



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This study, as a part of the national project aiming at building an LCI database for petrochemical products, has succeeded in collecting and compiling LCI data for ethylene, VCM and PVC. Based on the data provided by industries and PTIT, the LCA analysis was carried out in order to perceive and evaluate the environmental impacts associated with the production of PVC within the petrochemical section, which led to the following conclusions:

- In the production phase, the manufacturing of PVC from a fully integrated process has the greatest load on all impact categories, in which the respiration of inorganics is dominant. This severe effect on human health is mainly brought about by the sizable amount of harmful NO_x in air emissions due to the production of VCM as the raw material for the PVC polymerization process.
- Fully integrated PVC production also shows less favorable results in other impact categories such as, eutrophication, resource depletion and climate change, in descending order of severity.
- The production of VCM is accountable for approximately 85% of the total loads due to the fully integrated PVC manufacture process.
- PVC compounding has a rather low impact, due to its simplicity. The environmental performance during PVC compounding is fairly comparable to that of European countries.
- By changing the balance of imported and domestic VCM for manufacturing PVC, which is now 12.4% and 87.6%, respectively, the environmental burdens can be substantially reduced. The gain from environmental performance would be 20% and 30% if the percentage of imported VCM were to rise to 30% and 40%, respectively. Yet other factors such as economic and social impacts have to be taken into account should the practical implementation be pursued.

5.2 Recommendations

- Strategies and measures (such as seminars, incentives, etc.) are needed to gain more cooperation from industrial associations to complete the data collection stage for remaining petrochemical products

- A more comprehensive study into the process system of manufacturing VCM is necessary in order to identify hot-spots, thus improving the environmental friendliness as well as the competitiveness of PVC production in Thailand.

- Once LCI data for upstream petroleum, as well as other fundamental industries, are fully gathered, it is advised to replace all background data in this study, which were taken from the Ecoinvent database, with new data in order to obtain more accurate results for the country's sake.

- It should also be noted that the methodology used in this study to translate the LCI data into environmental impacts was Eco-Indicator 99. Although it is a professionally developed and widely-used method, basically all the results are based on the specific natural, societal and human distinctiveness in Europe, hardly suitable for applying to Thailand conditions without major modifications. Thus an appropriate assessment methodology developed for the South East Asia region, or Thailand in particular, which also will be the next step for the National Master Plan, is definitely essential to correctly perceive the environmental impacts due to any activities.