

THE FIRST “ZERO EMISSION” STATION

There are two main elements allowing the Princess Elisabeth Station to be fully operational while releasing zero carbon emissions.

One obvious reason is that the station was conceived to run entirely on renewable energy.

The other less obvious yet more important reason is that the Princess Elisabeth Station has been designed to use its energy very efficiently.

1. Princess Elisabeth will get its energy from wind and solar energy. There will be eight wind turbines installed on Utsteinen ridge next to the station, each of which will provide 6 kW of energy. This means a total of 48 kW of energy will be produced by wind power.

As for solar energy, 109.5 m² of photovoltaic panels will be placed on the roof and outside walls of the station, plus an additional 270 m² of panels on the rocks adjacent to the station. The panels will have an output of 50.6 kW (up to 800W/m² solar irradiation).

The energy gathered by the wind turbines and solar panels will be stored in batteries located in the central core of the station.

2. Since the amount of renewable energy that can be collected and stored in the batteries is not without limit, it must be used efficiently. Designing the Princess Elisabeth Station to use energy as efficiently as possible has been the number one priority for the designers of the station from its conception on. Using an evolving design approach, simulation upon simulation was carried out in order to determine the best possible design that would maximise the station's energy efficiency.

In addition to an efficient design, the station will use an energy control and monitoring system coupled with energy efficient appliances. This will keep energy use within the station to a minimum. In the end, the Princess Elisabeth Station will use only 20% of the energy needs required by an Antarctic station of comparable size.

Solar active and passive heating techniques, as well as the recycling of heat energy which is passively emitted by the main systems and equipment of the station will produce more than enough thermal energy to heat the base. Sound insulation will ensure that no thermal energy is lost. This means that, strange as it may seem, it will not be necessary to heat the Princess Elisabeth Station while it is in use during the austral summer.