

## **CHAPTER I**

### **INTRODUCTION**

In today's modern world, the deterioration of environment is increasing day by day. Issues such as climate change and global warming are concerned by many people, and many researchers around the world attempt to solve this problem. The main cause of this problem is greenhouse gases (GHG) emission. The greenhouse gases, emitted from anthropogenic activities such as energy utilization, agricultural processes, industrial development and expansion, transportation and deforestation as well as destruction of natural resources and environment, are a major cause of global warming. Increase in the Earth's average temperature is severely disrupting the balance of several natural processes, which causes environmental degradation on a global scale.

However, the good news is that awareness on the need for greenhouse gas mitigation and reduction is increasing at the international level. There are efforts being taken in various sectors to control and reduce GHG emissions including researches, process improvements, technology innovations, and green label or eco-label. In addition, another type of label which has become well-known at the present is the carbon footprint label, which identifies amount of carbon released throughout the life cycle of the products that result in greenhouse effect. Besides, it also motivates entrepreneurs to develop innovation for their products and services to be more environmental friendly. Furthermore, there has been increasing interest in the assessment of an organization's Carbon Footprint (or Corporate Carbon Footprint: CCF) in recent years. The quantification of it helps in identifying actions and measures that can be taken to effectively reduce GHG emissions. The CCF is useful for organizations to conceptualize their contribution to global warming. Universities and academic institutions are also potential sources of GHG emissions since there are a large number of people spending a long portion of the day with several activities. Even if the potential is small, the carbon footprint should be properly addressed by the staff. The scope of emission sources can be classified into 3 categories:

Scope 1 - direct emissions (e.g. from company owned sources, such as boilers, vehicles etc.),

Scope 2 - energy indirect emissions (e.g. purchase of electricity, steam and heat, employee commuting),

Scope 3 - other indirect emissions (e.g. outsourced activities, waste disposal etc.) (Janangkakan, 2013).

In Thailand, we have realized the impact of global warming for many years already. There are a lot of initiatives and activities such as energy saving campaigns, development and research about clean energy. In 2007, Thailand Greenhouse Gas Management Organization (Public Organization) or TGO was established, which is the governmental organization with a specific purpose as a supporting GHG researches and data. establishing GHG information center, and also has a duty in order to estimate and control carbon footprint of products. The government, industries, and private organizations such as PTT Global Chemical Public Company Limited, Siam Fiberglass Co. Ltd, EQ Rubber Co.,Ltd, Faculty of Environment and Resource Studies, Mahidol University and Department of Environmental Engineering, Chulalongkorn University have shared the same attempt to decrease amount of GHG. There are many ways that can be employed to fulfill this purpose. The labeling the quantity of carbon on their product and corporative research Carbon footprint (CF) emission in their academic organizations are significant examples.

Consequently, the purpose of this study is to estimate greenhouse gas emission and evaluate CF of the organizations in Chulalongkorn University using the Petroleum and Petrochemical College and the Office of the President as models. The study also to aim adopts the result of CF as the key factor to create improvement scenarios and develop alternative options for reduction of GHG emissions from an academic institution such as Chulalongkorn University. The scope covers direct and indirect emission sources such as vehicle fleet, energy consumption and solid waste generation. It involves the calculation of GHG emissions generated by the staff members and students from all activities of the organizations, which data were obtained from primary source and secondary source.