

# Industrial Energy Efficiency Project

## Benchmarking Report of Ceramic Sector

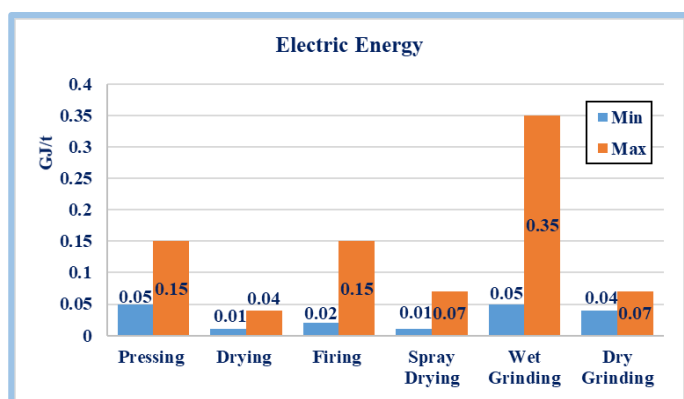
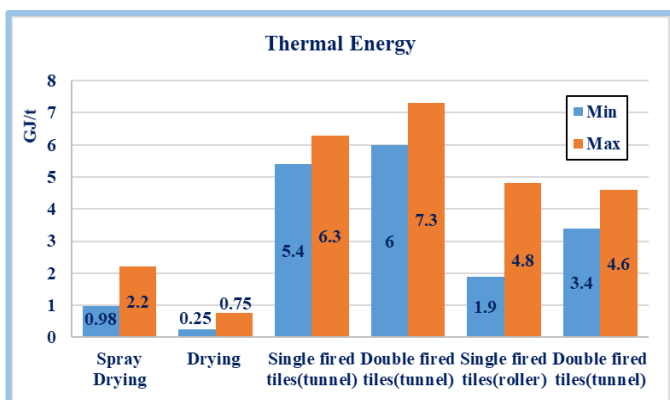
### 2016

Benchmarking report was prepared by the United Nations Industrial Development Organization (UNIDO) and funded by the Global Environmental Facility (GEF). The project seeks to address some of the key barriers to industrial energy efficiency (IEE), to deliver measureable results and to make an impact on how Egyptian industries manage energy through an integrated approach that combines capacity building and technical assistance interventions at the policy and energy efficiency project level.

The annual production of the whole ceramic tiles sector in Egypt is 366,006,561 square meters (Equivalent to 6,588,118 tons).

The “Best Available Techniques (BAT) is 3.31 GJ/t. The international Best Practice Technology (BPT) for total energy consumption is 4.13 GJ/t ceramic.

The BAT-associated thermal/electrical energy consumption levels for the different processing steps in the ceramic tiles manufacture is shown.



## Developing National Benchmark

The methodology applied for establishing the benchmarking studies was derived from UNIDO Working Paper “Global Industrial Energy Efficiency Benchmarking – An Energy Policy Tool, Working Paper, 2010”. Drawing the benchmark curves involved the following steps:

### 1- Selection of Companies

The ceramics sector in Egypt include 38 industrial plants. Of the 38 plants in Egypt, 19 plants (13 companies) were willing to cooperate in the project that cover 58% of the total production capacity of the Egyptian ceramic tiles industry.

### 2- Data Collection

Detailed data collection sheets were developed for data collection during site visits. Collected data included general information about the company, basic technical information, applied energy management system, implemented energy efficiency measures. Data of plant production [m<sup>2</sup>], thermal and electric energy consumption for the last three years.

### 3- National BAT and BPT

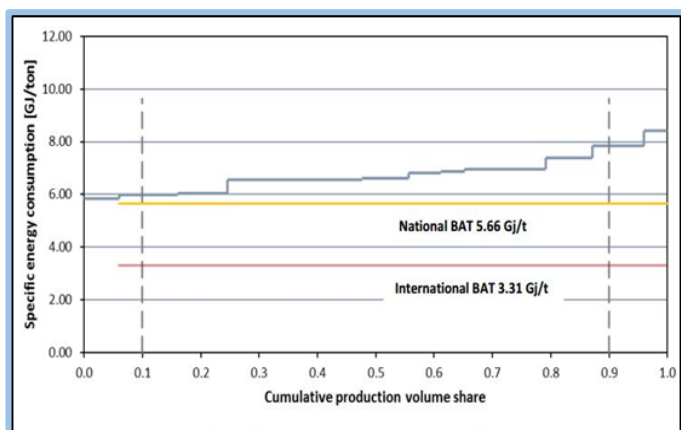
From the collected data, for each company, specific energy consumptions (SEC) were calculated:

- Specific thermal energy consumption (GJ/ton)
- Specific electrical energy consumption (GJ/ton)
- Total specific energy consumption (GJ/ton)

The company with the least total SEC gave the value of the National BAT (5.66 GJ/t), while the company with the second least total SEC gave the value of the National BPT (5.8 GJ/ton).

