

**ENVIRONMENTAL ASSESSMENT OF POLICY
THROUGH BUDGETARY ANALYSIS:
CONCEPTUAL FRAMEWORK AND METHODS**

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Abstract

The need to apply environmental assessment to government policies that encourage environmentally damaging human behaviour is now generally accepted by leading environmental experts. Currently, however, few methods exist for conducting such environmental assessments. Part of the problem lies in the complexity of the policy-making process, which confuses the identification of "policies." This problem of policy identification can be partially overcome by focusing on the most tangible statement of government policy: the budget.

This report begins with a rationale for why government budgets are the most appropriate unit of analysis for performing environmental assessments on government policy. Next, a literature review is conducted on the methods for assessing the environmental effects of policy. This is followed by a synoptic conceptualization of the interactions occurring among budgetary policies, human economic behaviour, natural life support systems, and political systems. Findings from the literature review and the conceptualization are used to guide the search for methods of assessing the environmental implications of government policy through budgetary analysis. The paper concludes with a discussion of promising directions for future research.

Résumé

Les principaux environmentalistes s'accordent aujourd'hui à dire qu'il est essentiel de déterminer, par le biais d'études, l'impact qu'ont sur l'environnement certaines politiques gouvernementales encourageant des comportements humains dommageables. À l'heure actuelle, il existe toutefois peu de méthodes pour procéder à de telles études. Le problème s'explique en partie par le processus complexe d'élaboration des politiques qui empêche parfois de cerner ce qui constitue vraiment les «politiques». Ce problème peut être partiellement résolu en se concentrant sur l'aspect le plus tangible des politiques gouvernementales: le budget.

Le présent article commence par un raisonnement expliquant pourquoi les budgets des gouvernements constituent un **barème** d'analyse approprié avec lequel on peut déterminer l'impact que certaines politiques gouvernementales peuvent avoir sur l'environnement. Le raisonnement est suivi d'un **examen** de la documentation **traitant** des méthodes actuellement **utilisées** pour déterminer l'impact sur l'environnement de ces politiques. Cette section est suivie d'une vue d'ensemble de l'interaction entre les politiques **budgétaires**, le **comportement** économique humain, le **système** de survie de la nature et les **systèmes** politiques. Les **résultats** de l'examen de la documentation et de la conceptualisation sont ensuite utilisés pour élaborer des méthodes pour **évaluer** l'impact environnemental des politiques adoptées par les gouvernements, par l'analyse des budgets qui y sont **alloués**. L'article se termine par une discussion sur les directions que pourraient possiblement prendre les futures recherches.

A nation's annual budget establishes the framework of economic and fiscal incentives and disincentives, including all forms of taxes, within which corporate leaders, businessmen (sic), farmers and consumers make decisions. It is perhaps the most important environmental policy statement that any government makes in any year, because in their aggregate these decisions serve to enhance or degrade the nation's environment and to increase or reduce its stocks of ecological capital. It is also the single strongest statement of the government's real, as opposed to its rhetorical, agenda. The budget should be regarded as an environmental statement (McNeill 1989).

1. INTRODUCTION

In 1987, the World Commission on Environment and Development (WCED) advocated a tighter integration of economic and environmental concerns through the concept of "sustainable development." The WCED (1987, p.43) defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." To achieve sustainable development, the WCED suggested society needed a new approach to environmental policy. It called the old approach the "standard agenda." With this approach, the government focuses laws and institutions on abating the adverse environmental effects of human activity. In the late 1960s and early 1970s, many countries adopted the standard agenda as their main approach to environmental policy. This reactive approach still dominates the environmental policy arena today (Heidenheimer et al. 1989). The standard agenda has achieved some minor successes. There is, however, a growing recognition that epiphenomenal social, economic, and environmental forces coalesce to overwhelm environmental standards. Because of the failure of standards, the quality of the environment continues to worsen. In contrast, with the new approach, the emphasis shifts to modifying the institutions and policies that are the source of those effects. The new approach, in other words, would be anticipatory. Following the WCED, many leading environmental experts now agree on the need for an anticipatory approach to environmental policy (cf. Speth 1988, Commoner 1990, Bregha et al. 1990, Brown 1991).

As one component of this anticipatory approach, some experts and governments have endorsed the idea of applying environmental assessment (EA) to government policies and programs (Bregha et al. 1990, Bridgewater 1989, McNeill et al. 1991, Federal Environmental Assessment Review Office 1990). Currently, however, few methods exist for conducting such EAs. Part of the problem of developing new methodologies for policy EA lies in determining what represents a government's real policy. The policy identification problem results from three complex phenomena present in the policy process: policentricity, incrementalism, and ambiguity. Policentricity occurs when a policy decision exerts web-like effects on many other policy areas (Tuohy 1989). For example, an energy policy decision affects other policy areas such as fiscal management, regional development, social/employment, and environmental policies (Doern 1990). Incrementalism complicates matters further, since "it is never totally clear when a policy process is truly 'beginning' or whether one is merely engaged in a series of marginal changes as opposed to fundamental reviews" (Doern 1990, p.4). Ambiguity results from the efforts of a government to appease competing interests. A government often makes ambiguous statements in support of seemingly conflicting policies. In turn, the government gives these conflicting policies varying levels of support--some receive funding commitments and others receive nothing more than rhetorical statements. Ambiguity thus allows the government to placate conflicting interests by "giving the rhetoric to one side and the decision to the other" (Stone 1988, p.125). In the process, however, ambiguity also makes the identification of a government's real policy priorities a problematic exercise. This policy identification problem can be solved partially by focusing on the government's budget, since it represents the most parsimonious

statement of a government's real, as opposed to rhetorical, policies (McNeill 1989, Dye 1987). Accordingly, the objective of this report is to explore approaches to, and develop methods of, applying EA to policy through budgetary analysis.

To place this report in the context of similar efforts, a literature review on the EA of policy is conducted in Section 2. In Section 3, a conceptual framework is developed. The framework illustrates the interactions occurring among the budgetary processes, economic systems, natural life support systems, and political systems. Findings from the literature review and conceptualization guide the development of methods for performing EA of policy through budgetary analysis in Section 4. In Section 5, the report concludes with a discussion of promising directions for future research. Most of this report addresses environmental management questions in a Canadian context. Nonetheless, the EA methods developed could be transferred to other jurisdictions.

2. ENVIRONMENTAL ASSESSMENT OF POLICY: A LITERATURE REVIEW

A review of the literature reveals a dearth of research on methods of assessing the environmental implications of government policies. Although many have written about the need for such assessments, few have addressed how to apply EA to policy (cf. Bregha et al. 1990, Bridgewater 1989, WCED 1987, McNeill 1989, Ontario Round Table on the Environment and Economy [ORTEE] 1992).

Gardner (1989) evaluates nine approaches to environmental impact assessment, planning, and management against eight substantive and four process principles for promoting sustainable development. Her study provides excellent insights into the strengths and weaknesses of current methods of impact assessment and management. But Gardner does not introduce new methods for assessing the environmental impacts of policy decisions or for integrating environmental considerations into policy-making. Paehlke and Torgerson (1990) delve into the theoretical questions on the definition of environmental problems and the relationship of these problems to the administrative state. Their book includes an article by Bartlett (1990a) that explores how existing EA processes have infused ecological rationality into the administrative state. Bartlett's (1990b) book examines the influence of current impact assessment processes on the formulation and delivery of policy, but does not include any new methods for applying EA to policy. Boardman's (1992) book contains many insights on the politics and administration of environmental policy in Canada, but it contains no specific articles on the EA of policy. Others use comparative analysis to assess and explain cross-national variations in the style of and approach to environmental policy in Great Britain, Europe, the United States, Canada, and Japan (Vogel 1986, Illgen 1985, Brickman et al. 1986, Hahn 1989, Heidenheimer et al. 1989). Serafin et al. (1992) identify and evaluate the methods of and theory behind post hoc assessment of resource and environmental management programs. Their work gives some general insights on how to assess the adequacy of environmental programs. These insights, however, do not lend themselves to the assessment of government programs that might encourage environmentally destructive behaviour. More generally, a large body of literature exists on the environmental ramifications of specific government policies (see, e.g., Shoard 1982 on agriculture, Pollution Probe 1991 on policies promoting automobile use, Repetto et al. 1988 on forestry subsidies, and Royal Commission on the Future of the Toronto Waterfront 1992 for a bioregional assessment). There is another large and diverse body of literature on methods of financial and budgetary analysis, with some emphasis on environmental policy (see, e.g., Swartzman 1982 for a study on use of cost-benefit analysis on environmental policy and Opschoor and Vos 1989 on the use of environmental charges in industrialized countries).

The above literature on environmental assessment and policy provides necessary but not sufficient background for improving our understanding of how to apply EA to policy. To gain a better understanding of the key issues, next we will explore in detail the literature that deals directly with applying EA to policy.

Integrating Environmental Considerations into the Formulation of Policy

Bregha et al. (1990) assert that an effective integration of environmental considerations into policy-making implies the government must consider these factors *during the* formulation of policy. This approach represents a significant departure from traditional project level EAs where the government grafts an additional layer of decision-making apparatus into the existing decision-making structure. In theory, this traditional approach infuses environmental rationality into decision-making by making project proponents responsible for the environmental impacts of their actions. In practice, however, the traditional approach suffers from two key problems. First, EA usually enters the decision path of a proponent too late in the process to exert a real influence on decision-making. Second, project proponents have spent considerable time and effort attempting to eliminate this hurdle by seeking exemptions (Puschak 1985, Jerrett and Smithies 1990). Consequently, project EAs have largely failed to alter the way proponents make policy decisions. As a result, these assessments tend to centre on choosing the least damaging alternative from a limited array of options and on how to minimize the impacts of the chosen alternative (Bregha et al. 1990). The salient question of whether the policy that spawned the project is environmentally sound remains unasked. Sometimes, critics question the “need” for the project, which usually touches on the policy or policies underlying the project. Unfortunately, when questions of need touch on policy issues, the project assessment often becomes mired in acrimonious arguments that cannot be resolved during the project review or hearing. With this process in mind, Livingston (1990) argues that EA is nothing more than a “mug’s game” designed to facilitate contentious projects by assuaging public concerns with technocratic double-talk.

Bregha et al. advocate the consideration of environmental factors during the formulation of government policies to overcome the problems inherent in the project-level approach to EA. In other words, to afford environmental considerations their due weight in policy-making--which presumably is a primary goal behind the EA of policy--institutional mechanisms must be built into the formulation process of government policy-making. Beyond giving the environment a higher level of protection, this method of EA probably would improve the efficiency of the government policy-making process by reducing the number of projects requiring an EA.

