MULTIPLE ACCOUNT EVALUATION GUIDELINES

Prepared by:

CROWN CORPORATIONS SECRETARIAT

Suite 2250 - 200 Granville Street
Vancouver, British Columbia
V6C 1S4
Phone: 775-1155
FAX: 775-1184

Province of British Columbia

February, 1993
ACKNOWLEDGEMENTS

These guidelines were prepared by the Crown Corporations Secretariat in consultation with representatives of Crown corporations. A working committee made up of the following people helped draft the guidelines. Their efforts are appreciated.

Mr. David Craig, B.C. Hydro and Power Authority
Mr. Ken Miyazaki, B.C. Hydro and Power Authority
Mr. Jim Alexander, B.C. Buildings Corporation
Mr. Ross Harris, B.C. Ferry Corporation
Mr. Bruce Duncan, Crown Corporations Secretariat
Ms. Eva Hage, Crown Corporations Secretariat
Mr. John Duffy, Crown Corporations Secretariat

Marvin Shaffer, Ph.D.
Assistant Secretary
Capital Evaluation and Economic Analysis
Crown Corporations Secretariat
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2.0 INTEGRATED PLANNING FRAMEWORK</td>
<td>3</td>
</tr>
<tr>
<td>3.0 PROBLEM DEFINITION AND IDENTIFICATION OF ALTERNATIVES</td>
<td>6</td>
</tr>
<tr>
<td>4.0 MULTIPLE ACCOUNT ANALYSIS</td>
<td>8</td>
</tr>
<tr>
<td>4.1 The Evaluation Accounts</td>
<td>8</td>
</tr>
<tr>
<td>4.2 Evaluation Procedures</td>
<td>9</td>
</tr>
<tr>
<td>4.2.1 Financial Performance</td>
<td>10</td>
</tr>
<tr>
<td>4.2.2 Customer Service</td>
<td>12</td>
</tr>
<tr>
<td>4.2.3 Environment</td>
<td>15</td>
</tr>
<tr>
<td>4.2.4 Economic Development</td>
<td>17</td>
</tr>
<tr>
<td>4.2.5 Social</td>
<td>19</td>
</tr>
<tr>
<td>4.3 Presentation of Results</td>
<td>19</td>
</tr>
<tr>
<td>5.0 RISK AND UNCERTAINTY</td>
<td>21</td>
</tr>
<tr>
<td>5.1 Sources of Risk</td>
<td>21</td>
</tr>
<tr>
<td>5.2 Risk Management Strategies</td>
<td>22</td>
</tr>
<tr>
<td>6.0 CONCLUSION</td>
<td>23</td>
</tr>
</tbody>
</table>
1.0 INTRODUCTION

The major plans and projects undertaken by Crown corporations can have significant implications for the Crown corporations’ own long term development and performance, and for the economic development and quality of life in the province as a whole. It is of paramount importance that the decisions of Crown corporations to pursue particular plans or projects are based on a clear understanding and proper evaluation of the full range of implications that they can have.

The purpose of the guidelines outlined in this report is to provide an evaluation framework that will assist Crown corporation management and Boards in systematically identifying and evaluating the implications and relative merits of alternative plans and projects. It is hoped that the application of these guidelines will contribute to well informed decision-making and to the selection of alternatives which best serve the needs and interests of the Crown corporations, and the economic, environmental and social objectives of the people of British Columbia.

Underlying these guidelines are four basic principles. Firstly, Crown corporation plans and projects are not undertaken in isolation; they are generally part of, and have implications for, broader corporate and provincial goals and strategies. The evaluation process must therefore be seen as part of an integrated planning framework. This requires an explicit recognition of the broader goals that plans or projects may serve and the interrelated interests and activities of other Crown corporations and government agencies.

Secondly, plans and projects are not ends in themselves, they are means of addressing problems or taking advantages of opportunities. It is essential at the outset of any evaluation to identify the problem or opportunity that a proposed plan or project is intended to address. This is necessary to be able to identify and consider the full range of alternatives to the proposed plan or project. In the end, the evaluation process provides a systematic assessment and comparison of the relative merits of alternatives. The evaluation of an incomplete or inappropriate set of alternatives, no matter how sophisticated, will not generally assist in
identifying the best course of action. It may simply serve to explain why one sub-optimal alternative is better than some other.

