

Applying Geoscience to Australia's most important challenges

Coal

Australia has substantial resources of coal, both black and brown. The most significant black coal resources are located in the Bowen-Surat (Queensland) and Sydney basin (New South Wales). Coal is Australia's largest commodity export with annual thermal and metallurgical coal exports worth more than \$40 billion, mainly to Japan, India, European Union, Republic of Korea and Taiwan. Economic demonstrated resources (EDR) of black coal are adequate for about 90 years at current rates of production.

Australia's very large brown coal resources are located mostly in the Gippsland Basin in Victoria where it is used for electricity production. At current rates of production, there are nearly 500 years of brown coal resources remaining.

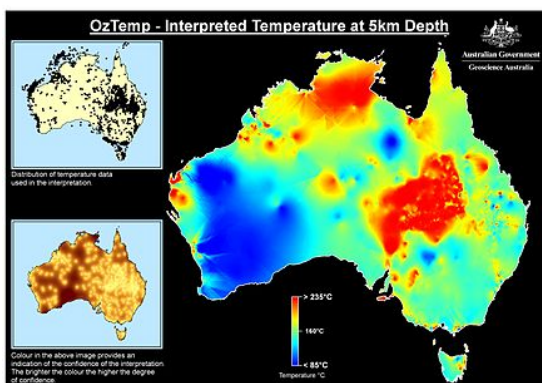


Renewable Resources

Australia's large renewable resource base is also widely distributed across the country. With the exception of hydro energy resources which are largely developed and wind energy, which is growing rapidly, large-scale utilisation of Australia's renewable resources has been constrained by higher transformation costs relative to other energy sources (except for hydro), immature technologies, and long distances from markets and infrastructure.

Geothermal energy

Australia has large but as yet inadequately defined and quantified geothermal energy resources. These include hot-rock type geothermal resources associated with buried high heat-producing granites as well as hot sedimentary aquifer-type geothermal resources present in deep aquifers in a number of sedimentary basins.



Hydro energy

Australia's hydro energy resources lie within areas of highest rainfall and elevation and are mostly in New South Wales and Tasmania. Hydro energy resources were developed early in Australia and are currently the largest source of renewable electricity. A dry climate coupled with high evaporation rates and highly variable rainfall over much of Australia limits substantial expansion of hydro power.



Wind energy



Australia has some of the best wind energy resources in the world, primarily located in western, south-western, southern and south-eastern coastal regions but extending hundreds of kilometres inland and including highland areas in south-eastern Australia. Wind energy technology is relatively mature, and wind power is expanding rapidly,

encouraged by government policies, notably the Renewable Energy Target. Wind energy is expected to become Australia's largest source of renewable electricity in the near future.

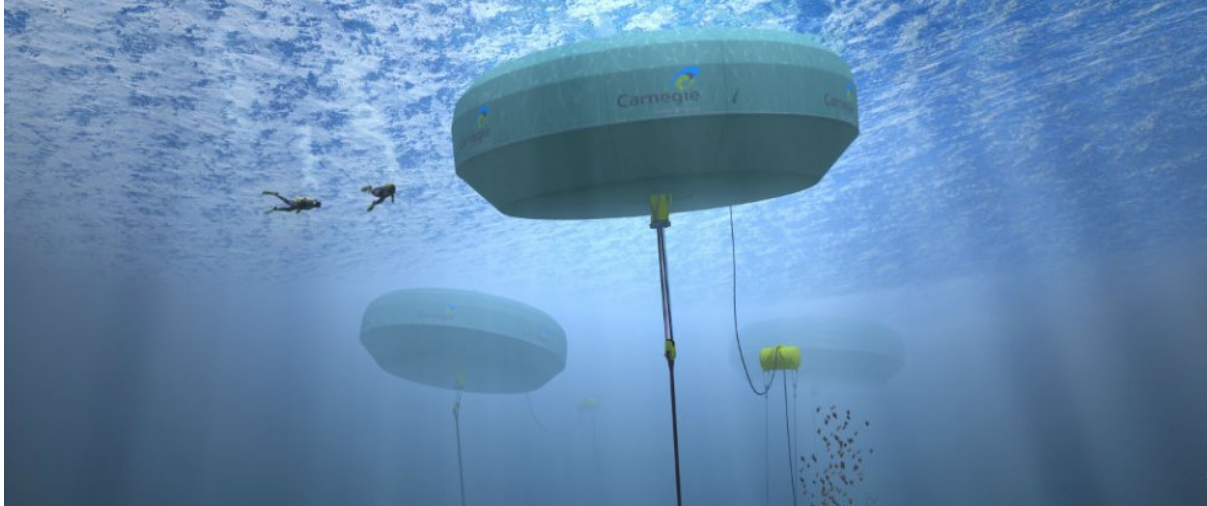
Solar energy

High solar radiation levels over large areas provide Australia with some of the best solar resources in the world. The best solar resources are largely located in the northwest and centre of Australia, commonly in areas that do not have access to the electricity grid and are distant from the major population centres and key energy markets. To date relatively high capital costs have limited widespread use of solar energy resources but significant investment in research and development is aimed at increasing the efficiency and cost-effectiveness of solar power, including the development of solar thermal power stations.



Ocean energy

Australia has a world-class wave energy resource along its western and southern coastline, especially in Tasmania. The best tidal resources, on the other hand, are located along the northern margin, especially the northwest coast of Western Australia, and largely removed from the major demand centres. At present most ocean energy technologies are relatively new and still need to be proven in pilot and demonstration plants.



Bioenergy

Bioenergy is another significant potential energy resource in Australia. Biomass (organic matter) can be used to generate electricity generation and heat, as well as for the production of liquid fuels (biofuels) for transport.



Currently Australia's use of bioenergy for electricity generation is small and limited to bagasse (sugar cane residue), wood waste, and gas from landfill and sewage facilities. A small but increasing amount of biofuels is produced, mostly ethanol from sugar by-products and waste starch from grain.

Source

<https://www.ga.gov.au/scientific-topics/energy/basics>