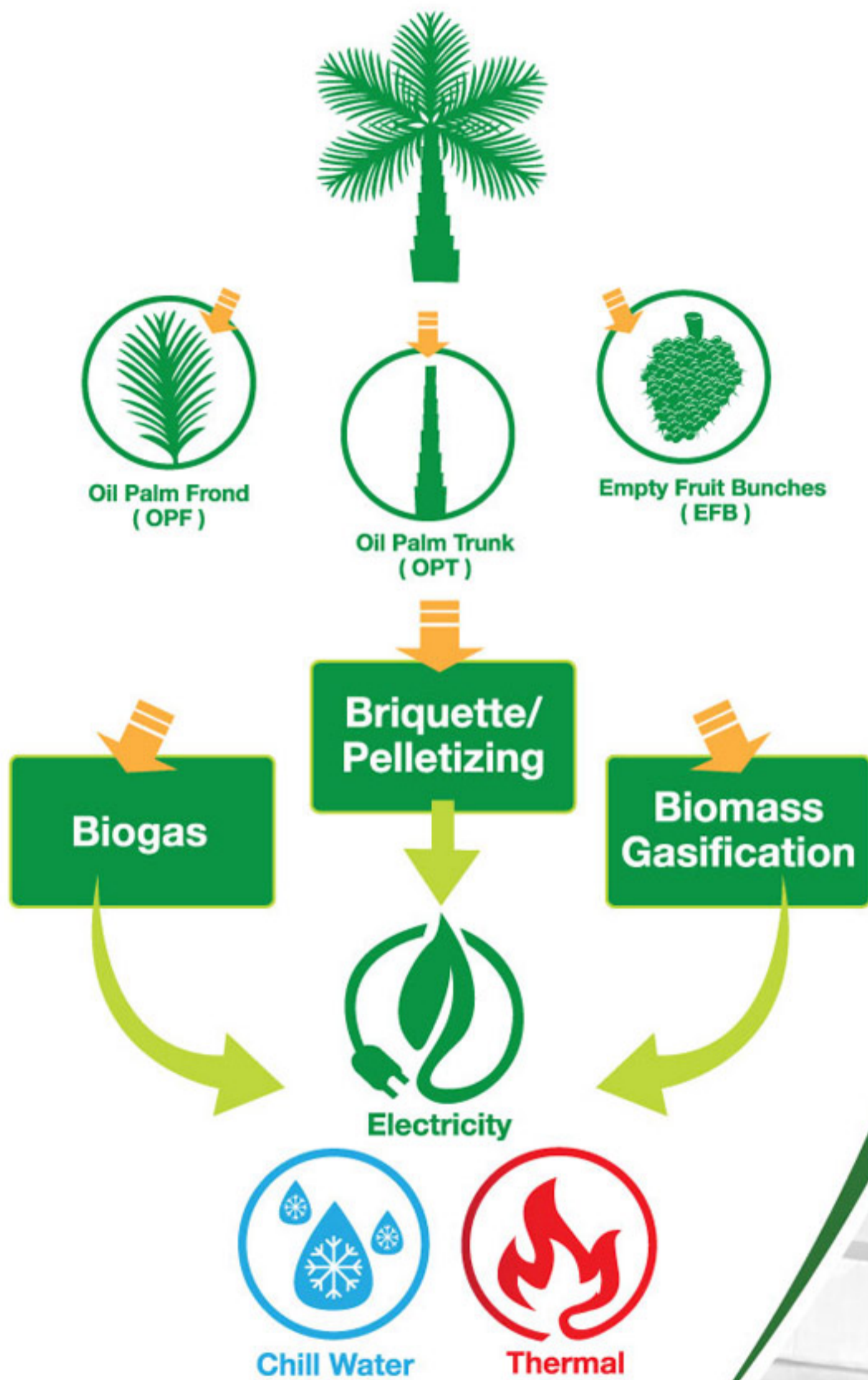




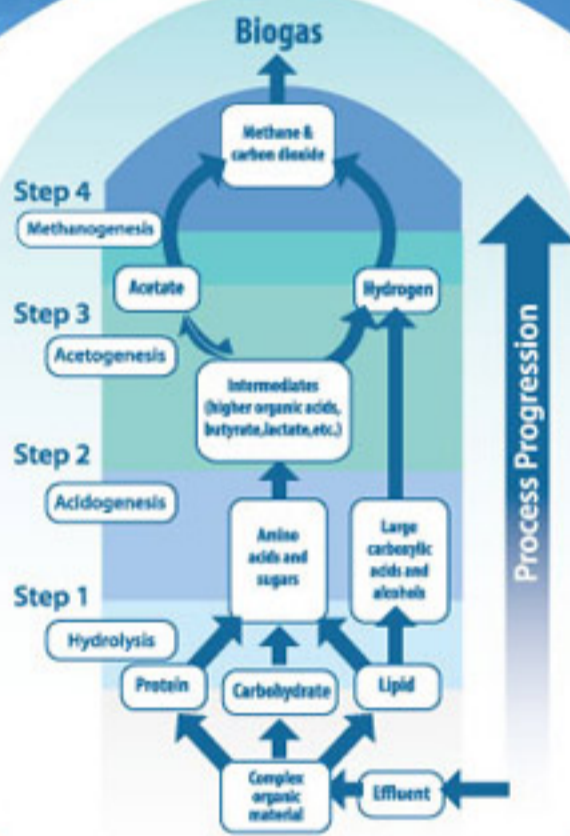
Renewable Energy

Renewable Energy

IPALM



Biogas



Biogas for POME	
Location	Trang Province, Thailand
Capacity	30 tons FFB/hour
Characteristic of W/W	250 m ³ /day COD = 60,000 mg/l, BOD = 40,000 mg/l, pH = 4.3
Biogas Information	
Technology	Hybrid Channel Digester of ERDI Nakhonping Chiangmai University
Digester Sizing	4,000 m ³ @2 unit (8,000 m ³ Digester Volume)
Biogas Production	7,000-8,000 m ³ at 55 % Methane Content
Biogas Utilization	
Electrical Produce	1 MW at 13 hours/day