Thirdly, Crown corporations have a number of different interests and objectives; in general, there is no single measure of overall net benefit that can adequately summarize performance in all relevant areas. A systematic analysis of performance under a number of evaluation accounts (e.g. financial performance, customer or public service, environmental impacts, economic development, social impacts) is therefore required to understand the full range of implications of alternative plans or projects. Such “multiple account” evaluations may not determine which of a set of alternatives is unequivocally preferred. However, that is not the goal. Rather, the goal is to clearly identify advantages and disadvantages, and the trade-offs that different alternatives entail -- to inform and assist decision-making, not to supplant it.

Finally, the implications of alternative projects and plans are subject to considerable uncertainty. It is essential to identify the nature and extent of the uncertainty and the potential significance it can have. To some extent this can be done with traditional sensitivity analysis -- determining the range of possible outcomes, corresponding to a range of alternative assumptions. However, uncertainty should also be considered more strategically, in terms of the flexibility of different alternatives to respond to new information and unfolding events. An understanding of how and at what cost alternative plans and projects would respond to unexpected conditions can be as important as understanding their implications under what is considered most likely.

The guidelines that follow are basically an elaboration of these principles. Section 2 contains a discussion of the integrated planning framework in which plans and projects must be developed and evaluated. Section 3 contains a discussion of problem definition and the consideration of alternatives. Section 4 presents the basic methodology for the multiple account evaluation of alternative plans and projects. Section 5 outlines approaches to the analysis of risk and uncertainty. The guidelines conclude with a summary of the decision-making framework.
2.0 INTEGRATED PLANNING FRAMEWORK

Planning is the process by which alternatives are developed, compared and the best alternative implemented in order to achieve specified goals. It is done at varying levels (e.g. broad strategic vs. specific project) and within different, interrelated organizations (e.g. B.C. Ferries, BC Transit and the Ministry of Transportation and Highways).

The planning framework most suitable for individual Crown corporations and agencies will vary depending on the nature of the business and the nature of the planning required. In general, however, it will encompass the following levels of activity, all of which ultimately contribute to the determination and implementation of capital and annual operating plans.

- provincial and regional community planning - establishing broad societal goals and corporate mandates;
- high level system and strategic planning - developing system plans and corporate strategies for meeting societal goals and corporate mandates;
- policy, project and program planning - identifying specific policies, projects and programs that best serve system and strategic plans;
- design, engineering and implementation planning - determining specific project or program components, characteristics and implementation plan.

Clarity of societal goals and corporate mandates is a prerequisite to integrated planning. It is these goals and mandates that provide the focus and direction for subsequent levels of planning.

In the energy sector, for example, broad societal goals include the meeting of energy requirements at lowest social cost and contributing to sustainable economic development in the province. B.C. Hydro’s mandate is to meet electricity requirements in accordance with these goals. The system and strategic plans it develops, the particular projects and programs it
pursues, and the manner in which projects and programs are designed and implemented should be guided by and focused on these goals and mandate.

Integrated planning also requires explicit recognition of the interrelated activities and opportunities across different Crown corporations and agencies. While Crown corporations must operate within their mandates, their ultimate purpose is to contribute to the effective pursuit and realization of societal goals. In many sectors this requires inter-agency development and evaluation of alternatives.

In the transport sector, for example, a major societal goal is meeting transportation requirements at lowest social cost, in a manner that best contributes to communities’ population, development and land use objectives. BC Transit has a mandate related to the provision of transit services; the Ministry of Transportation and Highways for road infrastructure; and B.C. Ferries for ferry service. Clearly, the system and strategic plans they develop must be integrated with one another in order to best serve societal goals. System planning, in this case, is not solely a corporate function but rather an inter-agency one.

In sum, effective planning requires the explicit recognition and focus on higher level goals and strategies. Effective pursuit of provincial objectives requires integrated planning across interrelated organizations both in the development and evaluation of alternatives.
INTEGRATED PLANNING FRAMEWORK

- PROVINCIAL AND REGIONAL COMMUNITY PLANNING
- HIGH LEVEL SYSTEM AND STRATEGIC PLANNING
- POLICY/PROJECT/PROGRAM PLANNING
- DESIGN AND ENGINEERING PLANNING

DETERMINATION OF CAPITAL AND ANNUAL OPERATING PLANS
3.0 PROBLEM DEFINITION AND IDENTIFICATION OF ALTERNATIVES

The most important step in the evaluation of any proposal is developing a clear understanding of the problem or opportunity it is intended to address and then identifying the full range of alternatives to which it should be compared. It is the advantage of a plan or project relative to all relevant and feasible alternatives which governs whether it should proceed. The ultimate purpose is to identify the best alternative to pursue.

