Piambong
WIND FARM

Learn about wind energy

Education pack for children 7-11 years of age

2022

What is the wind and what causes it?

Wind is air in motion.

Activity 1

Can you think of three signs of wind?

For example, you see movement in trees.

1 _____

2 _____

3 _____

Try this!

Take a deep breath in and blow it all out. You just created wind! You could use the energy in this small burst of wind to perform small tasks, such as blowing out a candle or making a fan turn.

Nature can also create wind. The wind we feel outside is mainly created by the sun. How does this happen?

A few things to remember:

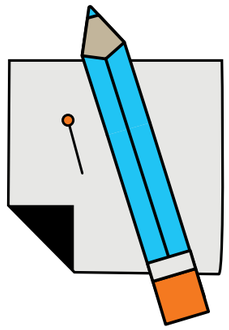
1. The earth gets most of its energy from the sun. The sun heats up the land, the oceans, your house, and even you! Different surfaces heat up at different rates. It turns out that land absorbs (and loses) heat faster than the oceans.
2. When air is heated, it becomes lighter and rises. The opposite is also true. When air cools down, it becomes heavier and sinks.

When warm air rises, the cool air moves in and replaces the warm air – just like water replaces air when you take a sip from your straw. This movement of air is what makes the wind blow.

Optional activity

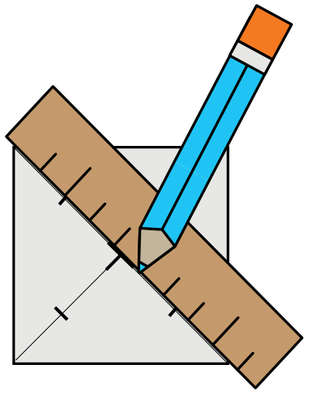
Making fan turn

You can make your own fan turn by creating a fan out of a piece of square paper, a pencil and a needle.



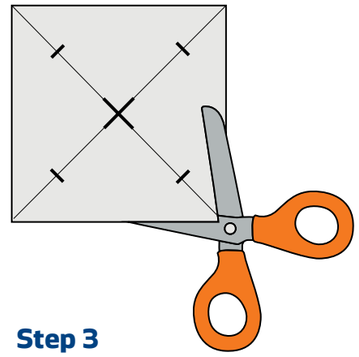
Step 1

Find a piece of square paper, pencil (with eraser) and a needle pin.



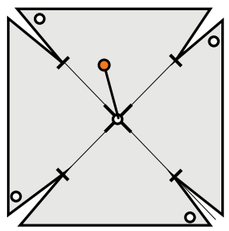
Step 2

Draw lines using a pencil and ruler. Use this drawing as a guide.



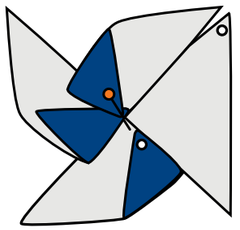
Step 3

Use scissors to cut the paper up to the first line from each corner.



Step 4

Use the needle pin to pinch holes in the same spots as pictured in this drawing.

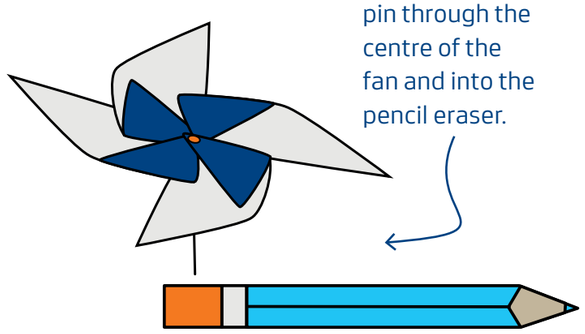


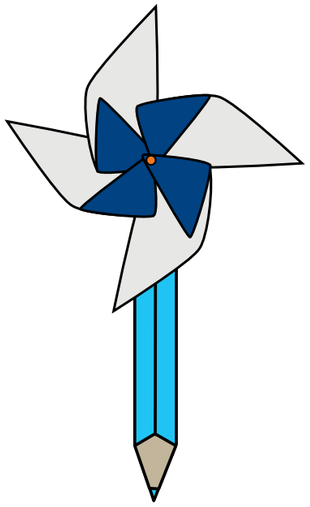
Step 5

Fold the corners to the center.

Step 6

Pierce the needle pin through the centre of the fan and into the pencil eraser.





