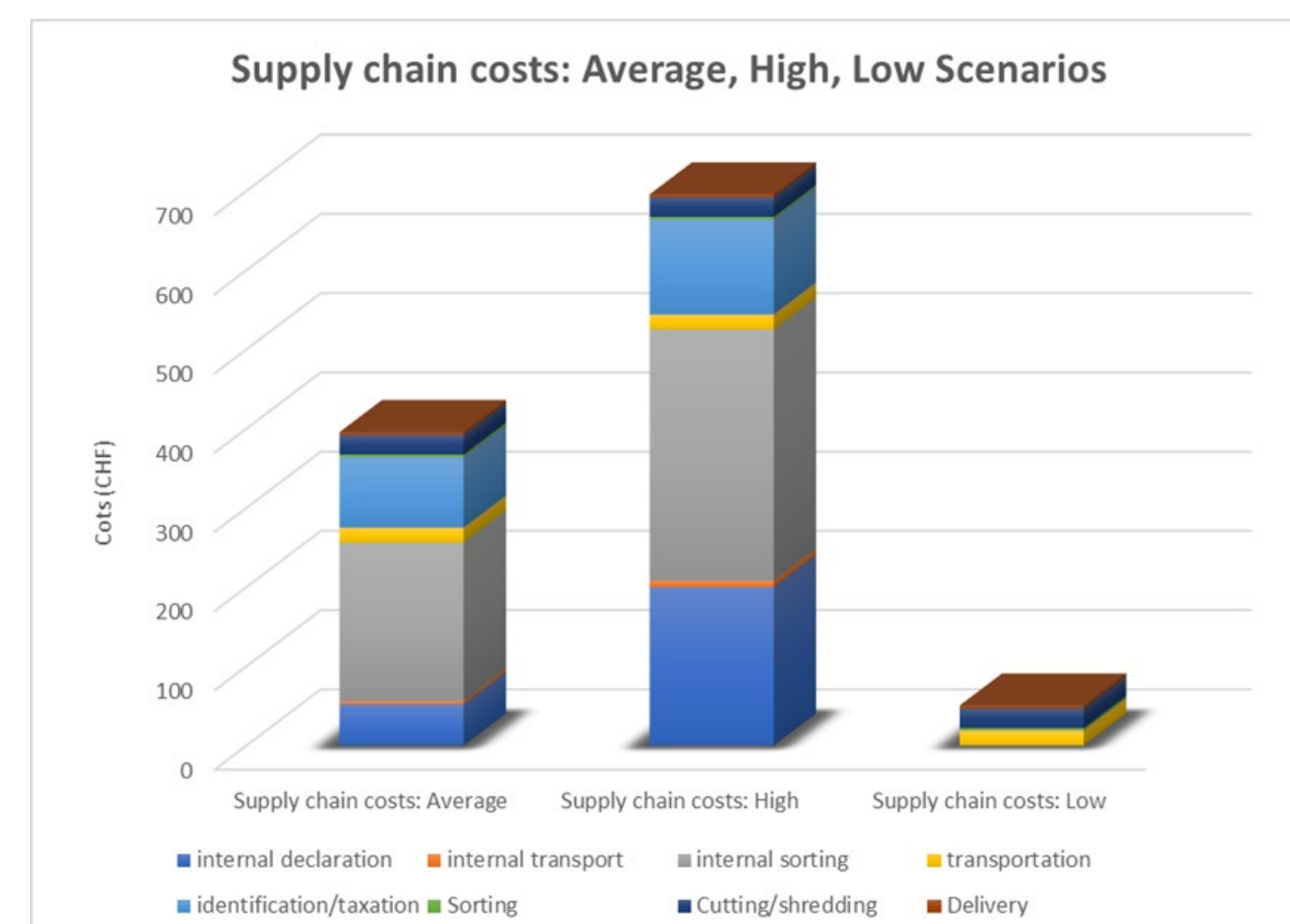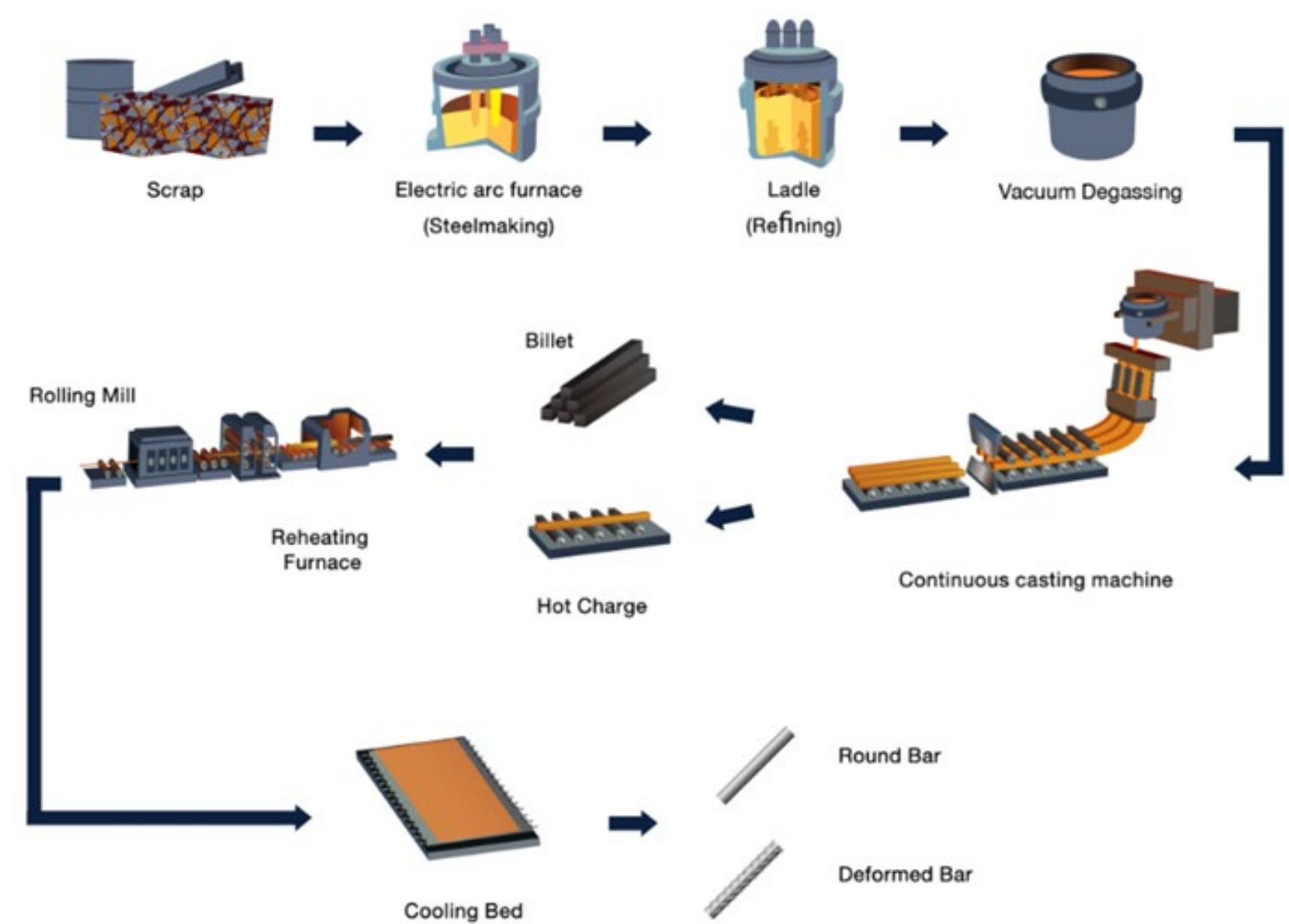