Too often, proposals are presented in isolation and compared only to a do nothing or status quo base case. This is generally inadequate. If there indeed is a problem, then there is every likelihood that any proposed solution may appear attractive. However, it may not be the best alternative to pursue. What is required is the identification and consideration of a wide range of possible solutions to the problem at hand. It is the creativity and thoroughness brought to bear in the identification of alternatives where the greatest potential gains can be realized from the evaluation process. A clear understanding of the underlying problem or opportunity will facilitate this process.

The generation of a wide range of alternatives can be enhanced through the establishment of an environment which fosters creativity and innovation. Specific methods that can assist in this regard include:

- collaboration among diverse groups (and, as appropriate, different organizations) that bring different perspectives or expertise to the problem being addressed;
- brainstorming of alternatives;
- critical analysis of key components of the problem and the possible solutions; and
- challenging proponents of a particular project to consider what they would or could do without it.
Outlined below are some of the generic types of alternatives that may be relevant to a typical problem facing Crown corporations - the need to respond to growing demand. As shown in the list, the commonly proposed expansion of capacity in response to growing demand is only one of many alternatives that could be considered.

**Illustrative List of Alternatives to Respond to Growing Demand**

<table>
<thead>
<tr>
<th>SUPPLY SIDE</th>
<th>DEMAND SIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Expansion of capacity similar to existing technology</td>
<td>• Pricing measures to reduce overall or peak requirements</td>
</tr>
<tr>
<td>• Investment in alternative supply technology</td>
<td>• Promotion of regulatory measures to reduce requirements</td>
</tr>
<tr>
<td>• Purchase/lease of third party supply</td>
<td>• Programs/incentives to reduce demand</td>
</tr>
<tr>
<td>• Reconfiguration or reallocation of existing capacity</td>
<td>• Reservations or other market control measures to manage peak demand</td>
</tr>
<tr>
<td>• Promotion of alternative source of supply (e.g. alternative fuel, alternative transportation mode)</td>
<td></td>
</tr>
</tbody>
</table>

The key is to expand the horizon or scope of considerations. In respect of common problems such as responding to growing demand for service, this means consideration of demand side (non-structural) as well as supply side alternatives. It also means consideration of alternative sources of supply or inter-modal solutions going beyond the narrow scope of a particular Crown.
4.0 MULTIPLE ACCOUNT EVALUATION

Multiple account evaluation entails the systematic documentation and assessment of the financial, environmental and other relevant implications of alternative plans and projects in order to determine the advantages and disadvantages they entail. It involves three basic steps:

- the specification of evaluation accounts;
- the documentation and assessment of implications under each account; and
- the presentation and interpretation of the results.

4.1 The Evaluation Accounts

Evaluation accounts define the range of criteria by which the relative advantage or performance of alternative plans and projects can be judged. Each Crown corporation may wish to define a specific set of accounts that best relate to its own mandate and needs. In general, however, the evaluation accounts should cover the major concerns and objectives of government. These include:

- financial performance;
- customer service;
- environment;
- economic development; and
- social.

The financial performance account serves to document the revenue and expenditure implications of the alternatives from both a corporate and broader government perspective.

The customer service account serves to document the net benefit or value that customers or users derive from the alternatives.
The environment account serves to document the nature, magnitude and significance of the major biophysical and natural resource impacts of the alternatives.

The economic development account serves to document the nature, magnitude and significance of the income and employment impacts of the alternatives.

The social account serves to document the major impacts of the alternatives on the social fabric and values or goals of directly affected communities or groups, including, where relevant, impacts on specific aboriginal community values and concerns.

Not all accounts are relevant to all evaluations. In some cases, there may be no significant implications or matters of concern under a number of accounts. Obviously, judgement is required in deciding which accounts to analyze and at what level of detail. However, the full set of accounts provides a checklist of information that may be required, depending on the nature, scale and complexity of the alternatives under consideration.

4.2 Evaluation Procedures

The evaluation procedures are designed to provide summary measures or statements that clearly identify the implications and advantages and disadvantages of the different alternatives. The specific methods for this, as outlined below, generally follow the principles of benefit-cost analysis. Advantages and disadvantages are defined and assessed in terms of social benefits and costs -- i.e. the value that people, business and government attach to the positive and negative implications of the alternatives.

