

Improving Small Scale Brick Kiln Efficiency, Viet Nam

Themes

- ★ Energy efficiency
- * Innovative technology applications
- * Linkages with other environmental goals
- ❖ Financing mechanisms and private sector involvement
- ❖ Technical capacity development
- ❖ Policy and legislation
- * Health (MDGs 4-6)

PROJECT DATA

Name: Developing a model of a vertical brick kiln with high efficiency

Implementing organization: Vietnam Thermal Technology and Science Association, VTTSA (NGO)

Location: Hung Yen Province, Viet Nam

SGP contribution: \$32,145

Start Date: June 2001

ENERGY OVERVIEW

Energy resource: coal

Technology: efficient kilns

Application: brick-making

Sector: small-scale commercial

Cost of each system: \$7,200 – \$9,200 per unit

Efficiency: reduces coal use in brick-making by 45-50%

Units produced: six vertical shaft brick kilns (Hung Yen Province), 15 (Hai Duong Province)

BACKGROUND

Brick-making is one of the most important industries in Viet Nam. It is also traditionally carried out on a small scale by family-run businesses in rural areas. In 1998, there were over 300 brick-making enterprises, of which 200 were privately owned and predominantly small-scale, and accounted for approximately 70% of total brick production. At the same time, brick production is one of the most environmentally damaging activities in the construction sector. Brick kilns tend to be highly inefficient, and make use of low-quality coal with high sulfur content. This leads to intense local air pollution, as well as a significant contribution to greenhouse gas emissions. Recently, the government of Viet Nam issued a decree that all traditional brick kilns in cities must be phased out by 2005, and in rural areas by 2010. Another type of kiln already used in Viet Nam is the "tunnel" kiln, which is very large and costly (over \$60,000). Small scale producers cannot afford this, and currently only state enterprises use them. A single company under the Ministry of Construction, called Viglacera, builds these.

Improved and more efficient brick kilns have been developed in China, and there is great potential for adopting this technology in Viet Nam. This project is located in the Xuan Quan commune in the Hung Yen province, where family-scale producers are very important. In this area, local authorities recently issued strict limits on the polluting brick kilns. Thus, there is a great need for

improved and more efficient brick-making technology.

PROJECT DESCRIPTION

Overview

This project demonstrates a model of the vertical shaft brick kiln that could be used in this region. In doing so, the project also raises awareness among local brick-makers about the technology, and also educates the local authorities on the effects of local pollution and greenhouse gases.

Implementation

This project began its work by meeting with and organizing training workshops for local government officials as well as community members. The goal was to work closely with the community and with the government in developing a model for an efficient brick kiln that would be usable in this community, as well as in other rural areas of Viet Nam. The VTTSA, with technical assistance from the University of Technology, provided supervision and management for community members who were involved in designing the model, and then conducted an independent assessment of the model's efficiency. The final step of the project was to share the experience of developing this kiln with brick-makers in other communities via training and study tours. The project organized 3 such training and study tours. Media, both local and national, including television and the Voice of Viet Nam, have publicized the results of the project.

Technology

The technology is called the "vertical shaft brick kiln," and is adapted from Chinese models. Local brick-makers were heavily involved in adapting and testing the model for Viet Nam. After one kiln was produced for a brick producer, he tested it and suggested adaptations. He has now become an expert in this technology. One example of an adaptation involved reducing the percentage of broken brick, which for this technology was quite high at 7%. Local brick makers tried different ways of adding fresh brick to the kiln, and added some coal to the clay for making fresh brick. Tests have shown that the percentage of broken brick has been reduced to 4%.

Environmental Benefits

Global: This project reduces greenhouse gas emissions by making more efficient use of coal in brick kilns. So far, six kilns have been built by this project. The neighboring Hai Duong Province has since financed the production of 15 more kilns. In addition, the model has also been replicated in other areas through brick producer investment.

Local: Since less coal is required to produce bricks, local air pollution problems stemming from coal burning in brick kilns are reduced.

