



The Essay

The Question

Part A (7,000 words)

Provide your prediction for the changes in primary energy demand, sourcing and facilities for electrical generation in Australia's geographical regions supplied by the Eastern and Western electricity grids for the period 2010 through 2050

Part B (3,000 words)

Provide your view of the likely longer term energy sources, amenable to Australia for its electrical energy needs to 2100, allowing for future scientific evolution of energy production for industry and society in the context of energy changes witnessed since the industrial revolution.

The Response

Part A **must** include reference to the following:

- an understanding of the estimated demand and distribution of the total energy demand and its electrical energy component now and in the future to 2050, including consideration of demand management, increasing gas reticulation and pipeline interconnection, etc - order of magnitude only, high confidence not expected, and
- views on the changing needs of society and industry resulting from proven technology, commercialisation of which, will impact demand during this period, and
- the economics, free of any subsidy or regulation, of the electrical generation concepts proposed, allowing for any system integration support required for fluctuating energy sources, and
- energy from coal, gas, nuclear fission, hydro generation, geothermal, renewables, and other commercially proven resources, and
- the logistics of supplying the raw materials for the energy production units at the power station, the treatment of gaseous and solid waste materials and the closure conditions expected to apply to generation sites, following the cessation of electricity production, and
- the environmental and societal aspects of the proposal, and the extent to which the essay's initial economic conclusions might vary with development and any implementation of external policies related to renewables, carbon emissions trading, carbon sequestration, and sustainability

Part B may range as widely as the author(s) would wish, including the following

- postulation of new ideas for large scale electricity production, demand management, cross linking of other fuels such as gas to provide for society's energy security. New ideas must be presented with some numerical coherency, and
- the extent to which demand may be altered as a consequence of new technologies (*for example in the domains of transport, metallurgical process, intelligent control systems, etc*) and new national and international regulatory approaches (*for example emissions trading systems, the setting of internationally accepted targets and other such prospective instruments*)



Assessment

To be considered for assessment, an essay must demonstrate that social, environmental and economic issues have been properly considered and that physical assets have been considered from a whole of life perspective.

Accuracy, clarity and attractiveness of the synopsis (Total marks 25)

- The ability to engage attention is an important feature in the successful communication of ideas. The synopsis will be considered as an important pre-requisite to the attraction of the audience to the detailed argument presented in the essay.

Overall approach and quality of presentation (Total marks 25)

- A high level of importance is attached to the clarity and lucidity of the essay. Contestants are encouraged to focus on conveying the arguments presented to an intelligent and thoughtful lay audience, likely to be knowledgeable although not necessarily expert in the chosen field.

Part A – Present systems and their development to 2050 (Total marks 75)

- Understanding of Australia's current integrated energy requirements, load characteristics and distribution. (15 marks)
- Forecast of growth distribution and characteristics for the period 2010 through 2050 (marks for contestants knowledge of growth, in particular social, economic and geographic influences, general order of forecasting expected only) (15 marks)
- Knowledge and ranking of the key elements of cost of installed primary energy systems and those systems available for immediate development, which contestant considers candidates for the future generation mix; costs include disposal of the non-electrical products of power station operation (15 marks)
- Assessment rationale (15 marks)
- Environmental and sustainability considerations (15 marks)

Part B – Future systems and developments to 2100 (Total marks 25)

- Energy generation research and development trends (10 marks)
- Impact of technology and associated energy usage on environment, society and growth patterns (10 marks)
- Promising technologies that may enter the primary energy power generation regimen from 2050 to 2100 (intended to assess contestants imagination based on scientific fact for both future energy production and utilisation eg production of hydrogen for industrial and mobile usage, nuclear power generation, electric vehicles, desalination, etc) (5 marks)