While similar to traditional benefit-cost analysis, the methods used in multiple account analysis differ in two important respects. Firstly, in multiple account analysis it is explicitly recognized that not all benefits and costs can be expressed in dollar terms. Secondly, even where dollar estimates are developed, it is not generally intended that these be combined into one measure of net benefit. Combining dollar estimates from different accounts can be
misleading because of the different bases and reliability of the estimates. It can also mask important information on the components and distribution of the benefits and costs of different alternatives.

4.2.1 Financial Performance

The financial performance of alternative plans or projects should be documented and assessed on the basis of forecasts of their impacts on annual revenues and expenditures. This evaluation should be done from at least two perspectives: (I) that of the Crown Corporation itself and (ii) that of the rest of the provincial government. The latter should not be ignored. Given the broader provincial government objectives that Crown corporations are intended to serve, it is essential to understand the revenue and expenditure implications to the government as a whole. This requires careful consideration of impacts on other Crown corporations and provincial ministries as well as the Crown corporation itself.

In some cases it will be appropriate to evaluate the financial implications from other perspectives. In particular, for projects with significant municipal involvement or effects, impacts on local government revenues and expenditures should also be documented.

The principal summary measure of financial performance is the discounted sum of the annual net revenues, i.e., the net present value (NPV), to the Crown corporation and the government as a whole. The NPV indicates the magnitude of the financial net benefit or cost from each perspective.\footnote{Individual Crown corporations may also wish to calculate and use other measures of performance as well. For example, the NPV per dollar of capital expenditure can be useful in ranking alternatives where a Crown corporation is subject to an overall capital constraint. The payback period can be useful in highlighting vulnerability to uncertain future events.}
Documentation of Financial Performance

<table>
<thead>
<tr>
<th>Year</th>
<th>Crown Corporation</th>
<th>Rest of Provincial Government</th>
<th>Local Government</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present Value</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is critically important that financial analyses are undertaken and presented in a consistent, comprehensive fashion. While specific modelling and analytical tools will vary, the following guidelines are recommended to promote consistency across all Crown corporations.

- A discount rate of 8% real should be used for purposes of a base case analysis. This is a measure of the opportunity cost of capital that has been proposed in previous B.C. government guidelines and that is currently used by B.C. Hydro.\(^1\)
  
  If a Crown corporation prefers an alternative discount rate, the rationale and implication of it should be presented along with the base case results. Sensitivity analyses at 6% and 10% real should be undertaken to determine the effect of

---

1 There is a need to review both the level and the application of the discount rate. With respect to the level, there is a need to determine whether 8% real is an accurate estimate of the opportunity cost of capital from a provincial perspective. Some argue it is too high and results in an inappropriate bias against long term capital investments. With respect to the application of the discount rate, there is a need to consider whether it would be preferable to use the estimated cost of capital to define annual capital charges and then discount the annual charges and other revenues and expenditures at a lower rate of discount reflecting society’s rate of time preference between current and future income. Some argue this more appropriate and is better suited to integrating consideration of long term environmental effects. These issues will be reviewed and discussed in future meetings with representatives of the Crown corporations.
differences in the assumed cost of capital on the financial implications of the alternatives.

- The estimated financial impact on the Crown corporation should reflect the incremental effect of each alternative on the total system revenues and expenditures as opposed to the capital and operating expenditures of the alternative considered on its own. These system implications should be forecast over a sufficiently long planning period to capture all significant effects.

- Impacts on government should reflect “first order” effects, i.e. direct payments made to the provincial (or local) government or other Crowns and direct expenditures incurred to provide specific services or infrastructure. Because of the many other factors governing total economic activity, government financial impacts should not include revenues and expenditures resulting from a change in total employment, population or sales in the economy.

- In discounted cash flow analysis, expenditures do not include interest payments or depreciation. Capital expenditures are reported on a cash flow - as incurred - basis. However, any differences in the asset mix at the end of the planning period should be reflected by an estimate of its remaining or salvage value. This can be captured by crediting in the final year of the planning period, the depreciated replacement cost of any newly acquired assets.

- A number of key assumptions (e.g. with respect to economic growth, population and prices) will generally be required in the analysis. These should be explicitly identified, and sensitivity analyses undertaken as considered appropriate. Over time, it is expected that representatives from the different Crown corporations and relevant government agencies will meet to discuss common data requirements in order to develop a common set of base case assumptions.

