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BUSINESS CASE STUDIES

Cost-benefit analysis – United Utilities

It is the job of United Utilities to bring three million households and 200,000 businesses in North West England an incredible 2,000 million litres of clean water each day – and take it all away again. It then treats it to make it safe to go back into the environment through rivers and the sea. In the period from 2010 to 2015 United Utilities will invest more than £3 billion to improve the water and wastewater infrastructure and the environment across the North West. One major wastewater quality improvement investment made by United Utilities was for a bathing waters and shellfish waters project in Millom, a coastal area in Cumbria.

Capital investment projects incur costs that need to be quantified. Internal costs are easy to determine, a major one being the cost of borrowing money (for example, the interest on a loan). Added to this are the direct project costs – these include materials, labour etc. However, projects can have negative effects on the locality. To arrive at the best decision for all relevant stakeholders, any project that United Utilities engages in requires a careful assessment of both the commercial costs and revenues and the external costs and benefits.

Social benefit = internal (company) revenues + external benefits
Social costs = internal costs + external costs

United Utilities is keenly aware of the social costs and benefits of its investments and always seeks to maximise the social benefits whilst minimising the social costs. As a project always has the potential for both positive and negative external effects, United Utilities seeks to quantify these to help select the best overall decision from its range of options. The key considerations for the Millom project were:
1. the initial capital outlay of the project (capex)
2. the ongoing operating expenditure from running the project (opex)
3. the wider costs and benefits to the environment and other stakeholders.

Partners in the plan engaged in a cost-benefit analysis to identify which of the three options put forward gave the best return against all factors. The whole-life cost assessment of the solutions involved examining capital costs of construction (e.g. concrete structures, pumps and pipe work) as well as operating costs e.g. power and chemicals for treatment.

Option	Key elements	Whole-life cost	Benefits	Risks and issues
1. Small scale upgrade to the site and using ultraviolet rays in tubes to kill bacteria in wastewater to improve quality	Lowest capex, but higher opex	£18.5m	Uses least land and lowest initial capex	High power and other operating costs. Uses a technique in a new way for United Utilities and the Environment Agency in the North West
2. Create new large storage and pipe work requirements	Highest capex but relatively low opex	£22.8m	Confident that the solution would work and deliver the benefits	Over budget. Results in very large concrete structures that generate waste for disposal
3. Major site upgrade and using ultraviolet in tubes to kill off bacteria	Middle for capex and opex	£21.3m	Uses a little less land than option 2	Over budget. Uses a technique in a new way for UU and EA

Although option 1 had a significantly lower initial capital outlay, originally United Utilities had discounted options 1 and 3 as the application of the technology was new to the company and the regulator, so more data was needed to accept the solution. This only left option 2, despite it being the most costly and potentially having a negative impact on the environment. However, United Utilities found positive evidence from colleagues at Welsh Water to demonstrate how the ultraviolet treatment processes could be used effectively. It then worked closely with the

Environment Agency to ensure the project minimised the negative external costs and maximised the external benefits. This resulted in United Utilities adopting option 1 as the most innovative, cost-effective and environmentally beneficial option that in some way satisfied all stakeholders. The key reasons were:

• It had the lowest capex and whole-life cost - the infrastructure for option 1 can be contained within the existing waterworks/treatment works site.

• Its carbon footprint and environmental impact was lowest – it minimises the use of concrete and construction waste.

• When storms and heavy rain occur the excess water is treated with ultraviolet disinfection and is discharged into the estuary. This eliminates strong odours that would have affected the local community and delivers benefits to the shellfish and bathing waters.

The table below summarises the financial and environmental impacts considered as part of the investment appraisal in order to assess the overall impact of the three options. This clearly shows how option 1 provided the most effective balance of commercial and environmental factors.

Option	Capex (£m)	Whole-life cost (£m)	Carbon (tonnes) from construction	Carbon (tonnes per year) from operating the site
1. Minor changes to site + UV treatment	15.8	18.5	5127	273
2. Storing wastewater in concrete structures	24.0	22.8	8719	827
3. Major changes to site + UV treatment	22.0	21.3	6553	349

Questions

1. What is cost-benefit analysis?
2. What is meant by social costs?
3. Explain why firms, like United Utilities, use cost-benefit analysis.
4. Analyse the difficulty firms may face when carrying out cost-benefit analysis.

Task

In pairs or small groups, consider a major investment project in your local area. Examples might include a new housing development, the building of a new power station or the construction of a new bypass. Through discussion and research, compile a list of all the private and external benefits and costs of the project. (You do not need to find any figures.)

What have you learned?

Jeopardy – think of 5 answers to questions relating to cost-benefit analysis. Give the answers, one at a time, to a partner and see if they can guess the question.

For example:

A: External costs plus private costs

Q: What are social costs?