



Institute of Actuaries of Australia

# EVALUATION OF PUBLIC POLICY INITIATIVES

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# EVALUATION OF PUBLIC POLICY INITIATIVES

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## **Abstract**

As applies to projects in the private/commercial world, Public Policy projects and initiatives require evaluation of the costs and benefits. This paper considers ways in which actuaries may “add value” in this process.

Where relevant, evaluations may be based on standard projections of such costs and benefits, discounted at a suitable interest rate. Some allowance will be made for the risks and uncertainties in the projected amounts.

However, there will usually be expected intangible benefits from public policy initiatives to the betterment of the community. While commented upon in reports, evaluation may not be attempted. Approval of the initiative may be required on the basis of the “hard” numbers alone – while “soft” benefits, if achieved, would simply be considered a bonus.

Sometimes, major initiatives may be rejected because such intangible benefits may be difficult to defend in a political environment. This paper reviews ways intangible social benefits may be valued and included in the evaluation process.

In addition, where the benefits are expected to improve economic growth, methods of allowing for the capacity of future beneficiaries to afford future costs and repayments of funding are considered.

**Key words:** Costs, benefits, intangibles, discount rate, community, future beneficiaries, funding

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## **Evaluation of Public Policy Initiatives**

### **Purpose**

The purpose of this paper is to identify areas in the process of the evaluation of public policy initiatives where actuaries could “add value”.

### **Introduction**

Reports on three potential initiatives have been studied to consider where, in the evaluation process of each, actuarial methodology and approaches to the issues may be of assistance in enabling the government to draw conclusions in the public interest. (It is appreciated, of course, that political factors may ultimately be involved in the decision making process).

Each initiative is from a different area of public policy in order to explore a reasonable range of aspects. At the same time, the paper is deliberately short in order to focus on issues where actuaries could “add value”.

Each study attempts to avoid involvement in non actuarial technical matters, and hence is inevitably somewhat “shallow” as regards the particular initiative, skimming over much of the report. Weblinks to the reports are given to enable those who wish to pursue more in depth investigation, to do so.

## Public Policy and Social Policy

### Definition

There are varying definitions of public policy. For the purposes of this paper I am going to use:

“Public policy is the legislative framework and other government initiated action to address a particular issue”. This can include deliberate inaction in relation to the issue.

Public policy which addresses social or people issues is often encapsulated in the expression: social policy. This includes welfare, education, health, housing, law and order.

Many public policy expenditure initiatives involve the use of taxes paid by a wide section of the community for the benefit of relatively few people. This includes future taxes to repay borrowing. Making decisions in this regard is political, and the basis for making such decisions beyond a cost/benefit evaluation is inevitably outside the scope of this paper.

### Areas where Actuaries can “Add Value”

It is suggested that these include:

- data gathering
- data analysis
- methodology for determining costs and benefits
- demographic issues
- projections of costs and benefits
- analysis of risks
- discount rates
- equity issues, including particularly generational fairness
- advice on funding arrangements
- investment strategy

The content of the actuarial course, the disciplines conveyed through passing the examinations, and training involved in many of the types of work pursued by actuaries, provide them with a thorough grounding in all these areas.

Experienced actuaries will have developed pragmatic insights into strategies to deal with outcomes in the longer term, and the need to consider various scenarios arising from possible future events and changes in the community.

### Discount Rate

Any project or initiative, whether commercial or public will usually involve expenditure before the benefit is achieved. Arguably, this applies even where the initiators only use their time to research, develop and sell their ideas to others, as such time can be considered to have monetary value to themselves or society generally.

The discount rate to be adopted for the evaluation of such a project or initiative is likely to be important – particularly where early expenditure is significant. Indeed it may be crucial, where a half percentage point may mean the difference between going ahead and rejection.

Yet economists and actuaries can vary widely in their views.

## Evaluation of Public Policy Initiatives

A discount rate is needed to reflect “time preference” and the “opportunity cost” involved. This is because expenditure could be used in a variety of ways - some of which represent simply consumer satisfaction. In this latter case “early satisfaction” is generally preferred to “later satisfaction”. In other situations, initial expenditure could be invested in other ways – some of which could provide a better return. And in some of these cases, the initial expenditure may need to be borrowed.

The investment return sought for a commercial project will be a real rate of return, together with a margin for risk of uncertainty of outcomes – whether in the form of benefits achieved or further expenditure.

Arguably the real rate of return should reflect borrowing costs – after all, the lender will also be seeking a return. Historically, the borrowing costs for major corporations have been around 5% pa (real). However this will vary between companies carrying out the projects depending on how risky the market perceives the areas where the money is likely to be spent.

For the government, borrowing costs have been around 3% pa (real). The question of risk margin tends to arise only in the context of the market perception of the overall level of debt to taxation revenue – ie “rating” of the debt.

The allocation of funds to public policy initiatives is a political process and taxpayers bear the risk of misestimation of costs and benefits. While there are arguments for the government to attempt to obtain a larger return from riskier projects, it is probably better to build a reasonable margin into the projected costs and accept public scrutiny as the process for managing risk.

It is suggested that public policy evaluation should start with these principles and modify them as necessary.

