

Abstract:

The Technological Feasibility and Economics of 100% Renewable Electricity for Australia

Mark Diesendorf

Associate Professor and Deputy Director
Institute of Environmental Studies
University of New South Wales, Australia

Hour-by-hour computer simulations have been performed of electricity demand and supply by 100% renewable energy in the five states and one territory comprising the National Electricity Market (NEM) of Australia. The simulations use actual hourly data on demand, solar and wind energy, and the characteristics of commercially available renewable energy technologies. We find that renewable energy could have met demand on the NEM grid in 2010 with the same reliability as the existing coal-based system. The principal challenge, of meeting demand on winter evenings following overcast days, can be achieved in several different ways. A preliminary, least-cost, economic analysis has been carried out.