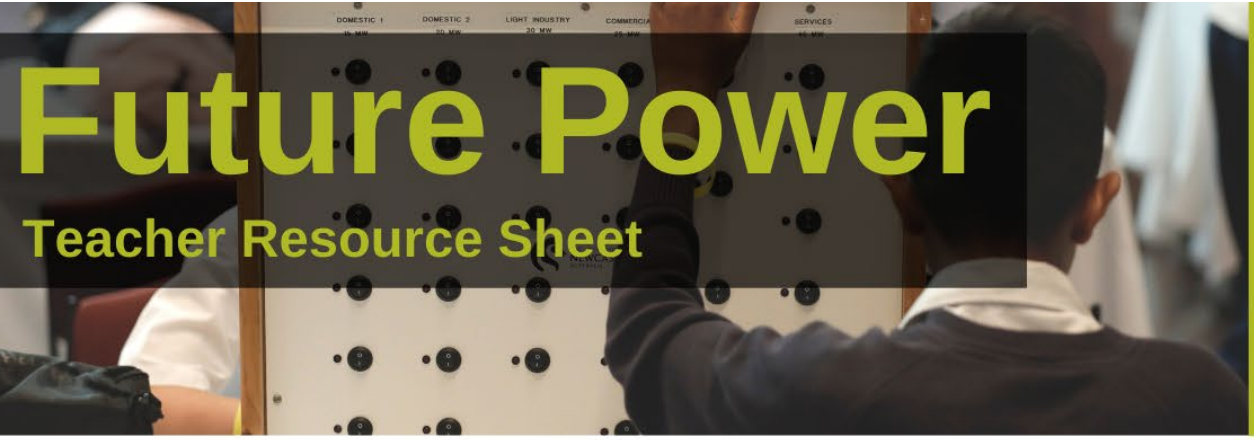

Future Power

Teacher Resource Sheet

science and engineering challenge

ON THE EVENT DAY

Half-day activity

Students will use a powered board, with the aim to supply power to required infrastructure as cheaply as possible. Students select power stations and control the supply (using dials) on the front of the board.

(Please remember that students cannot bring notes, models or other paperwork on the event day)

ACARA LINKS (Year 9/10)

- Energy conservation in a system can be explained by describing energy transfers and transformations **(ACSSU190)**
- Values and needs of contemporary society can influence the focus of scientific research **(ACSHE228, ACSHE230)**
- Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries **(ACSHE158, ACSHE192)**
- Investigate and make judgements on how the characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions **(ACTDEK046)**

Visit the ACARA website…

BACKGROUND

Future Power covers a range of processes and problem solving by applying concepts of maximum load, planning and consequences. The costs and benefits of coal, nuclear, solar, wind, hydro, and gas power stations must be considered to ensure all infrastructure is supplied power at a profit.

REAL-LIFE EXAMPLES

Matching electricity supply to the demand of a city can be very challenging. Generally, electricity must be used as it is generated. Renewable energy sources contribute to 24% of Australia's total electricity generation. Owing to the variability of renewable sources, electricity output can be less reliable than traditional fossil fuels. Modelling energy use in a city can help power plant operators anticipate when demand will peak, to avoid any large-scale blackouts.

RELATED CAREERS

- Engineer (Renewable Energy, Environmental, Electrical, Electronic)
- Energy Policy Officer
- Risk Analyst

RELATED DEGREES (UON)

- Bachelor of Engineering (Renewable Energy, Mechanical, Mechatronics, Electrical, Electronic or Chemical)
- Bachelor of Science (Physics)
- Bachelor of Mathematics
- B. Technology (Renewable Energy Systems)

Find out more…

Watch VIDEO – "What is Engineering"?

Phone (02) 4921 7319
Email challenge@newcastle.edu.au

www.newcastle.edu.au/challenge

Science and Engineering Challenge
@sciengchallenge
The Science and Engineering Challenge

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

VOCABULARY

Coal	A solid mineral substance that can be burned as a fossil fuel
Efficiency	The ability to produce something with little waste
Energy	The ability to do work
Hydroelectricity	Production of electricity from the force of falling or flowing water
Megawatts (MW)	A unit of measurement for power equal to one million watts
Natural gas	A mixture of different gases that formed slowly beneath Earth's surface
Nuclear power	Energy stored inside an atom by the forces that hold together the nucleus
Non-renewable	Resources that cannot be replaced after they are used
Renewable	Resources that can be used repeatedly as they are replaced naturally
Solar power	Energy generated directly from sunlight
Wind power	Energy generated from the wind pushing blades to rotate a turbine

RESOURCES/LINKS

Renewable Energy – Digibook resource on renewable energy via ABC Education

Snowy Hydro – In-depth website on the Snowy Mountains Hydroelectric Scheme. Includes information about the history, engineering and people as well as classroom resources.

How a wind turbine works – Animation with interactive labels and descriptive information demonstrating how a wind turbine works.

Solar Energy Fact Sheet – A one-page infographic explaining how solar cells work

Fission control computer game – Operate the controls for a nuclear reactor. The aim is to generate the most amount of electricity without overheating the reactor.

Ready to Go Lessons: Nuclear Energy through a Virtual Field Trip

Ready to Go Lessons: Passive Solar Design – and engineering and design-based activity requiring students to consider the cost and efficiency of appliances in a home.

Ready to Go Lessons: Wind Power Challenge – Includes teacher notes, learning guides, fact sheets and certificates

YouTube Playlist of helpful videos

EXAMPLES OF LEARNING ACTIVITIES

- Have students look up the definitions of the words in the 'Vocabulary' section above.
- Brainstorm examples of other renewable and non-renewable resources.
- Find out the different reasons why 'blackouts' occur and what to do when it happens.
- Research where and how the electricity in your local area is generated.
- Find out how many watts it takes to charge or use your daily electronic devices. Then try to work out how much it would cost every day, week, month and year.
- Research the positive and negative effects of different renewable and non-renewable resources. Consider the impacts felt by different communities and environments over time and in different locations.