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**Energy efficiency; a step towards cleaner production. An integrative case study of the Meat processing industry in Hermosillo, Sonora.**

por:

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Academic Work

## Introduction

- Production processes involve the usage of energy to convert raw materials to final products, in quantities that can vary from production process to production process, resulting in fluctuating negative impacts derived of the depletion of the energy resources (Jorgenson et al, 2014).
- It is urgent to think on its impact from the societal, economic and environmental perspectives, making it a key element for the accomplishment of sustainable development (Stern, 2010).

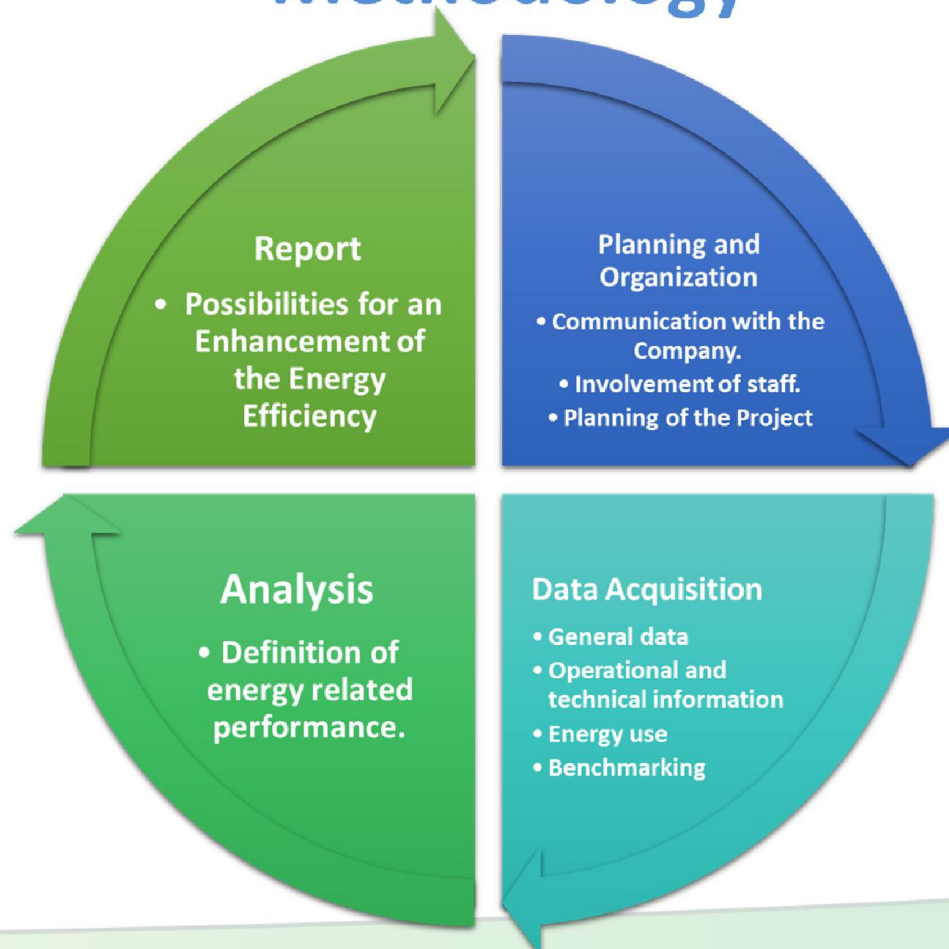


## Introduction

This work shows the results of the application of energy efficiency audit with the objective to reduce the negative impacts to the environment due the operation of a meat processing industry. In order to increase efficiency and upgrade its competitiveness.