4.2.2 Customer Service

Customer service implications should be documented on the basis of an assessment of the benefits and costs that the Crown corporation’s customers face as a result of any change in the quantity, quality or terms and conditions (e.g. price) of the services provided.

When service changes affect customer groups differently, customer service implications should be documented from the perspective of the different groups. This could require, for example, evaluations from the perspective of participant versus non-participant
The assessment of customer benefits and costs can be done in monetary or non-monetary terms. An assessment in monetary terms requires forecasts of the annual changes in the net value that customers attach to the services provided (i.e., the maximum amount they would be willing to pay) less the expenditures they incur for it. The present value of the annual net changes in total willingness to pay less expenditures provides a summary monetary measure of the customer service implications.

**Documentation of Customer Service Implications**

| YEAR | Participants | | Non-Participants | |
|------|--------------|------------------|------------------|
|      | Maximum Willingness to Pay | Actual Expenditures | Net Benefits | Maximum Willingness to Pay | Actual Expenditures | Net Benefits |
|      |                     |                   |              |                     |                   |              |
|      |                     |                   |              |                     |                   |              |
|      |                     |                   |              |                     |                   |              |
|      |                     |                   |              |                     |                   |              |
|      |                     |                   |              |                     |                   |              |
|      |                     |                   |              |                     |                   |              |
| Present Value | | | | | |

1 In economic terms the maximum willingness to pay less actual amount paid is called consumer surplus. The monetary measure of the customer service implications is therefore the forecast annual change in consumer surplus.

2 One could argue that a “time preference” discount rate should be used to calculate the net present value of the customer service implications. As noted in footnote 1, p. 11, the manner in which this should be done will be subject to future review and discussion. In the meantime, the present value of customer service implications should be calculated at the same rate as the financial performance to provide consistent comparisons.
In order to develop monetary measures of customer net benefits, one needs to estimate the maximum amount that customers would be willing to pay for the service provided. Often, estimates of this are developed based on what analysts believe customers should be willing to pay based on avoided costs. For example, estimates of the maximum willingness to pay for transit services have been based on avoided auto and parking costs. Such estimates, however, can be unreliable. They may not capture all of the factors bearing on customers’ valuation of the goods or service provided.

If an attempt is made to develop monetary estimates of net benefits, it is recommended that estimates of maximum willingness to pay be based on market research of customer preferences and values, or on estimated market demand curves which indicate what people do in fact appear willing to pay for different quantities or quality of particular goods and services. This is likely to be more reliable than the avoided cost approach.

Where market research or demand curves are not available, it may not be possible to develop, with any reasonable degree of confidence, monetary estimates of the changes in customer net benefits. Under such circumstances, customer service implications should be documented in non-monetary terms. This can be done by first identifying the nature of the customer service benefit (or disbenefit) and the number of customers affected, and then assessing in qualitative terms its significance. While the results of this assessment cannot be directly compared to the financial implications, it should provide an understanding and perspective of the customer service implications. This can be important in any evaluation of trade-offs between financial performance and customer service.

If customer service implications are documented in non-monetary terms, critical value analysis can be used to analyze their significance. Differences in financial performance between two alternatives determine the critical value that the customer service differences would have to be worth for the customer service implications to outweigh the financial account. The qualitative assessment should be designed to assist management and Board members in
determining whether and why any customer service differences between alternatives are in fact worth that critical amount.

4.2.3 Environment

There is a wide range of environmental impacts that could be relevant in Crown corporation capital and operating expenditure decisions, including, for example: pollutant emissions to land, water and air, solid or hazardous waste, land and natural resource use, and wildlife and habitat impacts. The nature, magnitude and other important characteristics of these (or any other relevant) impacts should be documented under this account. The effect of these impacts on human health, commercial and non-commercial resource use, and aesthetic, ecological and cultural attributes of the environment should also be presented.

The environment account is not intended to replace or fully incorporate detailed environmental impact assessments which must be undertaken to design and implement projects. Rather it is intended to document major biophysical and natural resource impacts in order to make explicit any key trade-offs that management and Boards should consider in their deliberations.

The nature and significance of the environmental impacts will generally vary depending on the perspective. The documentation should indicate the environmental implications from a local, regional, and provincial perspective. Where relevant (e.g. with respect to greenhouse gases), a global perspective should also be presented.