### **Intergenerational Fairness/Debt Repayment**

Intergenerational fairness may often be reduced to considering:

“Pay later” because (1) benefits will accrue to future generations, or (2) future generations will be better able to afford the cost, or

“Pay earlier” because (1) the current generation caused the problem, or (2) the cost will rise faster than incomes.

These are consistent with:

- Accounting principles recognising cost in the same period as benefit arises or is utilised, and
- Equity in actuarial work where benefits are to be received in proportion to contributions made to them.

Actuaries are well trained in these matters in order to meet their professional responsibilities.

Often, public policy projects have long term effects where a major proportion of the benefits may be enjoyed by the next generation. Consequently, consideration may be given to the possible weighting of debt repayment schedules towards future taxpayers. Alternatively, expenditure on any project may arise in the future so that, again, the issue of intergenerational fairness may need to be considered at the outset.

## **Evaluation of Public Policy Initiatives**

A recent (and perhaps, continuing) example of the latter situation is electricity generation in NSW. Over the last 3 years the cost of electricity has risen by around 35%. And we have been advised of likely further rises over the next two years of around another 20%. (This is before the impact of the federal government's proposal to impose a tax or price on greenhouse gas emissions.)

The main reasons have always been clear – successive state governments have failed to invest in the infrastructure necessary to meet the needs of the increasing population and need to replace older plant and equipment. Many people would consider that this has been bad policy now that the electricity prices are rising so rapidly to assist with “catching up” on development.

An alternative view is that people today, including pensioners, are better off financially than they were 10 years ago, and hence better able to afford the increases. Of course, it is doubtful that the government actually considered this aspect. If they had, the rises in price might have started earlier and been a little more gradual!

### **Private Sector Involvement**

The possible involvement of the private sector in a public policy project is inevitably a political decision. Factors will include relative expected efficiency, availability and cost of funding, management expertise, need or desire for ongoing private involvement.

Of course, any private sector involvement will need to be carried out on a commercial basis. The private sector is often involved in initial planning and development, where contractors have particular expertise and are likely to be more effective. This may well more than justify acceptance of their need for a higher return on their investment, relative to the cost of government funding.

Where a private sector organisation is involved in longer term management of a project and to take some of the risks, the extra return demanded may well be considered to be an unnecessary burden on taxpayers. After all, it may be suggested that once a project is up and running, the government should have been able to acquire the necessary expertise to assume management.

A general argument may be: a public policy initiative is a government project for which they take ultimate responsibility. Consequently the private sector's need for a commercial rate of return on their part of the project should not be the driver of the government's own discount rate determination. It should be simply part of the overall evaluation process. Expenditure in the form of money paid to a private contractor is a cost to the government; income received under the contract is a benefit.

In practice, public/private sharing of funding and management can take a variety of forms. Actuaries can contribute to advising on forms under consideration in respect of any particular initiative.

## Initiative - Very Fast Train (VFT)

### Recent Report

Infrastructure Partnerships is a combined business and government organisation pursuing research, advocacy and policy development for infrastructure in Australia.

Recently they hired international consultant AECOM to provide a report on the need, benefits and process for developing a Very Fast Train service between the Sunshine Coast in Queensland, through NSW and ACT, to Melbourne. The focus of the report is on the purchase or reserving of the necessary “corridor” of land to accommodate the VFT. However, it provides extensive information on how the development of the VFT can be justified, planned and implemented. The link to this report is <http://www.infrastructure.org.au/content/VFTSeptember2010.aspx>

The report notes that the regions which the train would service “account for the majority of Australia’s gross domestic product, up to 75% of all employment, and 63% of the economic activity, and house 60% of the population, as well as bearing most of the national congestion concern”.

The VFT concept is not new as there have been many proposals along these lines considered (and shelved) over the last 30 years. However, with our increasing population, the raising of it again seems reasonable, particularly with an update on the latest technology.

Travelling at up to 350 km per hour, the VFT would complete each of the trips from Brisbane to Sydney and Sydney to Melbourne in under 3 hours, and Sydney to Canberra in 1 hour. After taking into account the need for transport to and from airports, and time consuming luggage and security checking, boarding and embarking, these times and the smoother train experience would challenge the current air travel dominance for such trips.

### Economic Benefits

Although not specifically stated in the report, it appears expected that, like most other public ground transport systems, the VFT would be expected operate at a financial loss.

This means that the initial costs and ongoing losses will need to be justified in terms of other, intangible economic benefits.

The report refers to “modelling undertaken in the early 2000’s by the Allen Consulting Group for the Speedrail project (linking Sydney to Canberra) estimated a benefit cost ratio of 2.2 for the project, showing that despite the substantial costs associated with building a high-speed rail corridor the benefits can be substantial”.