Step 7

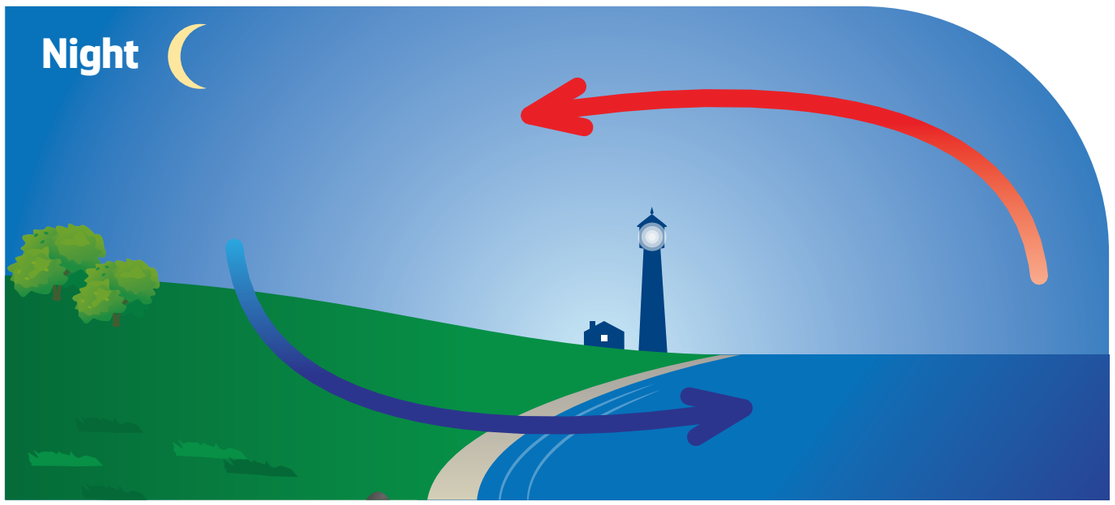
Your fan is ready! Blow into the blades to make them spin.

Activity 2

Can you circle the correct words?

During the day, the air above the **land/sea** is warmer than the air above the **land/sea**. The warm air **rises/falls** and is replaced by the cold air coming from the sea. We call this a sea breeze.

During the night, the air above the **land/sea** is warmer than the air above the **land/sea**. The warm air **rises/falls** and is replaced by the cold air coming from the land. We call this a land breeze.



Wind in the natural environment is capable of doing big jobs. For example, it can help boats sail the seas, help fly a glider plane or it can be harnessed to produce electricity.

Energy sources

Have you ever thought about how things work? For example, what makes it possible for us to watch television? Or toast a piece of bread? It is energy! Energy comes in many different forms, such as heat, light, sound, and motion. But one of the most important forms of energy for our daily lives is electrical energy…more commonly known as electricity. We use electricity to power our lights, our appliances, our computers, and even some types of cars, buses, and trains!

Activity 3

Which of the following objects need electricity to work?

- ☐ Heater
- ☐ Light bulb
- ☐ Row boat
- ☐ Game console
- ☐ Kite
- ☐ Toaster
- ☐ Roller skates
- ☐ Guitar

Activity 4

Engineers have figured out lots of ways to make electricity.

Can you think of some sources of electrical energy?

For example, wind.

1 _____

2 _____

3 _____

We get energy from two types of sources: renewable and non-renewable.

Non-renewable energy sources, like oil, natural gas and coal, take a very, very long time to form (millions of years), so they cannot be replaced once they are used up. These sources of energy are often called “fossil fuels”. These resources are dug up or pumped out of the earth. Australia has a lot of fossil fuels, but they will not last forever. Unfortunately, these sources of energy also create a lot of pollution in the environment.

Renewable energy sources are continuously replaced and will never run out. Wind energy and solar energy are the most familiar examples of renewable energy. Other examples are hydro energy (from water) and geothermal energy (from heat in the earth). These forms of energy are clean and do not create pollution in the environment. And, they will never run out.

Activity 5

Fill in the blanks

We can divide the energy sources we use each day into two types:

1. _____ energy sources are made from resources ‘mother nature’ will replace, like wind, water and sunshine.

2. _____ energy sources cannot be replaced once they are used up.

Both of the above sources of energy can be used to produce _____ .

Wind energy

The question is, how can wind be used to generate electricity?

