

# Appendix C:

## Assessment of Costs and Benefits

This appendix provides more detail on assessing costs and benefits. Effective assessment is important in achieving better regulation because it provides information to decision makers about the full impacts of the different options available to achieve policy objectives, and nature of the trade-offs involved in pursuing one option over another.

### Cost Benefit Analysis

Cost benefit analysis involves comparing the expected costs of a proposal against the expected benefits to choose the best or most profitable option. Cost benefit analysis attempts to express all relevant costs and benefits in monetary terms and to compare them on a common temporal footing. This technique is most usefully applied to proposals where the major benefits can be quantified quite readily.

Where costs or benefits are not exchanged in a market, monetary values may be assigned to them using a variety of techniques. These valuation techniques are summarised below.

There are two main decision criteria applied in cost benefit analysis:

- **Net present value (NPV)** – The NPV of an option is the estimated value in present terms (today's dollars) of the flow of benefits over time less costs. Calculating the NPV involves estimating the annual costs and benefits of an option over a fixed period, and then discounting that stream of net benefits to its present value. A positive NPV indicates that an option results in a net benefit. The higher the NPV, the greater the net benefit.
- **Benefit cost ratio** – The benefit cost ratio for a particular option is derived from dividing the present value of total estimated benefits by the present value of total estimated costs. A benefit cost ratio of greater than one indicates a net benefit. Measures that have a high benefit to cost ratio are likely to be less sensitive to changes in costs or benefits and therefore may be less risky.

The key strength of cost benefit analysis is it allows a range of options to be compared on a consistent basis (in dollar terms). However, the focus on valuing impacts can sometimes lead to the omission of impacts which cannot be valued quantitatively.

Cost benefit analysis can also require considerable data. Where the impacts of a proposal are not significant, the cost and effort required for this type of analysis may not be warranted.

### Cost Effectiveness Analysis

Cost effectiveness analysis is a useful approach where benefits of an option cannot be quantified readily in dollar terms but where the desired outcome can be clearly specified. In cost effectiveness analysis, the level of benefit (objective) is pre-specified and held constant for all options. Options are then assessed to identify the least cost means of achieving that objective.

For example, where an environmental outcome can be quantified in terms of environmental quality (such as the volume of environmental flows needed to ensure a healthy river) but not in dollar terms, cost effectiveness analysis can be used to determine the least costly way of achieving the outcome.

Cost effectiveness analysis is ideally suited to comparing the costs of alternatives that would achieve the same level of outcome or objective. However, a technique for comparing alternatives with varying outcomes is known as 'levelised cost'. This allows options to be ranked according to cost per unit of outcome. For example, to compare options to improve the efficiency of water supply in a particular system, the costs of each option could be compared on the basis of cost per litre of water saved.

## Multi-Criteria Analysis

If it is not feasible to assign monetary values to costs or benefits of an option, qualitative analysis should be used to compare options or elements of those options.

Multi-criteria analysis (MCA), or the balanced scorecard approach as it is sometimes called, is one technique for doing this. MCA requires judgments about how proposals will contribute to a set of criteria that are chosen to judge the benefits and costs associated with the proposals.

A number of different evaluation criteria are defined. A score is then assigned for each criterion depending on the impact of the policy option being considered. In its simplest form:

- a score of '-1' could be assigned if the impact is negative/undesirable/poor
- a score of '0' could be assigned if there is no impact or if the impact is neutral, and
- a score of '+1' could be assigned if there is a positive/desirable/good impact.

More complex scoring schemes with a greater number of point scales can also be devised.

Weightings should also be assigned to each of the criterion, reflecting their relative importance in the decision making process, and an overall score can be derived by multiplying the score assigned to each criterion by its weighting and summing the result.

