



WASTE TO ENERGY

A Case Study of Rice Husk Power Plant, Bihar

At A Glance

Location

Husk Power Systems, Patna
Bihar, India

Number of Rice Husk Power Plants Installed (October 2010)

57 Plants

Installed Capacity (each unit)

35 - 100 kW

Beneficiary Households (per plant)

450 - 500

Funding Agencies

Ministry of New and Renewable Energy (Government of India)
Shell Foundation, Draper fisher Jurvetson, Acumen Fund,
Bamboo Finance, Cisco, LGT Venture Philanthropy,
International Finance Corporation



Rice Husk Field, Bihar

The majority of population in the rural areas of Bihar lives below the poverty line and has no access to electricity. This has affected the development of the state to a large extent. The need of electrifying the villages in Bihar has been addressed by Husk Power Systems (HPS).

Husk Power Systems (HPS) came into existence in 2007 with the main goal to provide affordable, reliable and environmentally sustainable energy to rural India by using husk as the fuel. HPS follows the concept of three 'Rs' to provide electricity that is Reliable, Renewable and Rural. HPS builds, owns and operates 35-100 kW 'mini power-plants' that use waste rice husks to deliver electricity to off-grid villages in the Indian 'Rice Belt'.

Rice is the main crop of Bihar, which falls in the rice-belt of India. Bihar, on an average produces 47.14 lakh metric tonnes of rice per year and about 13.4 lakh metric tonnes of rice husk goes waste per year. Conventionally, after paddy rice is processed, a huge quantity of biomass is left as a residue in form of rice husks. This rice husk, when used in efficient gasification or combustion systems, has a considerable potential to generate energy.

OVERVIEW

Husk Power Systems started its operations with one plant in 2007. As on date, it has 57 plants in operation across 250 villages of Bihar

and Uttar Pradesh impacting 2,00,000 lives. Scaling at the rate of electrifying 10 villages every week, HPS plans to install 6000 plants by year 2014, which would brighten upto 6 million lives. The HPS initiative saves 42,000 litres of kerosene and 18,000 litres of diesel per year.

Partners

The basic premise of the HPS initiative is to provide electricity to the agrarian rural communities in a cost-effective and environment-friendly manner. Husk Power System has a major financial contribution from two social venture capital funds, one is Switzerland-based Oasis Fund and another one is the Hyderabad based Acumen Fund.

