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NTC The National Theatre for Children

NSW GOVERNMENT EnergyCo | ACEREZ the future of renewable energy

ENERGY GAME CHANGERS

BIG IDEAS INSIDE

- How is electricity generated
- How energy use impacts the Earth
- What is a Renewable Energy Zone (REZ)
- How you can be an Energy Game Changer
- and more

THE REZOURCE FORCE SCHOOL CHALLENGE

ENERGY GAME CHANGERS

ENERGY GAME CHANGERS is a live, in-school experience led by two actors who'll take you through fast, funny, interactive sketches, where you don't just watch, you get involved.

With improv, challenges, and team-based games, you'll explore how electricity is generated, where our energy comes from, and how the choices we make can impact the planet.

Get ready to compete, think on your feet, and maybe even change the game.

WORDS TO KNOW

Battery Storage System:
A common way to store electricity generated by a renewable source

Efficient:
Producing very little waste

Electricity:
A type of energy that runs our devices

Electricity Generation:
Making electricity using resources like the sun, wind, coal and gas

Energy:
The ability to do work and or make things move, or change

Energy Transition:
Replacing aging coal-fired power stations with renewable energy sources like wind, solar, and battery storage systems

Environment:
Everything around us that we need to keep healthy for all living things to survive

Natural Resource:
Something found in the environment that can be used by people

Non-Renewable Resource:
A natural resource that cannot be replaced once it's used, like coal

Renewable Energy:
Energy derived from renewable resources that will not run out, such as wind, sun and running water

Renewable Energy Zone (REZ):
An area where renewable energy is generated, stored, and sent through transmission lines to homes and businesses

Renewable Resource:
A natural resource that can be replaced or won't run out, like sunlight and wind

Solar Power:
Using the Sun's energy to generate electricity

Transmission:
The process of moving electricity from where it's generated to where people use it, through power lines

Wind Power:
Using the wind to spin a turbine to generate electricity

WHY BE AN

ENERGY GAME CHANGER?

We are in the middle of an energy transition, offering exciting ways to make a positive impact in a way that interests you.

Here's why you should be an Energy Game Changer:

See the Big Picture: Explore how electricity is generated, why renewable energy matters, and how Australia is planning for a reliable energy future.

Shape Your Future: From engineers and tradies to scientists and site chefs, renewable energy careers are growing fast. Discover where your skills could take you.

Be Part of the Change: Check the inside back cover to find out how to join *The REZource Force* and help power what's next.

THE SUN AND THE WIND

OUR GUIDES AND GIVERS

For First Nations people, the Sun and Wind are more than just parts of the natural world, they are our teachers, our life-givers, and our reminders of balance.

From the beginning, Aboriginal and Torres Strait Islander people have lived with deep respect for the rhythms of nature. Everything in the world is connected. The land, the waters, the sky, the animals, and us as people. Our Elders teach us that we are not above the land or the elements, but part of them. The Sun and the Wind each carry their own spirit, and we learn from them every day.

The Sun warms the earth and brings light to each new day. It gives energy to the plants, animals and people. Its heat is healing, and its light shows us the path forward. But the Sun can also burn if we don't show it respect. The Sun reminds us to share warmth, to lead with care, and to shine with purpose.

The Wind moves across Country in many ways, from softly to powerfully like a storm. It brings messages from other places, carries seeds, and clears the old to make way for the new. The Wind reminds us to breathe, to slow down and be present. It can be a calm friend or a fierce teacher. The Wind teaches us balance, from stillness and movement, to listening and speaking.

Our people have always known that the natural world provides what we need, if we respect it. Using the Sun and Wind to power our homes and schools is another way of listening to Country, of working with nature instead of against it. In everything we do, we must remember that we are part of a bigger story, one that includes the land, sky, and every living thing. The Sun and Wind are part of that story, just like we are.

Contributed by Mitchell Groat, Wiradjuri, Kamilaroi/Gamilaraay man.

