SUSTAINABLE ARCHITECTURE – TERRA ENERGY

Terra, The Sustainability Pavilion is a LEED (Leadership in Energy and Environmental Design) Platinum certified green building at Expo City Dubai.

Energy is generated through over 4,000 photovoltaic panels on the building's roof canopy and 18 'Energy Trees' that rotate to face the sun, like sunflowers.

The solar power produced in the day at Terra goes into the National grid. In the nighttime, when no solar is being produced, Terra draws the power back from the National grid.

To meet its goal of becoming 'net zero', Terra must generate as much renewable energy as it consumes from the grid.

Terra aims for both net zero consumption of energy and water making it one of the most sustainable buildings on Earth.

18 Energy Trees

Roof Canopy

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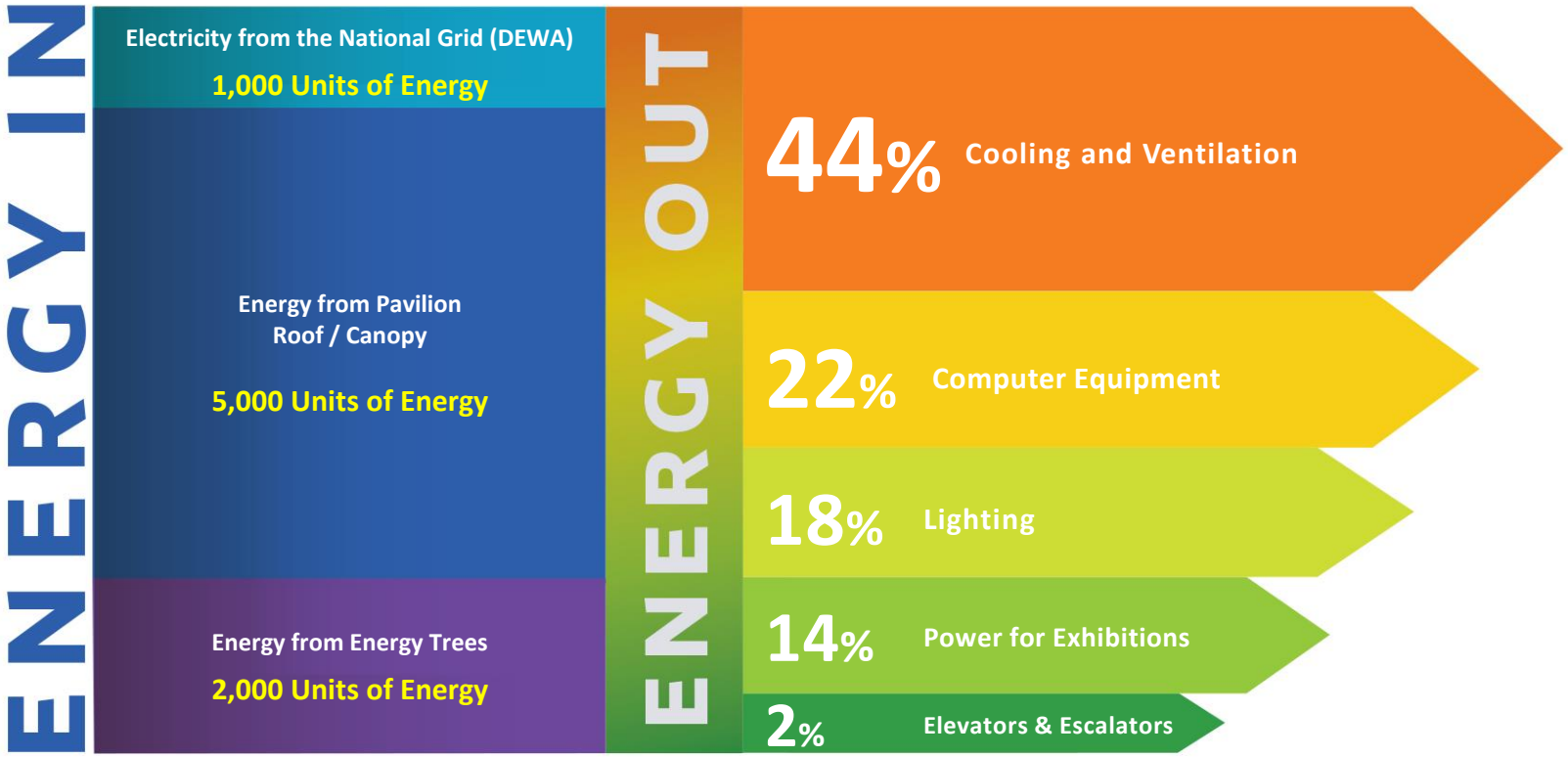
HOW IS THE ENERGY USED DURING THE DAY?

Energy generation changes massively depending on time of day, time of year and weather conditions. On an optimal day, Terra could receive 64% of its electrical energy from the pavilion roof canopy and 36% from the 18 energy trees.

This electrical energy is used to power everything in the building, including air conditioning and lighting.

DAYTIME CONSUMPTION



*'Energy units' do not represent kWh energy values. Actual values can vary significantly each day.