## Economic Valuation Techniques

When conducting assessments of the costs and benefits of regulation, the impacts of regulation should be quantified in monetary terms where possible. However, in many cases, there is no market price for costs and benefits. Economists have developed a range of approaches to estimate the economic value of non-market or intangible impacts. These techniques include:

- **Contingent valuation method** is a 'stated preference' method of valuing intangible impacts. It involves asking people to state directly their willingness to pay (or to accept compensation) for a particular outcome.
- **Contingent choice method** is similar to the above method, but is based on asking people to make trade-offs among sets of outcomes with associated costs.
- **Hedonic pricing** estimates costs or benefits of a characteristic with no market price, on the basis of how the market price of another good that has the characteristic is affected. For example, variations in prices of similar houses in different neighbourhoods may reflect the value of local environmental attributes.
- **Travel cost method** assumes the value of a recreational site is reflected in how much people are willing to pay to travel to visit the site.
- **Damage cost avoided, replacement cost and substitute cost methods** estimate the values of ecosystem services based on either the costs of avoiding damages due to lost services, the cost of replacing environmental assets, or the cost of providing substitute services. An example is the value of clean water measured by the cost of cleaning the water up, or by stopping it from becoming polluted in the first place.

- **Productivity method** estimates values for ecosystems or environmental systems that contribute to the production of commercially marketed goods (eg the value of certain insects by measuring their impacts on crop productivity through better pollination).
- **Benefit transfer method** estimates values by transferring existing benefit estimates from studies already completed for another location or issue.

In considering significant regulatory proposals, agencies may wish to seek expert advice to assist in selecting and developing the most appropriate framework for a robust evaluation of costs and benefits, including the estimation of the value of any intangible or non-market impacts.

## Other Issues to Consider in Evaluating Costs and Benefits

The following is a list of additional issues to be considered in developing any assessment of the costs and benefits of regulatory proposals.

### Transfers and double counting

When assessing aggregate costs and benefits, it is important to identify those which are purely transfers or redistributions from one group in the community to another, and those which represent an absolute increase or decrease for society as a whole.

An example of a transfer is the imposition of a pollution tax. The tax amount would show as both a cost to polluting businesses and a benefit to governments. While the costs and benefits to the different parties should be identified in the assessment, care should be taken they are not both included in the overall net impact. The double counting of costs and benefits can occur if the redistributive impacts of particular measures are not recognised.

### Distributional impacts

Cost benefit analysis shows the net social benefit of different proposals, regardless of whom the costs and benefits accrue to. If the net social benefit is positive, those who stand to gain from the option could, in theory, compensate the losers and at least one person would be better off. As this does not occur in practice, some options may not produce a fair distribution of costs and benefits. Benefits of an option may accrue to one group, while another bears most of the cost.

Where there are distributional impacts, it is important to include an assessment of the impacts of proposals on different groups as part the assessment of costs and benefits. For example, this could include examination of the relative costs of complying with regulation for disadvantaged groups within the community.

### Cumulative regulatory burden

Regulated parties can be affected by the burden imposed by multiple layers of regulatory requirements. Accordingly, it is important the cumulative impacts on business and other relevant groups in society are considered when developing proposals.

## Impact on innovation

Overly prescriptive, restrictive or intrusive regulation can suppress innovation. It can unnecessarily constrain business flexibility, the development of new products and services, and the pursuit of lower cost production methods. Conversely, flexible regulation can promote innovation by:

- improving the operation of markets where market failure exists
- supporting the development of new products and services
- allowing firms to develop more innovative ways to operate, consistent with the achievement of regulatory objectives, and
- opening up new business opportunities for firms which offer innovative solutions (eg the environmental services industry).

The NSW Government's *Innovation Statement* aims to reduce regulatory barriers to innovative NSW businesses and support innovation in areas where it will have the greatest economic benefits.

The impact of regulations on innovation should be taken into account when assessing regulatory options. Agencies should aim to minimise impediments to innovation when developing regulatory proposals. Regulatory review processes should also identify barriers to innovation created by existing regulations.

## Risk and uncertainty

Cost benefit assessment should include an examination of the risk and uncertainty associated with policy options. In cases where the degree of uncertainty associated with a proposal is high, agencies should consider an early review of the proposal to ensure it is on track to achieve its policy objectives.

## Sensitivity analysis

Sensitivity analysis can be used to show how changes in particular assumptions affect the outcomes of the impact assessment. Sensitivity analysis involves estimating outcomes using the plausible range of values for the uncertain inputs. The sensitivity analysis can demonstrate how the outcomes vary with changes in input assumptions. If outcomes are very sensitive to a change in a particular input, greater certainty about that input should be sought where possible to improve the assessment of costs and benefits.