

Sustainable Research and Technological Development on Bio-Energy

Abdeen Omer
 Associate Researcher at Energy Research Institute (ERI)

The move towards a de-carbonised world, driven partly by climate science and partly by the business opportunities it offers, will need the promotion of environmentally friendly alternatives, if an acceptable stabilisation level of atmospheric carbon dioxide is to be achieved. This requires the harnessing and use of natural resources that produce no air pollution or greenhouse gases and provides comfortable coexistence of human, livestock, and plants. This article presents a comprehensive review of energy sources, and the development of sustainable technologies to explore these energy sources. It also includes potential renewable energy technologies, efficient energy systems, energy savings techniques and other mitigation measures necessary to reduce climate changes.

There is strong scientific evidence that the average temperature of the earth's surface is rising. This is a result of the increased concentration of carbon dioxide and other GHGs in the atmosphere as released by burning fossil fuels. This global warming will eventually lead to substantial changes in the world's climate, which will, in turn, have a major impact on human life and the built environment. Therefore, effort has to be made to reduce fossil energy use and to promote green energy, particularly in the building sector. Energy use reductions can be achieved by minimising the energy demand, rational energy use, recovering heat and the use of more green energy. This study was a step towards achieving this goal.

Globally, buildings are responsible for approximately 40% of the total world annual energy consumption. Most of this energy is for the provision of lighting, heating, cooling, and air conditioning. Increasing awareness of the environmental impact of CO₂, NO_x and CFCs emissions triggered a renewed interest in environmentally friendly cooling, and heating technologies. Under the 1997 Montreal Protocol, governments agreed to phase out chemicals used as refrigerants that have the potential to destroy stratospheric ozone. It was therefore considered desirable to reduce energy consumption and decrease the rate of depletion of world energy reserves and pollution of the environment. This article discusses a comprehensive review of energy sources, environment and sustainable development. This includes all the renewable energy technologies, energy efficiency systems, energy conservation scenarios, energy savings and other mitigation measures necessary to reduce climate change.

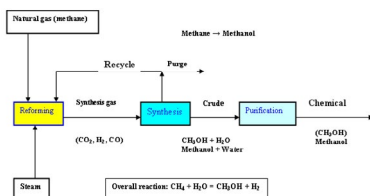


Figure 1. Schematic process flowsheet

RECENT PUBLICATIONS:

1. Omer, A. M. (2008). Energy, environment and sustainable development, Renewable and Sustainable Energy Reviews, Vol.12, No.9, pp.2265-2300, United Kingdom, December 2008.
2. Abdeen, M. O. (2009). "Chapter 3: Energy use, environment and sustainable development", in: Environmental Cost Management, Editors: Randi Taylor Mancuso, 2009 NOVA Science Publishers, Inc., 129-166, New York, USA, 2009.
3. Abdeen, M. O. (2010). "A review of non-conventional energy systems and environmental pollution control", International Journal of Environmental Engineering, 11, 7, 127-154, Nigeria.
4. Abdeen, M. O. (2012). Opportunities for sustainable low carbon energy research development and applications. Cooling India, 7, 10, 60-81.
5. Abdeen, M. O. (2011). "Energy and environment: applications and sustainable development", British Journal of Environment & Climate Change, 1, 3, 118-158, United Kingdom.

Biography

Abdeen Mustafa Omer (BSc, MSc, PhD) is an Associate Researcher at Energy Research Institute (ERI). He obtained both his PhD degree in the Built Environment and Master of Philosophy degree in Renewable Energy Technologies from the University of Nottingham. He is qualified Mechanical Engineer with a proven track record within the water industry and renewable energy technologies. He has been graduated from University of El Menoufia, Egypt, BSc in Mechanical Engineering. His previous experience involved being a member of the research team at the National Council for Research/Energy Research Institute in Sudan and working director of research and development for National Water Equipment Manufacturing Co. Ltd., Sudan. He has been listed in the book WHO'S WHO in the World 2005, 2006, 2007 and 2010. He has published over 300 papers in peer-reviewed journals, 200 review articles, 7 books and 150 chapters in books.

Notes: