

Sustainable energy production of festivals

Concept for toilet installation

Student



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Initial Situation:

This semester thesis addresses the topic of sustainable festivals in general on the basis of an installations of toilets and bathrooms at the openair Frauenfeld. The challenge is that most festivals require a large amount of energy within a short time. However, the events take place away from the municipal power grid and have limited access to energy sources. Until now, energy production has been provided by large diesel generators. These in turn are very inefficient and cause large CO₂ emissions.

The goal of this project is to develop a renewable concept that replaces fossil fuel energy production from festivals. This concept will be used primarily for energy production for a sub-area of the festival which is seen in the sector plan. Pumps for the toilet installation will be operated with this renewable energy.

Secondly, this concept will be applied to the entire energy production of the festival.

Approach / Technology:

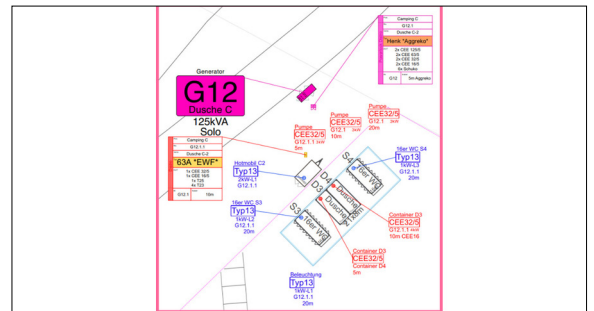
These three different technologies were selected according to the exclusion procedure and a concept was created from them. In order to be able to compare these variants with each other, the effort and costs involved in these technologies in particular were investigated and estimated. These concepts were finally evaluated for their compliance with the requirements and the best variant was selected. A cost estimate was used to calculate what the annual generation costs would be for each concept.

Result:

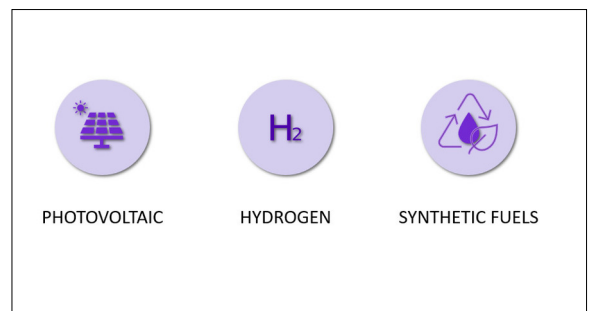
The answer to the question of whether it is possible to replace the entire energy production of a festival with renewable energy production and what savings can at least be made is that, based on the results, not all technologies are equally suitable. A mobile photovoltaic concept could not be found and is too high in the annual cost estimate to make this option worthwhile. In contrast, the concepts of hydrogen and synthetic fuels are well suited. On the picture you can see the hydrogen concept, where energy is generated with hydrogen and oxygen via a fuel cell. This hydrogen generator is already available on the market and its applicability for energy supply has been verified by consultation with the company.

These two concepts are very adaptable to the size of the energy production to be provided. The cost per unit of energy produced is low, but can be improved by using waste heat. The expense and installation are rather low and simple. It can be confidently assumed that one of these two concepts will be implemented soon, perhaps at the next openair Frauenfeld.

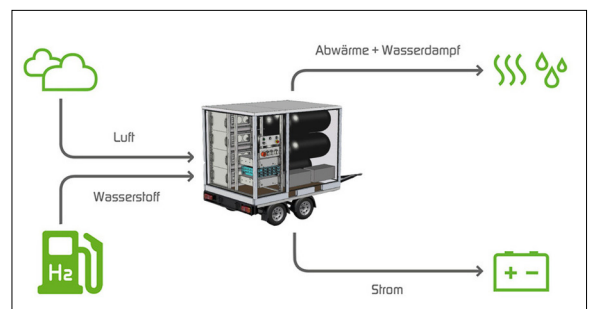
Sector toilet installation layout plan
S. Bani Stagelight



Three different technologies for the concept
Own presentation



Concept hydrogen with the H2-Genset trailer
h2-genset.com



Advisor

Prof. Dr. Markus Friedl

Subject Area

General energy technology

Project Partner

Stagelight AG, Herisau, Appenzell Ausserrhoden