



# Power Challenge

## I wonder how a turbine works?

### Video transcript

Kia ora koutou! It's Lewis and Cha Cha, back again to talk to you about all things turbine.

Hold onto your hats! It sure is windy.

And that means our turbine is hard at mahi – transforming energy from the wind, into electrical energy for our hapori.

But how? Let's take a closer look.

A wind turbine is made up of a few important bits and pieces:

- A sturdy base
- A tower
- A generator
- A nacelle, which is where the generator lives
- A hub
- And blades

Then, to make the magic happen, we need some wind.

When wind energy moves over the turbine blades, it makes them spin. This transforms the wind energy into rotational energy.

Next, the rotational energy needs to be transformed into electrical energy.

This is where the generator comes in.

The blades are connected to a generator inside the turbine nacelle. So, when the blades spin, the generator spins.

This transforms the rotational energy into electrical energy.

The electricity then travels down a cable, down the turbine and into the ground, and to the nearest substation before it's transferred to our homes!

Thank you wind turbine!

Usually, the faster the blades are spinning, the more electricity the turbine generates.

So how can we help the blades spin fast?

Aerodynamics!

Aerodynamics is the study of how air moves around an object.

Everything that moves through the air is affected by it, from a kākā gliding through the sky, to a rocket blasting off.

Turbine blades need to be aerodynamic to spin fast in the wind.

And this is down to force.

**A force is a push or a pull that can cause an object to move or change.**

Turbines experience two important forces: drag and lift.

Drag is the unhelpful pulling force that tries to slow the blades down.

While lift is a pushing force that helps the blades spin.

Turbine blades are designed to increase lift, and decrease drag – making them super aerodynamic, and really good at harnessing wind power!

When you imagine your own turbine blades, you'll need to think about how different designs will impact aerodynamics.

And where better to find inspiration than the many aerodynamic life forms that live in te taiao, or nature!

Good luck, and charge on.