#### 4- National Benchmark Curve

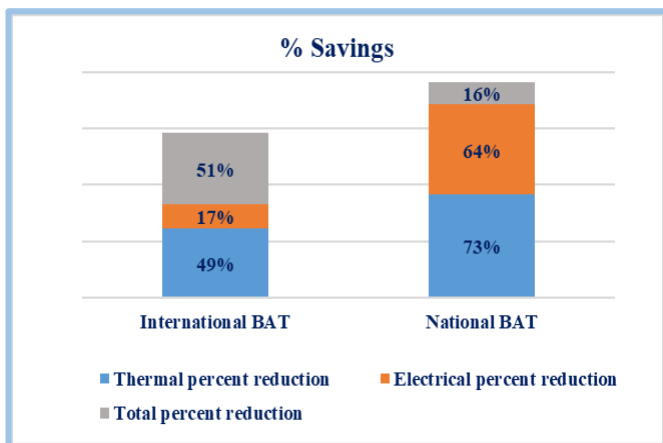
Benchmark curves for thermal, electrical and total SEC were developed for years 2013, 2014, and 2015. Comparison between successive benchmark curves showed that there are no real actions towards enhancing energy efficiency in the sector are implemented.



Average total SEC benchmark curves between 2013 and 2015

#### Energy Saving potentials

The weighted average specific energy consumption of the ceramic tiles industry in Egypt is estimated to be 6.76 GJ/t ceramic.



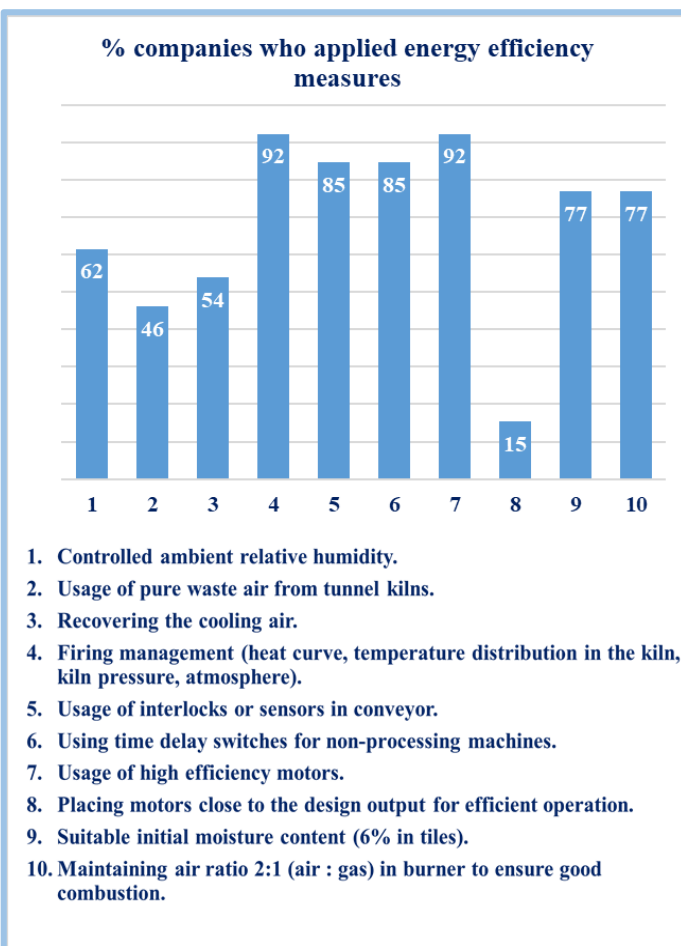
Annual saving potential for the whole sector was calculated using the national and international BAT.

$$\text{Sector Energy Saving Pottential} = (\text{Average SEC} - \text{BAT}) * \text{Sector Production}$$

The total energy saving potential for the whole sector using the national and international BAT are 7,216,096 and 19,499,010 GJ/year.

#### Saving Opportunities

Energy efficiency measures related to the drying process, firing process and housekeeping were identified. A survey was made on the status of their implementation.



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