Local Livelihood Benefits

Health: Reduced local air pollution can have important health benefits, especially in reducing respiratory illnesses.

Income generation: Since brick kilns are run by small, family busi-

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nesses, improved efficiency means they need to purchase less coal in order to produce the same amount of bricks. In addition, since the local authorities have expressed concern about the air pollution produced by brick kilns, access to this technology provides these small businesses with an option to continue to produce bricks but with less pollution.

National Benefits

Given the large scale of the brick-making industry and its widely dispersed nature, there is a great benefit to the country as a whole in testing this technology, in conjunction with local officials and community members. The country may benefit if use of the more efficient vertical shaft brick kiln becomes widespread throughout Viet Nam.

Capacity Development

The project has sought to develop the capacity of the Vietnam Thermal Technology and Science Association to manage environmental projects and work with local stakeholders. In addition, local government officials are gaining additional knowledge and understanding of energy and environmental issues related to the brick kilns.

Beneficiaries

Local brick-makers will be the direct beneficiaries of the project. In addition, the entire community will benefit from improved air quality.

Partners

The grantee has worked closely with the local community and with local authorities as their primary partners. The University of Technology provides technical expertise to the grantee and to support community members in developing an improved vertical shaft brick kiln. Community members have offered their expertise and experience in suggesting ways to adapt the kiln to local conditions, and in testing the use of the kilns. Local authorities have been supportive, and in the Hai Duong Province have financed 15 additional kilns.

LESSONS LEARNED

Environmental Management

This project illustrates the great potential that exists within the brick-making industry, as in many aspects of the construction sector, to improve energy use efficiency. Unlike some industries, this one has a large percentage of small scale producers. This means that the technology must work on a small scale, and therefore be adapted to and tested at that scale. Thus, there is a great need for work directly with communities like this one in order to adapt to local needs.

The project illustrates a situation in which local air pollution problems are strongly linked with greenhouse gas emissions. The government's new policies related to brick kilns were

motivated by local air pollution problems, but this project demonstrates how such problems can be addressed while also reducing greenhouse gas emissions.

Barrier Removal

Technical: This project is designed to reduce the technical barriers to the widespread use of the more efficient vertical shaft brick kilns. It has been largely successful; additional kilns have been financed by the neighboring Hai Duong Province, and through private investment in other parts of the country. Many brick makers are now waiting for the vertical shaft brick kiln to become widely available, and have even canceled their contracts for building tunnel brick kilns as a result.

Policy: At the local level, this project made a specific effort to educate and work with local authorities in their efforts to reduce air pollution while ensuring that brick-makers can still maintain a livelihood. It also seems that this project began a dialogue with policy-makers from the start, making their improved awareness and understanding of energy and pollution issues a very important element of the project. This local effort to involve local policymakers seems to have been quite successful.

It is important to bear in mind the national policy context in which this project emerged. The national government had recently placed deadlines for the phase-out of the traditional brick kilns. This provides a serious impetus to find new, efficient technologies to meet the needs of the very large number of small scale brick producers throughout the country.

Scaling Up

Given the vast number of small scale brick producers and the current policy environment, there appears to be a great need to scale up such efforts. The project itself appears to have produced a model that is well-adapted to small scale needs and local conditions through many rounds of testing and significant input from users. The low cost of the technology makes it possible for small scale producers to purchase it.

There are initial signs that the project results are catching on; one province has already taken steps to finance further production, as are some private investors. In November 2003, the vertical shaft brick kiln was one of four technologies included in a workshop sponsored by the Global Environment Facility as part of an effort to support small and medium scale enterprises in adopting energy-efficient technology.

SOURCES CONSULTED

Project Record VIE/00/004, SGP Project Database, <http://www.undp.org/sgp>
SGP Viet Nam. "Developing a model of vertical brick kiln with high efficiency." Project summary, 2001.
SGP Viet Nam National Coordinator; Nyugen Kim Anh. Email communications, September and October 2003.