

13th Global Conference on Sustainable Manufacturing - Decoupling Growth from Resource Use
Feasibility of cleaner production for Vietnam rice processing industry

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Abstract

On the international market, Vietnam's rice value is quite low while production costs are too high, especially in energy costs. Moreover, wastes and pollution have become one of the most imperative issues of rice processing industry, leading to waste resources, increase costs, reduce product quality, and adverse impact on the working environment and habitats as well as the reputation of the enterprises. From analyzing the current state of Vietnam rice processing industry and studying Cleaner Production, this research would study the feasibility of cleaner production technology for Vietnam rice processing industry. A roadmap to implement the cleaner production technology would be suggested. A case study on a rice processing factory belonging to Vietnam Southern Food Corporation would be done. It shows that there is a potential demand on cleaner production and it is possible to implement for Vietnam rice processing industry.

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1. Introduction

Rice is one of top ten valuable commodities in term of Vietnam largest export turnovers. However, contributions of rice production in the economy remain limited and unsustainable. On the international market, Vietnam's rice value still is quite low while production costs are too high, especially in energy costs. Vietnam rice has not yet entered broader market such as European by strict rules on product quality and environmental requirements on rice production industry. According to the report of Vietnam Food Association (VFA), Vietnam rice export has decreases most dramatically among the key rice-exporting countries, which makes Vietnam rank 3 in 2013, behind India and Thailand. In comparison to a country sharing similar features in geography, natural sources and environment, Thailand, in the period of instability in world rice industry between 2010 – 2013, there were some certain points that Vietnam surpassed Thailand in export volume (in 2012) but still ranked behind in export turnover (at FOB price)*. Besides, the by-products of rice

processing such as rice husk, bran have not been retrieved and used effectively.

Moreover, wastes and pollution have become one of the most imperative issues of rice processing industry, leading to waste resources, increase costs, reduce product quality, and adverse impact on the working environment and habitats as well as the reputation of the enterprises. On average, developed countries with strict environmental rules require spending about 1.5% GNP (Gross National Product) for activities and equipment to reduce industrial pollution [1]. Actually, the operation cost of these equipment often is 5 times higher than the installation cost. Focusing on waste treatment without paying attention to the original source of waste generation would add more costs but it could not reduce the amount of pollution. With the “foresight, anticipation and prevention” approach, Cleaner Production has become a solution which prevents the wastes by using effectively resources [2]. As a result, part material was transferred to finished products instead of excreting to the environment causing pollution. Therefore, cleaner production should be considered as a possible solution solving mentioned problems

* Data of Vietnam Food Association and Association of

Thailand Rice Exporters

in Vietnam rice industry at the moment – bad impact on environment and low rice values on international market.

2. The roadmap of Cleaner Production

“Cleaner Production is the continuous application of an integrated, preventive environmental strategy towards processes, products and services in order to increase overall efficiency and reduce damage and risks for humans and the environment.” † The implementation process of cleaner production usually consists of 5 basic steps [2]:

- (1) Planning and organizing the resources;
- (2) Analysing the research object to identify the wastes and its characteristics;
- (3) Proposing the possible solutions/methods;
- (4) Studying the feasibility of the solution;
- (5) Implementing the chosen solution.

However, cleaner production is not a one-time-project. In order to achieve the sustainable development and long-term benefits, the factory needs a system to maintain and improve continuously.

3. Cleaner production and Vietnam rice processing industry

This research was conducted on a rice processing factory belonging to Vietnam Southern Food Corporation as a case study. The commitment from the leader is very important, which could support establishing the cleaner production team. This team usually has the scale depending on the organization size. However, it should consist of members who have knowledge and skills as presented in Table 1.

Table 1 Cleaner Production Team Formulation

Member	Required knowledge and skills	People in charge (suggestive)
Team leader	Decision Making Techniques. Leadership. Project Management.	Vice director
Member 1	Environmental and energy use requirements in the processing of rice. Programs and applications related to environmental and energy consumption management. The concept of environmental management systems.	Factory manager
Member 2	The process of financial decision making. Risk management.	Finance – accounting staff

† The definition of United Nations Environment Programme

Cost-benefit analysis of the selected solution.		
Member 3	Rice production processes. The environmental measurement, control and assessment process. Industrial and systems engineering	Technical staff

After studying the processes and operations, the characteristics of energy consumption and wastes at rice processing plant are:

- Energy:
 - o Electricity: All machine and equipment
 - o Charcoal: Dyer
- Emission: CO₂
- Solid waste: Impurities, husk, rice bran, etc.
- Liquid waste: Very little
- Others: Noise, vibration

For energy issue, the factory has not managed the energy consumption process yet. Specifically, the plant power consumption has been much higher than the standard level of power consumption. The monthly reports show that the plant used 50 Kwh – 60 Kwh to produce 1 ton of raw material. Meanwhile, the standard level of power consumption is 23 Kwh – 30 Kwh‡.

About the solid waste, dust and bran still leaked into the air and dispersed into the environment during processing. Pipe End of Treatment for this type of contamination has been not yet effective. Regarding industrial emissions, noise and vibration have not currently affected the community because factories have been located in the suburbs away from residential areas. Factory pollution has been ignoring this type of pollution. However, with the high urbanization rate currently, ignoring the noise pollution and vibrations should pay attention on affecting on companies sustainable development.

In conclusion, urgent issues have increased force on the efficiency of energy consumption. Three goals setting up for a typical rice processing factory in Vietnam are shown in Table 2 [3].

Table 2. Matching between policy and objective of the plant

Policy	Objective
Ensure the compliance with the provisions and requirements related to energy management.	Complete the registration and labelling of energy under Circular 07 / 2012 / TT - BCT dated 04/04/2012 energy labelling for vehicles and equipment energy use of MOIT.

‡ Vietnam Southern Food Corporation

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