

# RENEWABLE ENERGY

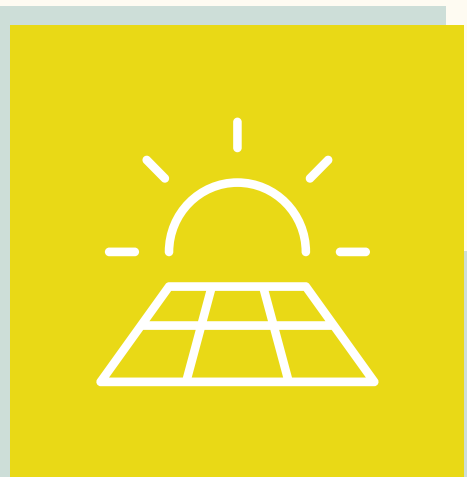
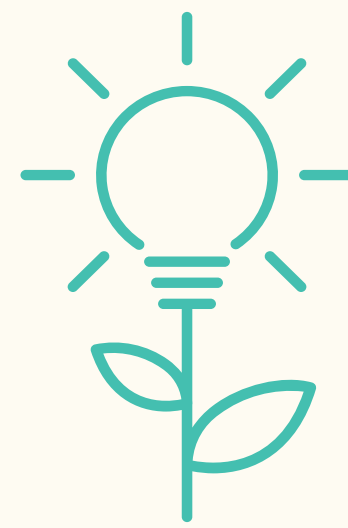
## — building a sustainable future

### Why is renewable energy important?

Fossil fuels, such as coal, natural gas, and oil are unsustainable energy sources. When converted to electricity, they create a significant portion of global greenhouse gas emissions. These are made up of gases such as carbon dioxide, methane, and nitrous oxide.

Greenhouse gases contribute to **climate change** which alters our weather, oceans, and ecosystems.

Renewable energy is generated from the environment's sustainable natural resources—wind, water, sun, geothermal, and biomass. Once renewable energy sources are installed, they produce little to no greenhouse gases. This is good for the environment and for our health.



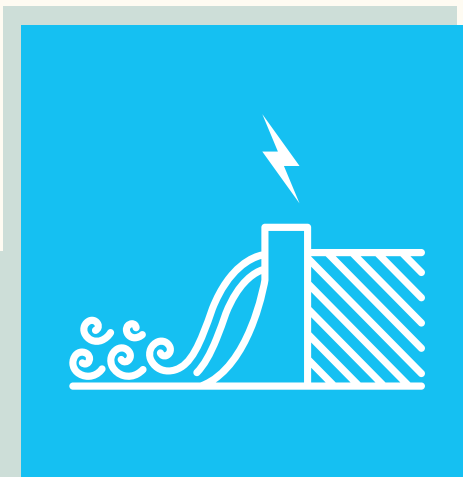
#### SOLAR ENERGY

The energy from the sun can be converted into electricity and heat. Photovoltaic (PV) panels convert sunlight into electricity and solar thermal collectors absorb and collect solar radiation to heat water.



#### WIND POWER

Wind turbines collect the kinetic energy of the wind to generate mechanical power. By using a generator, this mechanical power can be converted into electricity.



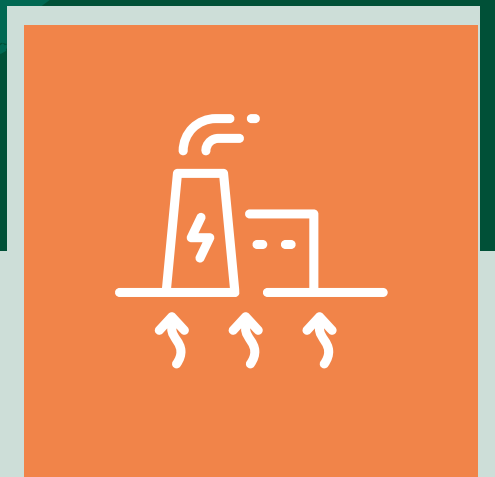
#### HYDRO POWER

Also known as hydroelectric power, this is one of the oldest renewable energy sources on the planet. Electricity is generated when flowing water spins a wheel or turbine.



#### BIOENERGY

Biomass (recently living organic materials such as plant matter, agricultural products, solid waste, and landfill gas) can be used to produce transportation fuels, heat, electricity, and chemical products.



#### GEOTHERMAL ENERGY

Heat extracted from natural hot water reservoirs below the Earth's surface can be converted by steam turbines into electricity. New Zealand is particularly rich in geothermal resources.

### Why isn't all energy generated by renewable energy?

Most renewable energy power production is intermittent and not always coincides with peak consumption.

For example, solar panels cannot generate energy at night—this means we need **efficient energy storage** technologies.



### What could NZ's power grid look like in the future?

In the future, New Zealand's power grid will be "smart". This smart grid will be made up of millions of smart appliances and EV chargers plus many small scale solar photovoltaic and battery systems—easing the need for large power plants and network investment.

#### Could you help NZ become carbon neutral?

To deal with these changes, New Zealand will need skilled electrical engineers with the ability to deliver innovative solutions.

**If you want to change the future, come study with us!**