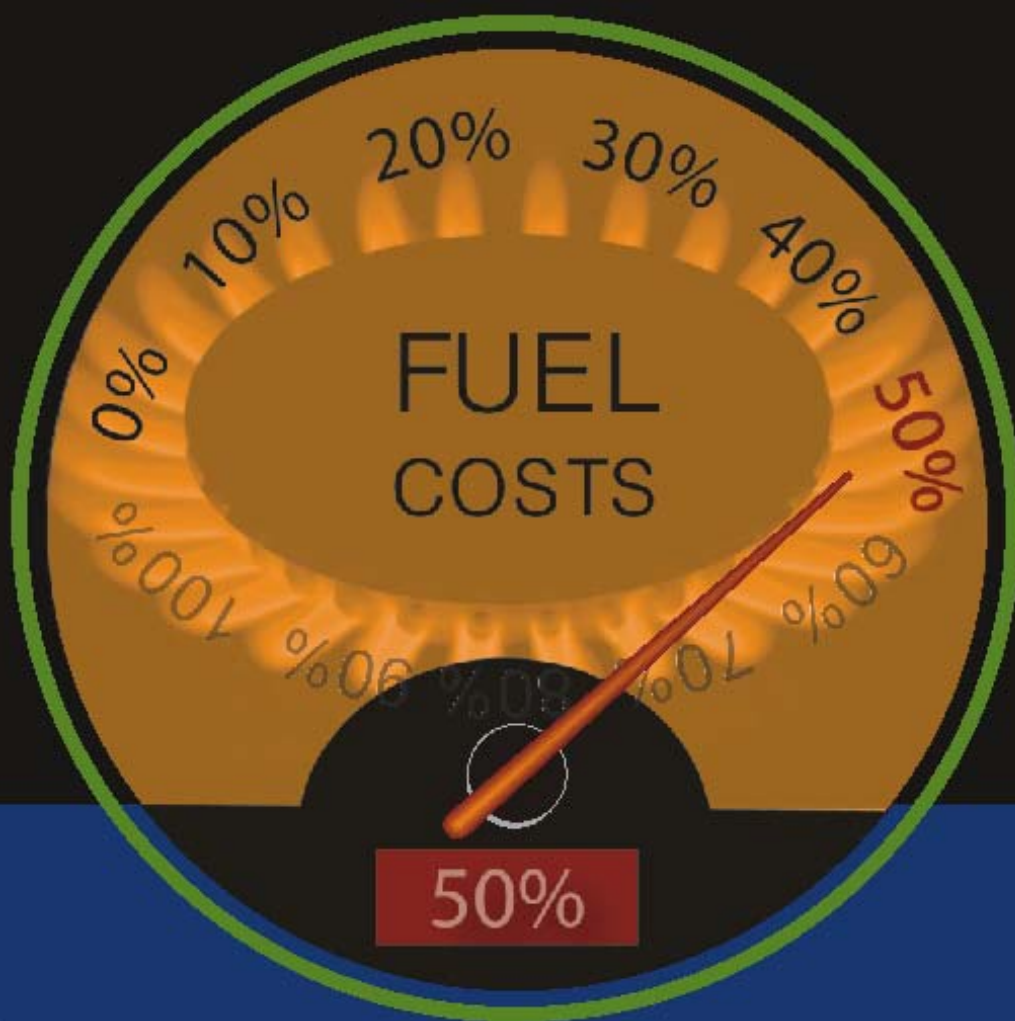


CUT YOUR FUEL COST BY

HALF



advantage

efficient

gasification



NSY Energy Engineering & Consul. Services P Ltd.

## Introduction

The NSY Vergassen is a simple and reliable solution for bringing down the fuel cost by over 50%. The NSY Vergassen converts wood into a burnable gas (producer-gas) by means of a process known as thermal gasification. The producer gas can be piped from the gasifier (which may be located outside the plant building) to the ovens/furnaces/etc located in the plant building and burnt in specially designed burners, in place of fossil fuels like F.O/L.D.O/Diesel/LPG/CNG.

