Costs and benefits of a Severn Barrage

Introduction

This is a teacher-led activity with no student sheet. It uses the example of the proposed Severn Barrage Scheme to introduce some of the challenges involved in assessing the costs and benefits of large energy schemes.

This article, published by the Office for National Statistics, goes far beyond the requirements of this Science in Society course but provides useful background to a discussion of cost-benefit analysis: http://www.statistics.gov.uk/elmr/12_08/downloads/ELMR_Dec08_Williams.pdf.

Science explanations

Oh Renewable sources of energy are naturally and continually replenished; they include wind, solar power, geothermal, hydropower, and various forms of biomass.

How Science Works

Ha Science-based technology provides people with many things that they value, and which enhance the quality of life or of the environment. Some technologies, however, have unintended and undesirable impacts. These need to be weighed against the benefits.

Hb Decision makers aim to make evidence based decisions, taking into account factors that include: technical feasibility, benefits expected, economic cost, risks to human health and wellbeing, risks to the environment. Cost-benefit analysis is the process of estimating the size of the costs and the value of the benefits as a way of determining the best policy option. A cost-benefit analysis should consider which individuals or groups receive the benefits, and which suffer (or pay) the costs.

The activity

Start by showing a short video which introduces the Severn Barrage scheme: http://www.dailymotion.com/video/x36xnc_france24enreportthe-severn-estuary_news.

Now show in turn these three videos which compare the Severn Barrage to the existing scheme on the Rance in France. Ask students to draw up a list of benefits and costs of creating a Severn Barrage based on what they see and hear on the videos.
Barrage part 1: http://www.youtube.com/watch?v=2REpH6BDEro&feature=related
Barrage part 2: http://www.youtube.com/watch?v=NU4x-JRAaFs&feature=related
Barrage part 3: http://www.youtube.com/watch?v=yQiltEjxMx8&feature=related

For each of the costs and benefits ask your students to suggest which groups of people stand to gain most from the benefits and which groups are likely to suffer from, or pay, the costs.

Now remind students of what they learnt about cost-benefit analysis in Topic 4. Two helpful web sites are:
http://tutor2u.net/economics/revision-notes/a2-micro-cost-benefit-analysis.html
http://en.wikipedia.org/wiki/Cost-benefit_analysis

Some aspects of cost-benefit analysis to consider include:

- the importance of everyone needing to be really clear about the underlying assumptions, and what happens if these turn out to be different.
- the issue of identifying and taking into account social costs and benefits that cannot be valued in money terms
- the fact that some decisions turn out to be essentially political, and .
- equity issues which may arise especially if the negative impact of the project is greater for people on lower incomes.

Ask students to discuss the problem of putting a money value to the costs and benefits they have identified – and also the assumptions of balancing future benefits against more immediate costs.

This is an interesting discussion of the issue on the Guardian web site which identifies some of the issues and refers to the provisional cost benefit analysis that can be downloaded from here:
http://severntidalpowerconsultation.decc.gov.uk/supporting_documents
See the Partial impact assessment amended February 2009.
This document is only useful in so far as it shows the wide range of issues and complexity of carrying out a cost-benefit analysis. Note, as Tim Worstall points out in his Guardian piece, that all the outcomes are negative.

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