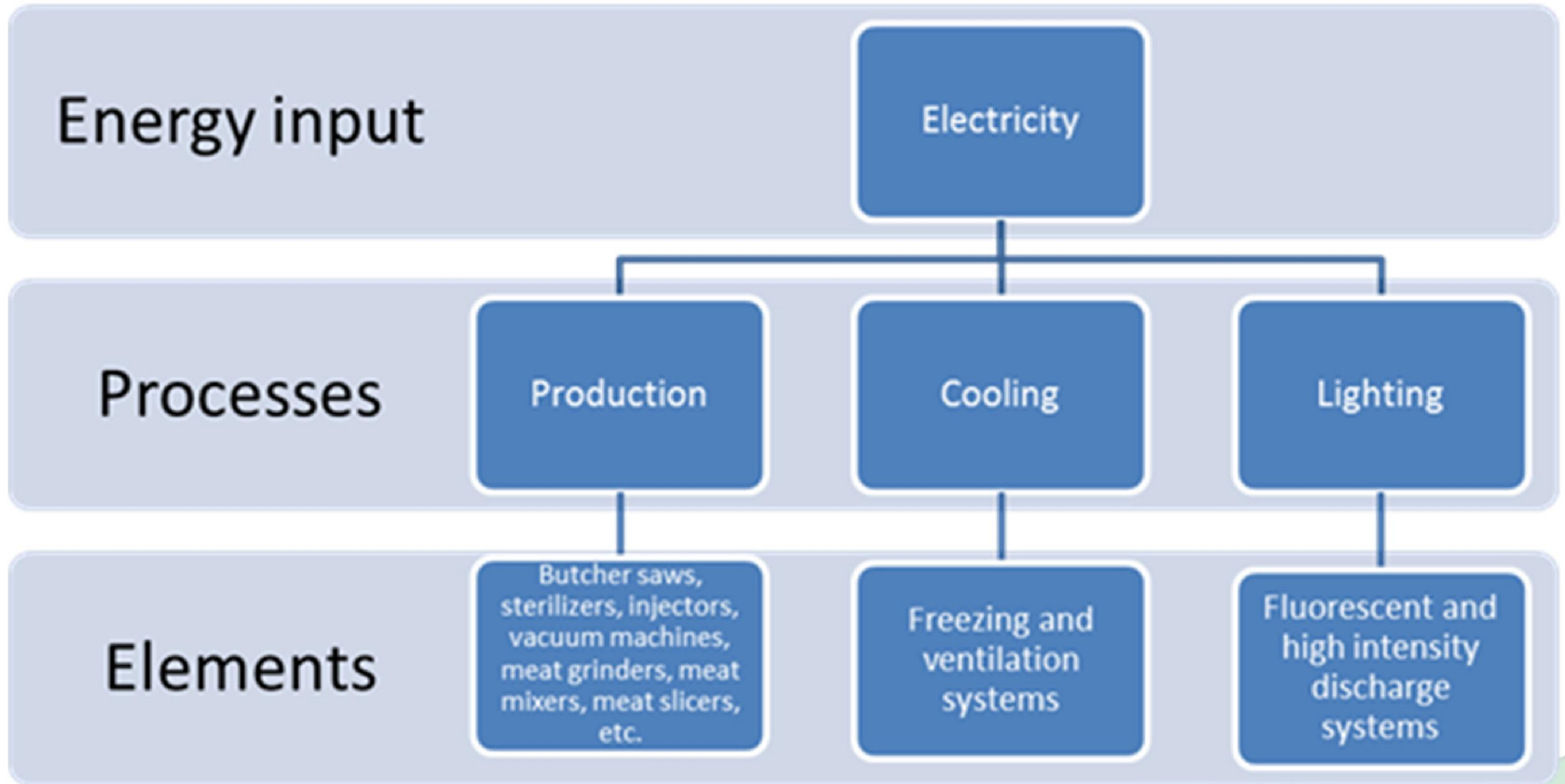
## Methodology



Modified from: UNEP, 2004.  
Guidelines for the Integration of Cleaner Production and Energy Efficiency.



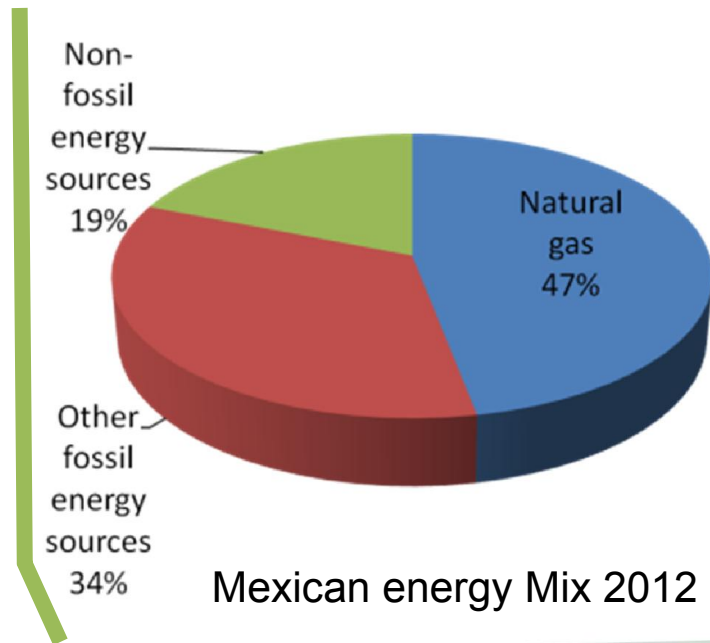
## Results



## Impacts of Electricity Usage

Estimation of GHG emissions:

***Activity data \* emission factor = Carbon Dioxide Equivalent***



Mexican energy Mix 2012 [Adapted from SENER, 2013]

Mexico's emission factor equals to  
***550.1 CO<sub>2</sub> Equivalent*** by MWh.

