Renewable Energy Technology	
School	Engineering and Physical Sciences
Module Leader	Dr Wolf-Gerrit Früh
	Dr J.K.Kaldellis
Module Number	B59E4
Credits	12
Assignments	YES
Exams	YES
Student Effort ours	120
Pre-reading/Other Program-related Activities	12 hours
Formal Lectures/Workshop	26 hours
Discussions/Group Activities/Case Studies/Demonstrations	6 hours
Laboratory work	4 hours
Independent Study & Coursework	72 hours

Objectives

Introduction to available or projected technologies available to generate energy/electricity from renewable resources. Place engineering technologies in context of environmental, political and economical constraints

Subjects

- Survey of current energy generation, projected demand, political targets; Introduction to range of discussed technologies
- Theory of turbines
- Hydro; Large-and small scale. Turbines; practical issues
- Wind energy (on-shore/off-shore); Fluid Mechanics of (wind) turbines; Practical issues of location/control/construction
- Photovoltaics; Fundamentals; Practical solutions and limitations
- Wave power; fundamentals, application, and potential
- Tidal streams and tidal barrages; Fundamentals and potential

Content

The structure of the module is relatively straightforward, given by the variety of renewables available.

An introductory chapter provides some background to current and projected energy demands, some arguments for the need of renewable resources (in place of, or in addition to,

finite energy resources), and a working definition of renewable energy resources. This is then followed by several chapters, each addressing a specific resource in turn. Each of these chapters can be broadly divided into three parts. The first part will describe the resource itself, which is then followed by a presentation of the technologies used to harness the resource. The chapters are then rounded off with a discussion of the practical application of the energy resource and its integration into the general energy demand and supply chain. Because the problems involved in the integration of the resources are very common throughout, the discussion of the specific resources in concluded by a chapter discussing their integration in general.

It is assumed in the discussion of the technologies that you have the basic knowledge in thermodynamics and Fluid Mechanics gained in an engineering degree. More specifically, you should be familiar with the first and second law of thermodynamics and be able to understand standard thermodynamic cycles. In Fluid Mechanics, the hydrostatic equation, the continuity equation, and Bernoulli's equation should be familiar. The concepts of hydraulic power and of the flow of momentum in a control volume should be vaguely familiar.