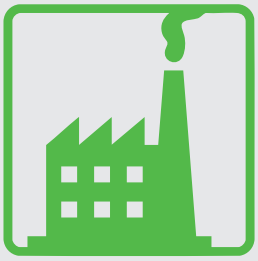
ELECTRICITY IS GENERATED

THE DIFFERENT WAYS

Electricity is the lifeblood of our modern world, empowering us with the ability to light up our homes, operate electronic devices and enjoy the countless technological marvels that surround us. But have you ever wondered about the fascinating process behind electricity generation? From conventional techniques to innovative sources, let's discover the various ways we meet our energy needs!

Renewable Energy:

With a growing emphasis on sustainability and reducing our carbon footprint, renewable energy sources have gained momentum in electricity generation. These sources include solar, wind, hydroelectric and geothermal power.



Non-Renewable Energy:

A common method of generating electricity involves the use of non-renewable resources - also known as fossil fuels - including coal, oil and natural gas. Power stations burn these fuels, producing heat energy that boils water and creates steam. This steam drives a turbine connected to a generator, which converts mechanical energy into electrical energy. While fossil fuels have played a significant role in meeting our energy demands, they are limited, and can't be replaced within a human timescale. Their use also contributes to air pollution and carbon emissions, impacting the environment and climate.

Nuclear Power:

Nuclear power plants generate electricity through a process known as nuclear fission. Atoms of radioactive materials, such as uranium or plutonium, are split, releasing an enormous amount of heat. This heat then converts water into steam, which drives a turbine connected to a generator. Nuclear power offers a substantial electricity output without significant carbon emissions. However, safety concerns and the long-term management of radioactive waste remain important considerations. Nuclear power generation is currently illegal in Australia.

Types of Renewable Energy:

Solar Power:

Solar panels capture sunlight and convert it into electricity using the photovoltaic (PV) effect. Sunlight excites electrons in the solar cells, creating an electric current. Solar power is abundant, renewable and doesn't produce pollution, making it an attractive option for sustainable energy generation.

Wind Power:

Wind turbines harness the kinetic energy from the wind to generate electricity. As the wind turns the turbine blades, the mechanical energy is transformed into electrical energy. Wind power is clean, renewable and relies on consistent wind patterns for optimal generation.

Hydroelectric Power:

Hydroelectric power taps into the energy of flowing water, typically from dams or rivers. The force of the water spins turbines, generating electricity. Hydroelectric power is reliable, renewable and produces no direct carbon emissions. However, building large dams can have environmental and social impacts.

Geothermal Power:

Geothermal energy utilises the heat from the Earth's core. Underground steam or hot water is brought to the surface, driving turbines to generate electricity. Geothermal power is renewable, reliable and produces low emissions. However, it is limited to specific geographic areas with accessible geothermal resources.

Electricity generation is a multifaceted field, with various methods employed to power our homes, schools and communities. From traditional fossil fuels to renewable energy sources like the sun, wind, hydro and geothermal power, each method plays a crucial role in meeting our energy needs. As ageing coal-fired power stations are gradually retired and Australia's energy demand continues to grow, expanding renewable energy sources is essential to fill the gap and ensure a reliable, sustainable power supply for the future.

ALL ABOUT

RENEWABLE RESOURCES

Renewable energy sources, unlike fossil fuels, are sustainable and have been harnessed by civilisations throughout history. From the early utilisation of solar and wind power to the modern advancements in renewable energy, let's uncover the fascinating story of humanity's quest for sustainable power.

Ancient Beginnings:

Thousands of years ago, ancient civilisations recognised the power of renewable resources and harnessed them for their energy needs.

Solar Energy: The ancient Greeks and Romans utilised sunlight by using mirrors to focus its energy for heating and cooking. They worshiped sun gods like Apollo, showcasing their understanding of the Sun's immense power.

Wind Power: People used wind energy to propel boats along the Nile River as early as 5000 B.C. By 200 B.C., simple wind-powered water pumps were used in China, and windmills with woven-reed blades were grinding grain in Persia and the Middle East.

Water Power: The Greeks used water wheels for grinding wheat into flour more than 2,000 years ago, while the Egyptians used Archimedes' water screws for irrigation during the third century B.C.

Industrial Revolution:

The Industrial Revolution (1760-1840) marked a turning point in energy utilisation as societies transitioned from agrarian to industrial economies.

Steam Power: James Watt's invention of the steam engine revolutionised energy production in the 18th century. Steam engines used coal as fuel to heat water and create steam, driving machinery and propelling the Industrial Revolution forward.