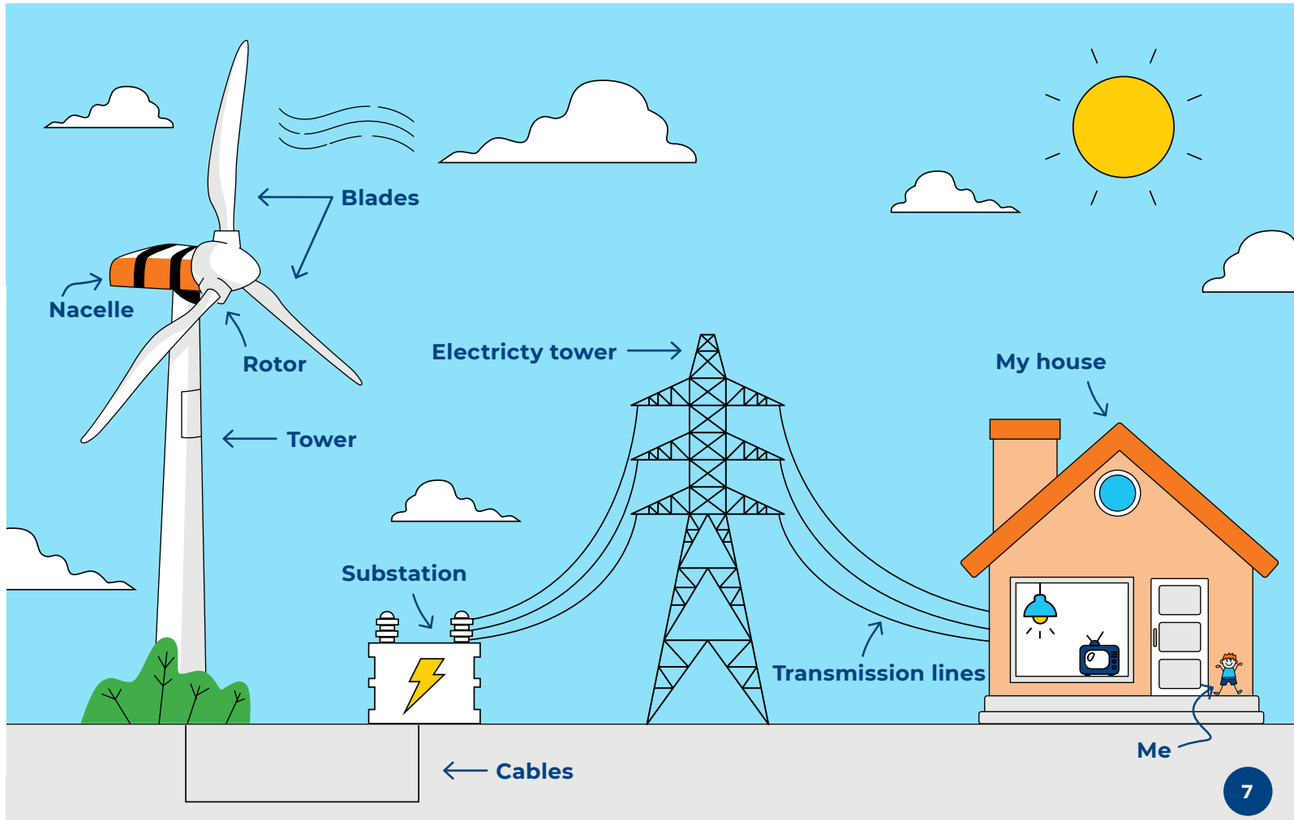
We use wind turbines that can harness the energy from the wind and turn it into electricity. This electricity reaches our home so our appliances and devices can work.

Imagine a wind turbine like in the illustration below.
Wind moves the blades which turns the rotor. The rotor is connected to a generator located inside the nacelle. The wind turns the blades, which turns the rotor, which turns the generator, which creates electricity! The electricity then passes through cables down the tower to a substation, and from there to our homes, factories, and schools.

Wind turbines are equipped with sensors that can detect wind direction and speed. The wind turbine is able to turn to face the wind, no matter which direction it is blowing from. Also, if the wind is too strong, the wind turbine will shut down so that the equipment is not damaged.

When we capture thepower of the wind and use it to do work, we call it wind energy

A wind turbine works opposite to a fan.
A wind turbine uses wind to create energy.
A fan uses energy to create wind!



Activity 6

Find the words

TIP: Look in all directions.
Words can share letters as they cross over each other.