Generator Set	Guascor 0.95 MW@1 unit
Efficiency Data	
COD Removed	85%-90% (Influent 60,000mg/l- Effluent 2,000-9,000 mg/l)
Last Pond	COD, 600 mg/l
Investment & Income Data (Approx)	
Investment (Biogas & Gas Utilization only)	55 Million Thai Baht (THB)
Income	0.85-1.2 Million Thai Baht(THB)(Normal Operation)
CDM Information	
Tons Carbon	Estimated 20,000 tons carbon/year

Briquette/Pelletizing

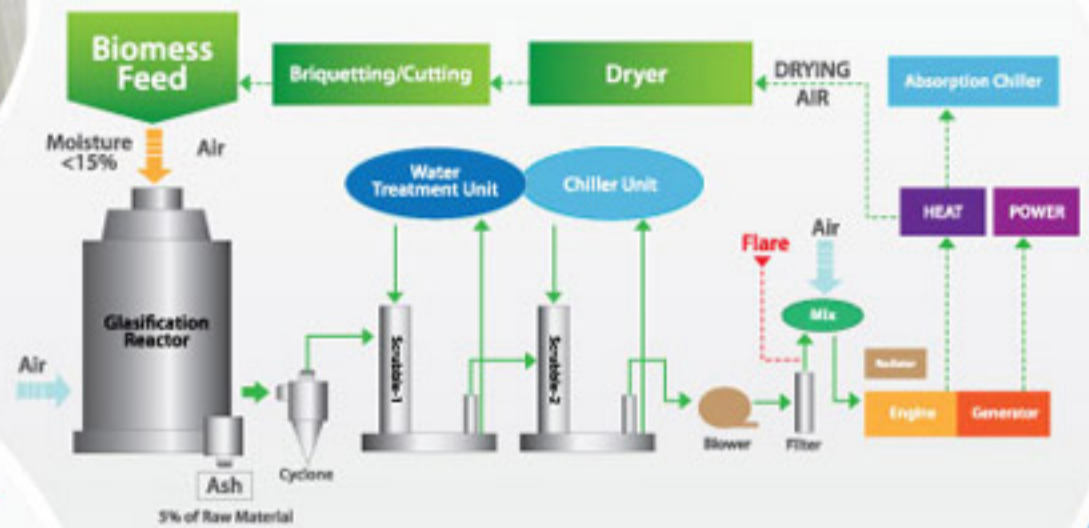


<i>PALM EFB</i>			
	Briquette	Pellet	Unit
Moisture	12-15	10-12	wt %
HHV	4350-4500	4450-4750	kcal/kg
Ash	5.2	5.2	wt %
Bulk Density	0.52-0.55	0.65-0.68	kg/l