Modern Renewable Energy Revolution:

With the recognition of fossil fuels' environmental impact, the world shifted its focus back to renewable resources. The modern era has witnessed incredible advancements in renewable energy technologies.

Solar Power: In the mid-20th century, the development of photovoltaic (PV) cells enabled the direct conversion of sunlight into electricity. Today, solar panels can be found on rooftops and in solar farms, providing clean power for homes and communities.

Wind Power: Large-scale wind farms with modern wind turbines emerged in the 1970s. These turbines capture the kinetic energy of the wind and convert it into electricity, making wind power an essential component of the global renewable energy mix.

Hydroelectric Power: The harnessing of flowing water for electricity generation has a long history. In the 20th century, the development of large-scale hydroelectric dams revolutionised this form of renewable energy, providing a significant source of clean electricity globally.

Other Renewable Sources: Alongside solar, wind and hydroelectric power, there are ongoing explorations of innovative renewable energy sources. Geothermal energy taps into the Earth's heat, while tidal energy captures the power of ocean tides, showcasing the endless possibilities of renewable resources.

The history of renewable resources is a testament to human ingenuity and the recognition of sustainable energy sources. Ancient civilisations laid the foundation by harnessing solar, wind and water power, while the Industrial Revolution propelled energy utilisation forward with steam power. Today, we stand at the forefront of a modern renewable energy revolution, with solar, wind and hydroelectric power leading the way.

IMPACTS THE EARTH

Every day, we rely on energy to power our homes, schools and the technologies we use. However, it's important to understand that the choices we make regarding energy sources and consumption have profound effects on the environment.

Non-Renewables and Climate Change:

Non-renewables, such as coal, oil and natural gas, have been Australia's primary sources of energy for many years. The more electricity we use, the more natural resources it takes to make it. However, their extraction, processing and combustion release greenhouse gases (GHGs), such as carbon dioxide (CO^2), into the atmosphere.

Carbon Cycle Disruption:

The amount of carbon on Earth never changes - cycling through the Earth's systems via the Carbon Cycle. When plants and animals decompose, their carbon turns into coal, oil, and natural gas over millions of years. Burning these fuels for energy releases excess carbon dioxide back into the atmosphere

Carbon Sinks Overwhelmed:

Carbon sinks like forests, oceans and soil absorb and store carbon, but when too much carbon is released into the atmosphere, carbon sinks can become overwhelmed

Air Pollution and Health Impacts:

The burning of fossil fuels also releases harmful pollutants into the air, affecting both the environment and human health

Advanced Greenhouse Effect:

Excess carbon dioxide traps heat in the Earth's atmosphere, contributing to the greenhouse effect. This phenomenon contributes to global warming and climate change, resulting in rising temperatures, melting ice caps and extreme weather events

Water Intensive Processes:

Energy production, particularly in thermal power plants, requires significant amounts of water for cooling purposes. This high water demand can strain local water supplies, leading to scarcity in regions already facing water stress

Australia's Energy Future:

Our energy choices play a vital role in shaping the future of our planet. While non-renewable resources have powered our lives for generations, understanding their environmental impacts helps us make thoughtful, informed decisions about the future of Australia's energy. As of 2025, 30–39% of electricity in NSW already comes from renewable resources. By gradually transitioning to a renewable energy mix, as well as using energy more efficiently, and reducing unnecessary consumption, we can help build a more sustainable energy system that meets the needs of future generations.

WHAT IS A

RENEWABLE ENERGY ZONE

A **Renewable Energy Zone (REZ)** is an area where renewable energy is generated, stored, and sent through transmission lines to homes and businesses.