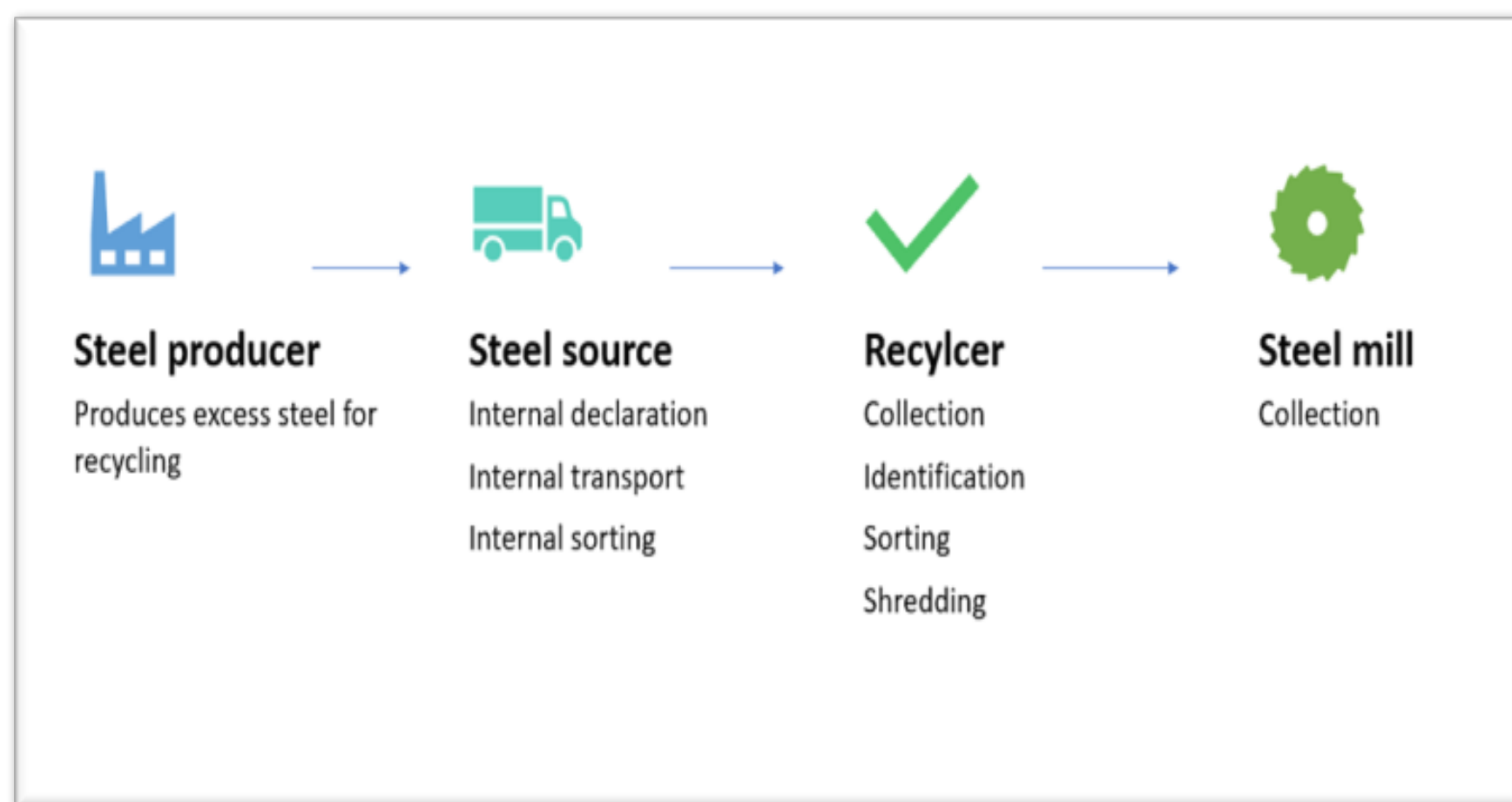**Bachelor's Thesis in Energy Systems Engineering**