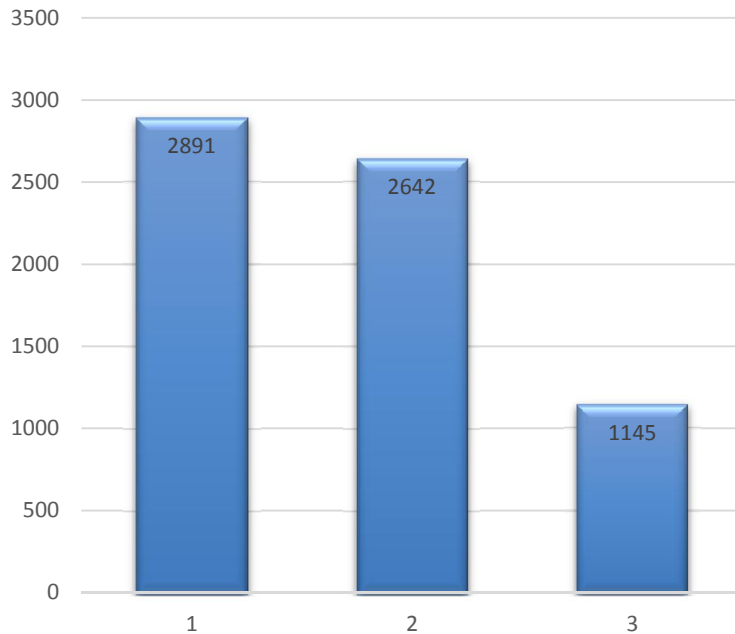
[Climate Registry, 2014]





