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Sustainable Energy for Profitability

ENERGY EFFICIENCY OPPORTUNITIES IN THE METAL PROCESSING INDUSTRIES

The Africa raw materials are most of the time exported and processed somewhere else, thus failing to add value to the resources. This has been causing continuous economical fall-outs and many African governments are trying to figure out the problem. Ghana is working out to augment its economy and launched the campaign “one district one factory” to create a factory in each of its 216 districts to transform raw materials into products

with high added value.

After extraction, the mineral ores are smelted, to separate the specific metal and then processed in ingots rolling process. The smelting and the ingot rolling process makes metal processing to be one of the most energy consuming industries in the world. So, **how can the expanding metal processing industries reduce their energy consumption and be more competitive?**

01 Specific energy efficiency actions for metal industries

Many different energy efficiency opportunities exist in the metal processing industry. As a rule of thumb however, Zero, Low and Medium capital expenditure (CAPEX) energy efficiency opportunities become available in metal processing operations, as the factories become

progressively older. In newly constructed metal smelting operations, few energy efficiency opportunities will be available as usually the process selection will be also based on its specific energy consumption in kWh per ton of product.



Metal smelting factories have furnaces that are energy intense. Below some

energy efficiency opportunities which can be implemented in these scenarios.

Few energy efficiency opportunities can be recommended for furnaces as follows:

- (a.) **Pouring distance:** The pouring distance refers to the distance between the lip of the furnace and the molds. The distance between these two parts of the factory should be reduced as much as possible. The longer the pouring distance, the more thermal energy will be lost in the process.
- (b.) **Reducing of splashing:** As can be seen in the two photos, there is more splashing in the second photo. Splashing occurs for



various reasons including impurities which cause bubbling in the molten metal. Impurities should be eliminated in the furnace input to the barest minimum. One of the most common method to remove impurities is preheating and thermal drying of the metal ore. The splashing results in loss of thermal energy.

- ©.) **Thermal energy harvesting:** Heat harvesting refers to the process of transferring wasted heat and putting the harvested heat to use in other sections of the factory. Heat harvesting is an energy efficiency opportunity which should be assessed and implemented in different sections of either the smelting or the rolling operations of the metal processing.

This figure demonstrates heat losses from a top loading furnace. The fogging event happens as a result of carbon-based impurities. Therefore, an important energy efficiency opportunity is to pre-treat the materials before they are loaded into the furnace. Decreasing impurities in the furnace-input will result in less energy use.

02 Energy audit

Significant reductions cannot be achieved unless the process itself is analyzed, challenged, and optimized. Doing an energy audit is a task that requires significant expertise and knowledge regarding the regulatory and the requirements of

the manufacturing processes. Maintaining the environment to ensure safe operating personnel protection and comfort are crucial factors that must be accommodated when making any changes to the process to save energy.

03 Conclusion

Metal processing companies need to implement energy efficiency measures in their operations, to benefit from reduced energy consumption and increased profitability. The cost of performing an energy audit will be easily offset by the implementation of low and no-cost measures that an expert can identify in collaborating with the plant engineers. As added advantage, the CO₂

reduction will provide to the industry a green image and the possibility to revamping old plants that can attract potential investors that are interested in the environmental policies of the company. Green marketing can also improve access to finance, relationships with decision makers and local communities, giving a competitive edge to the industry.

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