Analysis of energy efficiency and consumption in South African steel foundry

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Presentation Outline

- Introduction
- An over view of energy efficiency in South African foundries
- The improvement of energy efficiency
- Challenges faced on the improvement and implementation of energy efficiency
- Project briefing
Introduction

What is energy??
Types of energy:
- Light
- Heat
- Chemical
- Electric
- Kinetic
- Potential
What is energy efficiency?

- Using less energy to accomplish the same task

Figure 1a: Insulated house

Figure 1b: un-insulated house
Incentives "WHY"

- Brings awareness and knowledge
- Better understanding of current energy usage and enable future predictions
- Saves on cost
- Reduces production and product cost
- Has a positive effect on competitiveness
- Reduces risk/ exposure to rising energy price
Figure 2: International Electricity Survey (NUS Consulting Group International Electricity & Natural Gas Survey, 2013)
Figure 2b: Average electricity price in South Africa 2002-2017
Energy efficiency Overview

Figure 3: Worlds energy consumption by sector (EIA, 2012)
Figure 4: South African Energy consumption by sector (Promethium carbon 2006)
Figure 5: Energy consumption by sub-sectors
Figure 7: Energy consumption by foundry departments (Davies, 2012)
Energy efficiency developments in S.A

- Mandatory energy efficiency standards:
  - Appliance labeling- Potential savings with labeling or higher efficiency standards are estimated at 3 PJ in 2012
  - Certification and Accreditation- The Strategy makes use of several instruments where inspectors or auditors will be expected to carry out certain technical functions, or studies
  - Education and awareness- Information and generic awareness are key elements to achieve success in terms of changing South Africa into a more energy efficient society
Contd....

- Research and technology - Technological options represent significant potential for energy efficiency improvements

- Energy audits - Energy audits have been internationally used across all sectors to identify efficiency measures that can be implemented in a cost-effective manner

- Energy management - enables the formalisation of monitoring, evaluating and targeting energy consumption as well as providing sector-specific benchmarking information
CHALLENGES FACED ON ENERGY EFFICIENCY

• **Attitude**: The fear of appearing incompetent.

• **Resistance to change**: Fear of trying on new technology.

• **Perception**: Energy is too cheap.

• **Uncertainty regarding the future**: Investors are sometimes reluctant to commit resources to long-term projects.

• **Lack of capital**: Some energy efficiency measures involve the installation of expensive capital equipment (Fawkes, 2005).
Figure 8: Summary of barrier ranking regarding energy efficiency (Fawkes, 2005)
Conclusion

An analysis of energy efficiency on South African foundry can serve as an alarm to South African foundries on energy saving. This has been done by looking at the overall energy usage, the current development and challenges faced on implementing energy saving method. Therefore, by so doing it will enhance better understanding and highlighting the importance of energy efficiency in the foundry industry thus results in reduction of cost of energy.
Project briefing

1. To measure/map the energy consumption of the whole foundry,

2. To analyse foundry energy in that way identifying and quantifying areas that consume a lot of energy.

3. To formulate a baseline, identifying potential energy saving opportunity.

4. To develop energy model

Improvement of energy efficiency in S.A Steel foundries

Aim
1. Give an indication of the current state of energy in the foundry

2. Give an information collective knowledge of energy standards, status and way forward

3. Identify and quantify area of improvement in a form of a baseline

4. Provide a cost effective energy model for management and control purposes

Improvement of energy efficiency in S.A Steel foundries

Justification
Improvement of energy efficiency in S.A Steel foundries

1. How much energy consumed per department in AD steel foundry?

2. What is the significant energy user in the whole AD foundry?

3. How will energy process model assist the foundry in terms of energy management?

Research Q
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