

Natures Battery

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This project will enable implementation of renewable energy sources in small, isolated energy systems, in this case represented by a small town in Greenland named Sarfannguit. The intent is to subtract the use of fossil fuel as a main power supply and replace it with persistent energy sources.

To maximize the use of energy from renewable sources, a pumped storage system can be used. This system uses surplus energy produced from e.g. windmills to store water in an elevated reservoir, which later can be used to supply additional energy when the renewable sources are insufficient.

Our pumped storage systems contains several commercial products used for electricity production, primarily a hydro turbine, a generator, control and monitoring systems and a pump. All of these components are designed to be assembled and interact in a standard sized ship container. The container will be designed to require minimum maintenance during operation. In addition the container will be implementable in every environment that has access to both renewable energy sources and two reservoirs, one of which is elevated in relation to the other. The final product will be designed as a 'plug and play'-solution, which only need connections to the power system and the two reservoirs, and will therefore require minimum local manpower for implementation. This solution makes it easy to set up pumped-storage in remote areas.

The container will be designed with two separate "rooms", one for energy production and the other for storing energy. The section for production of energy will include the hydro turbine and the generator, while the section for storing energy will include the pump system. In case of machinery break-down it will be possible to repair or replace the module from each section independent of the other module. This design will increase the flexibility of our solution and thereby increase the lifespan of our final product.

By implementing this pumped storage system, we will be able to reduce the amount of greenhouse gasses released into the atmosphere, and in the long run possibly reduce the financial cost of energy production, and thereby making it a favorable solution both environmentally and economically. The design will follow our ambition to make the life-cycle assessment of the solution reflect an environment-friendly agenda. This cradle-to-grave thinking demand a prioritization of re-usability, production-methods and a design tailored for easy replacement of parts and/or upgrading individual machinery.

The future aspects of "plug and play" pumped storage systems as we see them are far reaching. As a concept it would be usable in setting up constant electricity production in remote areas as Greenland or in countries with mountains. Storage capacity is the missing piece in the renewable energy discussion and would make solar-, wind- and water-produced energy a real alternative to fossil fuel.