

## Chapter 8

# Rice Husk Power Systems: Exploring Alternate Source of Energy

**Pulkit A Gupta**

*IMT Ghaziabad, India*

**Vedant Sharma**

*IMT Ghaziabad, India*

**Mohan Krishna Gade**

*IMT Ghaziabad, India*

### ABSTRACT

*In this chapter, the impact of rising cost of fuel and inability of government to supply electricity round the clock leading to spurt in frugal innovations utilizing alternative sources of energy has been analyzed. Rice is one of the prime crops of India, Rice husk, perceived as waste by many, being abundant and available at low cost can be major contributor in alternate energy. Due to lack of awareness of the potential of rice husk it is discarded as waste and results in waste disposal problem and methane emission. The use of rice husk for electricity generation in efficient manner has potential to transform agricultural waste into a valuable fuel and could help in boosting farm economy. This study explores the usage of rice husk and its untapped potential as a major fuel source. The target markets are villages in India with 400-500 households having ample biomass feedstock.*

### INTRODUCTION

In India power supply comes mostly from non-renewable energy resources, a lot of which is bought from international markets. Moreover, non-renewable energy resources combustion is associated with pollutants of CO<sub>2</sub>, SOX and NOX leading to environmental impacts. The proposed solution for these problems is using alternative power instead of traditional (fossil) resources of power. Rice husk is considered to be source of an environment friendly energy because it can minimize CO<sub>2</sub>, SOX and NOX pollutants when compared with traditional energy.

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## ***Rice Husk Power Systems***

The majority of population in the rural areas of Uttar Pradesh lives below the poverty line and has limited access to electricity. As per Census 2001, Uttar Pradesh has a total of 97942 inhabited villages, and as per the report released by Central Electricity Authority, Ministry of Power, Government of India on 31 Oct, 2013 there a total of 32119 villages which are not electrified yet (Central Electricity Authority, Ministry of Power, Government of India, 2013). 33% i.e. 10856 of those villages are from Uttar Pradesh which needs immediate attention as this has affected the development of the state to a large extent. The need of these villages has been understood by an innovative system to generate power from rice husk, when used in efficient gasification or combustion systems, has potential to generate power. Rice Husk Power System used waste rice husks to produce and deliver electricity to off-grid villages in the Indian 'Rice Belt' region in Bihar. Rice is the main crop of Bihar, which falls in the rice belt of India, on an average, produces 47.14 lakh metric tonnes of rice per year and about 13.4 lakh metric a tonne of rice husk goes waste per year (GreenPeace India, 2010). Rice paddy has essentially two by-products, rice husk and rice bran.

Husk or hulls consists of the outer shell covering the rice kernel. Rice husk refers to the by-product produced in the milling of paddy which is 16-25% by weight of the total weight of paddy. India alone produces around 104.32 million tonnes of rice paddy per year, giving around 21.38 million tonnes of rice husk per year (Indian Agribusiness Systems Private Limited, 2013). Farmer's income would be increased if economically profitable means of utilizing rice husk generated are utilized in industry.

There are many other uses of rice husk such as a fuel in brick kilns, furnaces, rice mills for boiling process, raw material for the production of ethanol and acetic acid, as a cleaning or polishing agent in metal, in the manufacturing of building materials (Govindarao, 1980). Despite having so many well established uses of rice husk, little portion of rice husk is utilized in a significant way, remaining part is burnt, dumped as a solid waste or as a cattle feed. Some reasons for rice husk not being utilized effectively prior to this innovation are:

- Lack of awareness of its potential
- Socio-economic problems
- Penetration of technology
- Lack of interest
- Lack of environmental concerns

Its usage as a fuel in boilers is crux of our research with the possibility to have it implemented in villages in and around Ghaziabad. Also, the ash obtained post combustion of rice husk is silica rich and has been lately used as an important component of bricks.

## **LITERATURE REVIEW**

Important renewable sources of energy such as coal, diesel, kerosene, petrol are on the decline which leads us to the need for exploring non renewable energy sources. Biomass is one of these. Rice husk (form of biomass) is a product obtained on rice milling and has a huge calorific value and high silica content. It is used as a fuel in variety of furnaces such as rice mill furnaces, boilers, rice husk gasifier and in household stoves. In rural villages where power produced from plants fails to meet demand, rice husk gasifiers are being increasingly used to fill in the gap (Tanaka, Kjørven, & Yumkella, 2010). Also, rice husk is increasingly replacing cow dung/wood as fuel as there is high efficiency and almost nil smoke produced.

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