

# ACHIEVING ENERGY EFFICIENCY IN MANUFACTURING: ORGANIZATION, PROCEDURES AND IMPLEMENTATION

Sândina Ponte

Dr. Bin Wu, Dissertation Supervisor

## ABSTRACT

The industrial sector has one of the highest levels of energy consumption and therefore greatly impacts sustainable development around the world. Transitioning to renewable energy sources and becoming energy efficient are two ways to reduce greenhouse gas emissions, but the latter approach will take the least amount of initial investment, provide the quickest payback, and immediate rewards (i.e., cost savings, employee/company morale, and emissions reduction).

Energy efficiency is not a new concept, but its implementation has been slow and sometimes non-existent in some factories. This is due to many factors, including: lack of in-house expertise, lack of funding, lack of user-friendly tools, lack of institutionalized operational procedures, and most importantly energy efficiency has not been a part of the overall strategy.

To overcome these obstacles, this research proposes the introduction of energy efficiency into every layer of the company's overall framework, i.e. the Manufacturing/Supply Process, Human and Organizational, and Information and Control layers. This will be achieved by creating a complete methodology to help industrial organizations to plan and institutionalize energy efficiency solutions as a company wide program. While a systems' approach provides the foundation for the methodology, a web-based Task-Centered Workbook will provide the necessary tools for technical implementation.

With an integrated energy efficiency methodology for factories, the industrial sector will no longer be the highest energy consumer but a contributor to sustainable development. This is an integral part of industrial ecology, which can also benefit from a structured framework that unifies all available tools to better support sustainable development.