

## Australia's Energy

Lesson Map: <http://esriaustralia.com.au/education/SpatialActivity42>

### Engage

#### Renewable vs nonrenewable

- Australia's energy industry is still predominantly run by fossil fuels, making it one of the lowest renewable energy countries in the world. Countries such as Iceland and Sweden have 100 renewable energy, while Australia has only around 14%.
- 73% of Australia's energy is from coal and 13% from natural gas<sup>1</sup>. Our energy consumption is continuing to rise, with mining, manufacturing and transport the largest consumers.
- Based on your prior knowledge of energy, complete the below table with energy types from the word bank.

water - landfill gas - solar - waste water - bagasse  
natural gas - coal diesel - coal seam gas - wind

| Renewable | Non-Renewable |
|-----------|---------------|
|           |               |

### Explore

#### Raked over the coals

- Click on the Lesson Map URL above to open the map. In the 'Details' pane, under 'Content', tick the first checkbox to turn on the layer 'Coal'. Turn off all other

Download student worksheet [here](#).

Time

45 minutes

Activity

Introduction to Australia's current energy production

### Learning Outcome

Students will be able to:

- Identify the spatial distribution of Australia's major renewable and non-renewable energy
- Identify how we transport energy sources
- Analyse why our renewables have their own specific location

### ACARA Curriculum Link

Year 12 Earth and Environmental Science | Living on Earth

[ACSES071](#) | [ACSES072](#)

### Teacher Feedback:

To share your feedback on this, or any Spatial Activity, please contact [education@esriaustralia.com.au](mailto:education@esriaustralia.com.au)

layers.

- ? What is the spatial distribution of black coal in Australia? Where is it predominately located? **Queensland has the highest distribution of black coal sites.**
- ? What is the spatial distribution of brown coal in Australia? Where is it predominately located? **Victoria and South Australia are home to brown coal mineral sites.**
- ? Turn on the layer 'Coal – Operating Mines'. Are there more mineral deposit sites than operating mines? **Yes, there are many more mineral sites than operating mines.**
- ? Australia is the largest net exporter of coal in the world. In 2016-2017, coal exports were worth more than \$54 billion dollars. Why do you think we don't have more operating mines? **Coal mines receive substantial controversy due to the damaging environmental impact.**
- ? In the past few years, what is one mine that has received extreme backlash from the public? Hint: the official name of the mine is on the map! **The Carmichael Coal Mine, proposed by Adani Mining.**

## Explain

### *Australia's veins*

- In most cases, we have an uneven distribution of our energy sources. As a result, more than 37,000km of pipeline run through Australia connecting cities with natural gas and petroleum.
- ? Turn on the layer 'Oil and Gas Pipelines of Australia'. What do you notice about some of the pipelines in Victoria and Western Australia? **These pipelines begin offshore.**
- ? Turn on the layer 'Industry and Mining Western Australia'. You will notice a high density of wells near Broome, Western Australia. What does this tell you about the probable location of oil fields in Australia? **This is the location of a major oil field, the Carnarvon Basin.**

## Extend

### *Renewables*

- Australia has many renewable energy sites around the country. Turn on the layer

‘Operating Renewables’. Reminder, you can access the Legend via the Details tab.

- ? Because of the vast size of our continent, different renewables work best in different areas. What is a renewable energy source closest to your school?  
*Students own answer.*
- ? What is the spatial distribution of wind farms? *Wind farms are mostly located in the south of Australia, with a very high density in the south east coast of Australia.*
- ? Turn on the layer ‘Average Wind’. The darker red colours receive the highest annual winds. You can see there is a correlation between our current wind farms and fast wind speeds. Is there anywhere in Australia where there is room for more wind farms based on this layer? *Students own answer.*
- Turn off the ‘Average Wind’ layer.
- ? What is the spatial distribution of hydro energy? *New South Wales has a well-established hydro energy program, as well as sites across Victoria and Tasmania.*
- ? The east coast of Queensland has an array of bagasse facilities. What is bagasse?  
Hint: Turn on layer ‘AgricultureLandAuditQLD’. *Bagasse is a bioenergy made from sugarcane production.*
- ? The east coast of Queensland has an array of bagasse facilities. What is bagasse?  
Hint: Turn on layer ‘AgricultureLandAuditQLD’. *Bagasse is a bioenergy made from sugarcane production.*
- ? Why is bagasse greenhouse gas neutral? *The CO2 emissions that this burning process releases is the same amount of CO2 that the sugar cane absorbs during its growing phase, making it greenhouse gas neutral (Rural Industries Research and Development Corporation, 2013).*
- ? Where is Australia’s geothermal energy located? Why is it located there? *In Central Australia, between Queensland and South Australia. Geothermal is heat energy contained within the earth and these areas receive the highest temperatures.*
- ? Based on your location and geographical features of your suburb, what renewable energy source could be built near you? *Students own answer.*

## References

Origin Energy (2015). Energy in Australia. Accessed on 24/09/18. URL: <https://www.originenergy.com.au/blog/about-energy/energy-in-australia.html>

Rural Industries Research and Development Corporation (2013). *Biomass Producer*. Accessed on 8/10/18. URL: <http://biomassproducer.com.au/producing-biomass/biomass-types/crop-residue/bagasse/#.W7qgZGgzZGM>

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## Next Steps:

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Learn more about ArcGIS Online, and apply for your ArcGIS Online School subscription at <http://esriaustralia.com.au/education>