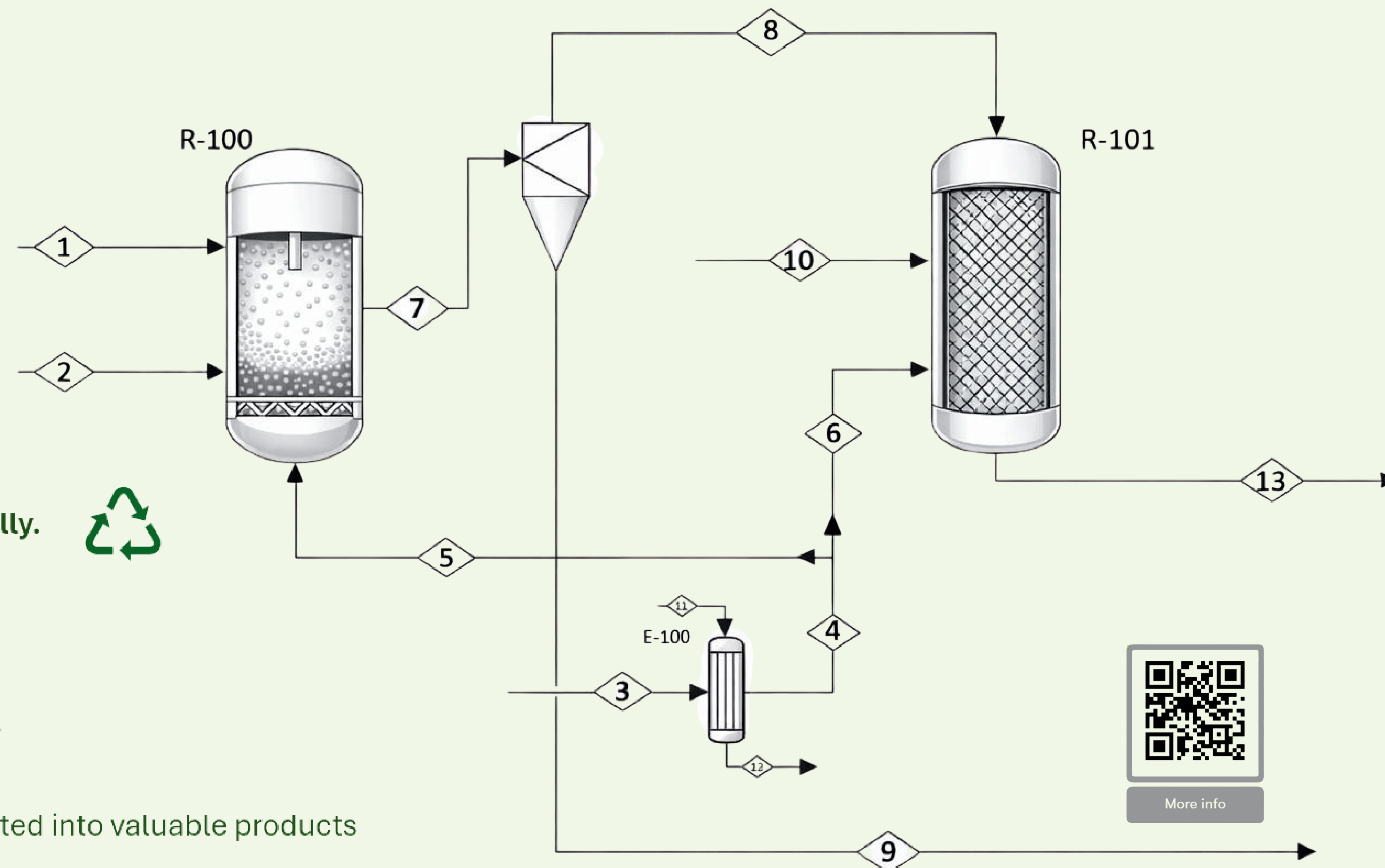
Utilize agricultural  
waste.