AECOM drew on experience in Europe and the US to cover the benefits of this form of alternative transport, including particularly:

- The saving in (total) travel times
- The convenience of direct CBD to CBD transport between the major cities leading to significant patronage of the VFT
- The reduction in pressure for a 2<sup>nd</sup> Sydney airport
- Decongestion in the major cities
- More efficient freight operations
- Assisting the necessary regional development to accommodate the expected increase in population
- Increase in ability to hold major international business, exhibition and sporting events



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- Tourism opportunities
- Wider opportunities for employment
- Reduction in greenhouse gas emissions

### Travel Times

The reduction in (total) travel times between capital cities over alternative modes of transport would clearly be the main driver in the volume of passenger trips by VFT. The report estimates the following for Sydney/Melbourne (millions):

Mode of Transport	Business as Usual		VFT Developed
	2010	2051	<i>2051</i>
Air	5.743	12.795	<i>6.611</i>
Car	1.096	2.086	<i>2.086</i>
Train and Bus	0.151	0.080	<i>6.264</i>

It is implied that ticket pricing and timetables would be set appropriately in order to achieve the dramatic increase in train usage. Equally, it is implied that such pricing and service generally would ensure an adequate cost/benefit ratio for the project. The report sets out a proposed process for investigation and development.

### Data

It is worth noting that there is a wealth of data on the Australian Bureau of Statistics website and other websites which assists in the development of an analysis of this type.

At the same time it is important to choose the most relevant data for the issues which need to be addressed.

### Purchase of "Corridor"

A major aspect of this project would be the purchase or reserving of the land forming the "corridor" for the train and related services.

AECOM estimate that purchase of the "corridor" would cost \$13.7 billion in 2009 - say \$15 billion today. They suggest that the "holding costs" for the government are represented by the Treasury discount rate, ie 7% pa, real.

Government departmental data for unimproved land values indicate that, along the whole of the corridor, such values have increased by an average 7% pa, or 4% pa real, over the period since 1996.

AECOM note that, historically, the government has been able to issue bonds which attract an interest rate of around of 2% pa in excess of inflation, and should be able to issue \$15 billion worth on these terms at the present time. Arguably therefore, the "holding costs" to the government of assets purchased with such funds are 2% pa real.

To purchase the land for the corridor now, effectively represents a commitment to develop the VFT. On this basis, purchase would cost 2% pa real, whereas the cost of purchase in the future would be represented by the increase in value of the land over the period to eventual purchase.

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As noted above, the average rate of increase of the land values has been 4% pa real. It seems likely then that the suggested "holding costs" rate of 2% pa real (or even 3% pa which possibly applies at the present time) would be exceeded in the future, and early purchase justified. It is suggested that this also satisfies the "commonsense" test.

Treasury's desire for 7% pa real, while justifiable commercially, could well result in the failure to pursue an important socially desirable project.

### Actuaries' involvement

As is its purpose, the report is deliberately written with a distinct bias in favour of the VFT.

There is no doubt that, with the increasing population along the east coast of Australia, there are valid comparisons with Europe, and the possibility of emulating their success in the development of VFT's.

At the same time, as envisaged by AECOM, before committing to the purchase or reserving of the "corridor", a major independent report is needed covering:

- The risks of pursuing the building of the VFT and supporting infrastructure. These include:
  - (i) The general risks of the actual costs of a major building project failing to meet the estimates – particularly difficult in view of the very long (40 year) time scale; (The proposal to pursue the works in stages, with cost/benefit analysis for each stage reduces this risk.), and
  - (ii) Possible changes in transport technology during the period.
- And revisiting the data, and assumptions supporting the analysis of the benefits, in particular:
  - a) The viability of the ticket pricing and timetables,
  - b) Methodology for valuing the intangible benefits, and
  - c) The appropriate discount rate(s).

Consideration needs also to be given to testing the effects of possible future air travel developments – bearing in mind particularly that currently air travel receives minimal government subsidy, whereas train travel, including the VFT, is likely to continue to need major subsidies.

In addition the report should consider alternative actions to facilitate east coast travel. For example, building a second Sydney airport which can service Wollongong and Canberra, together with building/improving airport to CBD trains to major cities.

Doubtless all this would happen in terms of the suggested approach to further the plan set out in the report.

It may be possible for some actuaries to suggest employment of their services since all the requirements for producing the report should be within their capacity.

Of course, they would need to seek significant technical input (as indeed did AECOM). In addition, learning about the statistics available to carry out estimates of intangible or hard to calculate economic benefits would be a necessary part of the exercise.

## **Evaluation of Public Policy Initiatives**

Where the actuaries have particular experience in relation to data gathering and analysis, and use of that data in developing a methodology for determining costs and evaluating benefits, this should enable them to add particular value to the exercise.

One aspect where actuarial expertise should also be valuable is in relation to the assessment of generational fairness issues for such a long term project and suggestions for their resolution.

## Initiative - War on Obesity

### Public Concern

Much has been written about the problem of obesity – in particular the greater chance that obese people will contract diabetes and other serious health problems. With increasing numbers of people in the western world categorised as obese – particularly children, reports now refer to the problem as an “epidemic”.

“Action is required” – but actions by government cost money. Such actions should have measurable benefits – which can be evaluated in advance.

### Methodology

For this paper, I have selected the 2006 report by Access Economics for Diabetes Australia “The economic costs of obesity”. The link to this paper is

<http://www.accesseconomics.com.au/publicationsreports/getreport.php?report=102&id=139>

This has been chosen from the numerous reports available on the issue, as it provides detailed analysis of the data and methodology adopted for determining the costs of obesity. (A later report updates the numbers; I will come to those later.)