As Bregha et al. suggest, however, integrating environmental considerations into policy formulation does not imply that reform efforts should concentrate solely on policies in the formulation stage. To the contrary, other administrative and methodological adjustments to the decision-making structure of government can be used indirectly to affect the formulation of policy. On this issue, they emphasize the necessity of improving accountability for decisions affecting the environment. Establishing an institutional advocate for the environment, modelled after the Auditor General, is one promising recommendation they make. An environmental auditor could influence the formulation of government policy by holding government decision-makers accountable for the environmental implications of past decisions. The possibility of public scrutiny would, in theory, increase the political incentive to integrate environmental considerations into policy.

Integrating Environmental Considerations into Policy through Indirect Feedback

Bridgewater (1989) agrees that the integration of environmental considerations into policy formulation is the preferred long-term goal. In contrast to Bregha et al., however, Bridgewater contends EA on policy must necessarily work indirectly on the formulation of policy through an ex post facto assessment. Ex post facto EA of policy would help to inject environmental factors indirectly into the formulation of policy. The integration of environmental concerns into policy formulation will require changes in the organizational structure of government, in the attitudes of the actors in the process, and in the expertise of the people who make up the system. Organizational and attitudinal changes of this magnitude take a long time to accomplish.

Based on this analysis, Bridgewater develops a model to guide the search for methods of policy EA. Bridgewater's bases the model on the premise that scientific "facts" for analyzing the implications of policy are often unavailable. Consequently, analysts must employ imagination and judgement as complements to logic and scientific data.

Bridgewater makes another worthwhile observation about the impossibility of developing one type of assessment for the many different types of policies. In response to this problem, Bridgewater develops a categorization containing three types of policies, each with a different linkage to the environment. She gives energy, agricultural, land use, and parks policies as examples of Category 1 policies. These policies link directly to the environment. For Category 2 policies, she gives taxation, agricultural subsidies, unemployment insurance, and transportation policies as examples. For this Category, the policy influences the environment indirectly. Impacts are transferred from policy to the environment through socioeconomic media. This type of policy also affects the government's ability to manage environmental problems. This indirect linkage to the environment and to the government's environmental policy makes the assessment of impacts from these policies more difficult than those in Category 1. For Category 3, Bridgewater identifies policies that are the driving forces behind project assessments. These include the following candidates for assessment: energy, transportation, regional development, national parks, defence, and "in the national interest." For this Category, Bridgewater suggests identifying the environmental impacts through project EAs. Once systemic impacts become evident, the government could then feed the results back into the policy or policies that generated the project. This categorization contains some ambiguities; e.g., how would one differentiate between policies in Category 2 and 3? Nevertheless, it gives us some useful insights about the possible linkage between policies and the environment.

Assessing Multiple Policies in a New Standard Format for Environmental Policy Analysis

Westcott's (1992) methodological search deals mainly with developing a new "standard format" for environmental policy analysis. Using the essential features of environmental impact statements and environmental management plans, Westcott develops a standardized format and applies it to the coastal management policy in Victoria, Australia. Figure 1 on the following page illustrates the framework developed by Westcott. In many ways, it resembles the traditional process followed in project level EAs. Westcott's approach differs, however, due to his emphasis on the complex of explicit and implicit policies from all levels of government that apply to the particular resource or bioregion in question. From this comprehensive analysis, he infers the defacto policy from the many policies that exist. Westcott then uses the frameworks of the world, national, and state conservation programs to establish the criteria against which to evaluate the Victoria's coastal policy.

Figure 1 The Recommended Format for Environmental Policy Analysis

1. A description of the current environment
 - 1.1 Biophysical environment
 - 1.2 Social and economic environment
 - 1.3 Administrative and legislative environment
 - 1.4 Political environment
2. Assessment of current policy
3. Objectives(s) for policy area
4. Alternative policy positions available
5. Criteria for selection between alternative policies
6. Selection and jurisdiction of preferred policy
 - 6.1 Selection/justification of preferred policy
 - 6.2 Description of preferred policy
7. Implementation of the preferred policy

Source: (Westcott 1992)

This standard format for environmental policy analysis shows promise due to its emphasis on drawing together disparate policies that could affect a resource or region. The ubiquitous character of environmental problems and solutions demands a broad focus, since these problems tend to cut across administrative and jurisdictional boundaries (Norton 1992). Although this approach has potential, Westcott's efforts remain closely aligned to traditional EA, and he has not supplied new methods per se. Westcott's main contribution is the way in which he encourages analysts to cast their net more broadly over the entire complex of policies affecting a specific resource or bioregion.

A "Rational" Approach to Assessing the Environmental Implications of Policy

The United Kingdom (UK) Department of Environment (1991) published a handbook entitled, **Policy Appraisal and the Environment**. The handbook emphasizes the need to appraise the environmental implications of policy at all stages of policy formulation, implementation, and evaluation, which is a useful recommendation. This handbook will prove useful for those unfamiliar with the use of cost-benefit and multi-objective evaluation in an environmental context. It falls short, however, of supplying new methods for assessing the environmental implications of government policy.

A key limitation of the handbook relates to its reliance on the traditional welfare economics approach to policy analysis, which relies on the "rational" decision-making framework. Rational decision-making is the prevalent decision model underlying most EAs and usually includes the following stages: problem definition, a description of the current or baseline conditions, an identification of the alternatives available to address the problem, an identification of criteria for evaluating and choosing among the alternatives, and some selection of a preferred alternative (see, e.g., Ontario Environmental Assessment Act, Section 5(3) R.S.O. 1980, Gibson 1989, Whitney and Maclaren 1985).

There is a serious drawback, however, to the "rational" approach as it is conventionally applied. This approach rests on the belief that the means for achieving a given policy can be separated from the actual policy objectives or ends. In cases where the policy is minor and impinges on only a few other policy arenas or existing institutions, insights can be gained from this linear approach to policy analysis. Many leading policy analysts now, however, see the means-end relationship as a two-way, iterative relationship. In other words, the means available for implementing policy influence the choice of ends and vice versa (Bromley 1991). With specific reference to the budgetary process, Wildavsky (1992, p.440) discusses how the means can affect the ends:

The question cannot be 'What do you want'--as if there were no limits--but should be 'what do you want compared to what you can get?' After all, an agency with a billion would not only do more than it would with a million but might well wish to do something quite different. Resources affect objectives as well as vice versa.

Likewise, an agency that defines its ends in a politically appealing manner may improve its ability to obtain the means to achieve its ends. Thus, the UK handbook will help policy-makers unfamiliar with traditional environmental and economic evaluation techniques. It will do little, however, to advance the theory and practice of policy EA.

Assessing the Environmental Implications of Budgets: A Principled Approach

In its study, Resource Futures International (RFI) (1991) performs an EA on the following three policy areas in the 1991 budget of the Government of Canada: energy, agriculture, and regional and industrial development. RFI's analysis includes a review of the Government's revealed priorities through

expenditure analysis. After identifying the spending priorities, RFI evaluates the spending patterns against environmental principles such as “environment-economy integration” and “anticipating and preventing environmental problems before they occur.” The principled approach used by RFI supplies a simple yet effective means for exposing government spending and taxation policies that militate against the maintenance and enhancement of environmental quality.

The principled approach receives high marks for practical reasons. As RFI shows, methodologies for conducting a detailed audit of government policies simply do not exist. RFI gives the example of assessing different approaches to energy policy. Specifically, no generally accepted methods exist for comparing diverse risks such as the loss of wildlife habitat (from hydroelectric and oil and gas development) and exposure to radioactivity (from nuclear generating stations). The principled approach overcomes these methodological problems by comparing specific policies against environmental principles that, if followed, would result generally in more sustainable forms of development.

Another problem the principled approach avoids can be illustrated by looking at the example of the EA of Ontario Hydro’s Demand-Supply Plan (DSP).¹ In the DSP, Ontario Hydro evaluates the environmental implications of different demand-supply scenarios for meeting Ontario’s needs for electricity over the next 25 years. Generic assessments of, say, hydroelectric versus nuclear were useful for informing the government and the public about the types of impacts each generating facility might cause. These assessments, however, gave little information on the specific impacts associated with the facilities. This shortcoming occurred because of the impossibility of fully assessing the impacts of these facilities without site-specific information. As a result, the assessment of generic options became a circuitous and largely frustrating process. On the one hand, it could not be decided which type of facility would be preferred without the site-specific information. On the other hand, it could not be decided what sites would be used without knowing which type of facility would emerge as the preferred alternative. This confusing interdependence between generic and site-specific assessments would, no doubt, plague many similar attempts to assess generic policy options. In short, it is impossible to compare the impacts of generic policy paths, with full knowledge. Site specific information is needed to assess all the impacts at a level of detail that can be used to guide many human actions that affect the environment (Norton 1992).

These methodological and conceptual problems highlight the attractiveness of refining RFI’s principled approach. Site-specific information is always necessary for comparing different options, but it is tenable to compare generic options for compatibility with environmental principles.

Lessons from the Literature

What lessons can we learn from the literature on the EA of policy? First, as a long-term goal, integrating environmental considerations into the formulation of government policy is the most desirable direction for reform initiatives to take. Not only does this approach get at the causes of environmental degradation, but it also could lead to fewer gridlocks at the project implementation stage. Second, such integration will take a long time to accomplish. In the short term, it might be more practical to audit previous decisions to supply feedback into the policy process. This approach would influence the formulation of the new policies and could help to educate decision-makers in the policy process. Third, the traditional approach

¹ As an environmental planner in the Approvals Branch of the Ontario Ministry of the Environment, I reviewed many aspects of the DSP, which is where this problem became apparent. Information on the DSP can be obtained from Ontario Hydro, the Ontario Environmental Assessment Board, and the Environmental Assessment Branch of what is now called the Ontario Ministry of the Environment and Energy.

to policy analysis, with its means-end dichotomy, may prove less useful in the iterative policy process. Instead, the iterative, two-way relationship between policy ends and the means for achieving those ends must be **recognized** in the design of the assessment methods and processes. Fourth, it will often be necessary to infer the defacto policy toward the environment affected from the complex of existing policies. In a federal system such as Canada's with the many overlapping and ambiguous jurisdictional responsibilities, inferring a defacto policy from the entire network of policies complicates matters considerably. Fifth, it is likely that different types of assessment will be necessary to cover the variations present in the policy process. In other words, some recognition of the various types or categories of policy appears necessary. Sixth, accepted methodologies are often incapable of dealing with the complexities inherent in generic policy assessments. In these instances, it might be necessary to extend assessments beyond the "objective" and "technical" considerations that have dominated project assessments. To fill these technical holes, assessors could employ imagination, judgement, and environmental principles to guide the assessment process. By making normative principles explicit, however, the government runs the risk of creating policy conflicts. Ambiguity over the underlying principles often provides an essential lubricant to the policy process by allowing actors with different interests to coalesce around specific issues (Stone 1988). In the next section, a conceptual framework is developed. The framework illustrates how budgetary policies translate into environmental impacts and vice versa.

