Enabling restorative growth





Introduction

The production of key resources, such as clean water, clean energy and a sustainable production of food represents some of our time's greatest challenges. The Sahara Forest Project is a new environmental solution that provides a holistic approach to tackle these challenges.

The Sahara Forest Project has a vision of creating revegetation and green jobs through profitable production of food, water, clean electricity and biomass in desert areas. This is done by combining already existing and proven environmental technologies, such as evaporation of seawater to create cooling and distilled fresh water (i.e. in a saltwater based greenhouse) and solar thermal technologies. In this way The Sahara Forest Project is designed to utilize what we have enough of to produce what we need more of, using deserts, saltwater and CO2 to produce food, water and energy.

A seawater infrastructure

The Sahara Forest Project proposes to establish a range of interconnected economic activities in different low lying desert areas based around a pipeline that creates an infrastructure for seawater. The seawater is used to condition the desert air in a greenhouse to create ideal growing conditions. The evaporation cools the dry air significantly, and the high humidity reduces the need for freshwater for irrigating the high value plants grown inside. Some of the water vapor in the greenhouse will condense on cold surfaces such as the roof at night to provide the necessary freshwater for the crop.

The water vapor that leaves from the downwind side of the greenhouse adds moisture to the surrounding environment. This moisture has proven to have considerable potential for aiding re-vegetation of the surrounding environment outside the greenhouses.

With a profitable way of bringing salt water into a desert, a range of other social and economic opportunities is opened up. This includes inland cultivation of fish or algae, which is a promising fast growing and sustainable kind of biomass.

Synergies

The most interesting synergies arise when the saltwater infrastructure is combined with Concentrated Solar Power (CSP). CSP is widely considered as one of the renewable energy technologies with the highest potential for rapid deployment and impact on the global energy mix. CSP systems use mirrors to concentrate the energy from the sun and create very high temperatures which produce superheated steam that can power a conventional steam turbine.

As with all thermal power plants the greatest efficiency is achieved by having the hottest steam and the coldest condenser temperature. In the past these systems have used fresh water to provide the necessary cooling, which often is not sustainable in an arid environment. Dry air coolers can reduce the amount of water needed, but at a cost of reduced power production (up to 10 %). The Sahara Forest Project proposes to combine CSP facilities with a saltwater infrastructure to achieve highly beneficial synergies:

- Saltwater can be used for cooling of CSP, increasing the power production.
- Both the new outside vegetation and the greenhouse structures will provide dust arresting. The outside vegetation will also stabilize ground conditions. Less dust in a CSP-field means more sun reaching the mirrors and less dust settling on the reflecting surfaces.
- Freshwater from the greenhouse facilities can be used for cleaning of the mirrors.
- Electricity from the CSP-facility can be used for running pumps and greenhouse equipment.
- The waste heat from the CSP-facility can be used for evaporating more water vapor from seawater that can be distilled back into fresh water.

In contrast to most traditional desalinization industry The Sahara Forest Project operates without emissions of brine back to the sea. As the water is evaporated from salt water the salinity increases to the point that the salts precipitate out from the brine. The extraction of the minerals from seawater is an alternative to mining them from the ground. The largest component is table salt [NaCI] that has many uses and has a value as an industrial feedstock. The more valuable salts in seawater occur at lower concentrations and extracting them commercially becomes viable if a sufficient quantity of seawater is used.

SAHARA FOREST PROJECT

E-mail: info@saharaforestproject.com Web: saharaforestproject.com Phone: +47 960 48 828 Vis. adr.: Maridalsvn. 17 B Mail: P.O. Box 2141 - Grünerløkka 0505 Oslo, NORWAY

From vision to reality

In January 2011 a Memorandum of Understanding was signed between the Aqaba Special Economic Zone Authority and The Sahara Forest Project AS in Amman, Jordan. This agreement committed Sahara Forest Project to conducting three comprehensive studies in Jordan financed and supported by Norwegian authorities. The MoU also includes that the Aqaba Special Economic Zone Authority will facilitate 20 ha for a Test and Demonstration Centre and 200 ha for possible later expansion.

The Sahara Forest Project AS has also entered into cooperation with Yara ASA, the world's largest supplier of fertilizer and the Qatari company Qafco, the world's largest single site producer of urea and ammonia. After successfully completing a comprehensive feasibility study on Qatar, the parties have committed to build the first fully operational Sahara Forest Project Pilot Plant in Qatar by December 2012.

Organization

The Sahara Forest Project is established as two entities. The Sahara Forest Project Foundation has been established to facilitate and promote research, knowledge and the use of technologies which enable revegetation and the creation of new jobs through the profitable production of food, water, biomass and electricity. The SFP Foundation has established Ethical Guidelines that all commercial Sahara Forest Project Initiatives must adhere to.

The Sahara Forest Project AS is a commercial initiative to create profitable innovation and development of environmental solutions within the food, water and energy sector. This is achieved by bringing The Sahara Forest Project technology to the people in relevant countries.

SFP Supporters

The following organizations are contributing to The Sahara Forest Project

