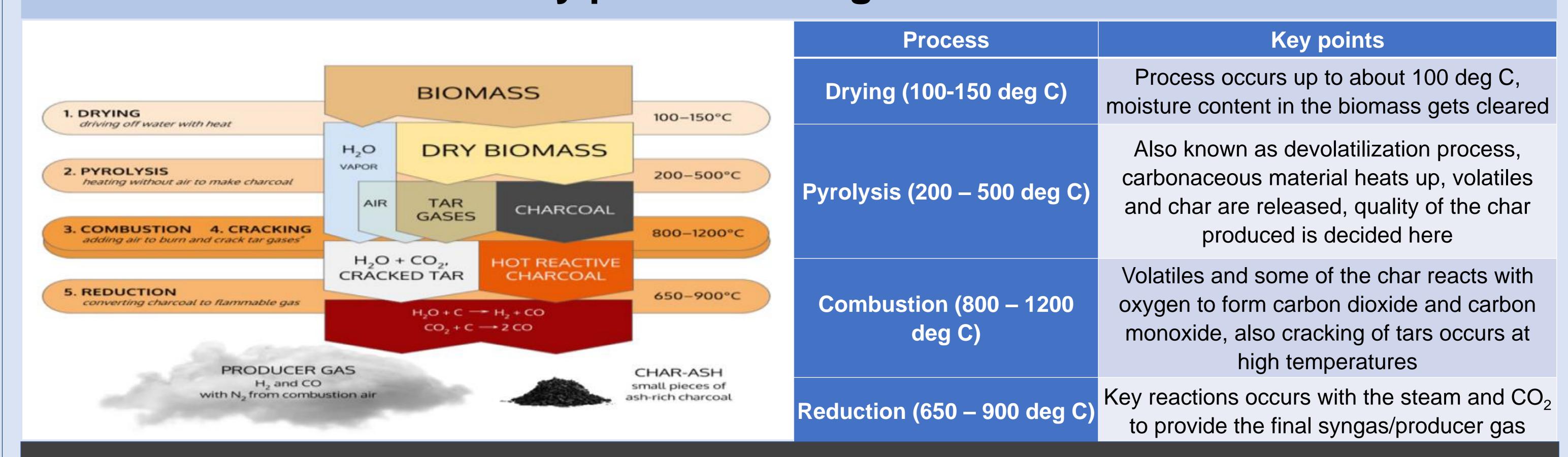
BIOMASS GASIFICATION



Combustion Vs Gasification

Combustion vs Casincation							
"Combustion is the Oldest method of Harnessing Energy from Biomass"			Process	Combustion	Gasification		
			Heat and Non	Feed	Biomass	Biomass	
			Reactive gas	Oxidant	Air	Air, Oxygen, Steam	
1 kg of wood	6 kg of oir	7 kg of flue gas (CO ₂ , H ₂ O, N ₂)		Oxygen stoichiometry	6 kg of air	2 kg of air	
1 kg of wood	6 kg of air			Heat supply	Auto-thermal	Auto-thermal	
			Operating temperature(deg C)	850 - 1200	550-900		
			Heat and	Gas/Energy	Inert	Combustible	
			Reactive gas	Calorific value(MJ/Kg)	Nil	5 to 12	
1 kg of wood	1.75 kg of air	2.75 kg of syngas (H ₂ , CO, CO2, CH ₄ , N ₂)		Main products	Gases such as CO ₂ , H ₂ O, N ₂ , heat	Gases such as H_2 , CO, CO2, CH ₄ , N_{2} , H ₂ 0 heat and tar	

Key processes in gasification



Key reactions in gasification

Chemical Reactions	Identified as
$C + H_2O \rightarrow CO + H_2$	Water-Gas Reaction (-131.4 kJ/mole)
$C + CO_2 \rightarrow 2CO$	Boudouard Reaction (-172.6 kJ/mole)
$C + 2H_2 \rightarrow CH_4$	Methanation Reaction (+75 kJ/mole)
$CO + H_2O \leftrightarrow CO_2 + H_2$	Water-Gas-Shift Reaction (+41.2 kJ/mole)

10 KGPH Gasifier





50 KGPH Gasifier

100 KGPH Gasifier



Combustion, Gasification and Propulsion Laboratory Interdisciplinary Centre for Energy Research

