

BELTRAN TECHNOLOGIES, INC.
Newyork, USA

**INTENSIVE MSW-RDF GASIFICATION
AND SYNGAS CLEANUP FOR
GREEN POWER GENERATION**

Presented by

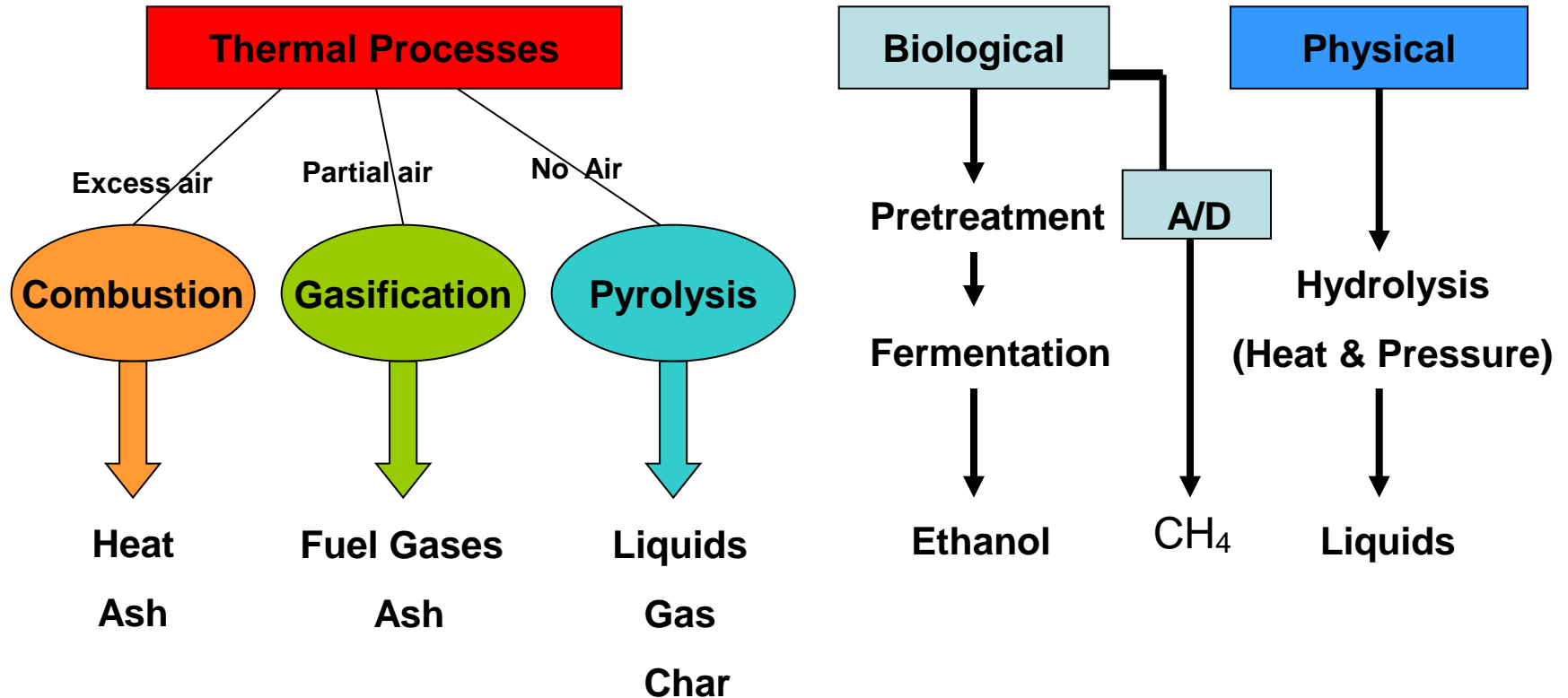
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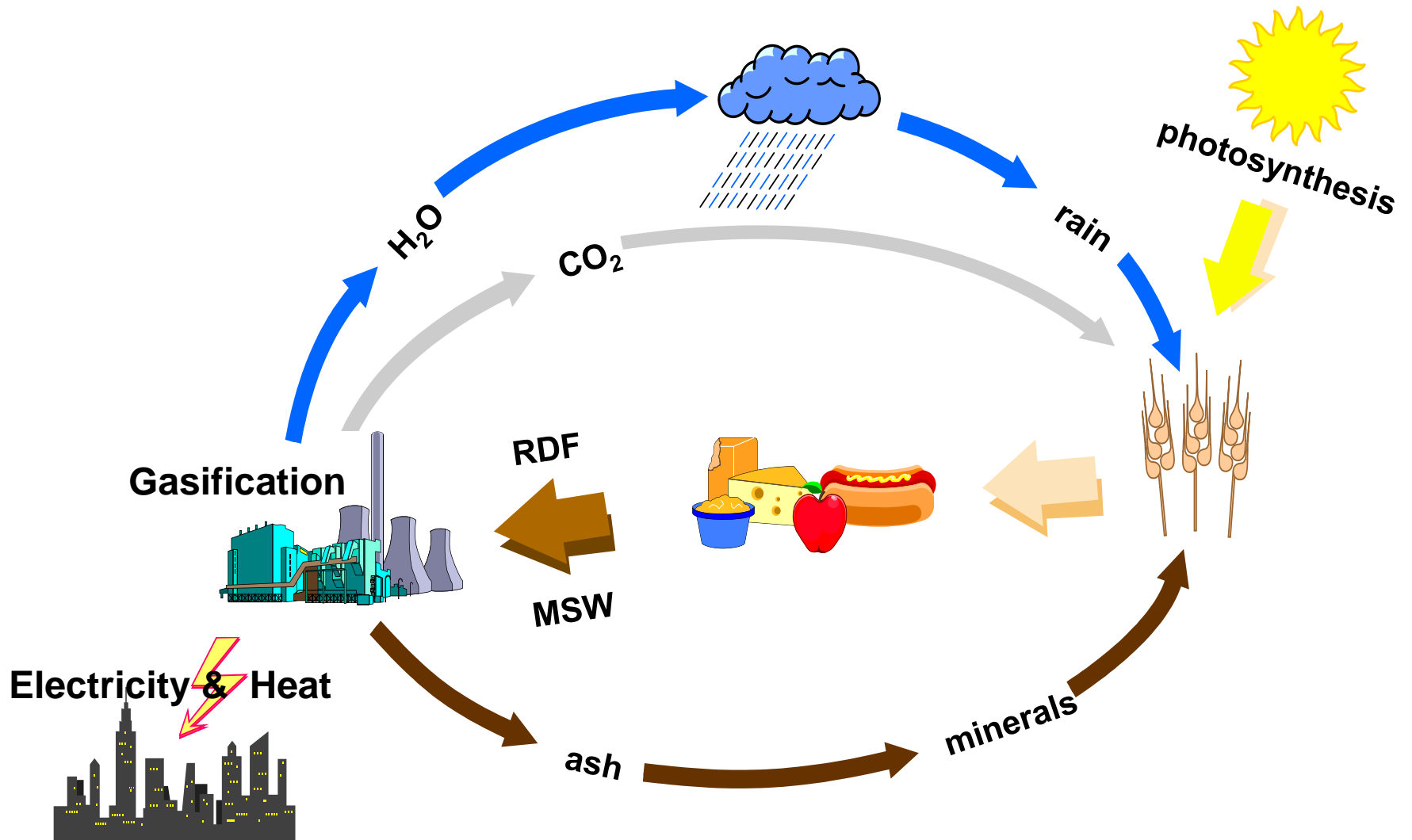
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Waste Conversion Paths