L	T	Y	R	L	D	B	U	M	Z	U	V	S	Y	I
A	D	U	Y	I	L	I	O	C	L	X	C	E	I	V
R	E	S	R	O	A	Y	R	R	N	D	T	N	S	A
U	E	Q	W	B	G	C	O	E	M	H	E	S	E	E
T	P	K	D	R	I	T	W	Q	C	Q	R	O	L	C
A	S	H	E	N	O	N	O	E	P	T	O	R	B	F
N	U	N	H	R	I	R	E	W	O	P	I	S	A	A
B	E	G	L	A	F	W	O	Z	O	Z	G	O	C	B
T	E	L	E	C	T	R	I	C	I	T	Y	X	N	L
E	L	L	E	C	A	N	F	R	U	E	Y	S	U	A
B	T	E	L	B	A	W	E	N	E	R	T	B	D	D
T	Q	I	J	J	T	B	I	L	L	W	Z	V	N	E
H	Y	R	E	S	O	U	R	C	E	S	O	K	J	S
W	J	G	H	P	V	Q	G	P	S	U	U	T	L	S
Y	I	Y	C	X	M	Y	O	K	Z	K	J	H	Q	O

Air
Blades
Blow
Cables
Direction
Electricity
Energy
Hub
Nacelle
Natural
Power
Renewable
Resources
Rotor
Sensors
Speed
Tower
Turbine
Wind

Wind farms

A collection of wind turbines is called a wind farm.
Wind turbines are often built on the top of hills so that they can capture the strongest, most consistent wind.

Modern wind turbines can be over 200 metres tall, with blades that are 80 metres long! That is almost as long as a soccer field.

There are some wind farms which are built in the ocean. These are called "offshore" wind farms.

Safety is very important. That is why the people who work at a wind farm are always well-equipped and protected.

Once a wind turbine is built, it can create electricity much more cheaply than using fossil fuels like coal or natural gas.

There are more than 125 wind farms in Australia, and in 2021 they produced about 11.7% of all the electricity in the country!

Wind farms do not require water to operate. Fossil fuels require a lot of water. Fresh water is a pretty important and scarce resource, especially in Australia.

The land underneath the turbines can still be used for farming. Sometimes sheep like to sit underneath turbines to get some shade!

Is wind energy a good idea?

What are the benefits of wind energy?

1. Wind turbines use a renewable resource – the wind – to produce electricity.
2. Wind turbines do not create pollution of the air, water or land.
3. Wind farms create electricity more cheaply than traditional fossil fuels like coal and natural gas.
4. Wind farms create new jobs for people to earn an income and support their families.
5. Most of the land used for wind farms can also be used for other activities. such as agriculture, farming and forestry.

What are the drawbacks of wind energy?

1. Some people think wind turbines can spoil the scenery and create noise.
2. Wind farms do not produce electricity when the wind is not blowing.
3. Wind turbines can be dangerous for some birds and bats.

Activity 7

How do you feel about wind energy and wind turbines?

Write here

Piambong WIND FARM

Every wind farm design is different. The Captains Mountain Wind Farm is a proposed wind farm project southwest of Millmerran, and is being developed by a company called Vestas.
The area has strong and consistent winds, making it a suitable place for a wind farm. If the government approves the project, the first wind turbines are expected to be installed in 2024.

Did you know?

One wind turbine blade is longer than **6 school buses**.

The wind turbines are almost as tall as a **70-storey building**.

The wind farm

Up to **56 wind turbines**.

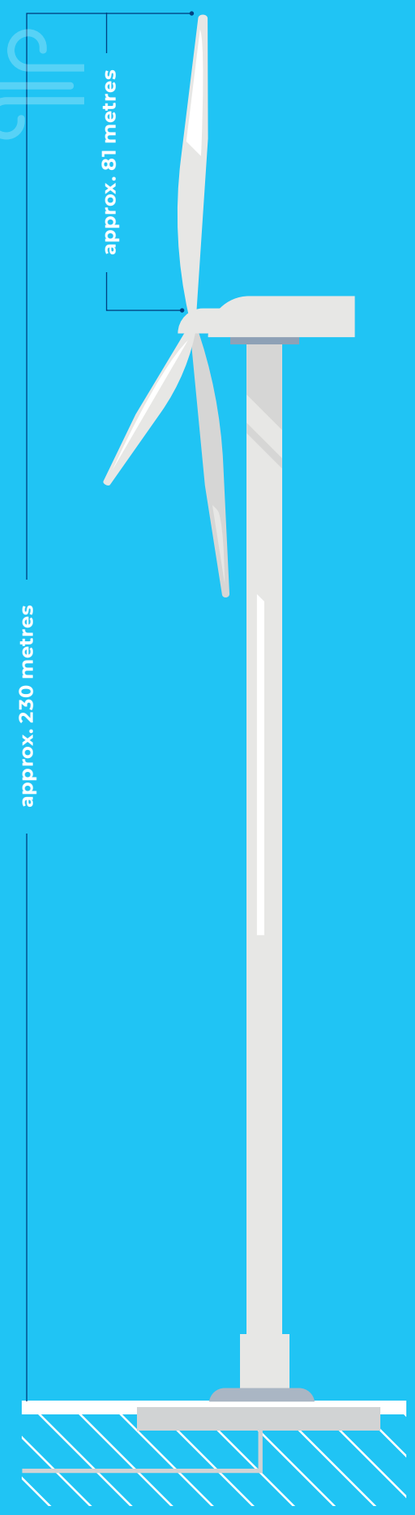
Up to **196,000 homes** could be powered by the energy produced annually from the wind farm.

