

## SUMMARY

In conclusion there are many different variables to consider if an accurate comparison is to be made between traditional methods of production and the fast-advancing AM methods of production. The whole lifecycle analysis from mining of the raw material, all the way till the end of life of the product. There are many researches done on this topic with various comparisons between AM and traditional production methods using LCA. Some of these focusing on sustainability, some focussing on Social LCA [32][33][34].

The experiments conducted in the TalTech labs for this thesis focuses solely on the power consumption of the used Visco SLM 280 3d printer, and the Haas HMC500 5 axis milling machine. Through the measured, and calculated power consumption values, the theoretical CO2 emission value is calculated, and compared between the two different production methods in effort to see which one is more viable.

It is clear from the values measured, and calculated, that the Vossi SLM280 has less power consumption than the Haas HMC500. But the 3d printed parts still need to undergo postproduction processing to achieve the desired surface finish, depending on the produced part's requirements.

Even though the 3d printed part needs to undergo another finishing phase after the printing phase is finished, since the finishing phases in both parts of the experiments conducted in this thesis work are the same, they have a null value in terms of comparison between the two experiments.

The 3d printing experiment took 7 hours and 34 minutes, with a total power consumption of 6,247kWh. Which causes a total of 987,012g of CO2 emissions (without the finishing phase).

In comparison, the machining experiment took 3 hours and 30 minutes, with a total power consumption of 8,275kWh. Which in turn causes a total of 1.307,45g of CO2 emissions (without the finishing phase).

It is clear through the work done throughout this thesis, that even though the 3d printing process took more than double the time, in terms of power consumption is a more viable option, as opposed to machining using 5 axis milling machine (for single item production and not industrial scale production). Hence it is a more sustainable option as it in turn leads to less CO2 emissions.