Abu Dhabi was built in 1761, and the original residents mainly lived on collecting pearls. It was not until the 1960s that the massive discovery and exploitation of oil brought about earth-shaking changes in Abu Dhabi, and it gradually developed into the city of “Pearl in the Desert”.

Inspired by “Pearl”, the design uses the sphere as the basic unit, fully adapting to nature, and maximizing the use of local solar and wind energy through different modes of day and night.

The form of “cloud and rain” composed of lightweight spheres and light pipes symbolizes a green livable future, and a changeable iconic landscape.

The humps covered by green vegetation on the ground symbolize the dunes and shells, and the generators are hidden underneath, which minimizes damage to the land and the environment while providing a place for residents and tourists.

During the day, the device uses a combination of solar and wind power systems "pearls" to form a cloud shape at a lower level. Thin film photo-voltaic power generations are arranged in the sphere of the surface of PET (Reinforced PET film) to fully collect solar energy and transmit it to the ground. Ordinary photo-voltaic systems face the problem of efficiency degradation caused by system overheating. This design sets up a Heat & Light chamber to re-use the light and heat generated during solar energy collection: He-filled closed chamber provides an upward force, and the black absorber of the Heat & Light chamber is good for absorbing heat, further providing the lifting force. This design achieve the effect of converting the heat rising power and the wind into electric energy; meanwhile, the sunlight passes through the Light collector. Light collector is transmitted to the light pipe under the cloud, creating a fascinating light landscape without consuming any power. The overall shape also provides a good shade for the ground, creating a pleasant space.

At night, the “pearl” is scattered to use more wind energy from the heights. The residual heat in the Heat & Light chamber continues to provide thermal ascent, which together drive the generator, making up for the shortcomings of a single solar photovoltaic system that cannot generate electricity adequately at night.

The device became the city's bright light and display business card at night. Different forms show different expressions of the design, and truly achieve the unification of renewable energy utilization, practicality and form.

**Annual power generation**:4018, 650kWh.

It is calculated that a three-meter-diameter spherical generator has a power of about 1 kW, which is equivalent to the power generated by a conventional solar panel with an area of 25 square meters. This design uses hemispherical photovoltaic. It is estimated that when the solar energy is sufficient during the day, the overall utilization of the solar power generation efficiency is 620 KW, and the wind power generation power is 100 KW, totaling 720 KW. At night, the wind power efficiency is 150KW. Annual power generation [(620+100)\*13+150\*11]\*365≈4018,650 kWh≈4000 mWh.

**Installation cost per watt:**

It is understood that the cost of a three-meter-diameter solar balloon generator is about $4,000. It is estimated that the solar power system cost of the device is about $1,600,000, the wind power system is $600,000, and the rest of the materials and installation costs are 800,000. A total of $3,000,000. Installation cost per watt is about $4.

**Technology:**

Thin film photovoltaicsr; wind-driven generator.

**Bill of materials:**

Reinforced PET film, Steel wire, steel, thin foil of black PET, Planting soil, Thin film photovoltaicsr; wind-driven generator

**Environmental Impact Statement:**

This design not only provides better and more flexible use of renewable energy than traditional solar installations, but also minimizes environmental hazards: lightweight materials made from recyclable materials, minimal use Materials such as concrete are extremely environmentally friendly, whether during production, use or recycling. Compared to traditional photovoltaic panels, the design frees up the floor space and creates more possibilities for people's activities. At the same time, it does not take up space when it is transported. It can also be standardized in the factory and assembled on site to reduce the damage to the site environment.