The significance of the environmental impacts can be assessed in monetary or non-monetary terms. Assessment in monetary terms requires developing estimates of the social external cost (or benefit) that the documented effects on health, resource use and environmental
attributes entail. A variety of techniques and estimates are available for this. It is expected that representatives from different Crown corporations and government agencies will meet to share available estimates and research in this area.

If cost estimates are available or can be developed, the present value of the annual costs (or benefits) should be calculated in order to provide an “order of magnitude” measure of the environmental implications. However, monetary estimates are often not available nor easily and reliably developed. In such circumstances, a qualitative assessment of significance should be undertaken, indicating, for example, the severity of the impacts, or their relative importance in the context of provincial policy goals and interests.

**Documentation of Environmental Impacts**

(by type of impact)

<table>
<thead>
<tr>
<th>Year</th>
<th>Local</th>
<th>Regional</th>
<th>Provincial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Present Value or Qualitative Summary**

---

1 Social external cost refers to the amount people would have to be compensated to offset an adverse impact or be willing to pay to maintain a resource or environmental attribute in an alternative (e.g. non-impacted) state. For a discussion of these concepts, see R. Mitchell and Carson, *Valuing Public Goods: The Contingent Valuation Method*, Resources for the Future, 1989.

2 These include net output loss, damage cost, travel cost, contingent valuation and hedonic pricing methods.

3 Again one might argue that a time preference rate of discount is more appropriate for this present value calculation than a higher cost of capital-based rate. As noted earlier, this will be reviewed. In the meantime, the same discount rate as used elsewhere in the evaluation should be used here.
The qualitative assessment should serve to provide an understanding and perspective of the environmental implications, and assist in the resolution of environmental trade-offs. As with the customer service account, it can be helpful to determine the critical value the key impacts would have to amount to in order to outweigh advantages (or disadvantages) on other accounts. For example, if one alternative entails a financial or customer service advantage but entails more air pollution, one should calculate what the cost of the air pollution would have to be (e.g. $/tonne of pollutant) to offset the specified advantage. The assessment could then address whether it is reasonable for the air pollution cost to equal or exceed the critical amount.

### 4.2.4 Economic Development

Economic development implications of alternative projects are often documented by estimating the direct and indirect income and employment impacts they entail. However, it is important to recognize that income and employment *impacts* are not the same as *benefits*. The creation of jobs in high growth areas may simply serve to increase congestion and bid up the price of labour, particularly for relatively scarce skilled trades. The creation of jobs for a short duration may give rise to social costs if there are not continuing employment prospects in the same general trades or occupations in the region.

The primary focus of the documentation under this account should be on the net benefits, not gross impacts, that new employment or economic activity provides. This requires an assessment of the manner or extent to which the alternatives generate or contribute to an increase in sustainable income opportunities. The documentation of impacts should be from both a regional and provincial perspective.

As in the previous two accounts, the assessment of economic development benefits may be done in monetary or non-monetary terms. A monetary measure of benefit can be developed by estimating the *incremental* income generated by each alternative -- i.e. the increase in pre-tax income accruing to persons who would otherwise be unemployed or underemployed. The higher the unemployment rate in the region or occupations where the employment is
generated, the greater will the incremental income benefit be. The present value of the annual incremental income benefits provides a summary monetary measure of performance under this account.

**Documentation of Economic Development Impacts**

*(Incremental Income)*

<table>
<thead>
<tr>
<th>Year</th>
<th>Regional Perspective</th>
<th>Provincial Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present Value or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statement of Significance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

An alternative approach is to provide a qualitative assessment of the economic development implications. This could include an assessment of the significance of any employment impacts based on forecasts of employment conditions. It should also include explicit consideration of the manner or consistency with which the alternative contributes to long run economic development objectives in the affected regions and sectors. This can be very useful in integrating Crown corporation activities with broader regional and provincial economic development planning.
4.2.5 Social

As with the environmental account, the purpose of the social account is not to fully incorporate detailed social impact assessments. Rather it is to document the major community or distributional impacts and trade-offs that the alternatives may entail.

Precisely what is documented here will vary depending on the nature of the alternatives under consideration. It could include impacts on community population stability, services and quality of life. It could also include income distributional or equity considerations. It should not, however, include impacts already documented under the other accounts (e.g. local government financial effects).

It is not recommended to attempt to develop monetary measures of social impacts (e.g. willingness to pay for positive effects or compensation demanded for negative ones). Rather, this account should simply serve to identify the nature of the effects and to provide an assessment of their significance.

