

## **CHAPTER I**

### **INTRODUCTION**

At present, the world has become more concerned about the issues of environmental degradation. Many industries and businesses must pay more attention on their activities that affect the environment and be ready to be responsible for the consequences. This means that relevant environmental impacts are to be seriously considered as an important factor for all kinds of industries around the world. In this perspective, new processes, new technologies and new products being developed nowadays have to fulfill the environmental requirements such as global warming, human health, and ecosystem degradation. In order to determine whether the new designs are beneficial for both economical and environmental aspects, a proper assessment must be done. One effective tool widely used nowadays for the environmental impact assessment is Life Cycle Assessment or LCA.

Life cycle assessment is a tool designed to analyze and quantify the environmental impacts of product or service based on resources utilization, energy consumption and environmental by-product emissions throughout the entire life cycle. To do LCA, numerous data and calculations are required and the analyses are complicated which may take long time to complete, and thus, simple reliable and not expensive software for calculations would play the important role for LCA studies. Currently, there are several LCA softwares available such as BOUSTED (developed by Dr. Ian Bousted, England), Simapro (developed by PRé Consultants, the Netherlands). However, most of the existing softwares are expensive for individual or students to attain and many are quite difficult to use.

Therefore, the purpose of this work was to develop an applicable life cycle assessment software (LCSoft) which is simple and easy to use at a reasonable price by using Visual Basic for Application (VBA) on Microsoft Excel. This LCA software was developed based on existing calculation models. The software model and architecture was first created, developed, and then verified. The simulation data were required to be input into the program by the user. The outputs of the software included environmental impact data, inventory data as well as carbon footprint for the designed process.