

# Sustainable Electric Supply for Future Arctic Housing

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## INTRODUCTION

This project, conducts a study of the potential in a renewable energy system for a new arctic housing project, in the capital of Greenland, Nuuk. The project introduces a sustainable hybrid solution, consisting of solar and wind energy.

## THEORY

A Photo Voltaic system is chosen because it is proven to have a high efficiency in colder climates due to the low temperature. Furthermore, the low maintenance level of a PV-system is desirable due to the relatively low availability of technicians in Nuuk. Wind turbines have a more stable power output over the course of a year, and is therefore seen as a good match for the more seasonal depended output produced by a PV-system.

## METHOD

The investigation of the produced energy is conducted on a yearly, monthly and weekly basis. The production from each sustainable source is compared to an estimated average consumption of a New Arctic Household.

## RESULTS

Results show that on a yearly and monthly basis 100% of the energy demand can be by covered by the hybrid solution. However, on a weekly basis one week fail to produce the required energy demanded by the consumption.

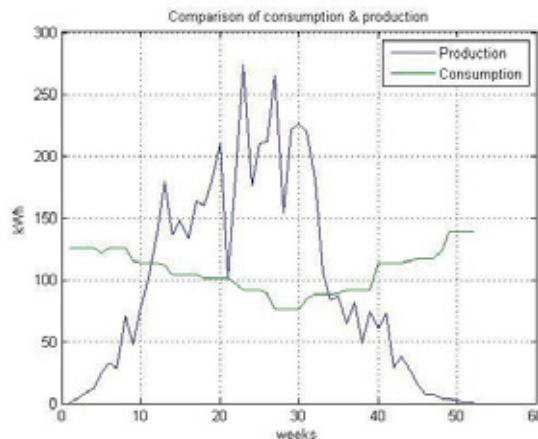


Figure 1 Comparison of consumption & production of hybrid

## CONCLUSION

The results shows to be sustainable in an environmental perspective, when investigating the economics surrounding the project; the investment turns out to have payback time that cannot be reached within the limits of the expected lifetime for both the wind turbine and hybrid system. This is largely due the fact that the energy supplier in Nuuk (Nukkissiorfiit) does not purchase the surplus energy produced by the hybrid system