Hybrid production of energy artwork.

The inspiration for the project is the production of a new kind of energy, energy produced by plants, in specific microorganisms. Algae is an energy producing product that requires hardly any other resources to create an array of energies. It takes the damaging carbon from our atmosphere and turns this into oxygen. Besides oxygen production it can also be used for food, biofuel, electricity production and medications. It is an up and coming form of renewable energy and food source that will help the urban grid going forward in many different ways.

Algae are a diverse group of organisms that, like plants, generate energy from photosynthesis using sunlight and carbon dioxide, churning out oxygen along the way. Since CO2 is a pollutant that’s produced by car engines, a busy highway riddled with environmentally damaging emissions is the perfect place to set up an urban algae farm.

Algae bioreactors consist of a closed system of transparent, algae-filled tubes that are hooked up to secondary equipment such as filters, pumps and solar panels. Thriving on the abundance of CO2 and sunlight, the algae will bloom and mature inside the tubes, filtering the air before being extracted and used for a variety of applications. The material could be used to create biodiesel, green electricity, medication, cosmetic products or even foods. Effectively, photosynthesis allows the algae to store light energy in a form of chemical energy that can be converted into electricity. The green colored pigments called chloroplasts present in the algae cells trap sunlight and perform a process called “catalysis”. In this process, water is broken down to oxygen, hydrogen ions and electrons. The electrons produced gain some energy during this process and move to a higher energy level. Later they are captured by proteins to form carbohydrates. If these electrons are intercepted on their way to proteins and harvested through a proper channel, then electricity can be generated.

Growing one kg of algae requires about 1.8kg of carbon dioxide, which is converted into biomass, oxygen and electricity.

As for the biofuel production aspect, algae in principle has the potential to produce seven times more energy per acre than corn-based ethanol, the main source of biofuel today.