**Swings**

When the sea breeze blows through the bustling Port Phillip Bay, it drives a group of huge swings into gentle sway.

The neighborhood, the beach, the Theatre, and the Luna Park, they all provide a rich stream of people.

Human activity and joy can be used as a continuous energy source. These art devices generate a steady flow of electricity.

In the daytime, the blades made of solar panels can also absorb the sun-light energy, providing extra power.

In the night without the sun and visitors, the swings are also swinging by the sea breeze, providing electricity energy.

Compared to the traditional rotary wind generator, this slowly swinging device won't hurt birds.

They take up little ground space, and leaves the field to peoples’ activities.

More importantly, they offer plenty of joy to people, for free.

In the help of the wind, the swings are more easy-swinging and comfortable. They turn human movement and joy into electricity.

The seats are made of environmentally friendly rubber, which is soft and save.

The blades are made of color solar panels, installing small LED lamps. They can emit a soft glow at night.

**Mechanical Principles:**

Swing the swing by wind and manpower.

The cycle of 9 steps：

1.The blade is perpendicular to the wind direction.2. Wind blows and the wind blade rotates with the wind. At the same time, the seat is pride up by the rigid link.3. Kinetic energy decreases, meanwhile, potential energy increases.4. The blade is parallel to the wind direction. Effective wind power reduces to the lowest. The potential energy increases to the maximum.5. With the effect of potential energy, the seat begins to swing back. At this time the blade is parallel to the wind, so the resistance of the wind is small.6. When the seat swings to the lowest point, the blade turns back and rereceives more wind power again.7. The seat moves forward because of its inertia.8. Swings up a little, and then swings back. 9. Back to the initial.

The rotation depends on a system called ‘Recirculating ball steering’.

It is widely used in automobile industry. It can change the direction of rotation. When the seat swings 15 degrees on y-axis, the ‘recirculating ball steering’ system let the balde make a 90 degree turn on z-axis. This can reduce wind pressure, so the seat can swing back smoothly. At the same time, the rotating shaft drives the generator.

**Power generation estimation：**

Solar power:

Solar panel power output: 0.3kW/m2

Solar panel energy production per square meter（calculate 6 hours a day）: 1.8kWh / day

The area of solar panel each swing: 9.5m2

Total solar panel area(64 swings in primary boundary & 56 swings in secondary boundary: 1140 m2

Total energy output per day: 2052 kWh / day

Wind power:

Wind power output: 5kW

Power output per swing: 120kWh / day

Total output of all the 120 swings (64 swings in primary boundary & 56 swings in secondary boundary: 14400 kWh / day

Human power:

Power output: 0.5kW

Power output per swing（calculate 8 hours a day）: 4kWh / day

Total output of all the 120 swings (64 swings in primary boundary & 56 swings in secondary boundary: 480 kWh / day

Total energy output: 16.932 mWh / day

Energy output per year: 6180 mWh