Energy Efficiency in Maquiladoras of electronic components: A Cleaner Production approach

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Background

• Up to two thirds of the world’s energy resources are used by the industrial sector.
• Energy consumption is predicted to increase 1.6% annually until 2030.
• Poor energy management, particularly in developing countries, results in unjustified CO2 and other greenhouse gases’ emission.
• Poor infrastructure and lax law compliance.
Maquiladoras

- Assembly and manufacturing plants
- Electric and electronic components
- 6 Maquiladoras located in two different cities, in the US-Mexico boarder region
- They differ in size, number of employees and managerial structure
- Environment temperature
Joint-Objectives

- To help reduce CO2 emissions
- To Help strengthen CSR
- To Increase cost reductions
Methodology

Planning and Organization

Pre-assessment

Implementation and continuity

Feasibility analysis

Evaluation

Action plan

✓ Interviews
✓ On-site visits and walk-throughs
✓ Interventions
✓ Implementation
✓ Improvement
Research questions

• Within a system’s approach, what areas in the participating maquiladoras have the most impact on energy consumption?

• Can competitive advantages be developed through efficient energy management in the participating maquiladoras?
Main areas of concern

- Heating, ventilation and air conditioning (HVAC)
- Pneumatic systems
- Electric engines
- Industrial ovens and exhausts
- Lighting
Challenges

- Investment
- Employee awareness
- Unresponsive management
- Uneven or disarticulate objectives
- Pay-back periods
Results

- Energy consumption
- HVAC
- Motorized systems
- Pneumatic systems
- Strong relation with varying temperatures
Results

• Policies greatly differs depending on size and corporate structure.
• Customer’s requirements as a driver for the adoption of newer technology.
• Willingness to include energy-efficient policies in their vision statement.
Results

• Up to 40% savings on energy costs
• Improvement of overall quality and working environment
• Uneven employee and management awareness
• Lack of follow-up directives when energy management procedures are in place.
• Different aspects of energy management seen as isolated elements, rather than as a compound.
Conclusions and Recommendations

• Newer technology on lighting.
• Replace pneumatic devices by electric ones, whenever possible.
• Isolate high-temperature areas
• Use exhaust heat as input for other processes.
• Develop stronger energy management policies
References

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