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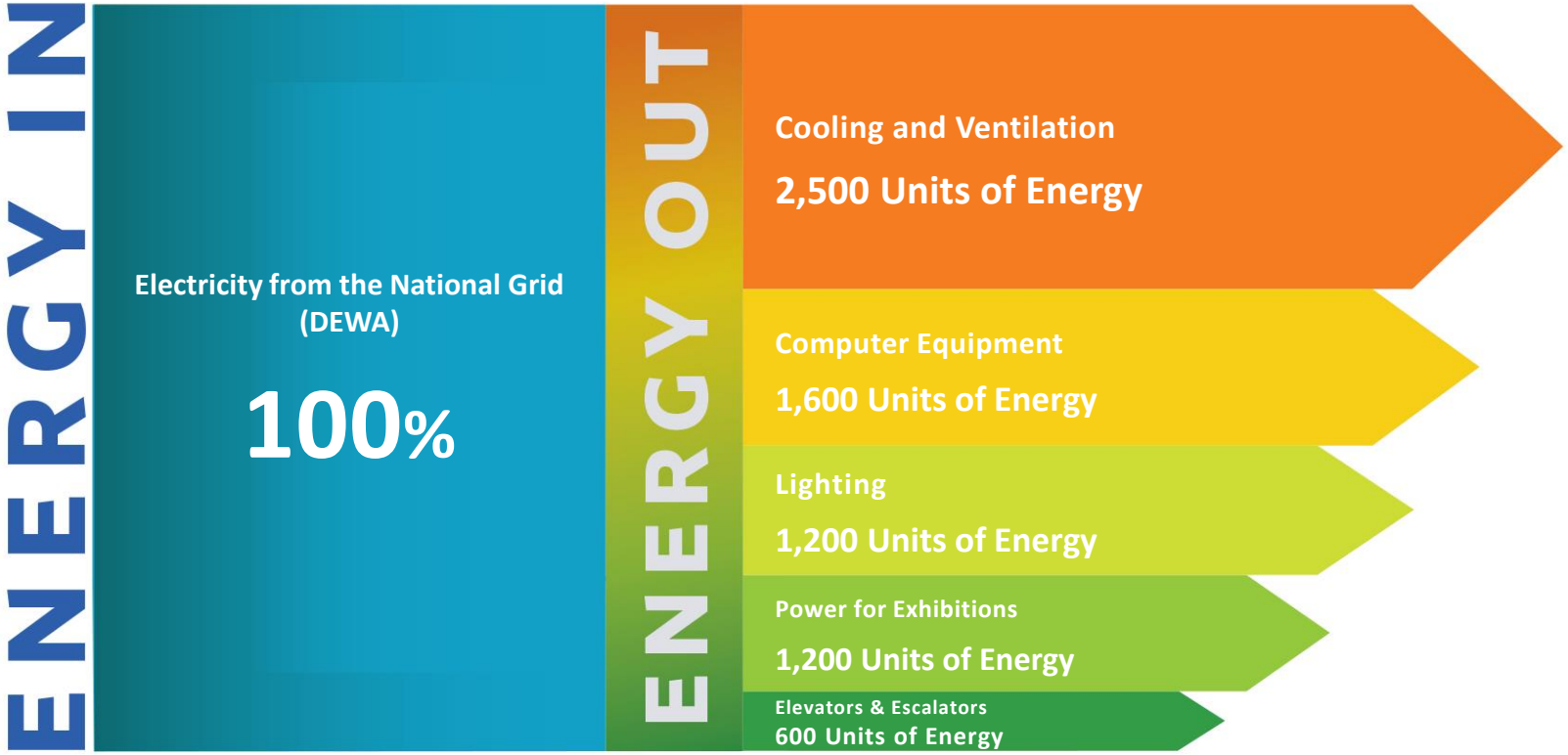
HOW IS THE ENERGY USED DURING THE NIGHT?

Energy generation changes massively depending on time of day, time of year and weather conditions. On an optimal day, Terra could receive 64% of its electrical energy from the pavilion roof canopy and 36% from the 18 energy trees.

This electrical energy is used to power everything in the building, including air conditioning and lighting.

NIGHT-TIME CONSUMPTION



*typical figures for an optimal day, actual values can vary significantly each day

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Questions

1. In this scenario:
   a) How much energy is generated from the solar cells?
   b) How much energy is needed from the National Grid (day and night)?
   c) Is Terra ‘net-zero’ on this day?

2. What is most of the pavilion’s energy used for?

3. On some days the energy generated by the pavilion is much lower than on other days. What are some possible reasons for this?

4. Much of the pavilion is built underground and surrounded by thick insulated walls. Suggest a reason for this.

5. The entrance to the pavilion is via a double set of automatic doors which close quickly after someone enters the building. How does this reduce the amount of energy used by Terra?

DID YOU KNOW?

The UAE expects to achieve net-zero emissions by the year 2050, making it the first country in the MENA region to do so!

This will help the UAE play it's part in meeting it's commitment to limit global warming to 1.5°C.

See if you can find out more about the Paris Agreement which saw countries around the world commit to reducing global warming to 1.5 degrees Celsius – are you are doing enough to support the country's efforts?