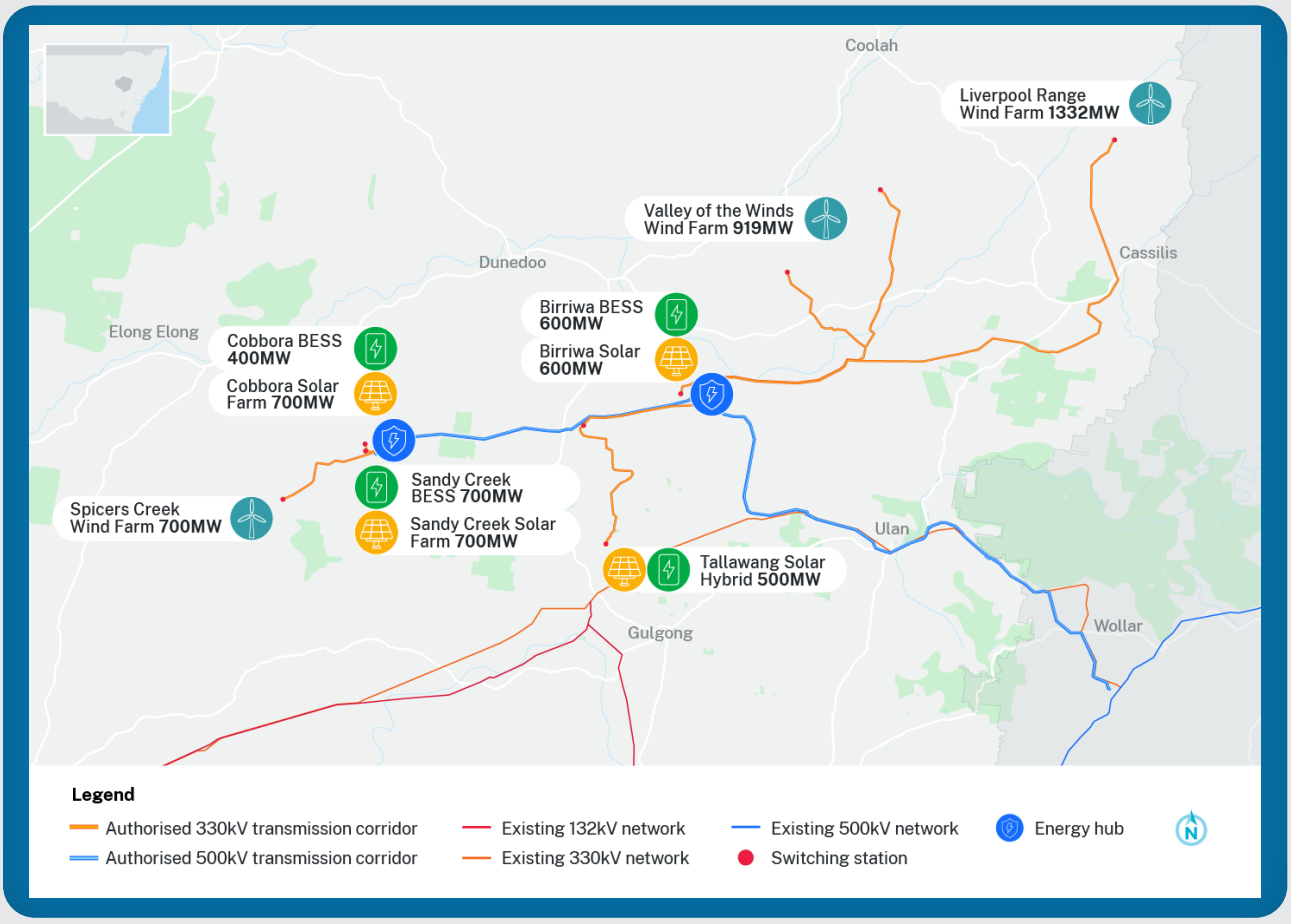
A REZ includes multiple large-scale energy projects such as solar and wind farms, battery storage and high voltage transmission infrastructure, all working together to supply renewable electricity to communities.

The Central-West Orana REZ

The **Central-West Orana REZ** is Australia's first declared Renewable Energy Zone.

The project will build over 240km of new high-capacity transmission lines, energy hubs and supporting infrastructure to transfer power generated by solar and wind farms to communities.

The REZ is due to become operational by 2028, initially unlocking up to 4.5 gigawatts (GW) of new network capacity, and provide power to over 2 million homes!



Map of the Central-West Orana REZ

Why is the Central-West Orana REZ needed?

The Central-West Orana REZ will play a significant role as traditional, non-renewable energy generation continues to make way for more renewable energy in New South Wales. A growing population and ever-increasing demand means bountiful, reliable energy is required to fill this gap and ensure constant supply for the future.

