RICE HUSK BRIQUETTES

GREEN FUEL FOR GARMENT FACTORIES, INCREASED INCOME FOR RICE MILLERS

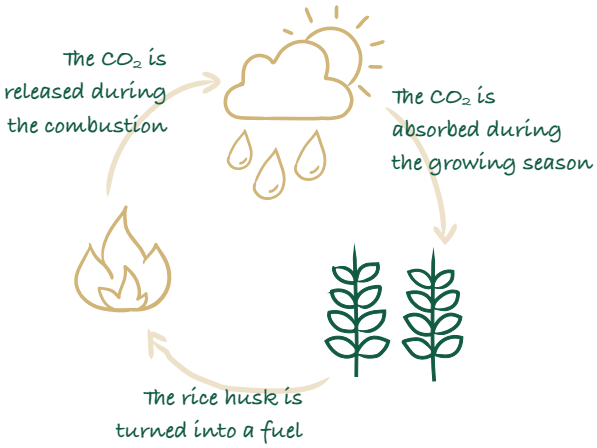
SUSTAINABLE THERMAL ENERGY AND ALTERNATIVE BIOMASS

geres

A GREEN FUEL
TO FIGHT AGAINST CLIMATE CHANGE AND DEFORESTATION

Cambodia is facing a major environmental threat because of deforestation resulting from forest conversion to agricultural land but also from the use of forest wood as fuel. **More than 780,000 MT of wood are burnt every year by the industrial sector in Cambodia**, including at least 300, 000 MT by garment factories only, mostly for steam production. This represents 3, 500 hectares of forest every year.

Natural forest stores CO_2 from the atmosphere. Burning wood from non-sustainably managed forests releases this CO_2 into the atmosphere thus contributing to climate change.



However using agricultural residues, such as rice husk, can be considered carbon neutral since the CO_2 released during the combustion is reabsorbed every year by the crops during the next growing season.

International garment buyers ask their suppliers to use renewable energies

Today both the private sector and the government are concerned about reducing the impact of the economy on climate change and the environment.

International companies, such as the H&M Group, are therefore encouraging their garment suppliers in Cambodia to switch from unsustainable firewood to greener fuels such as rice husk briquettes.

Moreover, the increasing demand for firewood from the industry is leading to a higher price for wood, making alternative biomass fuels more and more attractive for the industries.

The garment sector represents a potential market of more than 225,000 metric tons of Rice Husk Briquettes.

RICE HUSK
BRIQUETTING TECHNOLOGIES

Two main briquetting machine technologies are available, producing two types of briquettes with similar combustion properties. Both technologies are easy to adopt and operate.

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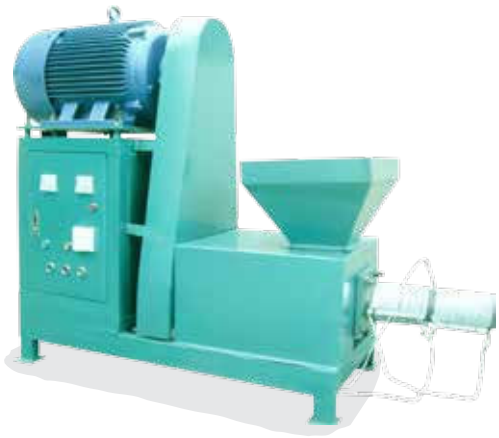


SCREW EXTRUDER PRESS

In a screw extruder press, the biomass is extruded continuously by a screw through a heated taper die. This is a very popular choice in Southeast Asia due to its low investment cost and the higher quality of the briquettes.

	SCREW EXTRUDER
Density of the briquettes	**1 to 1.4 gm/cm³**
Electricity Consumption	**around 150 kWh/ton**
Production Capacity	**0.3 - 0.5 ton/hour**
Cost per press	**From 3,000 USD**
Average Life span	**5 years**