### Definition

$$\text{BMI} = \text{Body Mass Index} = \frac{\text{weight in kilogrammes}}{(\text{height in metres})^2}$$

Adults with a BMI exceeding 30 are considered obese.

Although BMI is noted as not necessarily suitable for assessing all ethnic groups (or even body types), it has been accepted by the World Health Organisation as the international standard. An internationally accepted scale of adjustments is made for children.

### Prevalence v Incidence

The report focuses on the *prevalence* of obesity (and the related diseases) ie, the proportion of people who are obese in any one year, rather than the *incidence* of obesity which represents the proportion of those who become obese in that year.

Access Economics acknowledge that *prevalence* is favoured because the statistics available lend themselves to utilisation of such an approach. It is possible that actuaries would wish to pursue the construction of incidence tables with recovery and death parameters consistent with their approach to disability work generally. (Access Economics may do too).

Arguably also, governments tend to be focused on current year costs – which are generated from prevalence statistics. Incidence, death and recovery rates though, would be better for forecasting, if reasonable figures can be derived.

## Evaluation of Public Policy Initiatives

### Prevalence Rates

Basic prevalence rates (%) derived from the statistics available were as follows:

Age Group	0-4	5-19	20-24	25-34	35-44	45-54	55-64	65-74	75+	Total	Total Adults
Males	0.0	7.7	9.9	17.4	17.8	20.8	25.5	19.9	12.7	15.1	19.3
Females	0.0	6.1	8.6	12.4	19.5	26.9	32.8	29.4	15.6	16.8	22.2

Total obese population estimate is 3.24 million

### Health Risks

The report focuses on the major types of disease that have been shown to be linked with obesity.

“Attribution factors” are developed representing the approximate proportions of the obese population (in each age group) suffering from each type of disease. These are based on “relative risk” factors which had previously been developed by others from research.

A summary of the results of applying these factors to age group populations is as follows:

Disease Group	Diabetes	Cardiovascular	Osteoarthritis	Cancer	Total
Estimate (‘000’s) of obese population with disease	102	379	225	20	726

### Cost Impacts

These may be summarised as

**Health System Costs (including carer costs)** – hospitals, nursing homes, pharmaceuticals, medical and health services, research, health administration **\$1.6b**

**Other Financial Costs** – productivity losses, tax revenue forgone, welfare payments, other government costs. **\$2.2b**

**Non Financial Costs** – personal impact of loss of wellbeing/quality of life and premature death, expressed as the dollar value of the “burden of disease” **\$17.2b**

**Total Costs                    \$21.0b**

Health system costs are those specific to the disease, obtained from Australian Institute of Health and Welfare (AIHW) reports. The figures shown are estimates in respect of obese people suffering from the disease, ie estimates of those costs that would not be incurred if the people were not obese.

Estimates of the non financial costs were calculated by multiplying:

the number of DALY’s (disability adjusted life years) suffered by obese people with the various diseases, where 0 represents a year of perfect health and 1 represents death, by

VLV (Value of a [healthy] life year), and adjusting the result to avoid double counting of financial costs included.

## Evaluation of Public Policy Initiatives

The DALY concept was developed by the World Health Organisation, the World Bank, and Harvard University about 15 years ago, and has been applied in Australia by the Australian Institute of Health and Welfare.

“Years of life lost” through premature death and disability have been derived for the range of ailments. The proportions of years adopted for disability are intended to represent the impairment effect of the disablement including pain and suffering, relative to a healthy life state.

A VLY of \$162,561 was adopted. This was the lowest from a range of international studies valuing a total life (span) at between \$3.7m and \$9.6m, and then discounting over a working life of 40 years at 3.3% pa.

The breakdown of the costs by disease was as follows (\$b):

<b>Disease Group</b>	<b>Diabetes</b>	<b>Cardiovascular</b>	<b>Osteoarthritis</b>	<b>Cancer</b>	<b>Total</b>
Health System Costs	0.6	0.7	0.2	0.1	<b>1.6</b>
Other Financial Costs	0.5	0.8	0.6	0.3	<b>2.2</b>
<b><u>Total Financial Costs</u></b>	<b><u>1.1</u></b>	<b><u>1.5</u></b>	<b><u>0.8</u></b>	<b><u>0.4</u></b>	<b><u>3.8</u></b>
Non Financial Costs	1.3	11.2	1.2	3.5	<b>17.2</b>
<b>Total Costs</b>	<b>2.4</b>	<b>12.7</b>	<b>2.0</b>	<b>3.9</b>	<b>21.0</b>

### Observations

While there is a wealth of statistics available from the Australian Bureau of Statistics and the AIHW, extraction and application of those relevant to this exercise is complex and partly subjective. Actuaries may well choose different methodologies.

The basic obesity data for this report was taken from a sample of 11,207 people in 1999, who received a household interview followed up by a biomedical examination, in an attempt to avoid the problems of distortions from self reporting. (It has been found that there is a tendency for overweight people to under report their weight and over estimate their height.) Clearly a more up to date survey would be desirable. Indeed, a comparison would itself be useful to assess obese population change over time using the same data source methodology.