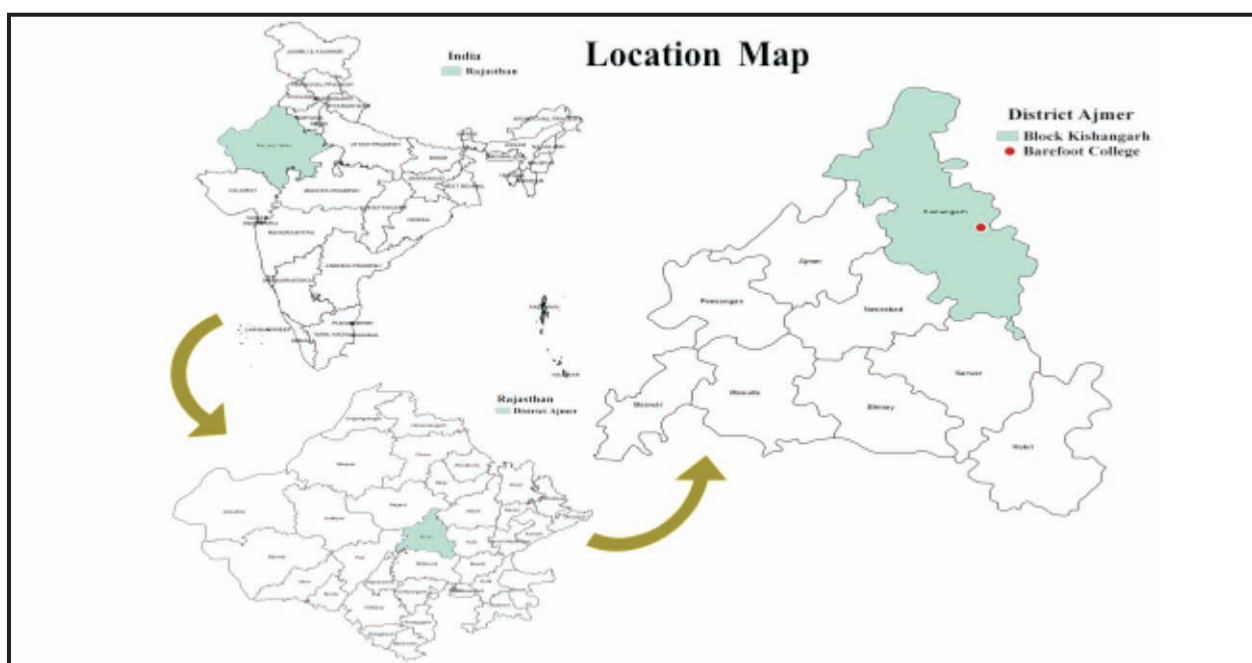
Process and approach

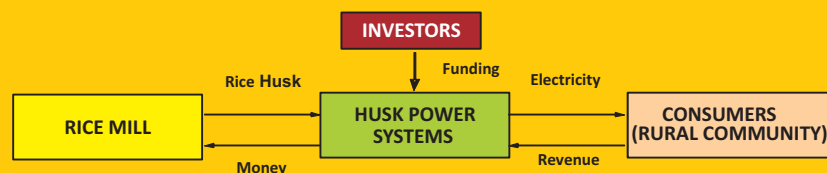
HPS supplies electricity to the villagers using environment-friendly biomass gasification technology. Electricity is supplied to only those villages that have demand of 15 kW and fall within the radius of 3 kilometres from the proposed HPS plant. HPS trains local villagers of the village in which the power plant is to be established. The duration of the training is two months and covers the operation and maintenance of the power plant. Thus, a job-platform has been created for unemployed literate/neo-literate villagers.

Business model

'Pay-for-Use' service approach is being followed by HPS for raising revenue and supplying electricity. The HPS business model is attractive and successful in the rural areas because of its low cost.

About 300 kg of rice husk is required as raw material to produce 40 kilowatt of energy, which is sufficient to supply energy to 500 households for 6-12 hours per day. Raw material (waste rice husk) is purchased for Rs. 1 per kg from rice mills. Generally, electricity is supplied to domestic and commercial consumers for fixed 6 - 8 hours in a day. Charge rates are Rs 80/month/2*15 Watt CFL's and mobile recharge. Low cost pre-paid meters have been installed that can efficiently regulate the flow of low-watt electricity and reduce electricity theft to less than 5 per cent.





Inflows and outflows of matter and money

OUTCOME

Husk Power Systems has made a tremendous impact in the lives of rural people by supplying affordable electricity. HPS initiatives have helped in creating conducive environment for employment generation and enterprise development. Environmental benefits are also very much evident.



A Rice Husk Power Plant, Bihar

Jobs created

HPS ensures that jobs are created for local communities. To facilitate this, company hires local villagers for maintaining and operating the power plants. At each operating unit, atleast 3 personnel are employed, which include an operator, a lineman/electrician cum bill collector; and a husk loader.



HPS initiative has provided opportunities for local employment generation

Socio-economic changes

Establishment of rice husk based power plants in rural areas has led to an enormous change in the lifestyle of the local communities.

Increased lighting has also indirectly helped the community by increasing the business hours in the market area, reducing thefts, improving health conditions and encouraging new business developments like computer shops and photo studios. Moreover, lighting has increased the possible number of study hours, as children are now able to study after dark.

Gender concerns

HPS initiative has provided employment opportunities to thousands of rural women by giving them training and raw material to manufacture incense sticks (using rice husk char). As of now, more than 1200 women have been trained (at 2 plant sites) for manufacturing incense sticks. This enables household to earn upto Rs. 1000 per month and save Rs. 150 on kerosene costs while paying only Rs. 80 for electricity.

Education & skill development

HPS has facilitated the education of children of local communities by paying school-fee of Rs 50 per month.

Environmental conditions

Emission reduction

Each Megawatt of power generated from rice husk plant has resulted in reduction of carbon dioxide (CO₂) emissions by about 5800 every year. These reductions in emissions can be attained with the implementation of 32-33 rice husk plants. HPS is currently developing a Programme of Activities (PoA) for Clean Development Mechanism (CDM) to gain carbon credits.

Moreover, processed waste water and tar tank water is collected in a settling tank and recycled, which ensures that there is no water pollution. Rice husk char/tar and used filter media are mixed and stored on the ground.