## Agricultural Waste in Saudi Arabia

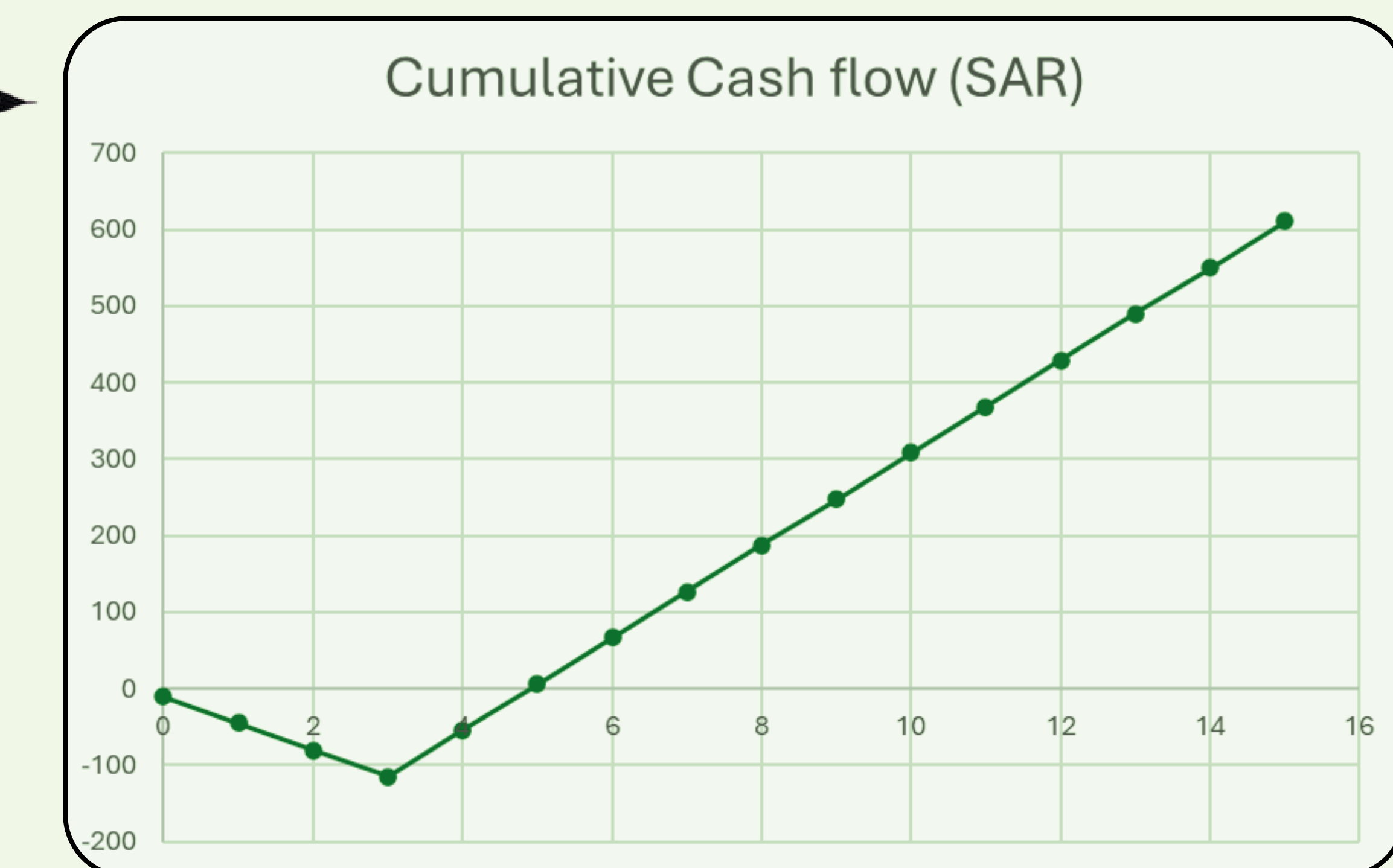
- Over 1.6 million tons of plant-based agricultural waste annually.
- Includes palm residues and field crop waste.
- Improper disposal causes environmental and economic impacts
- These wastes represent a potential resource that can be converted into valuable products such as energy, fertilizers, and industrial raw materials.



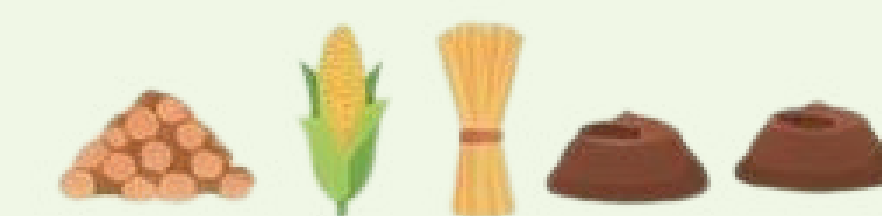
## FLOWSHEET



## ECONOMY ANALYSIS



## BIOMASS



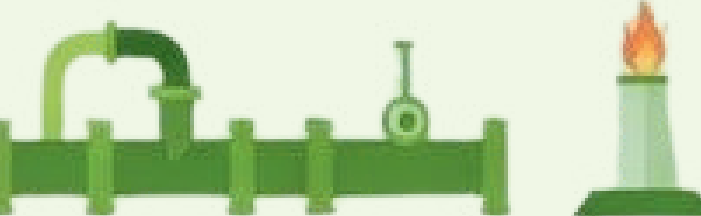
Organic matter from  
plants & animals  
A renewable energy source.



THERMOCHEMICAL  
CONVERSION  
(GASIFICATION)



## SYNGAS

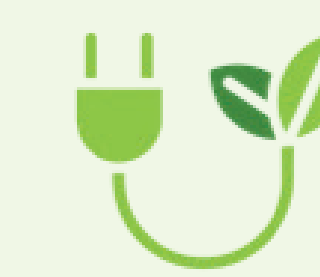


Synthesis Gas. A fuel gas  
mixture primarily composed H<sub>2</sub>,  
CO<sub>2</sub> (Hydreson), Carbon Monoxide,  
and some CO<sub>2</sub> & CH<sub>4</sub>. Used for  
energy, fuels & chemicals.

## Project Results:



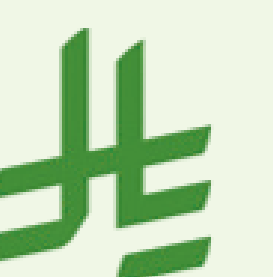
Recycle the  
Waste of  
Agricultural



Produce a New  
resource for  
Energy



Syngas Production  
298,541 kmol/hr  
52% H<sub>2</sub> | 25% CO



Gaining 630M  
SAR/Y