**Solarc**

**Refshaløen, LAGI competition 2014, Copenhagen**

This project is a solution that can produce green energy, through the inspiration of nature, while being merged to enrich the local environment.

Solarc addresses the environmental issues of the site, for example the industrial character and the static constructions, by offering a more environmental-friendly sustainable construction, designed to serve as a social meeting spot and to provide electricity to the neighbourhood. Solarc is a morphogenetic structure, which is mimicking the basic principles of functions in nature, like the membrane structure of plants to protect itself from bad weather conditions, like rain and snow. In addition the solar panels are reactive and tracking the sunlight. The shape of the structure is developed by a system,Galapagos in Grasshopper, which takes the parameters of length, width and height into consideration and creating the most energy-efficient shape automatically.

**The non-control approach**

The project is experimenting with the idea of shifting the approach from control to non-control of nature. The control approach in our understanding is the human-environment-interaction, in which human takes advantage from nature. In human-nature systems, humans are controlling the environment for their own benefits, by using tools as technology and science. In our opinion, non-control in nature is described by these characteristics: it does not require human impact to retain itself, it has its own behavioral system, where all species are depend on one another, forming the integral part of ecology and a closely linked chain. In nature, the environment forms the natural habitat. In addition, nature is self producing. As an example, most of the plants are able to produce oxygen and glucose by photosynthesis. The oxygen is required for all the living, while glucose provides energy for the plants that they could continue the photosynthesis process.

Solarc is not prioritizing human functionality or control, moreover it focus on the process of how the structure is shaped through environmental input.Our approach toward nature is, that the environment is shaping the structure and thus turns into organic, non-symmetrical shape. In relation to sustainability, we want to learn from the principles of nature and its use of energy. For that reason shifting the approach from wasting resources to providing them. We are inspired by nature; the plants and animals connection to the environment.The environment shapes the function and appearance of the living organism.

**Environmental impact**

The conventional approach to solar energy production is to put the solar panels in a 45 degrees angle in a static way in order to have the highest energy efficiency. This leads to high energy waste, due to the fact that the resources used to build it in some cases are not environmental friendly. In contrast to current sustainable energy installations, which are static and non-organic shaped, Solarc aims to establish a dynamic relationship between the environment and energy production. The behaviour of the solar panels are reactive to the local environmental conditions, such as changing weather. The electricity goes directly to the electrical grid, and therefore do not need electric wires to be concealed.  As not to disturb the existing environment, the structure is building high vertically and has only four counterpoints, which are connected to the ground. This structure serves as a catalyst for sustainability. We imagine that the second generation of the structure will be more integrated into nature and more environmental-friendly.

**Materials and technology**

The dimensions of Solarc are 10,5 in width x 18 in length x 9m in height.

**Eco ceramics**

The grid of the installation is made out of Eco-Ceramics. Inside the grid is a hollow space, where  the electricity wires from the solar panels and lights are placed. It was decided to use Eco-ceramics, because it has greater hardness than normal ceramic tiles and high modulus of elasticity. In addition, it has very low environmental pollution and low reactivity within the body. The majority of Earth’s crust is composed from Silicon, Aluminum and Oxygen and found as silica and aluminum silicates. Due to this it can be directly used for the production of ceramics.

**Solar panels (monocrystalline)**

Solar panels are used to capture the sunlight, which could be afterwards transformed into electricity. The electricity is used to light up the installation while the rest of it will go to the main electricity grid. To generate an efficient amount of electricity monocrystalline solar panels are applied because they have the highest efficiency rate from all the solar panels.

**Electroactive Polymers**

In order to produce a big amount of electricity, solar panels are tracking the sun. Electroactive polymers are used to move the solar panels. This material is called artificial muscle, because it behaves similar to human muscles.  Electroactive polymers are expanding when revealed to electric current and when the electricity is removed it contracts. The electrical potential energy is converted to mechanical motion.

**LED lights**

The LED lights are used to light up the installation. It was decided to use LEDs because such lights are energy saving, they last a long time and they do not contain mercury. The LED lights used in the installation require only 1 watt to power up themselves.

**Solar tracker**

In order to generate the highest amount of electricity solar panels are tracking the sun. The panels can move to both up,down,left and right. In addition, solar panels are protecting the structure from rain and snow by overlapping each other.

Solarc will approximately generate 1026 kW per year and provide electricity for 342 households.