3. CONCEPTUALIZATION OF RELEVANT SYSTEMS AND THEIR LINKAGES

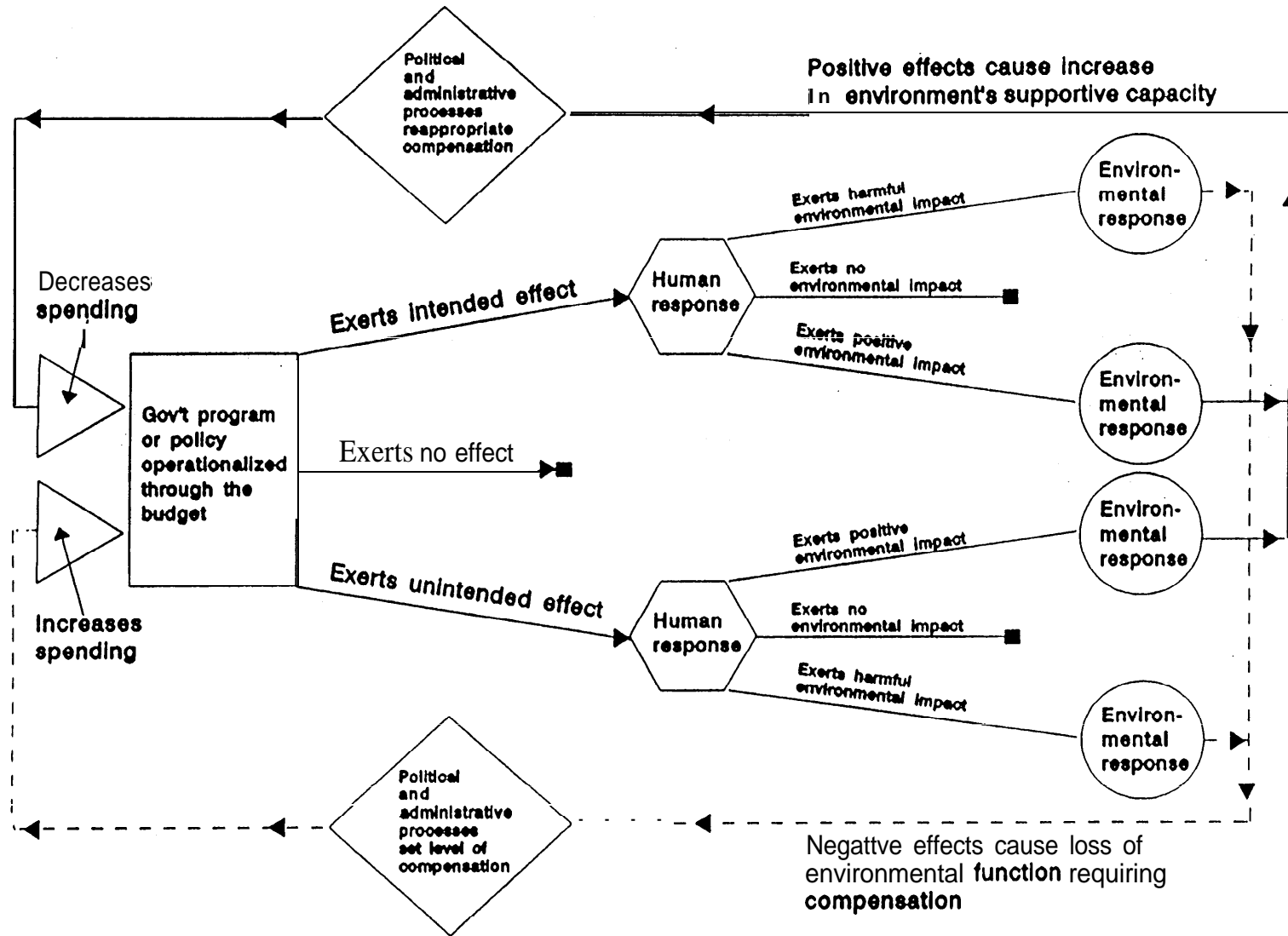
The first step in establishing a framework for applying EA to policy² through budgetary analysis involves a conceptualization of the possible interactions occurring among relevant systems. A better understanding of these systems and the interactions among them will assist in the design of EA methodologies with the greatest possibility of successful implementation. Figure 2 illustrates the component systems and their possible linkages. As illustrated, once the government operationalizes its policies through the budget, they can modify human behaviour. The extent to which a policy modifies human behaviour also depends on other socioeconomic factors such as market conditions and individual preferences. The resulting change in human behaviour can and often does accumulate in time, or space, or both, to cause some environmental response. When the response is large enough to influence the supply of environmental services valued by humans, this response often translates into political action directed at adjusting the level of compensatory expenditures. The government can make compensatory expenditures directly. Or, alternatively, the government can command or persuade private firms and individuals to make these expenditures (cf. Huetting 1980, Tuohy 1989).

Figure 2 illustrates how budgetary policies that translate into negative environment impacts can produce further budgetary expenditures, which compensate for the loss of environmental function. If the

² Based on the literature review in the **preceding** section, it is clear that the ultimate goal of assessing the environmental implications of government policy is to integrate environmental considerations into the policy, regardless of whether it is through direct integration in policy formulation or through indirect feedback obtained through ex post facto assessments of policy outcomes. The term "EA of policy" is used in the remainder of this paper for the convenience of language, but it must be understood to mean methods for achieving the ultimate goal of integrating environmental considerations into government policy. It should also be noted that, in some cases, the intent will be to integrate environmental considerations into policy by assessing programs. Programs are taken to mean a more specific and operationalized form of policy, i.e., they usually have staff and resources attached to them.

Figure 2

Conceptualization of Interactions Among Budgetary Policies, Human Economic Behaviour, Natural Life Support Systems, and Political Systems



compensatory expenditures begin to place a drain on the economy by siphoning scarce resources away from other needs, it is possible that these actions also can induce the government to spend money to compensate for the economic losses (e.g., welfare and unemployment insurance as a result of the collapse of the Canada's East Coast fishery). As increasing amounts of money go to non-productive uses, the likelihood of declines in economic productivity also increases. In turn, the government's ability to raise revenues for environmental and other programs also diminishes.

In other words, the budgetary expenditure and revenue policies can set in motion a process of "cumulative causation." (See Kapp 1963 for a pioneering discussion of this process and Sonntag et al. 1987 and Contant and Wiggins 1991 for more recent discussions on cumulative causation and effects). Cumulative causation refers to the interaction of "several factors that move the social system in the same direction as the initial impulse only faster" (Kapp 1963, p.26). For example, if the market failures such as externalities create incentives that promote environmental degradation, government subsidies to the actors causing the degradation could combine with market incentives to increase the pace of environmental degradation. When the process of cumulative causation begins, it becomes difficult, often impossible, to link specific effects to their precise cause or causes. From Figure 2, we can see we are dealing with the interaction among at least four complex systems, three artificial and one **natural**.³ Not only do these interactions dumbfound our existing analytical capabilities, but they also begin to challenge the limits of human cognition.

To complicate matters further, as natural scientists begin to embrace chaos theory, we are witnessing a fundamental change in the human understanding of the natural world. The physical sciences "are moving from deterministic, reversible processes to stochastic and irreversible ones" (Prigogine and Stengers 1984). It is still too soon to extend chaos theory analogously to social systems. If history is any guide, however, innovations in physical sciences may begin to influence the ideas of social scientists (cf. Georgescu-Roegen 1976, Daly and Cobb 1989). Indeed, some have already advocated the need for economics to focus more on irreversible, unexpected events (Clark 1986, Georgescu-Roegen 1976, Boulding 1991). And political scientists have begun to recognize the phenomenon of policentricity, meaning that policy decisions usually have web-like impacts that are impossible to predict fully (Tuohy 1989). If one accepts that social systems behave in chaotic ways as well, then the issue of whether a cause-effect relationship can ever be fully known between a government policy expressed in the budget, human behaviour in the economy, environmental degradation, and political response must be addressed. This is not to say that efforts to model and understand the constituent systems and their linkages are not useful or needed, for certainly they are. Due to **the** complexity involved, however, it is unlikely that our models will be able to supply **predictions** that can withstand the rigours of the policy process (Hare 1985). Because of limitations of our knowledge, we might, for the foreseeable future, have to settle for a second best approach to assessing the environmental implications of government policy. This approach would differ from the current practice of using scientific modelling and other analyses to predict and mitigate impacts of a project. Instead, efforts would concentrate on establishing guiding principles and institutional capacity to steer policy-making down more sustainable pathways.

³ Following Simon (1981), the term artificial has come to mean created wholly or partly by humans.

4. ENVIRONMENTAL ASSESSMENT OF POLICY THROUGH BUDGETARY ANALYSIS: APPROACHES AND METHODS

In this section of the paper, the focus shifts to the development of practical approaches and methods for assessing the environmental implications of policy through budgetary analysis. The breadth of this discussion precludes a rigorous exposition of these approaches and methods. Instead, the intent here is to introduce broad ideas that could be pursued by other researchers in the future.

Understanding the Budgetary Process

Budgeting Defined

Many definitions of budgeting exist in the literature. Looking at the most general definition, “budgeting is concerned with translating financial resources into human purposes. A budget, therefore, may also be characterized as a series of goals with price tags attached” (Wildavsky 1992, p.2). In addition, budgeting must be seen as a process for allocating values among competing interests. For many years, most students of budgeting believed the budgetary process was incremental in nature, but this theory has recently come under attack (Rubin 1988).

