Summary

Forty percentage of the global energy use is caused by buildings which raises the CO_2 emissions in the environment, with the construction industry rated as the third globally source for CO_2 emissions. Performing LCA helps to determine the future environmental impacts caused by a new designed building, and also points out the most important measures to considerate then carrying out an energy efficient refurbishment.

This thesis shows how Sweden is dealing with this topic compared to the Netherlands and Turkey. A detailed literature review is presented with specified literature that was published in each one of the previous mentioned countries separately in addition to an overall literature review. Then it is compared with practical application of LCA within building industry, by interviewing LCA specialists in each country individually. Those three countries were chosen depending on a preconception scale of how much LCA for buildings should be considered in each one of them. Turkey represents countries where LCA is a kind of new topic, while the Netherlands should be considered as one of the developed countries in this field. Sweden is expected to be one of the countries that have a good consideration of LCA use for buildings.

The purpose of this study is to explore how different countries are dealing with the LCA topic in the building field. The applied methods, used standards and the considered LCA stages were the main points to be explored. The literature was examined considering certain points, which were moulded as questions, and an attempt to answer those questions.

The interviews were done in the chosen countries to make the comparison of LCA use in buildings between them possible, by interviewing specialists in LCA in big companies in each country. The applied method in the interviews was a general interview guide approach, where a form with several questions was used in order to produce those interviews. The collected data were formed and presented in a narrative method in order to clarify how LCA is used for buildings in each country. In order to compare literature and practice these points were considered:

- The used standards.
- The considered environmental impacts.
- The connection between LCA and LCC.
- The considered parts and products of the buildings which LCA was performed for.
- The used methods and software to perform LCA studies.
- The period of time when the life cycle was performed.
- The required stages in the LCA studies.
- The type and situation of the building which the LCA was performed for.
- The ownership of the building.
- The rule of the energy use of the building in the performed LCA study.

The main motivation behind starting an LCA study in practice in general was to gain extra points in order to reach a desired level in a certification system, while the papers in the literature had different motivations.

It was found that for both Sweden and Turkey, the European standards were mostly considered in practice. As for the Netherlands, the used standards were according to the Dutch regulation system in both literature and practice. The Netherlands indeed was much more progressed in performing LCA in practice. They have their own standards and regulations, and some municipalities require performing LCA as one condition for the building to be approved for starting the construction. In Sweden the situation varied, as some companies seriously considered LCA in their projects while others applied LCA for some of their projects. However, there are still companies that do not perform LCA in their projects at all. In Turkey, LCA is used but it is still limited to the big cities and big projects. However, the case was different for the literature review process. The Netherlands had the lowest publications while there were really detailed studies that were published about LCA within Turkey and Sweden. But that could be due to the fact that only the publications which were published in English were examined.

It was concluded from this thesis that there are no common regulations regarding the use of LCA in buildings that apply within any of the three investigated countries as a whole. Including LCA in all certification systems for buildings should increase the interest in performing it in practice. In practice the LCA was performed for materials, products or parts of the buildings for all the three countries, while in the literature there was more consideration about the energy use and specifying the energy source. Getting the building certified is the main motivation behind performing LCA in practice for buildings in Turkey, while it is getting the building approved on, or due to recommendations from the municipalities in the Netherlands. Environmental management is the main motivation to perform LCA in Sweden.