4.3 Presentation of Results

The multiple account evaluation is intended to indicate the major financial, customer service, environmental, economic development and social implications of the alternatives. In order to communicate this information in a clear and consistent way, the key findings should be presented in a summary matrix of results.
The summary matrix highlights the advantages and disadvantages of the different options and the trade-offs they may entail. It can be used to define critical values -- i.e. the amount that a non-monetized advantage or disadvantage would have to be in order to offset identified financial effects. This, in conjunction with qualitative assessments of significance, can help decision-makers resolve trade-offs in an informed way.

By identifying advantages and disadvantages, the summary matrix may also suggest reconfigurations of projects that better serve all accounts. A project with significant financial advantages, but serious environmental impacts may be improved by greater investment in mitigation. Or, a project with large apparent customer service benefits but poor financial performance may be enhanced by different pricing strategies.
5.0 RISK AND UNCERTAINTY

Virtually all plans and projects are subject to uncertainty and consequent risk. A critical component of any evaluation is an explicit recognition and assessment of risk. This is particularly important for plans and projects of long duration or with largely irreversible implications.

The assessment of uncertainty and risk should serve two basic purposes:

(i) it should clearly identify the sources and nature of the risk facing different alternatives and the impact on the evaluation results; and

(ii) it should evaluate the flexibility of the different alternatives to respond to uncertain, unfolding events, and how this flexibility can be managed and enhanced through appropriate risk management strategies.

5.1 Sources of Risk

There are numerous sources of uncertainty than can raise significant risk with respect to the performance or outcome of different alternatives. These include uncertainty with respect to:

- economic, demographic and market factors;
- technological performance and duration;
- environmental impacts; and
- political and regulatory constraints.

The risk assessment should identify which factors are subject to considerable uncertainty and what effect they can have on financial and other evaluation results. Identifying the factors which are subject to considerable uncertainty requires a careful review of the basis for the assumptions employed in the evaluation. To determine what effect variations in these assumptions may have on the evaluation results, sensitivity or scenario analysis can be used. Sensitivity analysis involves analysing the effect of the change in a particular value or
assumption. Scenario analysis involves analysing the combined effect of the change of a whole set of assumptions (e.g., in terms of optimistic or pessimistic scenarios). For major complex projects more sophisticated risk assessment techniques like Monte Carlo analysis can be used.

5.2 Risk Management Strategies

Once the source and extent of the risks have been identified, it is important to identify and assess risk management strategies available to the different alternatives that can mitigate downside and enhance upside potential.

An important factor that governs the risk management potential of different alternatives is the flexibility they offer. Flexibility refers to the extent to which different alternatives can respond to and benefit from any new information that emerges over time. An assessment of flexibility and the risk management opportunities it affords should be considered along with the multiple account evaluation in the overall assessment of the advantages and disadvantages of different alternatives.

---

1 Monte Carlo analysis involves simulating outcomes based on a random selection of values for uncertain, underlying variables. Large numbers of simulations determine a range and probability distribution of results.

2 Flexibility can be analyzed in quantitative or qualitative terms. A quantitative measure is the “quasi-option value” or expected value of new information the alternative affords. This is calculated by multiplying subjective estimates of the probability of new information times the value (incremental benefit or avoided cost) of the best available response to it. Generally, attenuated, smaller scale projects offer much greater flexibility values because of the opportunity to change during the course of the program. Irreversible measures offer no flexibility value.
6.0 CONCLUSION

The multiple account evaluation guidelines outlined in this report are designed to provide management and Boards with the criteria and decision-making framework to make consistent and well-informed choices among alternatives. They should provide for the Boards:

- the planning context;
- a clear identification of the problem or opportunity;
- the full range of alternatives;
- a summary of their financial and other relevant implications;
- an identification of the risks and risk management strategies.

As stated at the outset, this information will not generally determine which alternative is unequivocally preferred. It is designed to inform, not supplant, decision-making.

It will be up to management and Boards to utilize this information systematically and effectively within their own decision-making framework. Management and Boards will have to consider the relative weight to put on different accounts. They will have to decide on the degree of risks they are willing to accept.

Trade-offs will generally have to be made. However, the information available to the Boards should facilitate a clear understanding and perspective of the trade-offs. They can then be explicitly recognized and resolved in a manner consistent with the mandate, goals and strategies of the corporation.