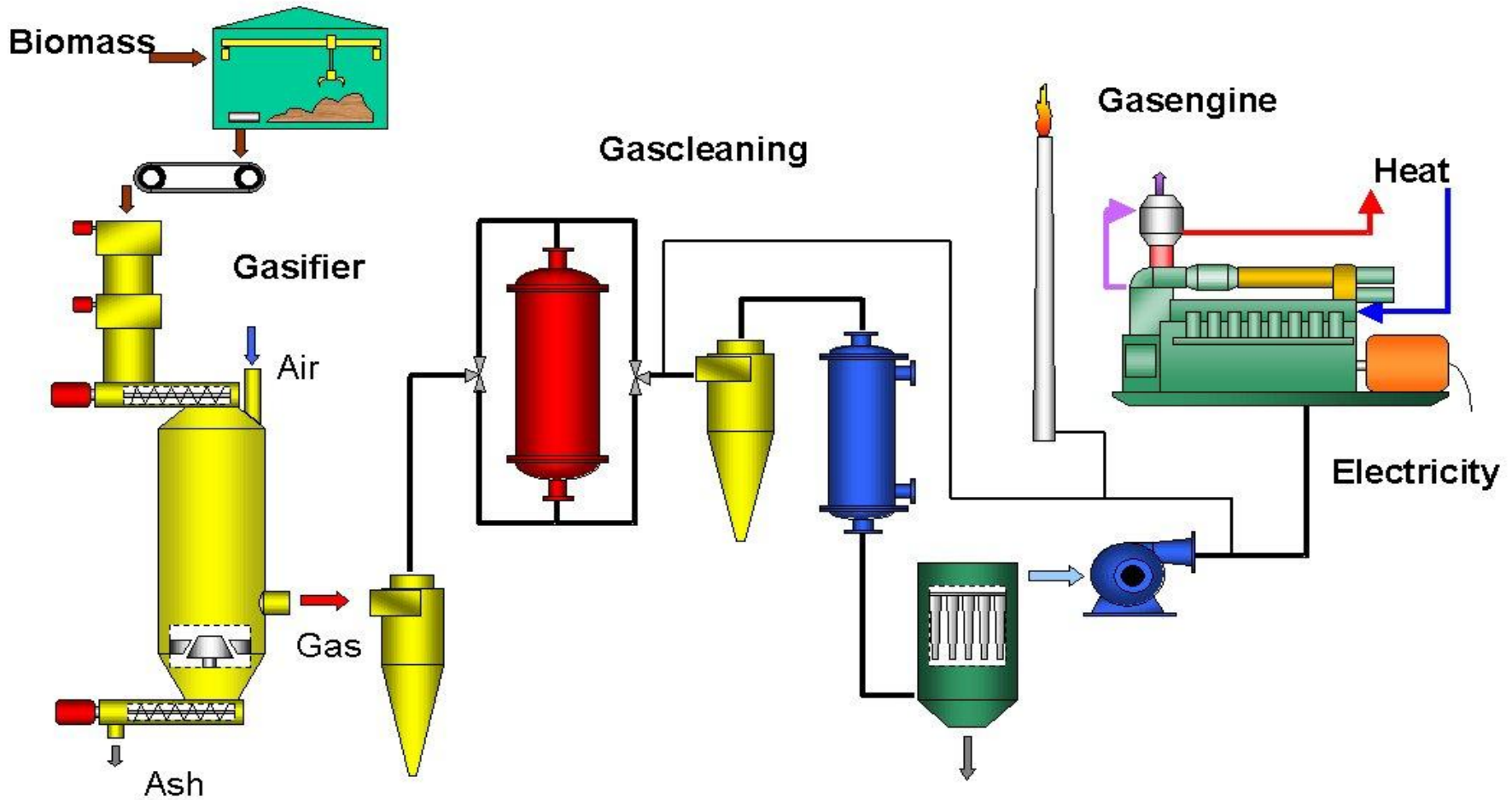


Thermal processes are 10-1000 times more **intense** than biological processes

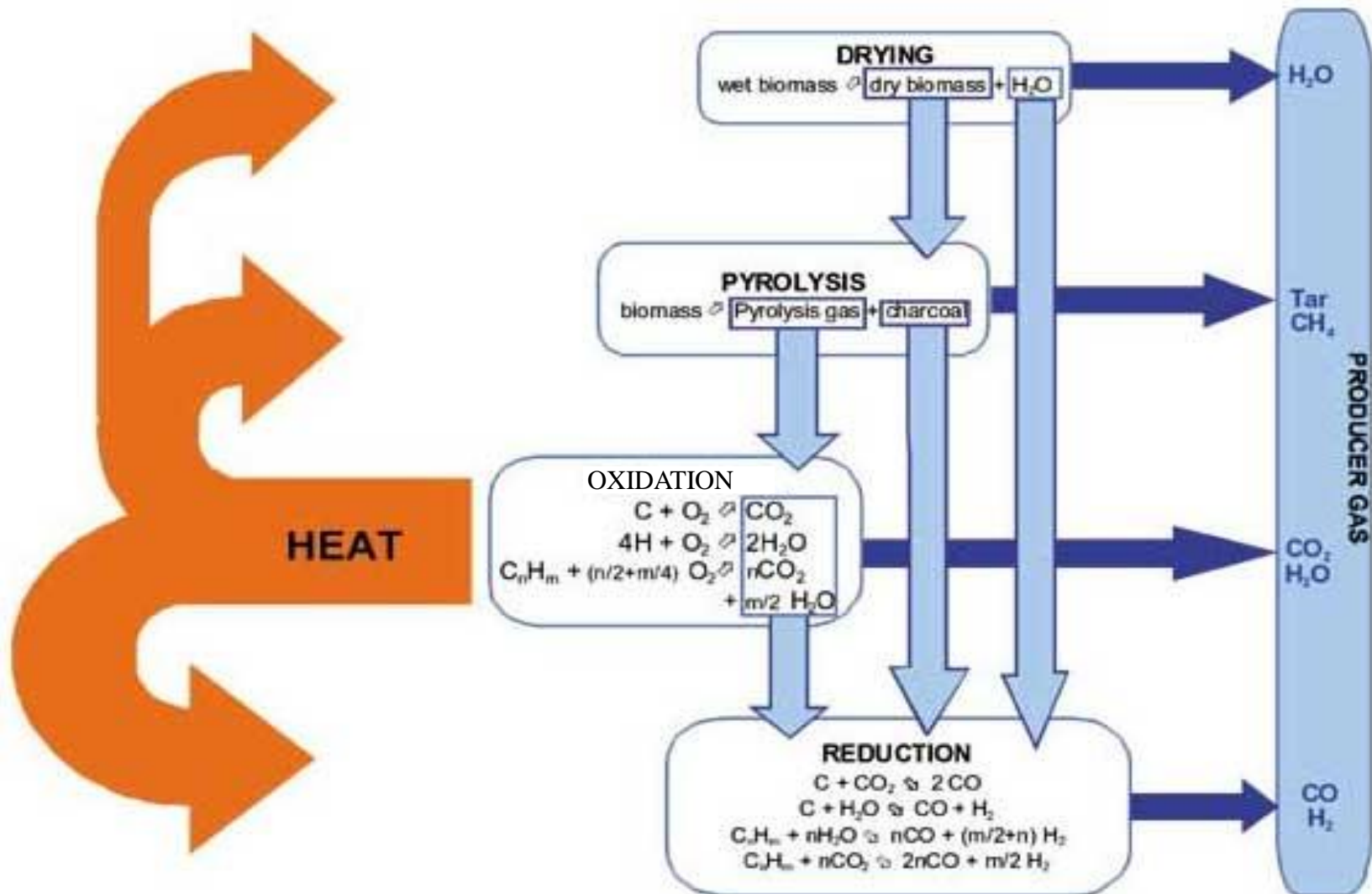
Waste Biomass Circuit - CO₂ Neutral



GASIFICATION POWER GENERATION SYSTEM



Summary of Reaction Zones in the Gasifier

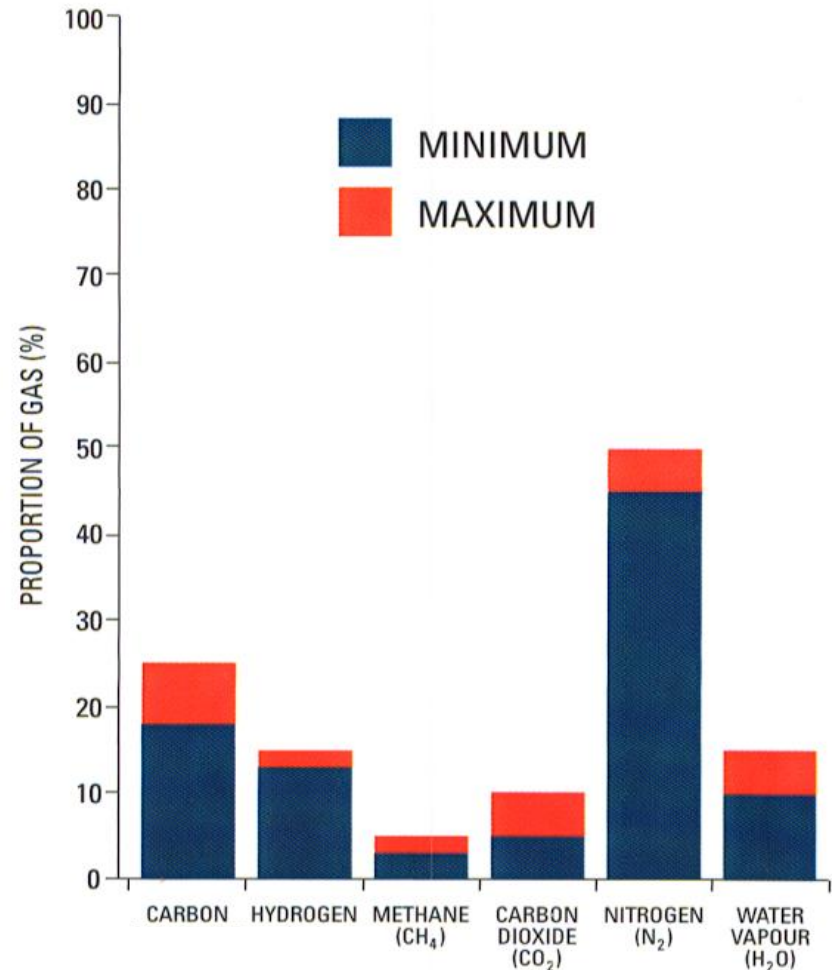


Syngas a Key to Fuels and Chemicals

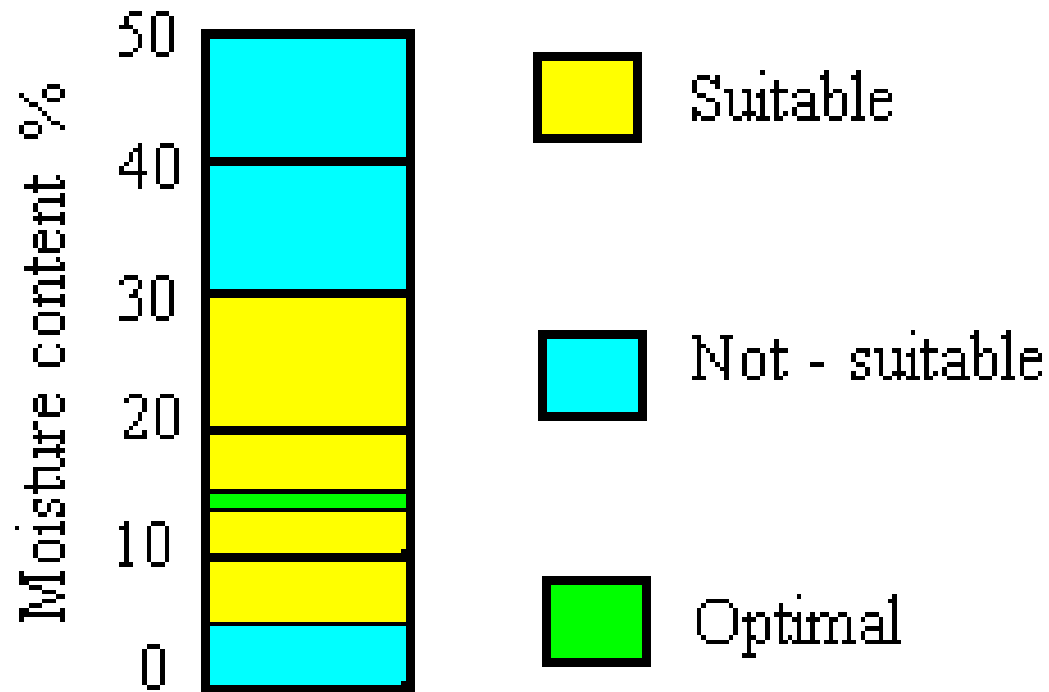
- Gasification with air produces low energy PRODUCER GAS suitable for heat or power applications. $GCV=5-6 \text{ MJ/Nm}^3$
- Gasification with oxygen and/or steam produces $\text{CO}+\text{H}_2$; SYNGAS that is suitable for fuels and chemicals:
 - Methanol, Ethanol, Ammonia
 - FT diesel etc.
- If biomass is to supply fuels and chemicals we need to develop medium scale decentralized gasifiers.

Facts about the syngas

- 1kg of waste (at 15% moisture content) produces 2.2-2.5 Nm³ of product gas.
- Cool and clean gas density is app. 1.027 kg/Nm³.
- Produced gas has an energy content of approximately 5-6 MJ/Nm³.
- Biomass consumption of the gasifier is app. 1kg for 1.2kWe electrical output.