Institutionalized Incrementalism

Under the incremental theory, budgeting is seen as a complex process in which time is in short supply and decision-makers possess limited cognitive capabilities. Due to these limitations, decision-makers involved in the budgetary process have difficulty comparing all the expenditures in the budget against a “zero-base.” With zero base assessments, all expenditure must be justified on their current merits with no regard for past decisions (Wildavsky 1992, Rubin 1988). The problems of limited time and cognitive capability force decision-makers to use calculation aids. The central aid consists of reducing the type of decisions made to small, incremental comparisons that use the existing policy as a basis for evaluating changes. Due to incrementalism, a large portion of the budget remains the same from one year to the next. Consequently, the cumulative impact of the entire budget is never fully or strategically assessed. For example, in Canada at the federal level, the “A budget,” which is generally defined as the expenditures required to maintain existing policy and program commitments (Hartle 1988), constitutes about 90% of the expenditures in any given year (Maslove et al. 1986).

Recently, however, scholars have attacked the theory of incremental budgeting. Rubin (1988, p.4) accurately summarizes the criticisms of incremental theory of budgeting in the United States:

Empirical findings have not been consistent with incremental theory. Studies have shown the budget base is not stable (different budget actors define the base differently and change their definitions from year to year); legislators look at things other than the increment; they sometimes compare different forms of expenditures and choose more of one and less of another; agencies’ budget shares change over time; and somehow conflict is expressed and handled in a political, budgetary arena, at least at times. Incrementalism has not done a very good job of explaining these findings because its initial assumptions about human nature or political nature were overstated and their implications overly deterministic.

Critics also point out how governments around the world have attempted to reform the budgeting process to include comprehensive calculations through planning, programming, and budgeting systems (PPBS) and zero-base budgeting (ZBB) (Wildavsky 1992). Most of these attempts have, however, failed due to the cognitive, political, and administrative difficulty of beginning from scratch every year in the case of

ZBB. Or, in the case of PPBS, of annually reviewing all the interrelated program objectives (cf. Wildavsky 1992, Savorie 1990).

Another criticism arises from the current atmosphere of fiscal constraint in many industrialized nations. In the current atmosphere of fiscal constraint, there is growing evidence that the budget base is becoming unstable. Many governments have begun contracting their budgetary base (Wildavsky 1992).

In spite of these criticisms and empirical digressions from the theory, however, incrementalism remains the most accurate description of budgeting processes in Canada. Commenting on 20 years of reform initiatives in the federal budgetary process, Savorie (1990) concludes that attempts to rationalize the federal budgetary process have failed. His main explanation for the failure is the bottom-up, incremental nature of the political decision-making that feeds into and occurs within the budgetary process.

The Implications of Incrementalism for Applying EA to Policy

The incremental and cumulative nature of the budgeting process holds significant implications for the methods of EA needed to integrate environmental considerations into the policy process. More specifically, this theory supports Bridgewater's (1989) idea that, in the short term, ex post facto auditing of budgetary decisions might be the best way of applying EA to policy. Given the incremental nature of budgeting, it might prove impossible for those concerned about the environment to influence, directly, the thousands of incremental budgetary decisions that could affect the environment. With the audit, the objective would be to ensure those responsible for making budgetary decisions recognize that they could be held accountable for the environmental implications of their actions.

The stability of budgetary allocations over time through the incremental budgetary process holds another important implication for environmental management. Temporal stability means that many past priorities may continue to receive large portions of budgetary appropriations, despite the current level of support these issues receive from the electorate (Schick 1988). And when politicians, departments, bureaucrats, and their constituents garner large portions of the budget, they also garner the political power that accompanies massive resources. This makes these groups hard to dislodge from their positions as barons of the expenditure process. In essence, the power they have held in the past gives them power to maintain their share of the budgetary allocations in the future. New departments and new interests may find it difficult to get their share of the budgetary pie, even if the overwhelming majority of voters would favour such a reallocation. An analysis of the environmental expenditures made by all levels of government confirms this theory with empirical evidence. This is discussed in detail shortly.

Other Issues Relevant to Environmental Budgetary Analysis

The definition of environmental expenditures is the topic of lively academic and professional debate. These expenditures are variously called "defensive" or "compensatory" expenditures. Christian Leipter (1986, p. 114) defines compensatory expenditures, "as the regrettable necessities whose purpose is either to compensate for past environmental and other damage or to prevent its occurrence in the future." At present, however, there is no internationally accepted accounting framework for measuring compensatory expenditures (cf. Daly and Cobb 1989, Leipter 1989, Gaston 1993).

Expenditures made to compensate for environmental losses are difficult to estimate due to a "joint product problem." This problem arises when expenditures made to maintain and enhance environmental quality are wholly or partly indistinguishable from outlays made to achieve other objectives (Gaston 1993). This problem leads to huge variations in the estimates of compensatory expenditures. For example, using a narrow definition of pollution abatement and control expenditures, Statistics Canada estimates the total

expenditure by all firms in Canada equalled \$1.3 billion in 1989. Based on a more inclusive definition, however, an Environment Canada survey found these expenditures equalled \$20.9 billion for the same period (Gaston 1993).

There is another conceptual problem with estimating compensatory expenditures. This relates to the difficulty in determining which expenditures a government makes to compensate for the adverse impacts caused by humans from those made in defense against ambient environmental conditions (Daly and Cobb 1989). For example, what portion of drinking water treatment expenditures can we attribute to water quality impairment caused by human activities and what portion can we attribute to protecting human health from pathogens that occur naturally in the water supply? Unfortunately, the scientific and historical data needed to address this and similar questions are scant. It is, nevertheless, possible to derive general estimates based on an understanding of the historical origins of government expenditures, on an evaluation of the intended purpose and actual outcome of current government programs, and on an understanding of the adverse environmental impacts caused by human economic activity.

The definition for environmental expenditures currently used by most governments is quite restrictive. For its Financial Management System, Statistics Canada defines environmental expenditures as “outlays on the physical environment, included in this function are expenditures related to water supply and purification, garbage and waste management, sewage collection and disposal, and pollution control” (Public Institutions Division, System of National Accounts Branch, Statistics Canada 1992, p-207). Other definitions are quite similar (see, e.g., Ontario Ministry of Municipal Affairs 1993). These narrow definitions exclude many areas of environmental expenditure such as parks and fisheries management. Therefore, estimates based on the traditional definition should be viewed as minimum estimates. It is important to keep these definitional issues in mind when analyzing expenditure data.

Another important point relates to the search for expenditures within the government budget. Expenditure analysis is not confined to direct spending, but also includes expenditures made on the revenue side of the budget. “Tax expenditures” represent a major portion of government spending. These expenditures are best understood by recognizing that a forgiven debt is equivalent to a direct expenditure (Weimer and Vining 1992). Studies undertaken in the 1980s suggest these expenditures are about \$30 billion per year at the federal level, which is large enough to warrant considerable attention (Doern et al. 1988). These expenditures are often difficult to detect and estimate for a few reasons. First, they are often buried in arcane tax codes that do not receive the same level of public scrutiny as direct expenditures. Second, tax expenditures in any given year depend largely on the incomes and expenses of millions of actors in the economy, which tend to vary from one year to the next depending on prevailing economic conditions.

Finally, while useful for assessing the relative priority of environmental policies, environmental spending provides only a partial indicator of the priority a government places on environmental protection. Other policy measures such as laws and regulations can result in environmental improvements, but these measures often shift most of the costs onto the private sector (Hoberg 1992). Nonetheless, environmental quality is similar to other government services because it displays the properties of a public good, in that it is non-rivalrous in consumption and non-exclusive in use (Baumol and Oates 1975). There is some debate in the literature over whether environmental quality is a pure or impure public good, but few deny its public good properties. As with other public goods, it is impossible to determine an efficient supply level through markets (Weimer and Vining 1992). To overcome this market failure, some rough approximation of the supply is made through political processes. The point here is that the government could increase the level of environmental protection through larger public investments in environmental programs and infrastructure. Without the resources needed for implementation, even measures designed

to shift compensatory costs onto the private sector, such as environmental regulations, are nothing more than paper tigers. Thus, while expenditures are not a complete indicator of a government's priorities toward the environment, they are an important measure.

From the above analysis, we can identify many opportunities to influence the environmental sensitivity of budgets. These opportunities are explored next. Methods of expenditure and revenue analysis are explored first. These methods would seek to influence policy development indirectly by providing feedback on policy decisions that have already been made. Institutional reforms to the budgetary process are explored second. With these reforms, the objective would be to promote the integration of environmental considerations during the development of policy.

Some Illustrations

Governments implicitly state their priorities through budgets. Looking at budgets as statements of priorities gives us a few avenues for assessing the environmental implications of policy through budgetary analysis.

Assessing Revealed Priorities

Using the current definition of environmental expenditures, these outlays accounted for slightly more than 2% of the total expenditure of all levels of government in 1991 (see Figure 3). As illustrated in Figure 3, the budgetary data for the last ten years supports the notion that temporal stability in budgetary allocations has worked to the detriment of environment policies and programs. Although many major environmental programs were initiated in the early 1970s in response to a blip in public support, it was not until the late 1980s that environmental initiatives began to emerge as a major issue on the political agenda. Polling data **suggest** that concern about the quality of the environment became one of the top public issues of interest to Canadians in the late 1980s (Bakis and Nevitte 1992). This nascent interest, however, failed to translate into any major change in the budgetary allocations spent on environmental initiatives. Figure 4 illustrates the rise in public support for environmental measures in Canada, as measured by the Gallup poll and the National Election Survey. By comparing these two tables, we can see that environmental protection only receives marginal increases in funding in the late 1980s. These meagre increases occurred at a time when the public believed environmental protection was one of the most important issues facing the country. Since the size of a department's budget in one year largely determines its allocation in the next year's budget (Wildavsky 1986), one can begin to see why new departments and programs that address environmental concerns receive low spending commitments compared to their level of public support. In fact, across all levels of government, environmental spending programs as a percentage of total spending actually declined through the period 1981-1991.

Cross-national Expenditure Comparisons

Cross-national comparisons of expenditure levels are also useful for informing policy-makers about the priority their home country gives environmental programs relative to other nations. Data from the Organization for Economic Co-operation and Development (OECD) indicate Canada falls in the upper-middle portion of the expenditure range for the public sector, with 0.9% of GDP devoted to environmental protection activities (see Figure 5). Unfortunately, complete data on public and private expenditures are unavailable. But Statistics Canada is now developing an environmental expenditures account as part of its efforts to augment the System of National Accounts with satellite environmental expenditure accounts (Smith 1993).