Thus, expensive liquid/gas fuels can be effectively replaced by low cost wood without any changes in operations, temperature profile, temperature control and cleanliness in the plant area

**The typical requirement of wood to be gasified to replace 1 unit of liquid / gas fuels is as shown below:**

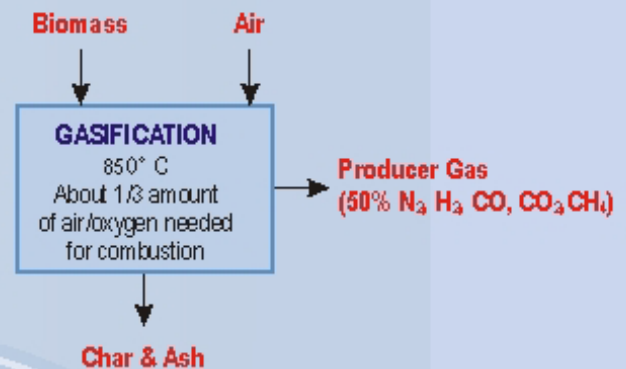
Fuel	Diesel 1 Litre	L.D.O 1 Litre	F.O 1 kg	L.P.G 1 kg
Wood Required in kg* #	4	4	4.5	5

\*Moisture Content < 15% #Application Temp. < 450 °C

## Gasification Basics

The gasifier is essentially a chemical reactor, where several thermo-chemical processes such as pyrolysis, combustion, and reduction take place.

Most biomass materials can be converted into producer gas. This gas has a lower calorific value (1000-1200 kCal/nm<sup>3</sup>) compared to natural gas or LPG, but can be burnt with high efficiency and good control. The producer gas flame temperature can be as high as 1100 °C. In energy terms, the conversion efficiency of the gasification process is in the range of 80% to 90%.



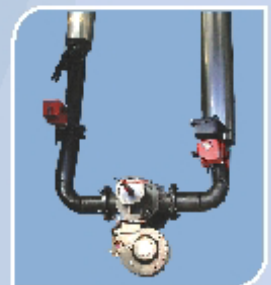
## The NSY Advantage

Conversion of solid biomass into combustible gas offers all the advantages associated with using gaseous and liquid fuels such as clean combustion, compact burning equipment, high thermal efficiency and a good degree of control. Furthermore, the gasification system can be physically isolated from the combustion system and hence the handling of fuel and ash removal can be away from the actual plant area. Besides the above advantages, Our gasifiers have range of special features that gives them the distinctive edge in thermal applications.

- **Dry gas system**
- **Compact foot print**
- **Advanced automatic Burner** : The production of good quality gas from wood is just one half of the solution. The solution is complete only when an appropriately designed burner is used to burn the gas. We have a wide range of burners in suitable for almost every type of application.
- **NSY Vortex Burner** : These are compact fully automatic burners that are specially designed to suit low & medium temperature requirements (upto 750 °C) in applications like hot-air-generators, ovens (all types), thermic fluid heaters, boilers etc.
- **Zero effluent system**
- **Highest overall efficiency**

**The list of models available and their equivalent popular burner models are indicated below:**

NSY Vortex Model	Bentone	Ecoflam	Riello	F.B.R.
Vortex-100 (Single stage) (60 - 115 Kwth)	BG200, STG120 B20, ST133	MINOR 8 MAJOR 10	RG2, RG2D RG2F, RDB4	G2 Series
Vortex-200 (Modulating type) (120 - 230 Kwth)	STG1466, BG300 ST146, B2, B30A	MINOR 12 MINOR 12R	RG3, RG3D RD3D, RG3F	GX3 Series
Vortex-300 (Modulating type) (180 - 345 Kwth) Double stage	BG400, B40A	MINOR 20 MINOR 30 OILFLAME 30	RG4S, RG55, RG4D RG4F, RG5D F PRESS G10, G24, GV	GX4, G130 Series



