During the winter months, Copenhagen has short days and long nights.

ENDLESS SUMMER uses energy from the moon to create artificial sunlight.

ENERGY

The moon’s gravitational pull causes the oceans’ tides. ENDLESS SUMMER converts this kinetic energy into electrical energy using the VIVACE converter (Vortex Induced Vibrations for Aquatic Clean Energy), developed by University of Michigan.

Each VIVACE converter consists of two sidewalls with horizontal cylindrical cross bars. The cross bars are oriented perpendicular to the direction of the water current. As the current passes over the round cross bars, tiny vortexes are created, causing the bars to move up and down. This, in turn, moves a magnet along a metal coil to create Direct Current (DC) power. Once converted to Alternating Current (AC) power, the electricity can be used to power the ENDLESS SUMMER installation and buildings in Copenhagen.

VIVACE is distinct from other forms of hydropower in that it is able to capture energy from slow-moving waters and does not require a dam or turbines. In addition to capturing energy from the tides, it may also capture energy from other movement in the water body. It is considered less expensive than wind and solar energy, making it a viable competitor with conventional energy sources.

ENDLESS SUMMER

The ENDLESS SUMMER art work provides a visible register of the energy production occurring below the water’s surface. A grid of light tubes spread across the site dims and brightens based on the amount of energy collected each day. Each light tube is 12 m tall, and contains 7200 full spectrum LEDs. The light from the LEDs passes through a prismatic diffusion glass, causing the tubes to appear as glowing cylinders. The tubes will emit full spectrum light, which offers the same mood-enhancing benefits as sunlight – evoking the feeling of an ENDLESS SUMMER, even during Copenhagen’s winter.

This sensation is heightened by the land-forming strategy, which pays homage to Copenhagen’s tradition of artificial land formation. Artificial sand dunes, created using dredged material from the harbor, create a defined and protected space on the pier. At 10 m tall, the dunes will be a unique topographic feature in the city, creating a beachy background for The Little Mermaid. The south sides of the dunes are covered in sand, creating a warm space for sunbathing. The north sides are covered in beach grasses, creating habitat for ground-nesting birds. Observation areas on the dunes afford views back to the city. The height difference between the dunes and light tubes allows the tops of the tubes to be visible from the city, but requires that Copenhageners visit the site to fully experience the artwork.

ENVIRONMENTAL IMPACT STATEMENT

ENDLESS SUMMER is designed to minimize environmental impact. The VIVACE converter is considered relatively safe to marine life because the bars oscillate at low speeds. The ENDLESS SUMMER light feature will only operate for one half hour before sunrise and after sunset, minimizing concern regarding light pollution. The dunes are formed using dredged material from the harbor, which would otherwise be landfilled elsewhere. Native beach grass plantings on the dunes create new habitat for ground-nesting birds. Porous concrete will be used in paved areas to minimize stormwater runoff.