Quantification of the market potential for high-quality steel in Switzerland

Abstract

This project looks at what benefit can be extracted for steel mills in the Swiss steel market industry by ensuring high-quality scrap steel is provided at the doorstep of the steel mill. The focus of the project is on one of two steel mills that operate in Switzerland to provide steel products to the Swiss steel market. Steel is one of the most used products globally and it finds its applications in the building and infrastructure industry but also in the automotive industry, because of its wide use it is of interest how value can further be added to this extensive industry.

The project focuses on the supply chain that provides scrap steel to steel mills, scrap steel is also known as secondary steel to steel mills, and it is used in the electric arc furnace by steel mills to produce steel products, there is also primary steel which is processed iron ore steel not recycled but extracted and used to produce steel products whereas scrap steel is recycled steel.

The project has the aim of quantifying the value of high-quality steel in the Swiss steel market industry for steel mills and it meets this aim by conducting interviews, developing a cost model, and performing a scenario analysis. The results of these methodologies showed that the value for steel mills is not in having high-quality scrap steel at their doorstep as the desired scrap grade may change based on production requirements, but rather in being able to identify the composition of the steel and knowing exactly what the steel composition is when it arrives at the steel mill.

The results showed that identification of steel is an important function in the scrap steel supply chain but it is however also an expensive function and so it was concluded that while it is important to streamline the process of identification in the steel supply chain and improve the quality of the identification function, it is also important to find methods of minimizing costs of identification when supplying steel to steel mills as this is a costly function.

Following the results, it was recommended to look deeper into the costs of no identification for steel mills, namely the steel that is lost as it becomes unsellable as it was not identified and to take the mitigation of these costs as benefits and weigh them against the cost of improving the efficacy of identification in the scrap steel supply chain.

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