- **NSY Swirl Burner** : These are specially designed burners which produce a vertical upwards flame suitable for heating large woks or "karhais". These burners come in two capacities, viz., 105 KW<sub>m</sub> (10 lph Diesel equivalent) and 210 KW<sub>m</sub> (20 lph Diesel equivalent)
- **NSY Jet Burner** : These are suited for high temperature ( Furnace temperatures upto 900°C) applications with constant loads like annealing and reheating furnaces. These are custom built burners.
- **NSY Long Flame Burner**. These are suited for low temperature application requiring long flames where the furnace area is large viz. automatic fryers ( chain convey or type).

## Applications

The versatility of the gasification process allows it to be used in a wide range of industrial applications. An indicative list of industries where the technology has been successfully adopted is given below:

### Bakery

- Rotary Oven
- Swing Tray
- Moving Tray
- Biscuit Oven

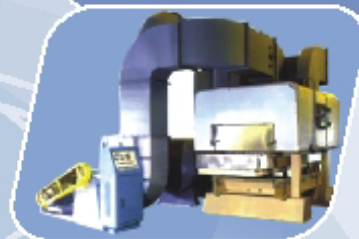


### Furnaces

- Continuous Annealing (Steel / Aluminium etc.)
- Batch Annealing (Steel / Aluminium etc.)
- POP Rotary Kiln
- Lube and Grease Refinery Furnace

### Fried Foods

- Potato Chips Plant
- Namkeen Fryer
- Automatic Sev. Fryer



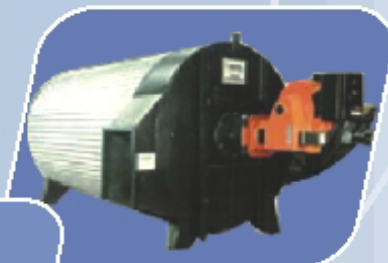
### Drying & Curing Application

- Tea Dryers
- Coffee Curing
- Mosquito Coils
- Paper Drying
- Wood Drying



### Steam Boilers (Oil Fired)

- Confectionery industry
- Pharmaceutical
- Textile
- Chemical
- Food Processing industry



### Thermic Fluid Heaters

- Packaging Industry

## Company Profile

Ms NSY Energy Engineering & Consul. Services (P) Ltd., is one of the leaders in biomass conversion & processing technologies in India. Since inception, our focus is to develop better technologies and products to process biomass for energy.

We have indigenously designed and developed various systems for biomass gasification, biomass pyrolysis, biomass briquetting and biomass drying.

At NSY our endeavor is to involve and understand our customers needs and objectives so as to offer not only a superior product but also a most suitable business solution. The emphasis is on better interaction and understanding towards building long term relationships.

It is the commitment to our customers business that drives our effort towards creating advances in technology through innovation. Not for the sake of technology, but towards bettering our customers business through productivity, profitability and peace-of-mind.

### List of Gasifier Models

MODEL		UPDRAFT	DOWNDRAFT MODELS					
		RG 200	DG 100	DG 150	DG 200	DG 300		
Gasifier Output	kW <sub>m</sub>	300	100	150	250	360	500	600
Fuel Oil Equivalent (Approx)	lph	30	10	15	25	35	50	60
Wood Consumption-Max*	kg/h	120	40	60	100	140	200	240
Gas Produced (Max)	nm <sup>3</sup> /h	270	100	150	250	360	500	600
Wood Size	cm	5-7	1-2		5-7			
Gas Cleaning System		NA	Dry Dust Collection only					
Connected Load	hp	3.5	1	1.5	3	5	7.5	10
Overall System Efficiency	%	>90%	85-90					

\*15% moisture content



RG 200 (300kW<sub>m</sub>)



DG 100 (150kW<sub>m</sub>)



DG 200 (360kW<sub>m</sub>)



DG 300 (600kW<sub>m</sub>)



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