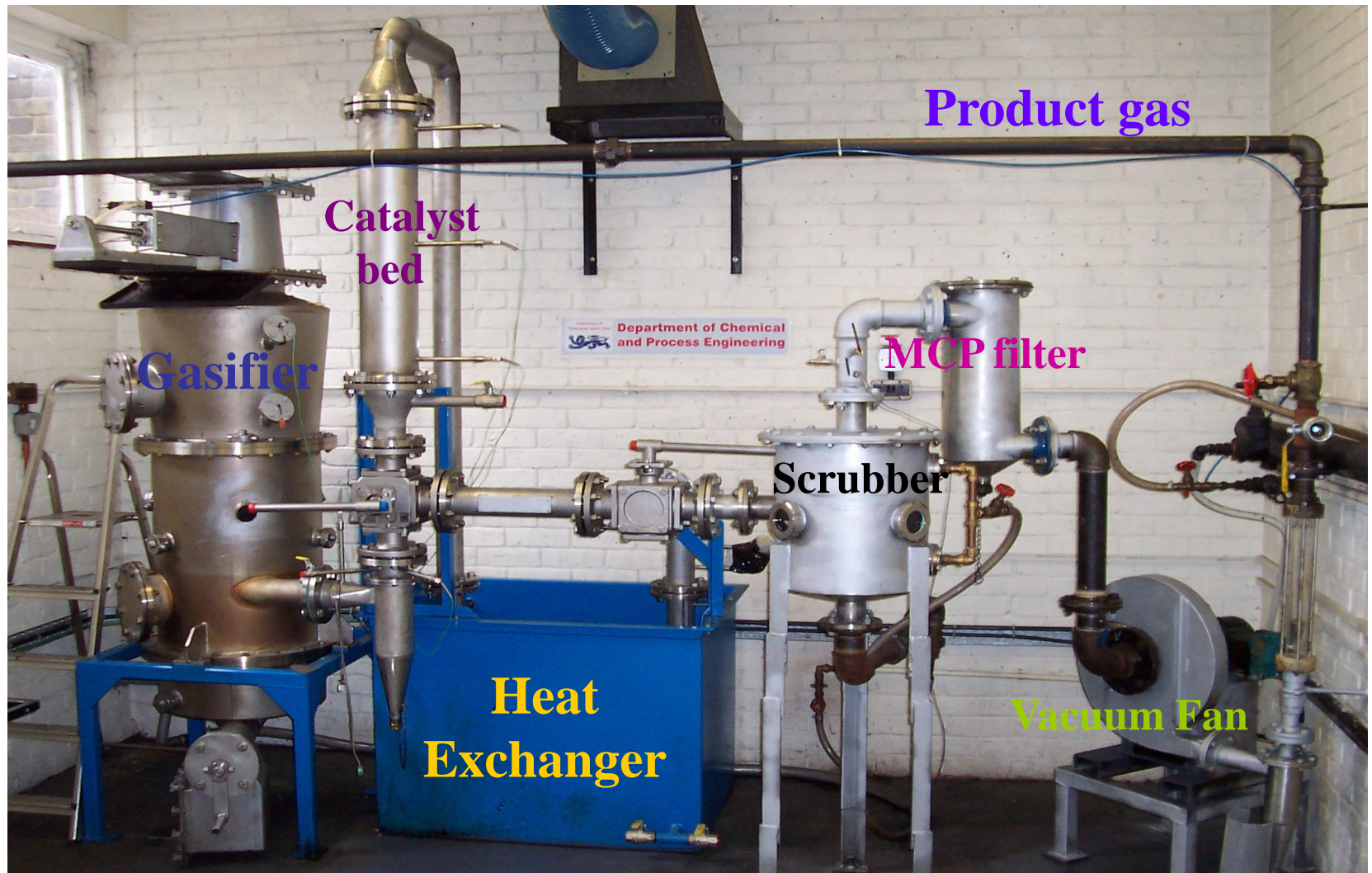


Feedstock (Fuel Moisture vs Gas Tar)

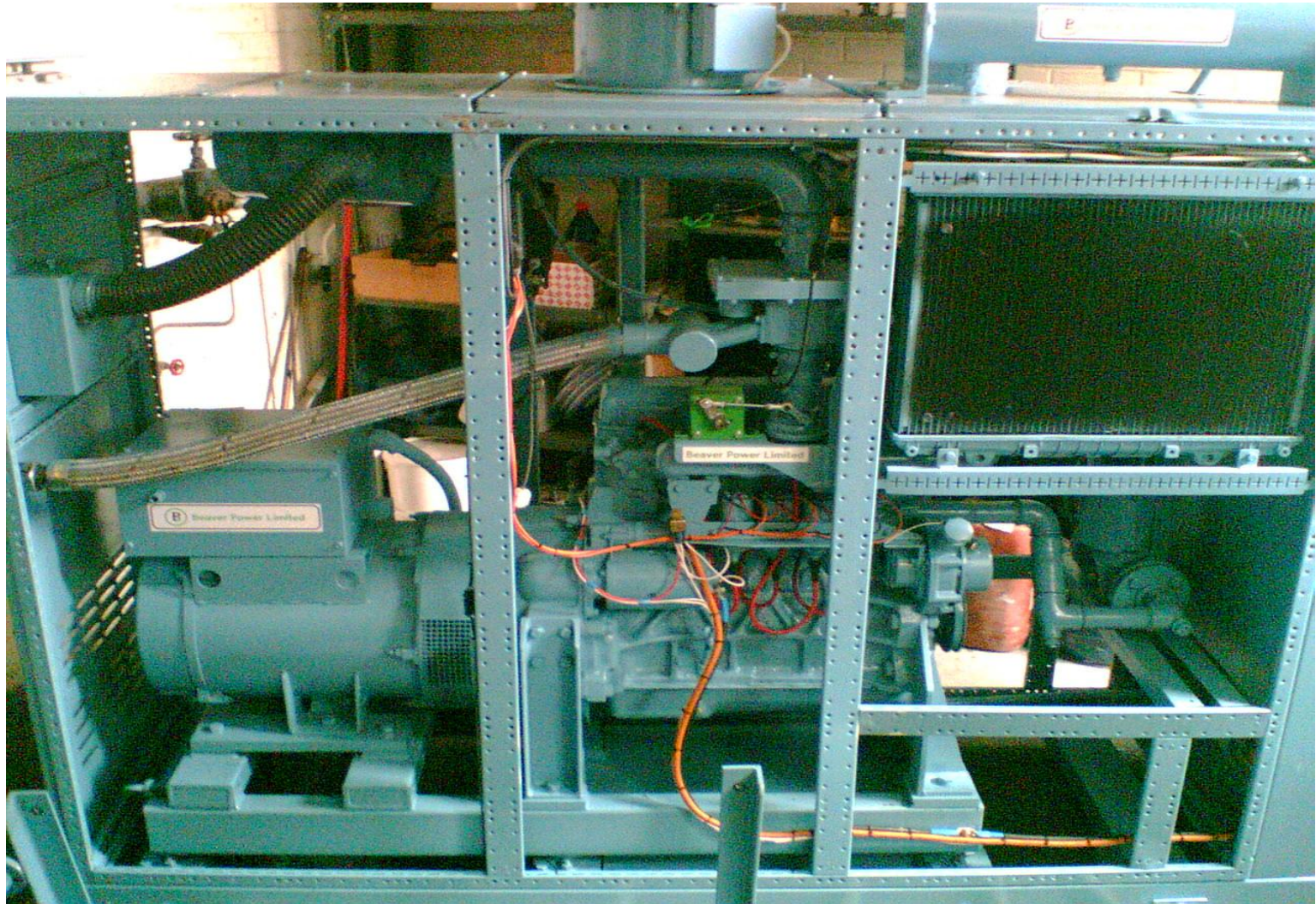


Moisture Scale for Gasification

Invented Gasifier Test Facility 1995-2000 Newcastle University, UK



CHP Application – 100 kWe & 150 kWt Ford Diesel Converted Gas Engine



Dry Sludge Gasification System-2005 (500kWe)