The wide range of VLY (value of a life year) from the various studies is a case in point. By taking the lowest, the report has adopted a conservative approach. Actuaries may also query the discount rate adopted.

The total health system costs of \$1.6b are only the excess over the average for the population as a whole of those costs attributable to obese people suffering from the types of disease investigated – 726,000. The remainder of the 3.24m obese population, ie 2.514m, would also involve a cost to the system which, for many, may well be greater than that for the average person. (The AIHW reports show that the average cost per member of the population in 2004/5 was \$4,001).

## Evaluation of Public Policy Initiatives

### Government Action

The federal and state governments currently provide a range of educational material relating to the causes and consequences of obesity, and personal action that may be taken to reduce weight. In addition, codes of conduct exist for advertisers of food products perceived to be “non healthy”, and there are media restrictions, particularly in relation to children.

Possible additional action may be categorised as:

- Introduce “fat” taxes
- Increase private health insurance premiums/require higher “gap” payments for medical services for the obese
- Subsidise obesity prevention programmes
- Subsidise healthy food
- More regulation of “unhealthy” food and its promotion.

All have clear logic. At the same time, fat taxes, special arrangements for private health insurance and more regulation would involve non trivial administrative problems. Subsidising healthy lifestyles would largely benefit the non obese already in good health (unless an administratively complex obesity registration system accompanied the initiatives).

A major concern is with child obesity. Stronger pursuit of exercise programmes and focus on healthy food in schools could pay dividends in the longer term.

With regard to future regulation Tony Abbott the then Health Minister (2006) noted:

*“Advertisements do have some influence on behaviour, otherwise people wouldn’t pay for them. Still banning food ads to children is a tokenistic pseudo-solution that’s been proven not to work. Quebec banned food advertising to children 25 years ago and Sweden banned it 12 years ago without any appreciable impact on obesity rates. In this area, bans are the soft option for governments more interested in looking good than doing good...”*

*I’m a reluctant regulator. Regulation is something we do when absolutely necessary as a last resort, when this is a clear benefit, when the benefits of doing something clearly outweigh the potential cost, including all the transitional costs, then you consider new governmental programmes, new governmental regulations”.*

He might have added that the effect of advertisements of food and drink is often simply to change brand preferences. Consequently banning advertising of certain products may have little effect on total consumption – as experienced in Quebec and Sweden.

### Government Action – Cost/Benefit Analysis

The report does not pursue a cost/benefit analysis of any government action. The following comments are mine.

While the \$21.0b annual cost of obesity appears large, only \$3.8b is “financial” – ie where money spent to reduce the cost would be of direct benefit to taxpayers. The balance of \$17.2b represents the intangible costs from the “burden of disease”. While the benefit from amelioration of this would accrue mainly to the individual and his or her family, the community would gain from the diversion of health system resources to other needs and sense of well being from the improvement in the health of the people generally.

## Evaluation of Public Policy Initiatives

Arguably though, for most people, obesity is a personal choice matter; the individual has the option of eating less and exercising more (although it is accepted this may be very difficult for some). Indeed it is suspected that many just on the minimum BMI of 30 are broadly happy with the way they are, and reject any allegation that they have a problem – possibly regarding the measurement process as flawed. At older ages they are part of a large minority, and may well have rationalised their weight – particularly if they have friends with similar BMI.

Putting people on a strict diet and exercise regime would have a positive outcome. However, certainty of this is only possible with incarceration and compulsion – rather against their human rights!

Consequently, it may be difficult to justify use of taxpayer funds to do more than provide information and education.

An exception to this generality may exist in the case of children. The regimented structure of school activity provides a good environment for development of a healthy lifestyle. The report suggests that some success was achieved in Singapore with their programme some years ago. However it is possible that the Chinese culture encourages more acceptance of restrictions than might be possible in Australia – particularly in respect of food being brought from home.

### Taxpayer Costs – Offsets

As noted above, the costs of obesity to the taxpayer are estimated to be \$3.8b. While perhaps perverse, the report might have noted that offsetting this are savings in respect of age pensions and related fringe benefits from earlier deaths. Possibly also, with cardiovascular diseases often causing quick deaths from heart attacks and strokes, some nursing home costs could be saved.

### Update

In 2008, Access Economics were asked by the Diabetic Association to update their 2005 Report numbers to allow for the increase in the population, inflation, and generally, new data and information becoming available. The link to this report is:

<http://www.accesseconomics.com.au/publicationsreports/getreport.php?report=172&id=219>

A comparison of the results is as follows:

	2005	2008
<b>Obese Population</b>	3.24m	<b>3.71m</b>
<b>(% of total population)</b>	(15.9%)	<b>(17.5%)</b>
<b>Obese Population with specified diseases</b>	0.726m	<b>1.339m</b>
<b>Health System (including carers) Costs</b>	\$1.6b	<b>\$3.9b</b>
<b>Other Financial Costs</b>	\$2.2b	<b>\$4.4b</b>
<b>Non Financial Costs</b>	<u>\$17.2b</u>	<u><b>\$49.9b</b></u>
<b>Total Costs</b>	\$21.0b	<b>\$58.2b</b>

There seems to be no doubt that some aspects of obesity are a problem.

