

# NEXTGEN EDGE FACILITIES

## Phase-change material and outside air

### Ziggo

Ziggo, A Liberty Global company, is the leading provider of communication and entertainment for consumers and companies in the Netherlands. Ziggo manages more than 700 EDGE Facilities, many of which are located in residential areas. In 2010, Ziggo needed to expand the number of EDGE Facilities

### Challenge

The challenge for Ziggo was to expand the number of EDGE Facilities in an environmentally and socially responsible way linked to improved availability, lower costs and higher energy efficiency. With this in mind, Ziggo approached suppliers to develop new concepts that go beyond the state of technology at that time.



### Solution

An integrated approach was chosen, where phase-change material was incorporated within the architectural design. Phase-change material was not used anywhere in a EDGE Facilities but Ziggo saw the possibilities. The integrated design is based on a modular system with a 24kW phase-change material cooling system and 11 redundant movable parts. Each component is replaceable without affecting the operation. The EDGE Facilities were developed together with supplier Tizzon and a large team of specialists within and outside of Ziggo. In 2011 the first EDGE Facilities was built with phase-change material, outside air and adiabatic cooling.

### Phase-change material

Phase-change material is a substance with a high heat of fusion which, melting and solidifying at a certain temperature, is capable of storing and releasing large amounts of energy. Heat is absorbed or released when the material changes from solid to liquid and vice versa. Phase-change materials work on a natural principles and is



as simple as it is revolutionary. The Phase-change material used within the EDGE Facilities consists of encapsulated salt hydrates and is a residual product from the Dutch salt mines. Depending on the desired temperature within the EDGE Facilities and the climatic conditions, the most ideal phase-change material with sufficient capacity are compounded. The heat in the EDGE Facilities is stored during the day in the phase-change material, and this heat is discharged at night by means of the cold outside air. As a result, the EDGE Facilities are at constant temperature. By the use of phase-change material, no refrigerants are necessary.

## Award

In 2011 Ziggo won the Datacentre Leaders' Award. The jury determined that the EDGE Facilities contribute in innovative ways to sustainable construction and substantial savings in energy and environmental costs.

## How does phase-change material work in the Ziggo EDGE Facilities

During outside air temperatures between 18°C and 25°C, cooling is normally provided by outside air only at a nominal level of 24 kW IT load at a  $\Delta T$  of 10K.

With temperatures above 25°C the phase-change material will melt as soon as the outside air temperature rises above the melting temperature. This absorbs the energy and cool down the system air within the ASHRAE range.

Once the temperature of the outside air drops, the process is reversed.

The phase-change material solidifies overnight because the temperature of the outside air drops below the solidification temperature. The absorbed energy is once again released into the system air.

## Tizzon

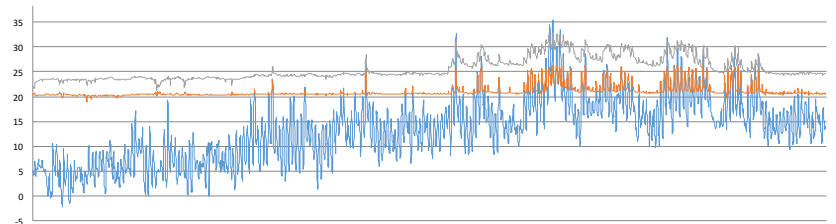
Tizzon is a supplier of EDGE Facilities and manufacturer of air handling units based on phase-change material specially build for the world wide telecom industry

**TIZZON**  
● HIGH INNOVATION

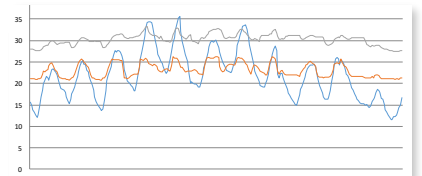
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## Results

The use of phase-change material and outside air result in a constant adjustment and lowering the system air temperature and humidity according the ASHRAE. In recent years, Ziggo has built more than 30 NextGen EDGE Facilities spread all over the country. All EDGE Facilities are monitored by the building management system.



Temperature ZTM-LC0002 in °C  
(2015/2/8 - 2015/9/19)



EDGE Facilities based on phase-change material and outside air provide:

- Higher availability up to 99.998%
- 26% Reduction of investment
- 33% Reduction TCO
- 43% Improvement of the Energy efficiencies
- No refrigerant used
- 85% Reduction of environmental impact (BREEAM)
- 22% Smaller foot print
- Appropriate to the surroundings

## Next steps

With Tizzon, a team of specialists within Ziggo and an innovation fund, further development of EDGE Facilities based on phase-change material will be possible, including datacenters, other size EDGE Facilities and street cabinets.

**Ziggo**

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