CHAPTER I
INTRODUCTION

The last century has witnessed an unprecedented growth of industrial activities in every sphere that is fuelled by the increasing demand of the global population expansion, which presently is in the order of 6.5 billion. Inevitably, the burden currently loaded on the environment is becoming heavier than ever, posing a critical threat against the very existence and development of mankind.

Acknowledging the looming problem, many governments have tightened their environmental legislation by publishing new and more comprehensive regulations. For example, in the EU the EPR (Extended Producer Responsibility) policy, the WEEE (Waste from Electrical and Electronic Equipment) directive, the RoHS (Restriction of Hazardous Substances) directive, and the EuP (Energy-using Product) directive are typical examples. In addition, increased public awareness and intense global market competition have forced manufacturers to be more concerned directly or indirectly about environmental issues than before. Sustainable development of an industry depends on its ability not only to manufacture products with good quality and low prices, but also to serve the environment in proper stewardship.

To cope with and/or take proactive action for these challenges, better environmental performance during a product's life cycle is a critical condition. This life cycle approach offers appreciable advantages over those "end-of-pipe" solutions which are aimed at "blocking" pollution (with targets and controls on factory emissions, higher costs for waste disposal, etc.), or one-phase thinking such as cleaner production strategies; and thus it has been widely accepted as a practical and satisfactory solution for the environmental question. A life cycle approach looks beyond the production of an individual product and incorporates the exploration of resources to make the products, their use by the consumers, and their eventual disposal (so-called "from-cradle-to-grave" concept). It implies that everyone in the whole chain of a product's life cycle has a responsibility and a role to play, taking into account all the relevant impacts on the economy, the environment and society. There are tools, programs, and procedures support such life-cycle based decisions, which generally fall into two categories: practical and analytical approaches. Life Cycle Assessment (LCA), an analytical tool under life cycle approaches is one of the most useful tools in identifying and assessing the environmental aspects and potential impacts associated with a product or service throughout its entire life cycle, helping stakeholders in making well-informed decisions.

Realizing the importance of the issue, Thailand has started developing a plan and framework to identify a mechanism which will support green products and services under the life-cycle concept. Building a reliable national LCI (Life Cycle Inventory) database, which is pivotal for conducting LCA analyses and for enhancing business competitiveness, has been the preliminary strategy under the National Master Plan on Green Product Development. In the initial phase, the database will cover infrastructure such as energy, transportation, and basic materials. Among various categories, natural gas, oil refining and petrochemical industries have been chosen for the pilot project due to their incontrovertible priority.

This work, as a part of the National project, aims to collect LCI data from domestic industrial associations for major petrochemical products such as ethylene, VCM, PVC, from the "gate-to-gate" approach, and subsequently to carry out the LCA analysis with the aid of SimaPro software for the production of PVC in different scenarios. Besides, based on the calculated results, this study also suggests improvement measures to boost up the environmental performance of PVC manufacture.