EECB
ENERGY EFFICIENT
CLAY BRICK

# South African Brick Maker Survey Summary

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## Abbreviations and Acronyms

| ACRONYM | DESCRIPTION |
|---|---|
| CBA | Clay Brick Association |
| EECB | Energy Efficient Clay Brick |
| EnE | Energy Efficiency |
| kg | kilogram |
| MJ | Mega Joule |
| TVA | Transversal Arch |
| VSBK | Vertical Shaft Brick Kiln |
| VSD | Variable Speed Drive |

## Executive Summary

The South African Brick Makers Survey conducted in 2015 sought to determine changes around energy efficiency which have taken place in clay brick production since the start of the EECB project in 2013. Out of an estimated 100 formal brick companies in South Africa, a representative sample of 40 brick makers participated in the survey across the 9 South African Provinces and included the different firing technologies (clamp, tunnel, VSBK, TVA, zigzag).

The results of the survey have shown that there has been a substantial change in the mindset of the brick makers who were willing to share information about measures implemented and their energy consumption, with the view that the sharing of information would surely benefit the sector as a whole.

### *Energy Consumption*

With regards to energy consumption, the data from each brick maker was calculated to determine the average energy consumption per kilogram of fired brick. The average identified is 3.40 MJ/kg of Fired Brick with 65% of brick makers falling within this average and a total of 35% percent of brick makers above the average.

The total energy consumption was looked at in relation to the firing technology used. The Clamp and Tunnel kilns energy consumption results were below the sample average with the Vertical Shaft Brick Kiln's (VSBK) energy consumption just slightly above. It is important to note that in the cases with the VSBK kiln, additional energy is used due to the drying of bricks which resulted in a total energy increase. When the drying energy was removed the results showed the VSBK being well below the sample average.

The data obtained showed that between 70 to 97% of energy used is a result of the firing process, with 1 to 10% of energy use coming from electricity and 2-12% from diesel usage. In cases where additional fuel is used for drying, the energy consumption for drying is between 15 and 65% of the total energy consumption.

These ranges alone indicate that the first opportunities for saving energy, lie in the energy used for firing as well as the amount of diesel used. It also shows how little is known about the real energy consumption for the drying process.

### *Implemented measures*

The survey results indicated that 83% of brick makers are actively seeking methods of improving energy efficiency. This is supported by the fact that over the last two years 88% of the brick makers have implemented energy efficient measures. Of these 88%, 8% of the brick makers did not want to share the measures which implemented, however because the remaining 80% of brick makers were willing to share their measures, we were able to determine the most popular categories for implementing EnE.

These include:

- **Optimization of current systems and technology** – implemented by 53% of brick makers which includes:
    - Continued testing and improvements to raw materials used;
    - Using double casings and covering with mud to reduce waste;
- **Energy monitoring** - implemented by 53% of brick makers which includes:
    - Regular checks on stock piles to determine wastage and quality of stock.
    - Manual monitoring of energy used, based on orders and accounts.
- **Energy efficiency motors and electrical management** - implemented by 50% of brick makers which includes:
    - Power factor correction;
    - Variable speed drives (VSD);
- **Mobile fleet management** - implemented by 47% of brick makers which includes:
    - Changing of fork lifts from old Bell machines, to Linde an Manitou forklifts;
    - Replacement of water truck with a tractor and water tank, resulting in reduced energy, improved efficiency flexibility and reduced water waste.
- **Energy management behaviour** - implemented by 44% of brick makers which includes:
    - Continued review of energy consumption and trends to identify areas of improvement;
    - Reorganising operational hours to fit in with off peak times;

### *Drivers for Energy Efficiency*

The main driver for the brick makers is economic. Environmental and legislative drivers were generally considered important however this was more because non-compliance to either has a very serious economic impact to the business.

The general response from the brick makers was that they will implement whatever measures need to be implemented as long as it reduces costs, increases market share or keeps them in good standing with the law. Therefore any measures for energy efficiency should be considered in terms of the economic impact it will have on the brick makers.

### *Obstacles*

The survey also sought to determine the main obstacles for brick makers when implementing energy efficient measures. The survey revealed that the four main obstacles are; a lack of funding (58%); a lack of comparable data (40%); a lack of knowledge (38%) and a lack of support services (35%).

This provides the EECB project, along with the CBA, with specific areas which they may be able to address.

### *Attribution*

When attempting to determine the attribution to the EECB project to the changes taking place, 35% of the interviewed brick makers stated that they have been influenced by the EECB project in their business decision to implement EnE measures. 35% of the brick makers said the work done by EECB is very good, 33% gave a rating of good and 5% rated the work as bad, while 28% did not provide a response.

The brick makers are very enthusiastic as to what the EECB project will still be able to add to the sector.

Due to the nature of the project and the fact that it is a market system development project, the brick makers will not always be aware of the work done by EECB as EECB works directly through the CBA and service providers and not directly with the brick makers. This is the reason for the 28% of brick makers who could not respond. Taking this into account, it may be advantageous to provide more information to the brick makers to explain this.