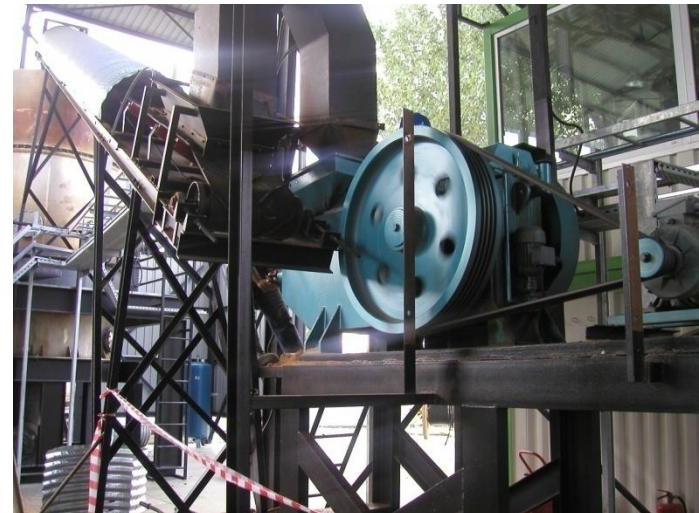
RDF Gasification System-2005 (2MWe)



Novel Gas Clean-up with WESP



MSW to RDF Fuel Briquettes

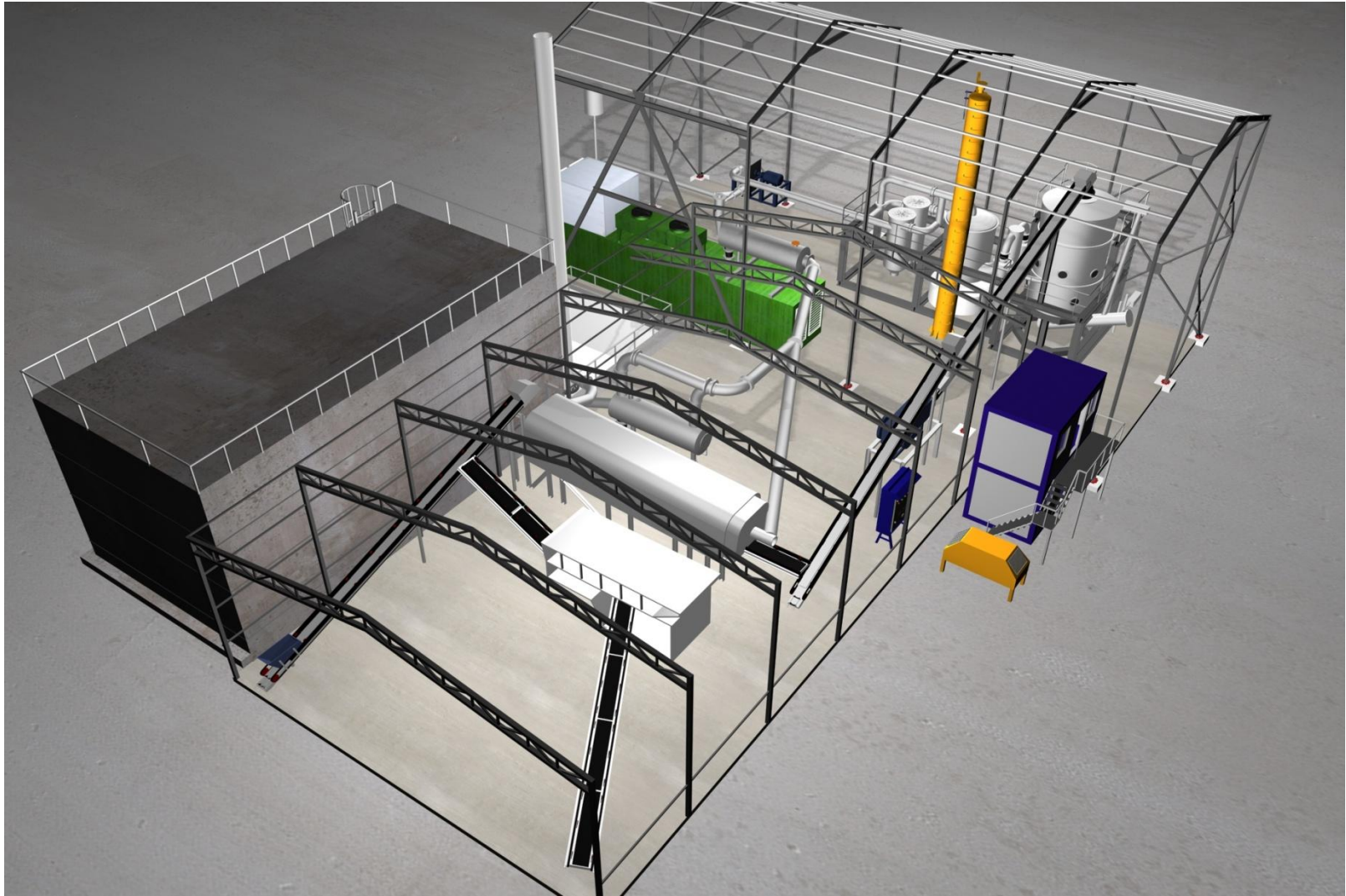


MSW derived RDF Briquettes

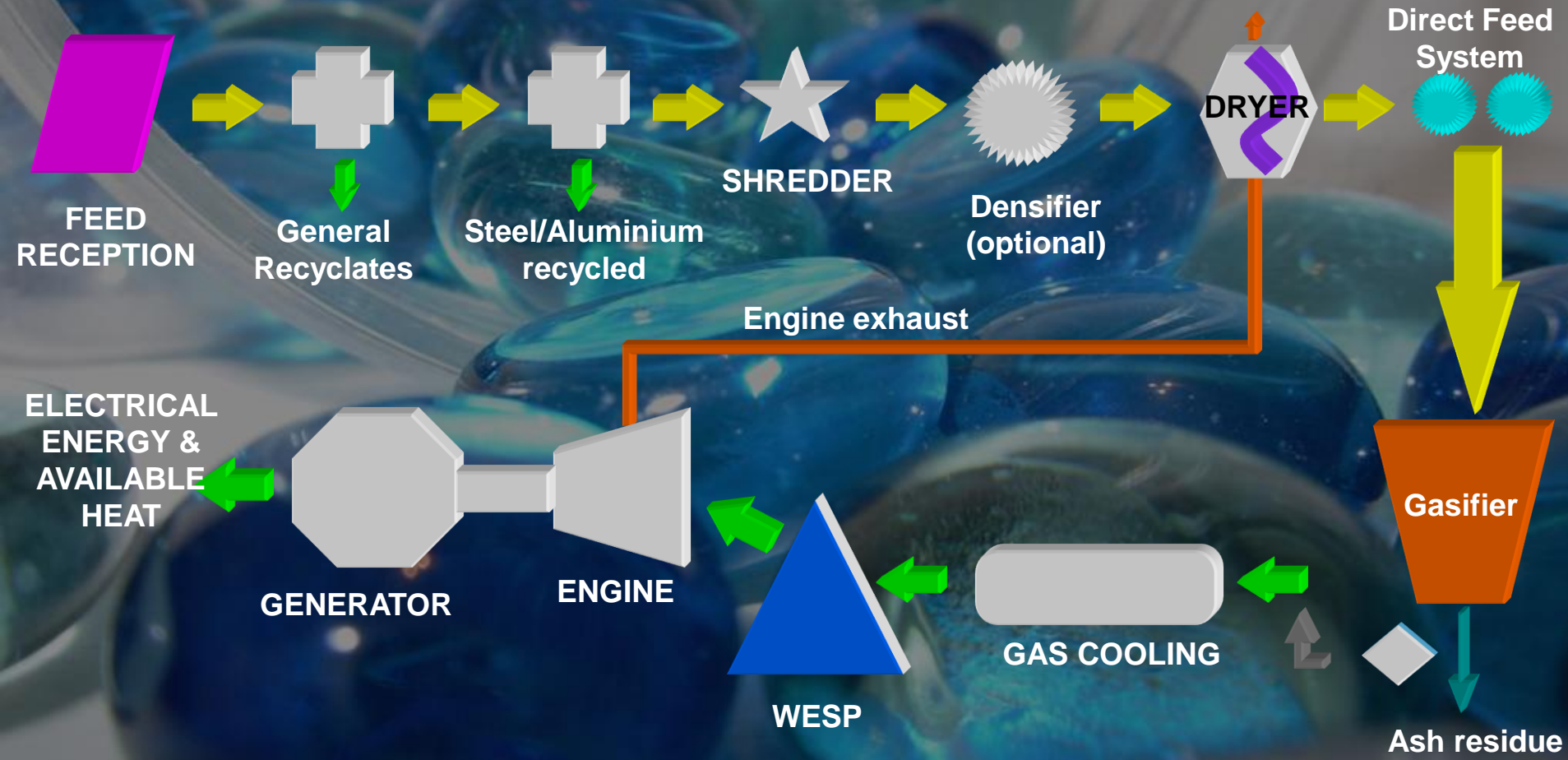
