

Leader: Professor Peter Guthrie

Timing: Lent Term

Structure: Eight 2-hour sessions in Weeks 1 to 8: plus coursework assignments.

This course will explore the question "How do we balance economic, environmental and social dimensions in large-scale infrastructure project design, evaluation and decision making". Currently, large-scale, long-lived infrastructure projects involving many economic, social and environmental aspects are evaluated using cost-benefit analysis, and similar economic instruments. These tools have been applied since the mid 20th century. In the 1970s environmental impact assessments were instituted as another dimension of engineering project assessment. Since the Brundtland Commission Report of 1987 and the 1992 Earth Summit at Rio, efforts have been made to come up with even broader multi-dimensional evaluative frameworks that address sustainability

Today there are a wealth of sustainable development evaluative frameworks, but traditional economic instruments typically dominate over environmental assessment tools with social assessments or sustainability assessments either limited in scope or non-existent. The module will explore economic, environmental and social evaluative frameworks as separate instruments, then consider and apply examples of frameworks that attempt to get at the "triple bottom line". Evaluative frameworks for the sustainable development of large infrastructure projects will be considered in the context of case studies, for example, the Thames Tideway Tunnel, Olympic Park for London 2012, the Northwest Cambridge development, Dunsfold Park Eco Village, Tidal Power from the Severn Estuary, Nuclear power development in UK, and hydropower projects around the world. The overall aim is to show how we might plan and evaluate large projects differently to achieve sustainable outcomes. A new approach to sustainable development thinking recognising the different phases of a project's development is described, and a review of sustainability decision making tools is presented.

Content

Establishing **project values** and setting goals, defining desired outcomes and metrics.

Environmental **assessment**, strategic environmental assessment, social impact assessment, sustainability appraisal, environmental social impact assessment.

Achieving sustainability at different **project life cycle stages** (commissioning, feasibility, optioneering, detailed design and specification, construction, operation and decommissioning).

Sustainable site planning; material selection and waste management strategies. Regulation and Sustainable Design Codes (BREEAM, LEED). Dealing with risk and uncertainty (real options).

Project management and **organisational structure** of very large projects.

Examples of best and worst practice through **case studies**

Objectives

To demonstrate how large projects can be planned and evaluate differently to achieve sustainable outcomes

Assessment: 100% Coursework