## Impacts of electricity use

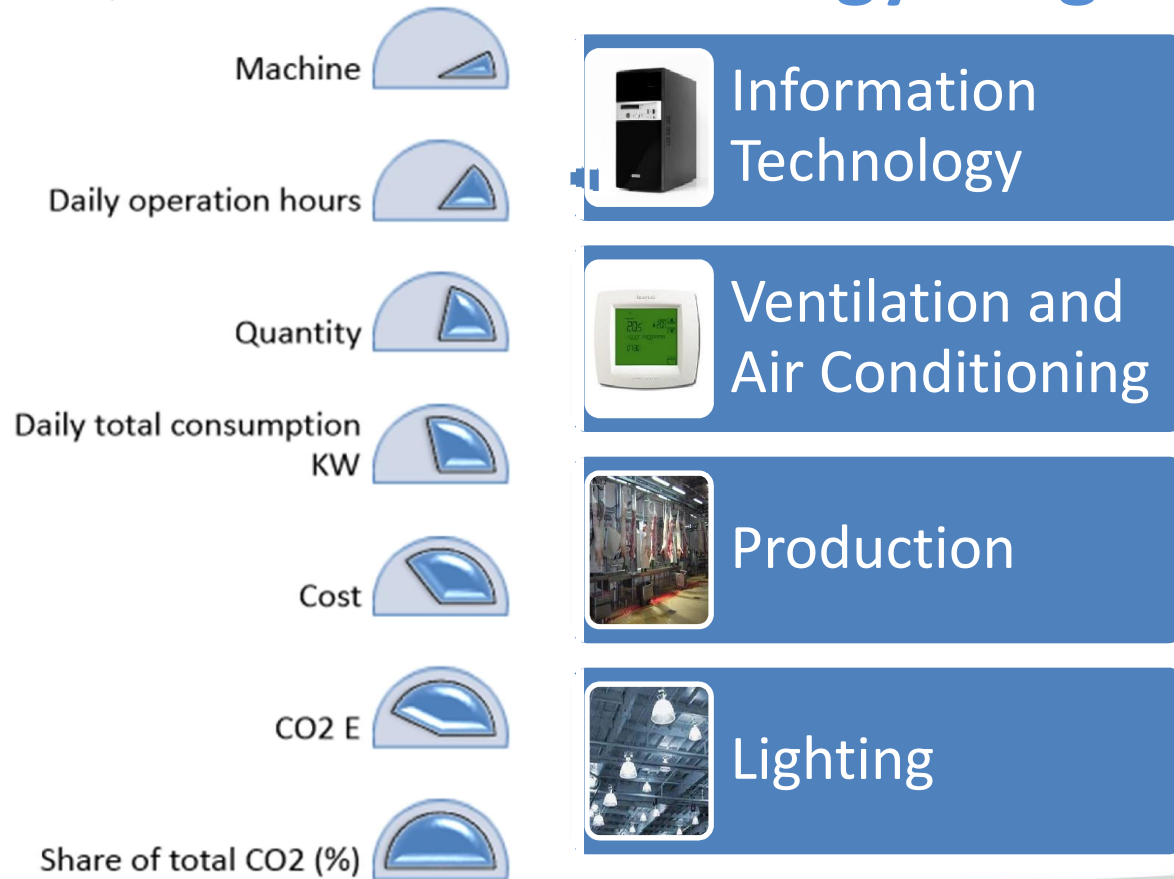
Yearly Carbon Dioxide Emmissions



Electricity	2012	2013	2014
Quantity [KWh]	4,192,023	3,832,094	1,660,109
CO <sub>2</sub> E [Metric tons]	2891	2642	1145
Share of total CO <sub>2</sub> E	94	74	73



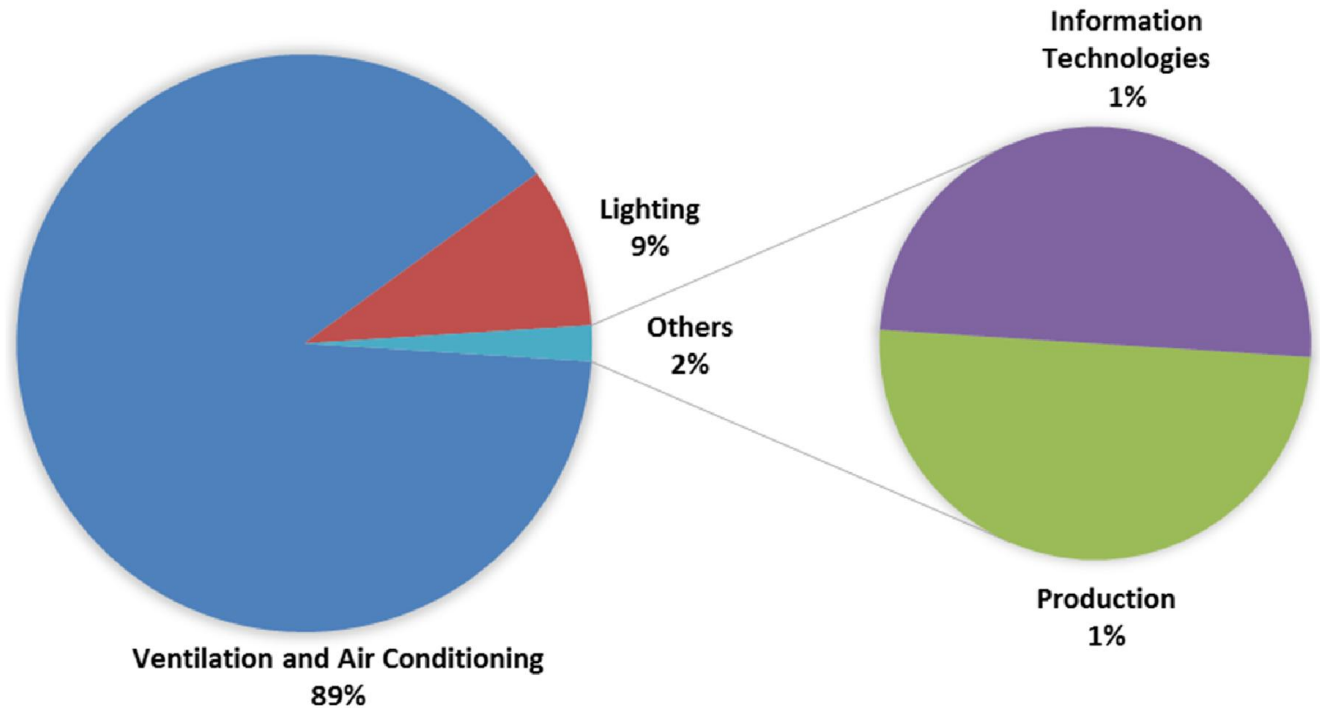
## Quantification of energy usage





## Categorization of energy consumption

The daily KWh consumption of each category is described in terms of the environmental impacts of these categories are expressed in  $CO_2$  Equivalents.



## Energy efficiency potentials



- Illumination
- Pneumatic systems
- Electric drives
- Pumping systems
- Ventilation and air-conditioning technology
- Space heating and cooling systems
- Hot tap water systems



**As a summary, the main opportunities in this company are described:**

- Energy efficiency is one of the main topics that should be addressed in matters of cleaner production.
- Measures for energy efficiency can be achieved without affecting the regulatory compliance.
- The result serve as the basis to a more energy efficient and cleaner production processes in Company A. Therefore a more depth analysis of materials flow is recommended.
- Opportunities on cleaner sources for energy should be noted and are also part of the company's transition to cleaner energy.



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