The Central-West Orana region was chosen as an optimal location to host renewable energy generation. With large wind and solar generation potential and good access both to quality renewable resources and to the existing electricity network, the Central-West Orana REZ will provide a clean, affordable and reliable power supply for energy consumers across NSW.

What is the Energy Transition?

The Energy Transition is the process of gradually replacing aging coal powered electricity stations with renewable sources like solar and wind. This is necessary because most of Australia's coal fired power stations are set to close by 2030. We need to replace the energy they were producing with renewable energy to keep the lights on.

Australia's abundant supply of solar and wind resources, combined with an increased capacity for energy storage and high voltage transmission infrastructure, will ensure a reliable, and clean energy supply for homes and businesses into the future.

Want to learn more?

Read more about the Central-West Orana REZ here:

- **acerez.com.au/the-project**
- **energyco.nsw.gov.au/cwo-rez**

CAREERS AND PATHWAYS

Australia's renewable energy industry is growing fast. From solar and wind farms to exciting new clean energy inventions, the future of Renewable Energy offers a wide range of career paths.

Careers in Renewable Energy

Here are just some of the roles that make a difference in Australia's clean energy future:

Engineering – designing and building renewable energy systems

Construction – helping build solar farms, wind turbines, and power lines

Technology – creating and managing energy software and systems

Project Management – planning and running energy projects

Environmental Scientist – protecting the environment while we build clean energy

Accounting – managing the money that keeps projects running

Commercial Cooking – feeding the teams working on remote energy sites

Community Engagement – working with locals to support energy projects

Human Resources – hiring and supporting the people in the industry

Construction Jobs

- **Electrician**
- **Plant operator**
- **Concreter and form worker**
- **Steel fixer**
- **Crane and drone operator**
- **Welder**
- **Scaffolder**
- **Technology developer**
- **Explosive technician**
- **And more**

Non-Construction Jobs

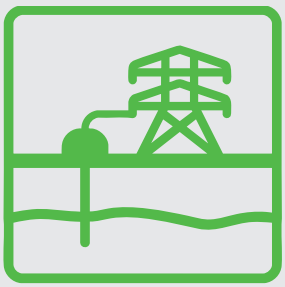
- **Accountant**
- **Community engagement officer**
- **Environmental scientist**
- **Human resources specialist**
- **Legal and contract manager**
- **Project manager**
- **Technology developer**
- **Explosive technician**
- **Commercial Chef**
- **And more**

Whatever path you take,
there's a place for you in renewable energy.

How to Get Started

There are many ways to get started in renewable energy. You can choose science, tech, or trade subjects at school, then move into:

- **TAFE**
- **Apprenticeships**
- **Traineeships**
- **University**



Different paths suit different goals:

- Hands-on careers → Apprenticeships, TAFE
- Technical/scientific careers → University
- Entry-level jobs → On-the-job training and progression

THE SUN AND RAIN

Contributed by Mitchell Groat
Wiradjuri, Kamilaroi/Gamilaraay man.

This artwork shows the strong connection First Nations people have with the Sun and the Wind. At the centre, the Sun gives light, energy and warmth as it is our guide through each day. Behind it, flowing shapes show the Wind as it moves across Country. The Wind brings change, carries stories, and clears the way forward.

Kangaroo tracks on each side show progress, movement, and travelling together into a cleaner, stronger future. On the outside, pathways remind us that people are always learning, growing, and walking in harmony with nature. This design is a reminder that the Sun and Wind are more than just weather, they are powerful teachers and part of our shared journey.

Consider your personal connection to the Sun and Wind as you colour in Mitchell's artwork.

Become an Energy Game Changer

Join

THE REZOURCE FORCE

and make a real impact for our energy future!

THE REZOURCE FORCE SCHOOL CHALLENGE

Explore how your school can take part in

THE REZOURCE FORCE SCHOOL CHALLENGE

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There are real-world discoveries to make and prizes to win!

Start your Challenge Project today — and help power what's next.

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ACEREZ
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ACEREZ has been appointed network operator by EnergyCo to design, build, finance, operate and maintain the Central-West Orana REZ transmission network.