LESSONS LEARNT

- Grid based power is not a competition to off-grid renewable energy systems because of high demand for modern energy services and low availability of power in the grid.
- An interstate tax policy on technologies and products is acting as an impediment for dissemination of renewable energy technologies.
- Locally available renewable energy sources provide sustainable models to be built around them.
- Availability of trained work force at the local level is critical for sustainability renewable energy systems.



Income generation activities have initiated the gender empowerment

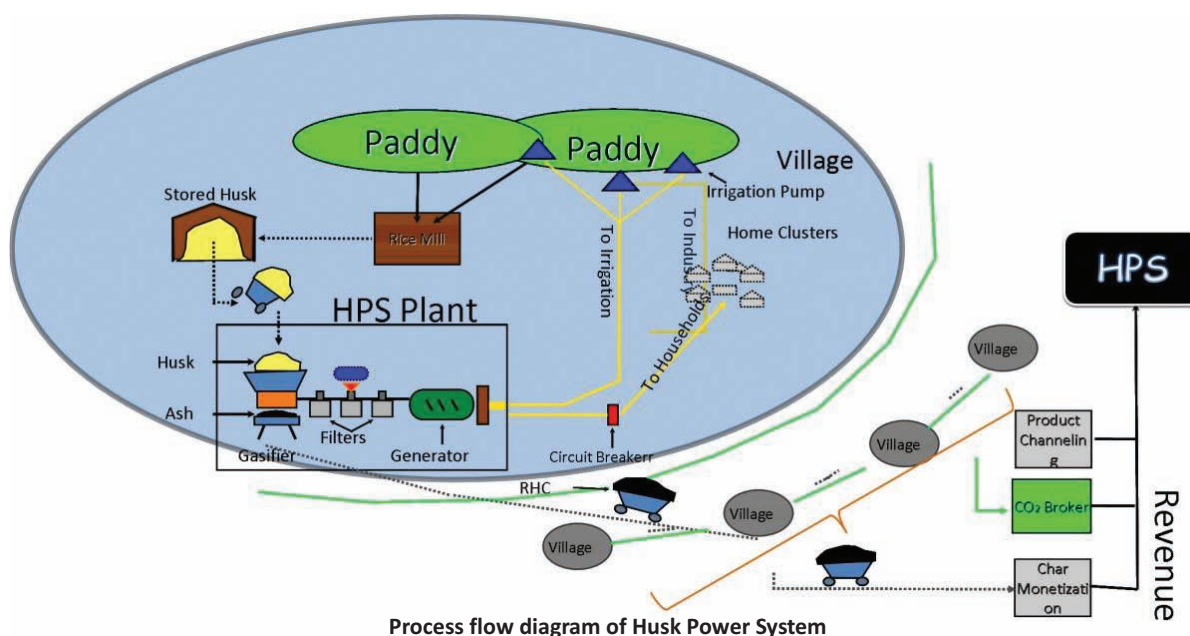
WAY FORWARD

Currently, only 50 per cent of total potential of generating electricity through rice husk is being exploited. There is an ardent need to penetrate the market. HPS has identified 25,000 villages

as feasible sites within India's rice producing belt (Bihar and neighbouring states) for establishing rice husk based power plants. HPS has a goal of installing 6000 power plants till 2014 and has the vision of electrifying large sections of rural India.

HIGHLIGHTS

- Husk Power Systems has installed the first rice husk based power plant in India to generate electricity.
- Residual waste from the plant is used in making incense sticks, rubber and manure.
- About 1200 women have been employed in incense sticks manufacturing.
- For each Megawatt of power generated about 5800 tonnes of carbon dioxide emission reductions can be achieved every year.



About the Partners

Husk Power Systems (HPS) is a company that aims to provide affordable, reliable and environmentally sustainable energy to rural India. HPS has enlightened the villages from 100 per cent biomass based power plant that uses discarded rice husks to generate electricity.

For further details please contact

Husk Power Systems Private Limited
 Opposite Sheo Mandir, Shastri Nagar Market
 Sheikhpura, Patna - 800 014, Bihar, India. Tel: +91-612-2283333
 Email: info@huskpowersystems.com, akumar3@deval.org, nrana@deval.org
 Web: www.huskpowersystems.com