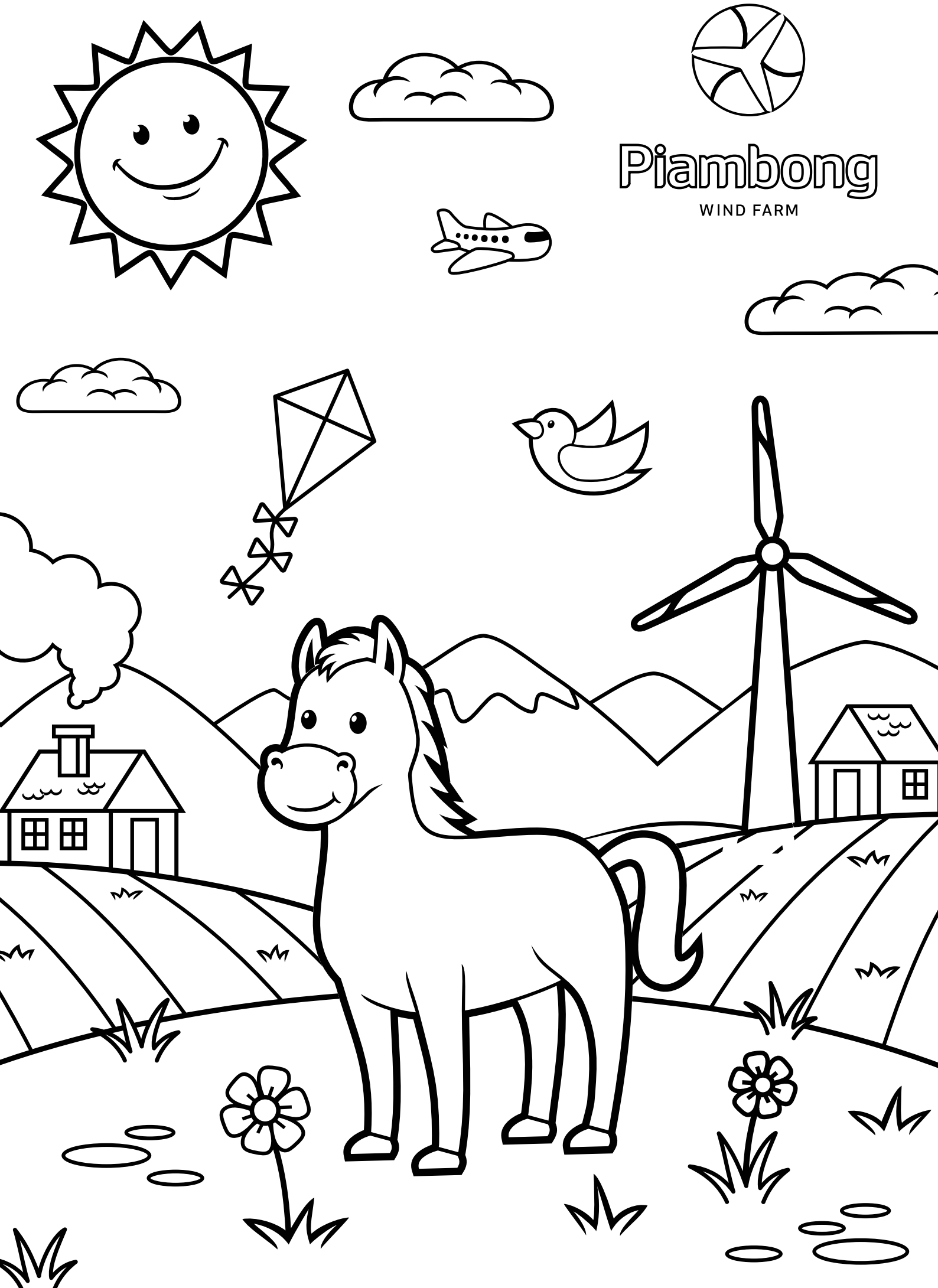
Creates around 200 new jobs during construction.

Vestas

40 Years of experience in wind energy.

82,000 turbines installed in **86 countries** worldwide.




Piambong
WIND FARM