COMPONENT	MSW - RDF
Moisture (% wt)	15
Fixed Carbon (% wt)	12
Volatile Matter (% wt)	55
Ash (% wt)	18
Gross Calorific Value (MJ/kg)	20



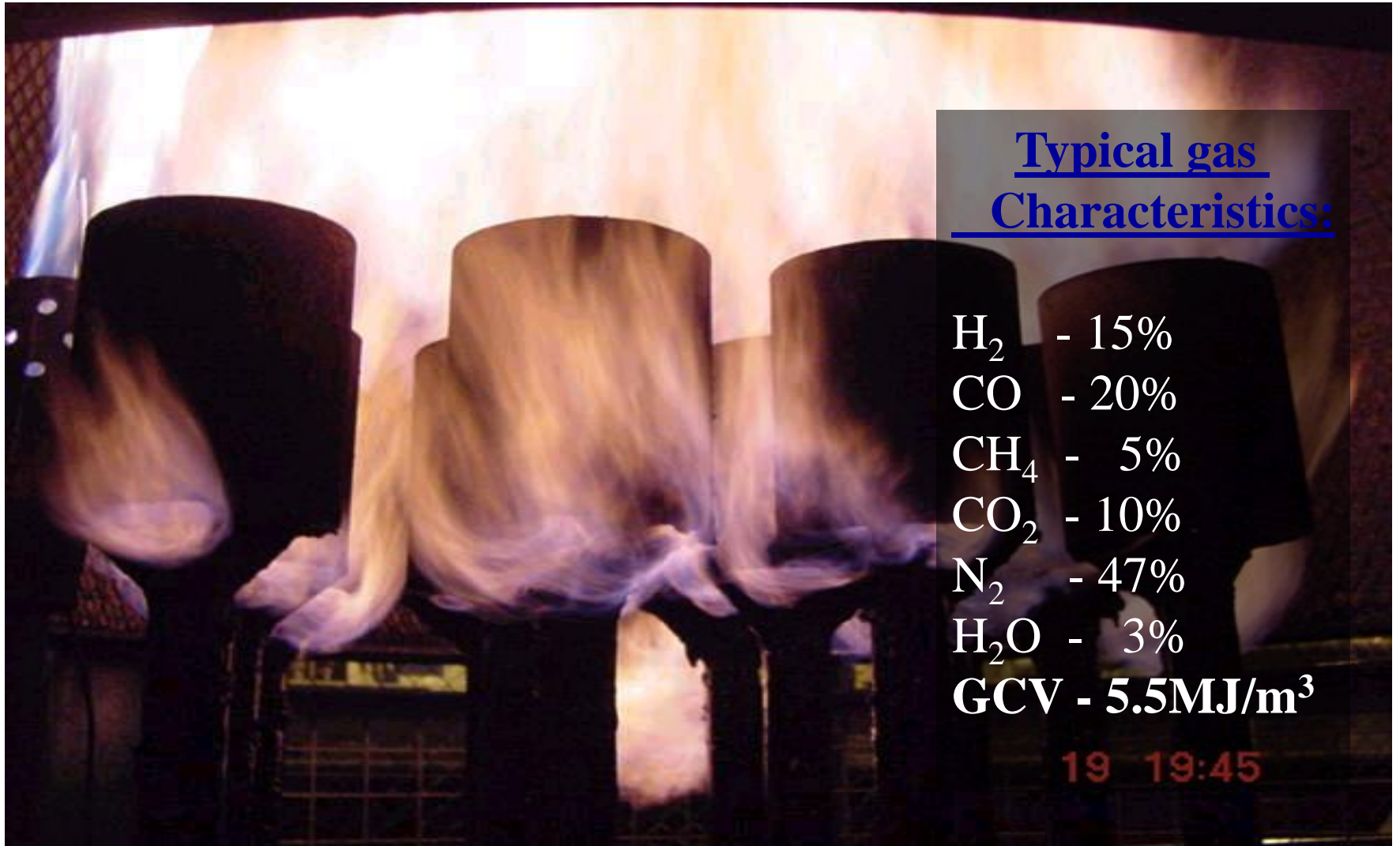
COMPLETE 2 MWe + 2MWt RDF GASIFIER SYSTEM