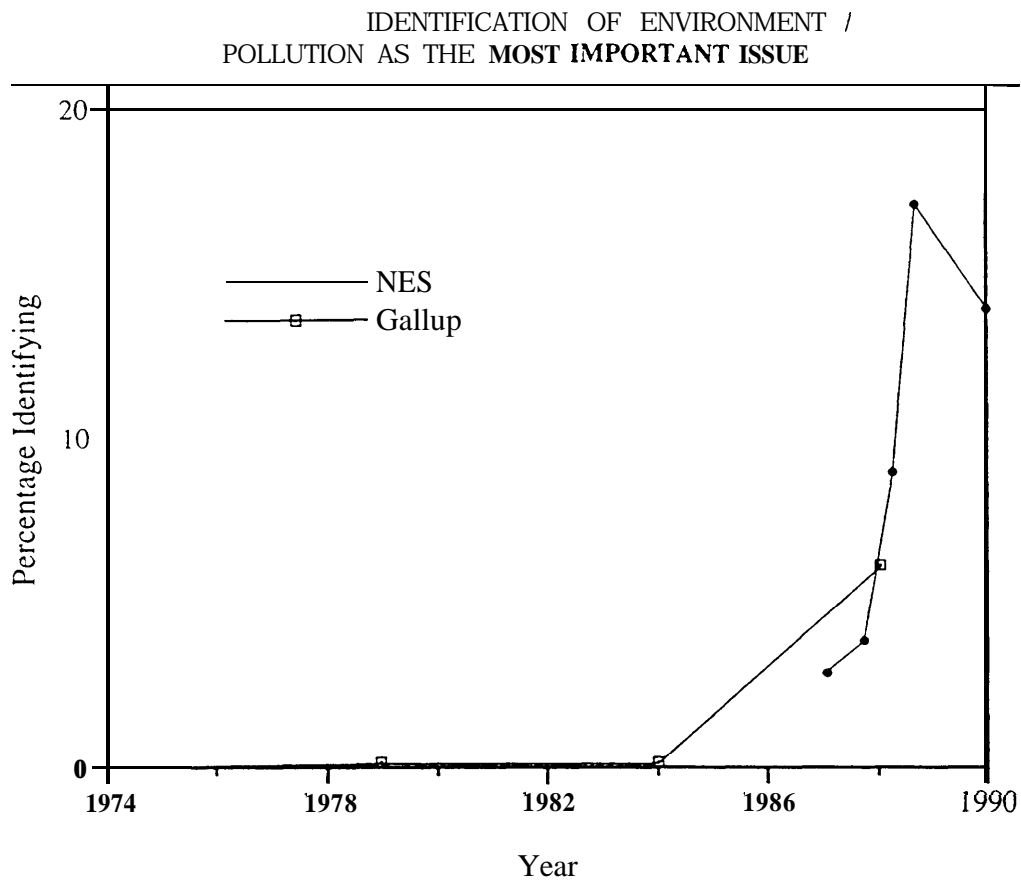
Figure 3

Environmental Expenditures by All Governments
as % of Total Expenditure

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
	millions = dollars 1986=100										
Total Expenditure	\$177,873	\$185,777	\$179,941	\$210,987	\$220,196	\$224,496	\$222,357	\$225,209	\$225,757	\$234,020	\$241,411
Environmental Expenditure	\$4,262	\$4,038	\$3,521	\$3,960	\$4,014	\$4,194	\$4,071	\$4,126	\$4,536	\$5,112	\$5,370
CPI 1986=100	1.35	1.21	1.14	1.09	1.05	1.00	0.95	0.90	0.85	0.81	0.78
Envir. as % of Total	2.40%	2.17%	1.96%	1.88%	1.82%	1.87%	1.83%	1.83%	2.01%	2.18%	2.22%

Source: Canadian Tax Foundation 1992a

Figure 4 Polling Data on Public Attitudes toward the Environment



NES: What is/was the most important issue in this campaign to you?

Gallup: What is/was the most important problem facing Canada today?

Source: (Bakvis and Nevitte 1992)

Figure 5

POLLUTION ABATEMENT AND CONTROL EXPENDITURE as a percentage of GDP, selected countries, 1985-1990 (a)
 DÉPENSES DE LUTTE CONTRE LA POLLUTION, en pourcentage du PIB, pays sélectionnés, 1985-1990 (a)

		1985	1987	1988	1989	1990
Public and private sectors/ Secteurs public et privé (b)						
Canada	(c)	..	..	..	1.1	..
USA/États-Unis		1.4	1.4	1.3	1.4	1.4
<i>including private households/ y compris les ménages</i>		1.7	1.7	1.6	1.6	1.6
Japan/Japon	(d)	..	1.1	1.1	1.1	1.1
Austria/Autriche	(e)	..	1.7	1.7	..	..
<i>including private households/ y compris les ménages</i>		..	1.8	1.8	..	..
France	(f)	0.8	1.0	1.0	1.0	1.0
<i>including private households/ y compris les ménages</i>		1.0	1.2	1.2	1.1	1.1
w. Germany/Allem. occ.		1.5	1.6	1.6	1.6	1.6
Netherlands/Pays-Bas		1.5	1.5	..	1.5	..
<i>including private households/ y compris les ménages</i>		1.5	1.6	..	1.6	..
Portugal	(g)	..	..	..	0.6	..
<i>including private households/ y compris les ménages</i>		..	..	..	0.8	..
UK/Royaume-Uni		1.3	..	..	..	1.5
Public sector/ Secteur public						
Canada	(c)	0.7	0.7	0.7	0.8	0.9
USA/États-Unis		0.6	0.6	0.5	0.6	0.6
Japan/Japon		0.9	1.0	1.0	1.0	1.0
Austria/Autriche		1.0	1.0	1.0	..	..
Denmark/Danemark		0.7	0.8	0.9	0.9	1.0
France	(f)	0.6	0.7	0.7	0.7	0.5
w. Germany/Allem. occ.		0.7	0.8	0.8	0.8	0.8
Italy/Italie		..	..	0.2	0.2	..
Netherlands/Pays-Bas		1.0	0.9	..	0.9	..
Portugal		..	..	0.5	0.4	..
Spain/Espagne		..	0.5	0.5	0.6	0.6
Sweden/Suède	(i)	..	0.7	..	..	..
Switzerland/Suisse		0.7	..	0.7	0.8	..
UK/Royaume-Uni	(h)	0.7	..	..	..	0.4

Notes: see page 297 / voir page 297

Source: OECD/OCDE

Inter-jurisdictional Expenditure Analysis

Another useful approach is to break-out the expenditures by level of government to illustrate the relative priority each level places on environmental protection (see Figure 6). Looking at Figure 6, for example, we can see that, measured as a percentage of total spending by level of government, the federal government places the lowest priority on environmental programs. In terms of expenditures, then, we can see from Figure 6, that Canadians prefer to act locally on environmental problems.

Assessing Intra-jurisdictional Environmental Spending Priorities

As part of another study (Jerrett 1993), the environmental priorities of the City of York, as revealed through its budgetary expenditures, were analyzed. For this analysis, these sectors were air, water, land, waste, and multi-media.⁴ The actual expenditure items are summarized below for comparative purposes on Figure 7, and the data are available in the 1991 Budget of the Corporation of the City of York. Figure 7 illustrates how this type of “revealed priority” policy analysis could improve our understanding of current and proposed environmental management programs.

Extrapolating Expenditures into the Future

Given the incremental nature of budgeting, it is possible to regress, linearly, historical compensatory expenditures against time. The resulting parameter estimates can be used to predict costs for future years (cf. Wildavsky 1986, US-EPA 1990). The United States Environmental Protection Agency (US-EPA) completed this kind of analysis for the public and private sector in the United States. The results of the US-EPA study are illustrated on Figure 8. As shown on the Figure, the US-EPA expects environmental expenditures to rise over the next seven years. Better knowledge of the composition of compensatory expenditures can contribute to more cost effective environmental policy (US-EPA 1990). For example, compensatory expenditures can be broken out by economic type (i.e., operating and capital costs), by environmental media (i.e., air, land, water, multi), by the sector incurring the cost, by mandate (i.e., local, provincial, federal), by new and existing regulations, and by year (US-EPA 1990). All of this information helps governments, firms, and citizens set environmental priorities.

Estimating the Environmental Deficit

By extending the upper boundary of the definition of compensatory expenditures, it is possible to estimate the value of an “environmental deficit.” When a gap exists between official environmental objectives and actual implementation, there is an environmental deficit (cf. US-EPA 1990, Brown 1993). The environmental deficit can be defined as the difference between current environmental spending and the expenditures required to achieve full compliance with officially stated environmental objectives. Major studies in the United States and Germany indicate that compensatory expenditures and the environmental deficit have increased over time. These studies predict this trend will continue to increase in response to worsening environmental conditions, to increasing public concern for the environment, and to the consequent increase in environmental initiatives by government (Leipert 1986, 1989, Leipert and Simonis 1988, US-EPA 1990;).

By adding the environmental deficit to current compensatory expenditures, a country or region can estimate a minimum dollar value of the costs resulting from unsustainable development. Consequently, these estimates can inform decision-makers about the environmental cost of economic growth (Hueting 1989). Using actual expenditures for valuing environmental degradation avoids the problems associated

⁴ Multi-media expenditures are defined here as those expenditures not easily attributable to one of the other sectors.