I will leave the reader to consider the reasons and implications of the changes in the numbers.

Perhaps disappointingly, the update adds nothing in respect of possible government action to deal with the issues.



### Life Insurance Industry

The life insurance industry balances the cost of underwriting against the anticipated saving in claims. Much death risk business is conducted through group arrangements (mainly superannuation funds) where almost all individuals are accepted on standard terms for fixed amounts of cover, simply on the basis that they are at work and self certify that they are in good health. Thus the cost of underwriting is minimised while the large spread of risk minimises the impact of variations in claims experience. Higher amounts of cover require more detailed underwriting along the lines of that applicable to individual applicants.

For individuals applying for life insurance directly, the underwriting process is intended to accept over 90% of expected applicants on standard terms. On this basis some offices accept those with BMI up to 32 provided they have no health problems. Continuing improvement in mortality has confirmed that this process has been broadly successful.

While the increased propensity for obese people to contract various ailments has been established, it seems likely that the risk becomes greater according to the degree of obesity. Thus this issue is more serious for those with BMI over say, 35, than those between BMI 30 and 35. Combined with the general disbelief of many of those with BMI around 30 that they may have a problem, this suggests that there could be more focussed public concern if the target was narrowed to those with BMI over 35 – perhaps representing around 10% of the adult population and described as “very obese”.

It is worth noting that obese applicants accepted only with a higher premium have an incentive to lose weight as this will mean that the loading can be reviewed.

### Actuaries' Involvement

A major area where actuaries could add value is in the development of “incidence of obesity” rates. As a start, an approximate single decrement table could be constructed from the prevalence data (and other data which might be of help), to produce numbers of lives (a) expected to become obese, and (b) dying, for each age. This would assist in developing projections to estimate the level of obesity in the future. (It would be useful to provide for the later inclusion of a “recovery” decrement, as a database recording this may be developed in the future).

A crucial exercise to be developed is the obtaining of a good survey sample of up to date data which is not distorted by self selection or self provided height and weight information. Actuaries could assist in conducting such a survey, and establishing the database and its regular updating in the future. Life insurance experienced actuaries should be able to suggest some useful detail to be incorporated in the process.

The establishment of such a database, together with continuing research could facilitate the determination of the costs and benefits from stronger action to reduce obesity (than simply education and awareness campaigns), that might be considered in the future.

Actuaries are likely also to be able to contribute to the continuing debate over the “value of a healthy life”, and how this should be taken into account for the purpose of placing a value on the “burden of disease”.

## **Initiative – Climate Change Action**

### **Ross Garnaut – Climate Change Review**

In his 2008 report, Climate Change Review, commissioned by the federal government, economist Ross Garnaut advised on the structure of a greenhouse gas emissions trading scheme. The link to this report is <http://www.garnautreview.org.au/contents.htm>

It is not intended that the merits of an ETS nor the attempts to mitigate climate change through reductions in greenhouse gas emissions be subjects for debate in this paper. The purpose of studying the report is simply to consider the economics of a long term public policy adopted by a high profile economist.

Garnaut assumed a forecast global temperature rise of 4.5 degrees Celsius by 2100 and scientific advice of the (expected) consequent climate change effects. He then analysed the risks, costs and benefits of attempts to mitigate the climate change effects, as against adaptation as changes occur in the future.

He developed model outputs to simulate economic outcomes under the “with” and “no” mitigation scenarios. (He noted that some expected benefits from the avoidance of global warming, like the “insurance value” of fewer catastrophic events, and the preservation of environmental amenities and biodiversity, are difficult to place a monetary value on, and ignored them for this purpose.)

He found that mitigation would negatively impact economic growth in the early years. However, thereafter strong growth was expected to be resumed.

Under the “no mitigation” scenario, the 4.5C temperature rise forecast was expected to result in a significant increase in the frequency and intensity of storms and heatwaves, particularly in tropical areas. Rainfall would develop into more extreme “wet” and “dry” periods.

Despite this, his projections showed that Australians would still “have higher material incomes and wealth in 2100 than they have today”, even after taking the necessary steps to adapt to the more extreme weather conditions, less agricultural production and need for more water source developments.

Inevitably, he needed to determine a suitable discount rate to value the projected costs and benefits of climate change mitigation.

### **Ross Garnaut – Discount Rate**

Garnaut drew on “philosophy kings of economics” who reject any value for time preference as “equal weight should be placed on each person” (regardless of when they live). Adoption of a figure of 0.05% pa for the Review was then justified as reflecting the (slight) “risk of human extinction in any one year”. He then noted that this figure happened to equal the value adopted in the UK’s Stern Review on climate change mitigation.

He noted that expected GNP growth in Australia means that people in the future would be financially better off than people today despite the impact of unmitigated climate change. Consequently he considered it “reasonable to value future income at a lower rate than current income” and hence to add a margin for the “marginal elasticity of utility with respect to consumption”. He assumed two values (1.3% pa and 2.6% pa) for this element which “accommodate strongly diverging views on how much should be spent now to benefit future”. This was based on his assessment of future growth in per capita income of 1.3% pa (real).

## Evaluation of Public Policy Initiatives

The addition of this margin resulted in his adoption of total (real) discount rates of 1.35% pa and 2.65% pa.

