**Chloroplast Spring**

When an installation can continue to perform different energy conversions, the sun, wind, water, kinetic energy, etc. The way to learn to convert to nature is bound to enhance effectiveness and increase sustainability.

**Environmental Impact**

Learn from the chloroplasts of plants and perform photosynthesis on the site. The Chloroplast Spring is like a collection of chloroplasts, like metabolism according to the environment. The corresponding material may be transparent concrete or plastic with elasticity. The connection between the chloroplasts is spring-like material, allowing Chloroplast Spring to collect different energy sources for different forms of topography. Between stability and instability, the experience of people walking between the visual and the device can be more unique.

**BPV**

BPVs are fuel cells that use the power of photosynthesis in microscopic organisms to create electricity. One new design that uses genetically modified algae is more powerful than previous attempts, and even allows for storage.

Researchers at the University of Cambridge have developed a new fuel cell that is powered by algae, and that is five times more efficient than existing models that use microscopic plants and algae. This new design is not only more efficient, it is also more cost-effective and practical to use than previous attempts.

These algae-powered fuel cells, described in the journal Nature Energy, are a type of biophotovoltaic (BPV) device, also known as bio solar cells. BPVs harvest solar energy and convert it into electric current using the photosynthetic abilities of microorganisms like algae. This is both an environmentally-friendly and cost-effective alternative energy source.

The Cambridge team’s version utilized genetically modified algae that works more efficiently than normal, minimizing the amount of electricity that is dissipated without use during photosynthesis.

According to a Chloroplast Spring (size: L60\*W30\*H10 m) to estimate renewable energy of solar:

．　　0.5w \* 　 18,000m³ \* 3.5Hrs = 12,000 KW

(watts per m³) (area of Chloroplast Spring) (equivalent Hours) daily volume

**Buoyant Airborne Turbine**

An MIT startup has built a helium filled wind turbine that will catch winds up to 8x more powerful than those on the ground.

Large wind farms floating over major cities may seem like something from a sci-fi movie, but the concept of airborne wind turbines is close to becoming reality. Altaeros has already built the world’s highest turbine that can generate twice the energy output of its ground-based counterpart. Besides generating power, these floating power plants can provide data coverage, cell service and local weather data and can be deployed in harsh weather conditions.

According to a Chloroplast Spring (size: L60\*W30\*H10 m) to estimate renewable energy of wind:

．　0.37kw \* 　 100m \* 10.9km/h = 403.3 KW

 (power) (cross-sectional area of tube) (wind speed) daily volume

**Wave energy**

Wave energy is a vast, untapped resource that could help reduce our reliance on fossil fuels.

Like solar and wind power, wave power harnesses energy that comes ultimately from the sun. Solar radiation causes air pressure gradients that cause wind, and wind gives its momentum to the ocean surface, producing waves. As Alam puts it, “Wave power is a very dense form of solar power.”

Just how dense? Every square meter of a solar panel receives 0.2 to 0.3 kilowatts of solar energy, and every square meter of a wind tower absorbs 2 to 3 kilowatts. Every meter of the California coast receives 30 kilowatts of wave energy.

Wave energy has another advantage over solar and wind. Waves are easy to forecast, and unlike solar, which works only in daylight hours, wave energy can be harnessed 24/7.

According to a Chloroplast Spring (size: L60\*W30\*H10 m) to estimate renewable energy of wave:

．　200 \* 0.6²m \* 1,800 m² = 130 KW

 (average height) (area of Chloroplast Spring) daily volume

**Sustainable Dance Floor**

The Sustainable Dance Floor is the world’s first energy dance floor that converts kinetic energy of dancing people to electricity. It’s an innovative experiential marketing tool that engages and energizes people.

This dance floor uses human movement as source of energy. This kinetic energy is converted to electricity which powers the floor’s LED lights. The floor interacts with the public and involves them in an interactive energy experience. The generated electricity can be used to power one of our Energy Plugins, like our digital energy meter, photo application or LED battery.

The Sustainable Dance Floor modules flex slightly when stepped on. Inside each tile is an electromechanical system, which transforms the small vertical movement produced by dancing people into a rotating movement that drives a generator. Each module by the size of 75x75x20 cm can produce up to 35 watt of sustained output. Between 5-20 Watt per person.

According to a Chloroplast Spring (size: L60\*W30\*H10 m) to estimate renewable energy of movement:

　 0.07w \* 　 18,000m³ \* 8Hrs = 3,800 KW

(watts per m³) (area of Chloroplast Spring) (equivalent Hours) daily volume

BPV + Buoyant Airborne Turbine + Wave energy + Sustainable Dance Floor

= 12,000 + 403.3 + 130 + 3,800

= 116333.3 KW

Sources:

1. Futurism, 〈Genetically Modified Algae Could Be Key to Tomorrow’s Bio Solar Cells〉, 〈 Buoyant Airborne Turbine〉.
2. AENews, 〈Wave energy〉.
3. Studioroosegaarde, 〈Sustainable Dance Floor〉.