Figure 6 Environmental Expenditures as a % of Total Expenditure by Level of Government 1991/1992 Millions of Dollars

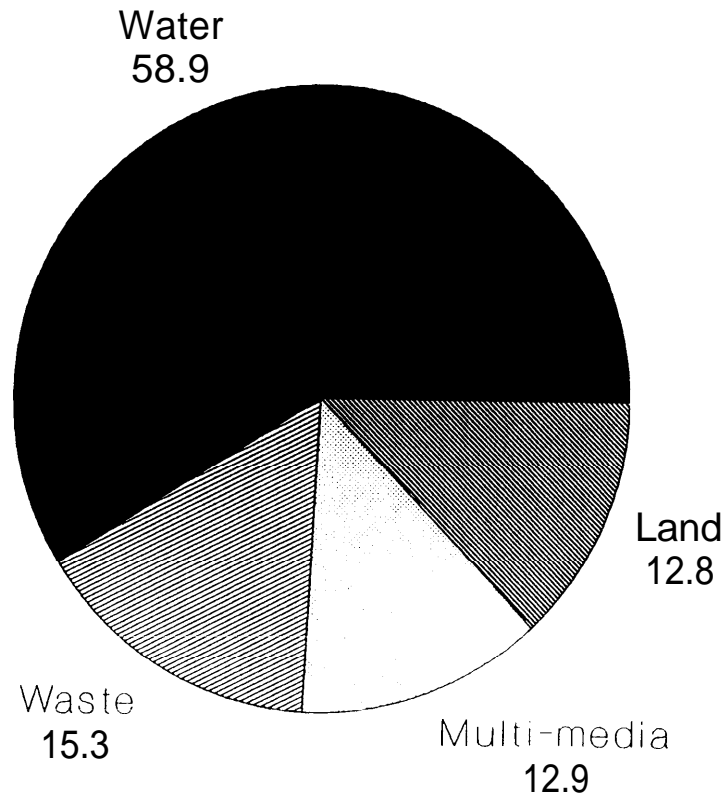
Level of Government	Total Spending	Environmental Spending	Env. as % of Total
Local	64835.7	6306.0	9.7
Provincial	161,819.3	1945.6	1.2
Federal	168,068.0	647.0	0.38

Source: (Public Institutions Division, System of National Accounts Branch, Statistics Canada 1992)

Note: Data not corrected for inter-governmental transfers. Therefore, totals for provincial governments are inflated slightly, which could also inflate the percentage calculation for the provincial level in column three.

Figure 7

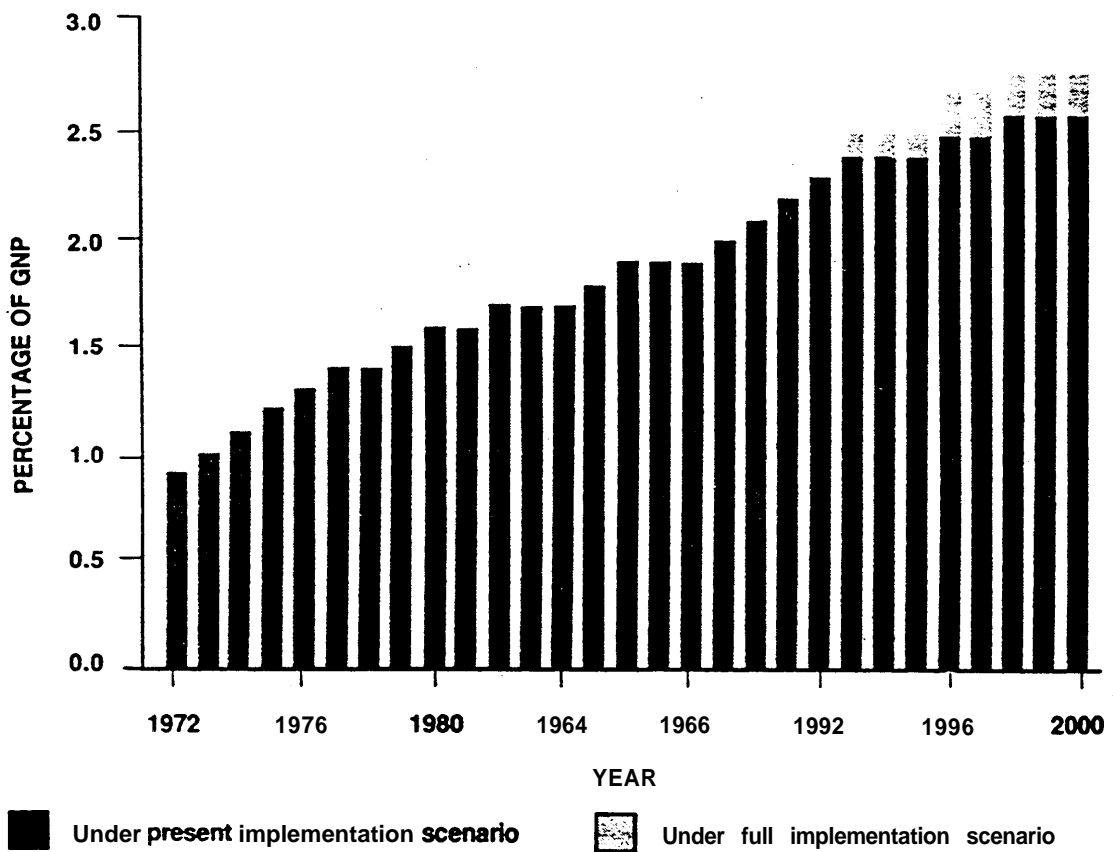
Environmental Spending Priorities City of York



Source: 1991 York Budget

Figure 8

FIGURE 2. Total annualized costs of as a percentage of the U.S. gross national product (GNP).



SOURCE: A. Cariin and the Environmental Law Institute, *Environmental Investments: The Cost of a Clean Environment-A Summary*, EPA-230-12-90-084 (Washington, D.C.: U.S. Environmental Protection Agency, December 1990).

with willingness to pay techniques. The main advantage results from the absence of dubious assumptions about an individual's willingness to pay for environmental protection or, conversely, about her or his willingness to accept environmental damage. In this era of concern about the fiscal deficit, governments also need to be reminded of the environmental deficit, since an increase in either could place a burden on future generations.

Assessing Throughput Subsidies

In Canada, the state has always played the conflicting role of entrepreneur and regulator. The entrepreneurial role of the state dates back to pre-confederation times when the main source of foreign exchange for the country was staples products such as beaver pelts, squared timber, and cod fish (see, e.g., Watkins 1980). Over Canada's history, the state has proven itself a much more adept entrepreneur than regulator. In practice, this entrepreneurial bias has translated into a dizzying array of subsidies designed to promote resource development, especially in less developed regions of the country. These subsidies take many forms, including direct financial investment in the industries, the supply of infrastructure below its real costs, preferential tax treatment, underpricing of resource inputs, insurance premium reductions, loan forgiveness, loan guarantees, payment of compensation through unemployment insurance to workers in seasonal industries, below cost waste disposal, and lax environmental regulations (Weimer and Vining 1992). While these subsidies often serve worthy social objectives, they also increase the rate of throughput from the environment to the economy and then back to the environment in a degraded form. In the process, many of these subsidies create incentives that promote deforestation, desertification, the destruction of habitat and species, the build up of toxic chemicals, the emission of carbon dioxide, and other declines in air and water quality (McNeill 1989). Governments make most of these subsidies with no environmental conditions attached. With these subsidies, the government not only encourages damaging activity, but by granting them with no conditions, the government forfeits its ability to use fiscal and revenue policies to achieve collective environmental goals. Some of the more egregious examples of these subsidies are discussed below.

In British Columbia the federal logging tax deduction, when combined with the province's logging tax credit, usually results in a 100% refund for the BC logging taxes paid. Quebec offers similar tax credits. In Alberta, corporations receive a royalty tax credit worth 75% of Province's petroleum and natural gas Crown royalties (Canadian Tax Foundation 1992).

In terms of direct subsidies, the federal Department of Energy, Mines and Resources (EMR) subsidized energy supply promotion programs with \$530.3 million in the 1991-92 fiscal year. For the same period, EMR subsidized demand management programs with \$34.7 million (RFI 1991). This type of subsidy tilts the playing field in favour of supply-side energy alternatives and, more generally, reduces the incentive to conserve energy resources. With the significant role energy production and consumption plays in so many serious environmental problems (see, e.g., Jackson 1990), this bias toward supply-side subsidies promotes environmentally destructive energy use.

These are but a few examples of subsidies to activities with the potential to harm the environment. The magnitude of these subsidies in many sectors of the economy makes their immediate removal politically unfathomable. Some of the most powerful lobby groups, such as farmers, depend heavily on these subsidies for their economic viability. Although immediate removal of subsidies appears out of the question in the short term, there is a viable alternative. These subsidies could be redesigned to promote environmentally sound behaviour. For example, forestry companies found guilty of violating environmental laws would lose their tax credits. From this brief examination, we can see that much research remains to be done in the area of identifying and assessing subsidies.

Revenue Analysis: Taxing Damage

Economists have long hailed Pigovian or pollution taxes as a more efficient policy tool for achieving environmental objective than laws and regulations (see, e.g., Pearce and Turner 1990, Baumol and Oates 1988). There is little empirical evidence to support this contention, and space does not permit a complete discussion of the issues here. If we accept for the moment, however, the theory that they are more economically efficient, we can learn something about the priority given to environmental protection in the budgetary process. Data on the outputs of revenue budgetary processes in Canada indicate environmental considerations have received a low priority in the formulation of revenue policies. In a major survey of 16 industrialized countries, Opschoor and Vos (1989) found that Canada uses fewer revenue instruments for achieving of environmental objectives than any of the other countries surveyed. And in a discussion paper on the use of economic instruments, the Government of Canada (1992) admits it has little experience with the use of economic instruments for environmental protection and that other countries possess much more experience. While subsidizing environmentally destructive activities represents a sin of commission, the failure to use revenue instruments represents a sin of omission.

If other countries are able to use more efficient policy instruments to meet their environmental goals, then this divergence in budgetary outputs is a concern from an economic and an environmental perspective. Environmentally, if firms and individuals are faced with less efficient regulations, then they are more likely to resist progressive environmental measures. Economically, if Canada's trading partners are able to achieve their environmental goals more efficiently, the higher costs incurred by Canadian exporters will reduce their international competitiveness. In other words, Canada will face an unenviable choice: either reduce the level of environmental protection or reduce its international competitiveness.

In sum, comparative analysis of revenue instruments is useful for refining domestic environmental policy. And it appears that more emphasis on the policies of other nations could help to overcome one of the problems associated with the incremental budgeting process, namely, that important policy options are overlooked (Lindblom 1959). By compiling an international database on the use of revenue tools for achieving environmental goals, the government could increase the probability that policy-makers would not overlook environmental charges when implementing new tax policies. While such a database could improve revenue policy, the problem of neglected environmental options runs deeper in the budgetary process, and it appears to be connected to the closed decision-making that occurs in the formulation of budgets. This issue receives attention shortly.

Backcasting: Using Revenue and Expenditure Policy to Reach Desired Future States

The idea of using some desired state to evaluate current policies is not new, but it could be useful for applying EA to policy. Energy expert Lovins introduced the idea of energy "backcasting." This method of energy analysis is "explicitly normative, involving 'working backwards' from a particular future end-point to the present to determine what policy measures would be required to reach that future" (Robinson 1982, p.337). Robinson outlines a possible method of energy backcasting, but this method could also be used for other areas of government policy such as transportation, agriculture, and urban planning.