He then questioned whether there is a contradiction between “(using this range) in summing utility of income over generations, and applying a higher rate, 4% pa real, in pricing emissions permits and the (assumed market) rate at which investors choose to allocate capital in Garnaut-Treasury modelling”.

He argued that market pricing (2% pa risk free real + 2% pa risk premium) was appropriate for modelling the pricing of emissions permits; but “strong arguments can be made against any approach using observed market rates in the case of climate change. They include that a market portfolio approach averaging over high yielding and underperforming projects was not applicable to climate change where winners and losers live in different generations”.

Finally he reflected that the assumed discount rates for climate change mitigation (1.35% pa and 2.65% pa) straddled his expected GNP growth rate of 2.1% pa, and considered that this was appropriate.

### Letter to the Australian Financial Review, July 2008

*“Economist Ross Garnaut tells us that, by the year 2100, all the normal measures of Australian standard of living (real wages, and per capita consumption and so on) will be somewhere between five and ten per cent below what they would be if humans were not filling the atmosphere with carbon dioxide.*

*He also tells us that, by 2100, and in the absence of global warming, the Australian economic output per person would increase by about 400 per cent. Provided the government didn't waste it, most of that would come back to us in the form of increased standard of living. Therefore the average Australian of 2100 should be something of the order of 360 percent better off than ourselves even when he or she has been devastated by climate change. In other words Professor Garnaut is asking for lots of our money so that he can give it to the people of the future who will be at least three and a half times wealthier than we are. The guy must be nuts.”*

This might be considered “an alternative view”, regarding the philosophy for carrying out the cost/benefit analysis. (One can quibble with the numbers in the letter; however “correction” to those which might be considered more consistent with the report would not change the overall message intended by the letter writer).

A major issue is that economic growth does not necessarily equal “growth in happiness”.

Even allowing for the expected adverse environmental impacts would not necessarily demonstrate the relative level of happiness enjoyed by future generations compared with the present. In the future, a greater proportion of the population are likely to be forced to live in apartments; some will want to, but others will have no other option. They will be financially better off - but may not be able to obtain the volume and variety of fresh food we have today. And generally, they may be unable to enjoy some of the social benefits suburban families today take for granted. (But some might say: what one doesn't have one doesn't necessarily miss). In any case, while incomes may be higher in 2100, expenditure on energy and products involving a high use of energy for their provision may be so high as to result in no greater quality of life.

### Discount Rate Reflection

Social policy is fundamentally a government responsibility. Expansion of services will need to be paid for by the people. There will always be general considerations of fairness, if not actual equity, as well as conflict over prioritising current plans.

For many social policy initiatives, prioritisation is a process for timing of their introduction. Time preference or opportunity cost must therefore be a significant part of the determination of the discount rate. Garnaut's split of the discount rate into "time preference" and a "margin for elasticity of utility with respect of consumption" is interesting.

However, it is suggested that where taxpayer money is involved, the (overall) discount rate for assessing costs and benefits should be the rate at which the government may borrow. Both currently and historically, this has been around 3% pa real.

### Generational Fairness

Garnaut appeared to be suggesting that generational fairness may be preserved by ascribing a zero value in the discount rate for "time preference" as "equal weight should be placed on each person" (regardless of when they live).

Arguably though, the issue of generational fairness is dealt with via the *funding* method. Repayment of initial debt within a short period ensures that current taxpayers are bearing most of the initial costs. Alternatively, long term interest only bonds would shift much of the cost to future taxpayers who will be repaying the debt.

It has been accepted by the UN that the increased levels of greenhouse gases in the atmosphere have been caused to a significant extent by the developed countries' industrialisation and forest clearing. Consequently, not only should it be those countries that pay for the mitigation of the potential effects of the anticipated global warming, but also they should pay for it as early as possible.

### Intangible Benefits

Clive Hamilton and others have criticised Stern and Garnaut for their presentation of the cost/benefit issue as one where judgement is made on the basis of *market* evaluation and the appearance that economic growth is the hallmark of this.

Their argument is that prevention of the dire consequences of unmitigated climate change cannot properly be assessed on economic growth impacts alone.

I agree. However, I suggest that the problem is that no assessment has been made of the value of what Garnaut called "non-market impacts", for example, the insurance value of fewer catastrophic events, and the preservation of environmental amenities like the Great Barrier Reef and beaches, biodiversity, parks and playing fields. These are some of the suggested intangible benefits of mitigation. It is accepted that valuation is difficult and any results may be controversial. However, it seems likely that significant positive values can be acceptable for such benefits provided the methodology seems reasonable.

Even with a market discount rate of 3% pa real, inclusion of long term intangible benefits may well result in the discounted value of (total) benefits exceeding the costs.

### **Actuaries' Involvement**

The Garnaut report runs to 688 pages. It is well laid out and has a huge volume of information and model output with regard to Australia's economic activities and the possible effects of climate change on them.

It is possible that actuaries may take alternative views on some aspects which could add value to the development of government policy. Actuaries may also be able to add comments on the "insurance value" benefits of mitigation against potentially increasing numbers of extreme weather events.