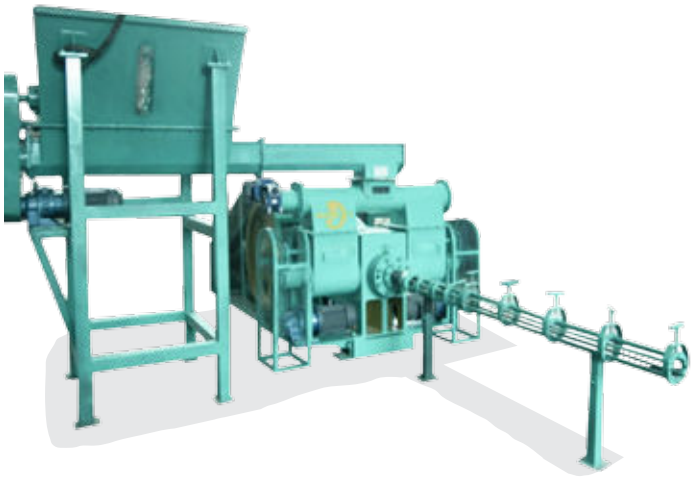
*These values are indicative: characteristics of the presses can vary a lot depending on the origin, quality and cost of the press

Higher operation cost
because of the heating die and high compression, the electricity consumption is very high.

More maintenance due to the high level of silica in the rice husk, the screw needs to be regularly welded and replaced.

Lower investment cost
The cost of one screw press with a capacity of 500 kg/h usually starts from USD 5,000.

Better quality
higher density, presence of a central hole and carbonization of the outer layer helps to achieve a uniform and efficient combustion.



Various suppliers from Asia and Europe, are able to deliver briquetting machines to Cambodia, so don't hesitate to contact GERES team for further information.

PISTON PRESS

In a piston press the biomass is punched into a die by a reciprocating ram with a very high pressure thereby compressing the mass to obtain a briquette.

	PISTON PRESS
Density of the briquettes	**0.9 to 1.2 gm/cm³**
Electricity Consumption	**around 75 kWh/ton**
Production Capacity	**1 to 1.6 ton/hour**
Cost per press	**From 30,000 USD**
Average Life span	**8 - 10 years**

*These values are indicative: characteristics of the presses can vary a lot depending on the origin, quality and cost of the press

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Higher Investment costs

Piston presses usually have a minimum production capacity of 1 ton per hour and their price starts from 30,000 USD.

Low density briquettes

Briquettes are less dense which causes them to crumble more easily (this can make the combustion less efficient).

Lower maintenance

The wear of the contact parts, the ram and die is lower compared to the wear of the screw and die in a screw extruder press and therefore less maintenance is required.

Lower operation costs

The densification process is much less energy intensive.

FOR THE GARMENT FACTORIES,

RICE HUSK BRIQUETTES ARE A GOOD SOLUTION TO REPLACE UNSUSTAINABLE FIREWOOD

Garment factories need to produce large quantities of steam and hot water for ironing, washing or dyeing. To do so they usually use firewood in steam boilers.

They are a **guaranteed legal and sustainable fuel** which is not the case of firewood.

They can **easily replace wood logs** in the steam boilers.

They are **more efficient than wood** thanks to their low moisture content and high calorific value.

They are **easy to handle, store and transport.**

Large-scale rice husk briquette production is **already existing** in Vietnam, China, India, Japan and Europe where they are used in different industries such as food processing, garment factories, paper factories...

A large amount of ash is generated during rice husk combustion (about 20% of the rice husk is converted into ashes). It is therefore important to discuss ash management and disposal with customers before initiating a supply contract.

FOR THE RICE MILLERS,

RICE HUSK BRIQUETTES ARE A GOOD WAY TO:

SCREW PRESS BRIQUETTES

PISTON PRESS BRIQUETTES

Increase the income from the rice husk by creating more added value on the product.

Get regular customers buying rice husk in large quantities.

Save space to store raw rice husk by compressing it into briquettes.

Moreover, briquetting machines are **easy to install and operate.**

Sustainable Thermal Energy and Alternative Biomass

STEAM PROJECT

Since June 2016, GERES, with the support of H&M Group and the Cambodia Climate Change Alliance, has been researching solutions to reduce the use of unsustainable firewood in the manufacturing industries.

Ongoing cooperation and mutual feedbacks with garment factories and rice millers allowed GERES to propose appropriate solutions to reduce the impact of the industry on climate change and deforestation. GERES did several tests in laboratories and in factories to confirm the technical feasibility and the performance of a switch from forest wood to rice husk briquettes to produce steam in Cambodia.

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CAMBODIA CLIMATE CHANGE ALLIANCE
Implemented by: Ministry of Environment
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WISIONS of sustainability

H&M