Whole MSW-RDF Process



Gasifier Syngas Quality



Typical gas Characteristics:

H₂ - 15%
CO - 20%
CH₄ - 5%
CO₂ - 10%
N₂ - 47%
H₂O - 3%
GCV - 5.5MJ/m³

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Gasifier-Power Generation Engine



Gasification Plant Economics

Gasifier Max Capacity : 2 ton/hr RDF

Electricity Generation : 2 MWe net

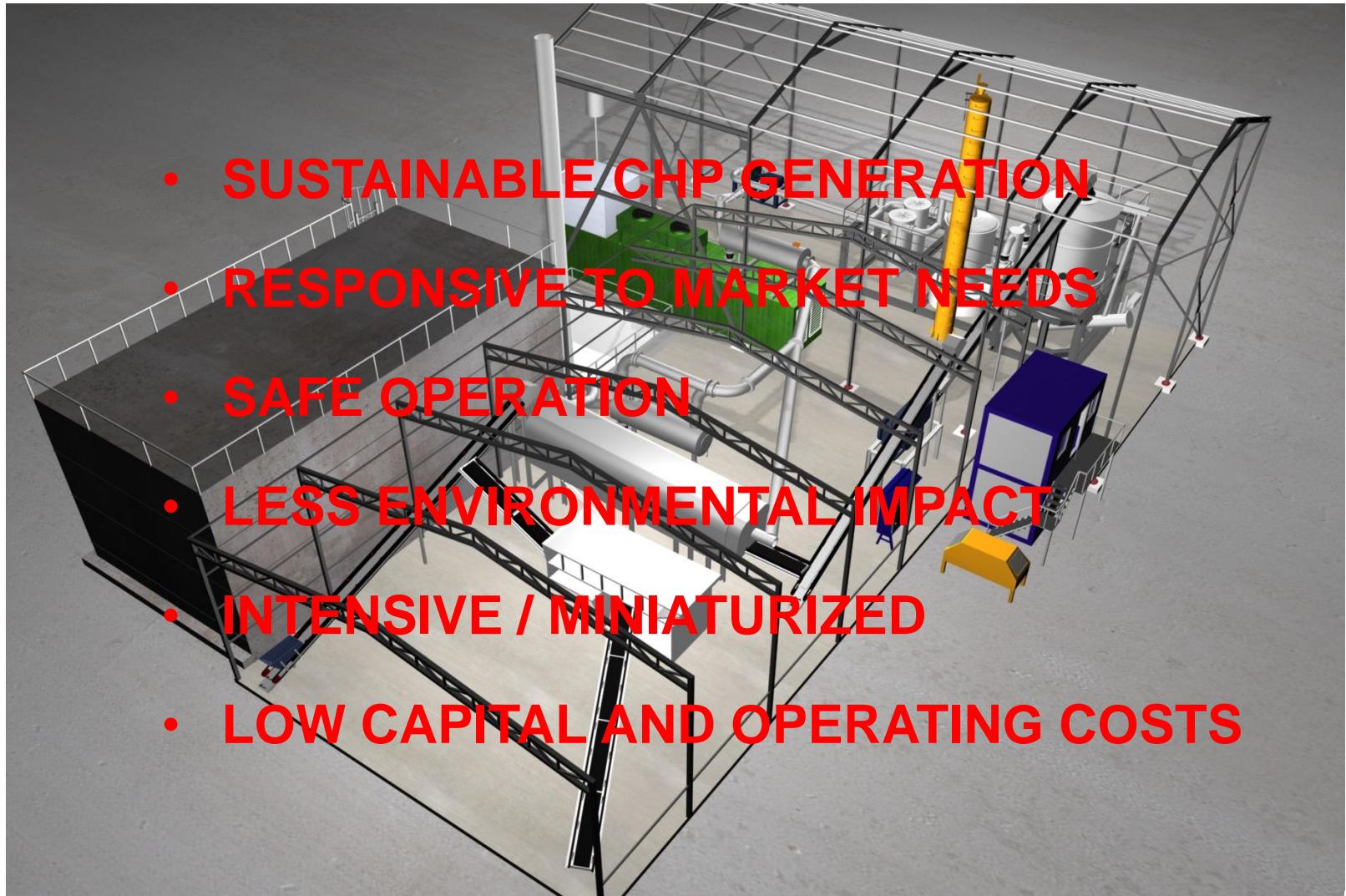
Heat Production : 2.5 MWt net

Plant Availability : 8500 hpa

Internal demand : 120 kWe to 130 kWe

Capital Payback : App. 2-3 years

Complete Small-Scale Mobile Gasifier System



- **SUSTAINABLE CHP GENERATION**
- **RESPONSIVE TO MARKET NEEDS**
- **SAFE OPERATION**
- **LESS ENVIRONMENTAL IMPACT**
- **INTENSIVE / MINIATURIZED**
- **LOW CAPITAL AND OPERATING COSTS**