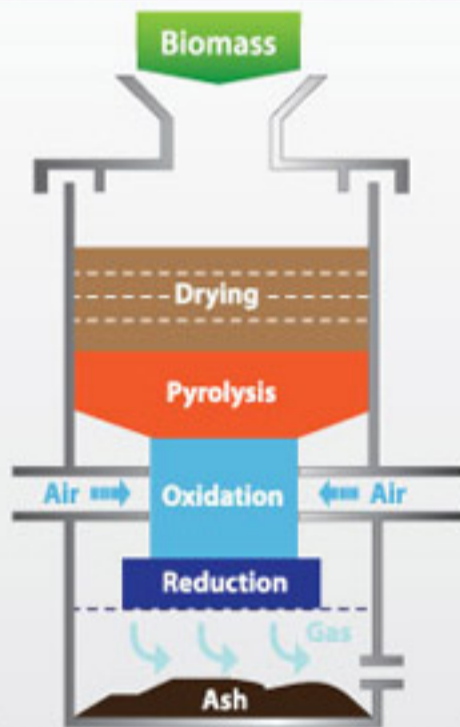
Biomass Gasification



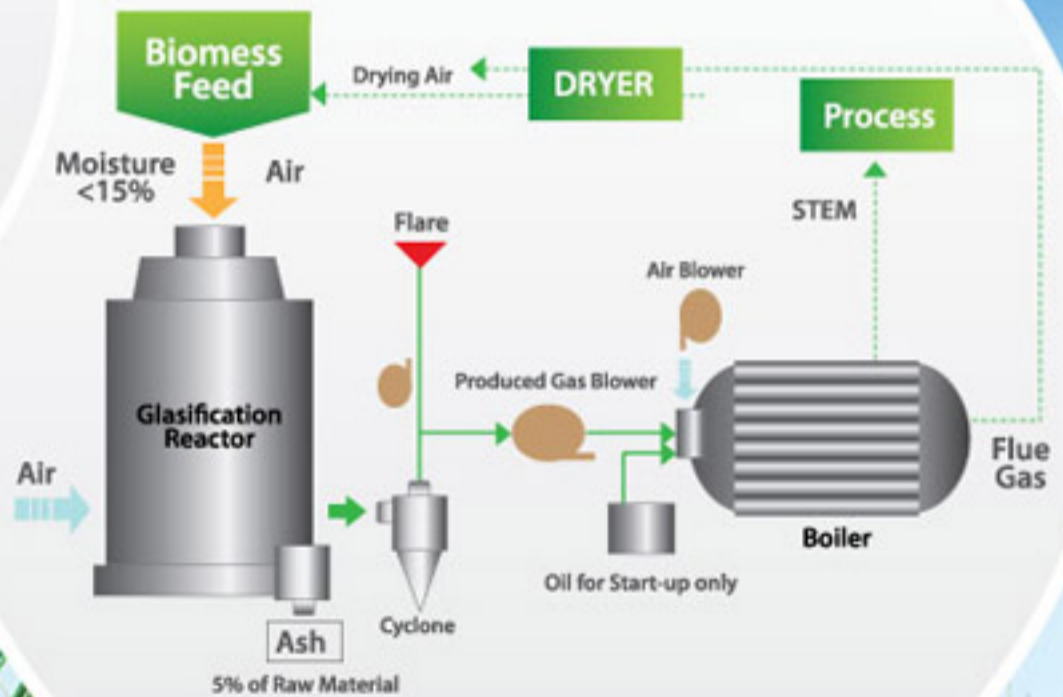
Flow of Biomass Gasification Power Plant



Principle of Gasification Power Plant



Flow of Biomass Gasification For Heat Duty



Heat Utilization

Dryer for Biomass, Food Process

Electricity

CPP, VSPP

Ash

Fertilizer, AC for Water Treatment

Biomass Gas

H ₂ : 18-20%	CO : 18-20%
CH ₄ : 1-2%	CO ₂ : 12-14%
N : 45-48%	O ₂ : 1-2%
HVN : 4.5-4.8 MJ/M ³	



will work for trees



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