The desired future state could then be used as a basis for evaluating the environmental implications of specific policies. For example, Robinson identifies "a society based entirely upon renewable resources or soft technologies" as one possible policy goal for a desirable energy future. Continued subsidies to supply-side megaprojects such as the Hibernia offshore oil development would receive low marks when evaluated against this goal.

A Typology of Expenditures that Affect the Environment

From the conceptual framework developed in Section 3, four broad categories of expenditure can be identified. These categories are relevant to assessing the environmental implications of government policy. First are expenditures that alter human behaviour in a way that is beneficial to the environment. Second are those expenditures that alter human behaviour in a way that is damaging to the environment. Third are those expenditures that exert no effect on human behaviour due to the countervailing force of other social and economic factors. And fourth are those expenditures that compensate for past environmental damage or attempt to prevent its occurrence in the future.

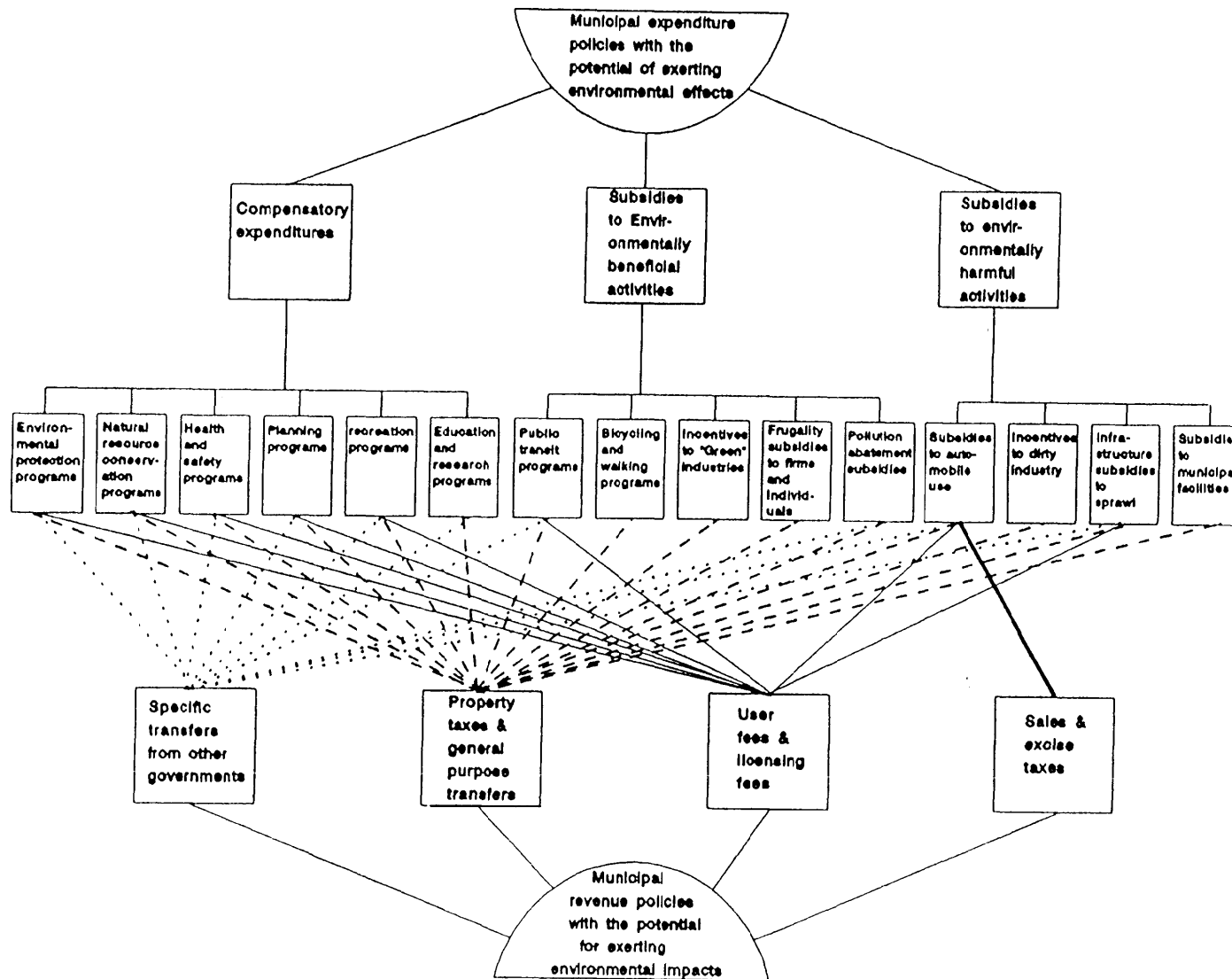
A refinement of this typology is illustrated on Figure 9. This Figure gives a break-down of the possible government programs that might fall into each category of assessment as well as the revenue sources that typically fund each activity. This Figure illustrates the possible program envelopes for municipal government, but a similar framework could be developed for the federal and provincial governments. Program envelopes in Figure 9 have been extracted from reports published by the Canadian Tax Foundation (CTF 1992a, 1992b) and from theoretical literature on the social and environmental impacts of government fiscal and revenue policies (see Baumol and Oates 1988, Bressers 1983, Downing 1973, Pearce and Turner 1990, Government of Canada 1991, Hahn 1987, and Opschoor and Vos 1989 on revenue policies; Shoard 1982 and Fair Tax Commission [FTC] 1992 on agricultural and energy subsidies; Pollution Probe 1991 on subsidies to automobile use; Repetto 1988 on forestry subsidies; RFI 1991 on energy subsidies; and Elkin et al. 1991 for a more general analysis of sustainable urban development).

Once this type of framework is refined, ratio indicators could be developed to compare the expenditure and revenue patterns in different jurisdictions. For example, a ratio of environmentally damaging to environmentally beneficial spending could give decision-makers a general indicator of the sustainability of the government's policy direction. It also would prove useful to assess whether a relationship exists between this ratio indicator and the level of compensatory expenditures. Intuitively, one would expect that compensatory expenditures would absorb a higher level of total expenditure in jurisdictions that have a higher ratio of environmentally damaging to environmentally beneficial expenditures.

In Figure 9, the revenue linkages also illustrate policies that could be scrutinized for their environmental implications. Downing (1973, 1977) suggests average cost pricing of urban infrastructure subsidizes sprawling suburban areas where the marginal cost of supplying infrastructure is much higher than in dense, inner city areas. This type of subsidy could contribute to urban sprawl, which is now generally considered to exert adverse environmental effects (cf. Paehlke 1991, Fowler 1992).

Although this typology of revenues and expenditures possesses many advantages, there are problems worth noting. The expenditure envelopes classified as environmentally beneficial also could contain activities that are harmful. For example, literature in environmental economics raises questions about the benefits of subsidies to firms for pollution abatement. Specifically, Baumol and Oates (1975, 1988) argue that subsidies to polluters for clean-up activities could induce new firms to enter the polluting industry. The result would be lower amounts of pollution from each firm, but higher levels of pollution from the entire sector. Much more research is needed in this area to clarify which expenditures belong in the different categories. Another problem relates to the accounting practices in different jurisdictions. Inconsistent treatment of these expenditures in, say, local governments in different provinces could make the comparison of categories across jurisdictions difficult.

Figure 9 Municipal Environmental Accounting Framework



Institutional Reforms

The reforms discussed below would, in theory, help to change the process through which governments make budgets to promote the integration of environmental considerations into the formulation of policy.

Consulting Environmental Interests through the Budgetary Process

Secrecy constitutes another enduring and important aspect of budgetary processes in Canada, where most of the critical budgetary decisions are made by politicians and bureaucrats behind closed doors. The traditional interests involved in the budgetary process probably display a bias toward business interests (cf. McQuaig 1986, Hartle 1988). With the revenue budget, for example, officials from the Department of Finance preside almost exclusively over the formulation of the budget (Lindquist 1985). These officials are probably trained in economics and accounting with little formal training in or sensitivity to environmental matters. It is reasonable to expect that these officials would pay more attention to business and economic lobby groups than to environmental groups. The closed process, with a preponderance of business interests, could partially explain why Canada uses so few revenue instruments to achieve environmental goals.

It appears, therefore, that the government could introduce more environmental awareness into the policy process simply by opening up the budgetary process to more environmental voices. In the interim, the government could follow the advice of Bregha et al. (1990), and establish an institutional advocate within the structure of government to ensure environmental voices are heard loudly behind the closed doors of the Department of Finance. Provincial and local governments could pursue similar institutional improvements.

Organizational Structure and Environmental Spending

The organizational structure of the budgeting process represents another important determinant of policy outputs. Environmental issues transcend most jurisdictional and administrative boundaries. As such, environmental issues are not easily pigeonholed into increasingly compartmentalized bureaucratic structures. This friction between ubiquitous environmental issues and what Weber called the “iron cage” of bureaucracy leads to poor administrative arrangements that fail to afford the environment the protection it deserves (Timmerman 1991).

For example, the low funding priority afforded Environmental Canada in the 1980s results partly from the position it occupies in the process of resource budgeting in the federal government (Brown 1992). During this period, under the policy and expenditure management system (PEMS), which is a derivative of the PBBS approach discussed above, spending was grouped into nine expenditure envelopes. Environmental Canada was grouped into the social development envelope. This envelope contained the “quality of life” programs (Brown 1992). In spite of the growing recognition that environmental issues extend beyond quality of life issues and are inextricably linked to human economic welfare over the long term, environmental concerns were mixed into a stew of other social issues.

Brown (1992) identifies four reasons that explain why the social policy envelope resulted in parsimonious funding levels for Environment Canada. First, the social policy envelope was the largest of the spending envelopes, and it contained huge expenditure items such as the Department of Health and Welfare, which accounts for 35 % of the total budgetary expenditures. With this administrative arrangement, the larger departments within the envelope dwarfed Environmental Canada and were, therefore, able to out-muscle it in the battle for funding. Second, many of the expenditures made through the social policy envelope went directly to individuals for income support and other similar programs where only limited ability to

cut or transfer funds exists. Third, its administrative position robbed Environment Canada of its ability to compete for funds with other sectoral interests whose interest lay in economic development. Finally, in the 1980s social issues lost favour with the Mulroney administration and the focus of government interests turned increasingly to economic development. From this example, we can see how important it is to ensure the organizational structure of the budgetary process does not rob environmental interests of their fair share of funding.