Actuaries may also be able to develop methodologies to use the data in valuing the potential intangible benefits arising from the mitigation of the forecast climate change effects.

## **Government Funding**

### **Borrowing Costs**

The current 10 year Commonwealth Bond Rate is around 5.5% pa.

This market rate may be suggested as representing 3% real, plus 2.5% inflation. The bondholders may view the rate as a fair and equitable: 3% for time preference and 2.5% for inflation.

From the point of view of the government, the total rate arguably represents their long term capacity to repay debt with interest and without impacting other aspects of the economy, ie expected economic growth rate, including inflation.

### **Repayments**

The normal funding involves government bonds (unindexed) which pay interest only, with full repayment of the face value at the end of the term of the bond.

An alternative approach would be the issue of level payment term certain annuities, ie principal and interest repayments.

Each of these could be adjusted for indexation to attempt some form of equity between current and future taxpayers, ie arranging for repayments to increase in line with inflation.

If there was an expectation that the capacity of future taxpayers to make repayments was significantly higher than that for those current, the repayments could be planned to increase in line with economic growth, including inflation, ie currently expected 5.5% pa.

### **Index Linked Bonds**

The federal government's current bond portfolio comprises a total outstanding debt of \$177b, with just 7% of this represented by CPI linked bonds.

Such bonds are considered to be useful investments for superannuation funds, particularly for retired members. It would assist this market if the government could see its way clear to issue more CPI linked bonds.

### **Economic Growth Bonds**

Seeking to align repayments with the rising standard of living of taxpayers could result in the consideration of the launch of "Economic Growth Bonds" (EGB's). One form these could take would be for redemption each year of a proportion of the initial bond – say equal to  $1/n$  where "n" is the term in years of the bond. The redemption payment would be the proportion of the initial bond amount, increased by the rate of economic growth over the period - including inflation.

As with indexed bonds, economic growth bonds could be a favoured investment for superannuation funds, particularly for retirees.

Let us suppose that the benefits from the project are expected to increase in line with (real) economic growth – ie following the above redemption payment structure, and that the discounted value of the first 10 years of these at the government bond rate, covers the initial cost. (It is assumed that this will be close to the market rate for EGB's of the same term).

## Evaluation of Public Policy Initiatives

Funding for the project will be represented in the equation:

$$\text{Initial Cost} = \text{Amount to be borrowed} = \text{Sum for } t=1 \text{ to } t= n, R(1+r)^t * v^t$$

Where “r” is the assumed (real) economic growth rate = 3%, expected inflation is 2.5% and “v” is calculated at rate  $i = (1.03)*(1.025) - 1 = .0558$ .

When Initial Cost = 10,000, then  $R = 1142$ .

So expected repayments at the end of each year from  $t=1$  to  $t=10$  are:

$$1142 * (1.03)^t, \text{ ie } 1176, 1212, 1248, 1285, 1324, 1364, 1405, 1447, 1490, 1535.$$

### Repayment Scales

A summary of possible interest plus repayment scales for a borrowed amount of 10,000, repayable over 10 years, based on the above funding variations, is set out below.

Year	Government Bond	CPI Linked Bond	Annuity	Economic Growth Bonds
1	550	308	1,313	1,176
2	550	315	1,313	1,212
3	550	323	1,313	1,248
4	550	331	1,313	1,285
5	550	339	1,313	1,324
6	550	348	1,313	1,364
7	550	357	1,313	1,405
8	550	366	1,313	1,447
9	550	375	1,313	1,490
10	10,550	13,185	1,313	1,535

### Conclusion – Actuaries’ Involvement

One conclusion that can be drawn immediately from just the 3 examples in the paper, is that the evaluation issues of public policy initiatives cover a very wide range.

Major aspects are: data selection, data analysis, projections and valuation discount rates. It is accepted that many non actuaries can carry out this work. However, not only are actuaries particularly well trained in these areas, but much of their work is focussed on the careful attention to both the detail and the importance of the larger picture. This includes consideration of the types of risk involved, alternative solutions and the range of possible outcomes.

In the case of private sector involvement - sharing of funding and management can take a variety of forms. Actuaries can contribute to advising on forms under consideration.

While the range of issues (and sub issues) may be very wide, it is probable that a framework for the systematic and objective evaluation of a project and its costs and benefits (including risks) could be developed. This would assist the decision making process generally – and particularly where there are competing projects. (It is possible that Treasury already have such a framework; however, this is no reason for an actuary not to take a fresh look at this).

Evaluation of most areas of public policy are likely to involve experts in other fields. Apart from accountants, lawyers and merchant bankers, actuarial work has tended not to involve working with other professions – certainly very little with scientists. However, there is no fundamental reason why this could not become more widespread.

It seems clear that actuaries have much to contribute in the area of public policy beyond the current focus of the profession on the traditional work areas.

This may be considered as “beyond the mandate” of the Institute. However, if actuaries become more involved in the wider areas of public policy, the mandate of “supporting the members” can morph into those wider areas. Arguably, the Institute should consider public policy generally as a significant opportunity for expansion of its influence and services to the community.

To facilitate this development, it may be possible for the IAA, from time to time, to fund a research project for an actuary making a submission on a public policy issue in the wider field.

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