Principled Environmental Assessments of Budgetary Outputs

One theme that emerged from the literature review relates to the usefulness of filling in technical holes with normative principles. The conclusion of the **conceptualization** that it might prove difficult to model the link between specific budgetary policies with environmental effects also supports this view. The EA of the 1991 Federal Budget by RFI, discussed in the literature review, illustrated the usefulness of evaluating government expenditures against environmental principles. A review of the literature on sustainable development reveals the following principles as possible principles for evaluation:

- Full-cost accounting (ORTEE 1992, Tolba et al. 1992),
- Polluter pays (Tolba et al. 1992, OECD 1991),
- Living off the interest (ORTEE 1992),
- Least cost energy planning (RFI 1991),
- Anticipating and preventing environmental problems before they occur (RFI 1991),
- Informed decision-making (ORTEE 1992),
- Weak and strong sustainability (Daly and Cobb 1989),
- Precautionary principle (Elkin et al. 1991),
- Intra and inter-generational equity (Elkin et al. 1991), and
- Inter-species equity (Leopold 1949).

Although most of these principles appear sensible on the surface, little experience exists in deriving their meaning in practical situations. Policy theorist Goodin (1983) suggests that decision-makers must be able to translate abstract principles into easily understood rules of thumb, if these principles are to exert any effect on actual decision-making.

One example of the difficulties in applying these principles is the use of the polluter pays principle (PPP) in Germany. In 1985, the OECD adopted an environmental declaration that reaffirmed the PPP. In practice, however, the specific meaning of the principle remains ambiguous. The PPP essentially dictates that polluters should bear the cost of implementing pollution prevention and abatement activities that government authorities have set to keep environmental quality at an acceptable level. In Germany, however, temporary subsidies to assist firms are considered in compliance with the PPP, provided the polluter remains fully responsible for its pollution and the subsidies assist the polluter with meeting stricter environmental standards (Pearce and Turner 1990). This experience demonstrates the desirability of applying principles in a variety of practical situations. Through practical application, the specific meaning of these principles in the “real world” can be worked out and agreed upon.

Determining the Public Interest with Environmental Principles

There is a deeper issue in the application of environmental principles to government decision-making. This relates to how government might apply these principles across varied policy arenas to determine when policies are in the public interest. Flathman (1969) develops a test for deciding whether policies and actions are in the public interest. The test explicitly accords community values or principles a role in defining the public interest. In the case of assessing the implications of budgets, some or all of the

environmental principles discussed above could be used as community values. Flathman views public interest not as an empty concept, but as a meaningful symbol indicating that a specific type of policy debate is about to occur. Using the formal logic of moral philosophy, Flathman argues that the concept of public interest contains two distinct but related meanings. The first is to commend a policy or course of action. The second is to justify the course of action. To justify the course of action, Flathman develops a two-stage test. First, community values and moral rules must be identified as relevant to the particular decision. Second, the action must pass the tests of the Principle of Consequences (PC) and Generalization Principle (GP). Taken in its fuller as opposed to elliptical meaning, PC can be stated as: “If the consequences of A’s doing X would be undesirable, then A ought not to do X *without a reason or justification*” *Op. 107*). GP can be stated as follows: “What is right (or wrong) for one person must be right (or wrong) for any similar person in similar circumstances” (p. 111). Tying these concepts together as a justification for the “public interest” commendation, Flathman states, “If the policy or action passes these tests, and if it serves a community value or accords with a moral rule, there is a prima facie case for considering it justified” (p. 185). In other words, the policy or action is justified because it is in the public interest. By following this logic we are able to consider, explicitly, the role of environmental principles in defining the public interest.

Community ethics or principles explicitly enter Flathman’s logical argument in three places. First, the community values or ethics relevant to the decision must be identified. Second, there must be an ethical basis for deciding what is undesirable when the PC test is applied. Third, there must be an ethical basis for considering what constitutes an acceptable reason or justification for proceeding with an action that is considered undesirable.

Flathman’s analysis is useful for illustrating how to apply environmental principles to assess the environmental implications of government policy. Below is an example of how Flathman’s framework could apply to budgetary expenditures to determine whether a policy is in the public interest.

SPECIFIC EXAMPLE USING FLATHMAN’S TWO STAGE TEST OF THE PUBLIC INTEREST

- 1. IDENTIFIED COMMUNITY VALUES = POLLUTER PAYS PRINCIPLE
- 2. APPLY PRINCIPLE OF CONSEQUENCES AND GENERALIZATION PRINCIPLE TESTS

(i) Principle of Consequences Test

If the consequences of A (i.e., individual, firm, or other level of government) doing X (e.g., failing to pay the cost of their pollution) are undesirable, then A ought not to do X without reason or justification.

(ii) Generalization Principle Test

What is wrong for one person (e.g., not paying for the pollution he or she produces) must be wrong for any similar person in similar circumstances.

A few important points emerge from applying Flathman’s tests in the budgetary process. First, if the government pursues policies that contravene the PPP, then it must supply a reason or justification that will withstand public scrutiny. Currently, when the government supplies a reason, it is given with little explicit comparison to the environmental consequences of the policy. Typically, the government now supplies little or no justification for pursuing policies that encourage environmentally destructive behaviour. Second, the test makes no distinction for the political power of the parties in the policy process. If it is considered wrong to subsidize polluters, then it is equally wrong to subsidize large corporations through tax expenditures as it is to subsidize citizens living in suburbia through average cost

pricing of infrastructure. This equality provides an avenue to pursue principled EA across many different policy areas. In sum, Flathman's test of the public interest, when combined with the appropriate environmental principles, could help to clarify what constitutes an environmentally acceptable policy for all parties in the policy process.

5. CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

Approaches to and methods of assessing the environmental implications of policy are in their formative stage, and the current lack of methods presents a hindrance to the achievement of the new, anticipatory approach to environmental policy advocated by the World Commission on Environment and Development. Currently, there are only a few approaches and methods available, and these were discussed in Section 2. Regardless of which approaches prevail in the long-term, this report has demonstrated the usefulness of using budgets as the unit of analysis for assessing the environmental implications of policy.

Now that the usefulness of budgetary analysis is firmly established, what future research directions are worth pursuing? One direction is empirical case studies focused on increasing our understanding of the linkages among the various component systems identified in the conceptualization in Section 3. This could be done by exploring the linkages between two systems, say, agricultural subsidies and farming practices or farming practices and environmental impacts. Or, alternatively, case studies could pursue "life cycle environmental policy analysis." In these studies, an effort would be made to track the influence of one expenditure or revenue policy through all the constituent systems. While this type of case study may prove impossible due to the confounding effect of other variables, attempting such a study could improve our understanding of the linkages among the systems. Case studies could also follow the lead of Westcott (1992) by beginning with a specific bioregion, environmental medium, or resource and working back to identify the complex of policies which could influence that region or medium. The conceptual framework developed in Section 3 could receive useful refinements through increased empirical knowledge of both the constituent systems and their linkages.

Institutional issues are another important area for future research. As alluded to in Section 3, the environmental implications of budgetary policies cannot be analyzed in a vacuum. These policies represent the residue of broader institutional forces and the resulting relationship among actors in the policy process. The following questions give some direction for future research in this area. What immediate measures could be taken to ensure environmental concerns are heard in the closed budgetary process? What organizational measures are needed to ensure environmental concerns receive a share of funding more in line with the priority the electorate seems to place on them? How can different levels and agencies of government consolidate state-of-the-environment reporting, environmental and natural resource accounting, and policy EA into a coherent decision-support system?

Another area for future research lies in expanding the methods of analysis developed in this paper and in developing new methods for application to other government agencies and to larger macroeconomic policies. For example, how do the pricing policies of Crown corporations such as water and public transit authorities affect human behaviour and, consequently, the environment? How do the pricing policies of marketing boards and other regulatory agencies influence the human use of the environment? Some work in this area has been referred to in the body of this report, but much work remains to be done. In terms of larger macroeconomic policies, what are the environmental implications of different interest rate policies? The interest rate obviously affects the way individuals, firms, and governments make inter-temporal trade-offs, but no one has yet attempted to assess how one could integrate environmental

considerations into the policies of the Bank of Canada. How do macro fiscal stabilizers such as welfare and unemployment insurance affect the human use of the environment? Has unemployment insurance, for example, contributed to the decline of the fisheries on Canada's East Coast by making it economically viable for too many fishers to fish the area for too long? These and many similar questions must be addressed along with those relating to the application of EA to government budgets.

Assessing and understanding the strengths and weaknesses of policies implemented in other jurisdictions is another promising area for inquiry. Under this area, there are three tasks. First, developing databases on the use of expenditure and revenue policies to achieve environmental goals in other countries could help to ensure environmentally friendly policies are taken into account in the incremental budgetary process. The International Institute for Sustainable Development (IISD) is now preparing a casebook of leading practices in using fiscal policy for achieving environmental goals (IISD, undated). While the casebook is a good start, some ongoing, international database on innovation in environmental policy would provide more coherent direction for domestic policy-makers. Second, what policies exist within other different jurisdictions in Canada? The goal of this type of analysis is similar to the cross-national analysis. By examining policies closer to home, however, policy-makers could rest assured that the policy under consideration could be implemented in a Canadian context. Third, comparisons can be made among jurisdictions of like size and character to discern and explain variation in budgetary outputs. For example, if one city spends much more on compensatory expenditures than many other cities of like size and location, then municipal officials might want to explore the possible causes of the divergence. Computer decision support systems are already available to assist with inter-municipal comparisons of revenues and expenditures (Campbell, Jr. 1990).

Refining the environmental accounting framework developed in Section 4 is another promising area for future research. Developing similar accounting frameworks for the provincial and federal governments is a first step. More applied research on which program envelopes belong in which category of expenditures (i.e., harmful, beneficial, compensatory) would strengthen the framework and make it more readily applicable. The cultivation of principles for assessing the environmental sustainability of government policies such as those identified in Section 4 could also strengthen the accounting framework. For example, how could the polluter pays principle fit into this framework to assist with the classification of program envelopes?

More research is also needed on developing transitional strategies to soften the blow to those affected by reductions in throughput subsidies that promote environmentally damaging behaviour. Reducing subsidies to throughput will produce winners and losers. To prevent the losers from stridently objecting to subsidy reductions, some form of transitional assistance needs to be put in place. Possibly, one way to promote more sustainable practices in the short term is through linking subsidies to environmental protection goals.

EA of policy through budgetary analysis shows great promise as an analytical tool for use in the anticipatory environmental strategy advocated by the WCED. This approach to EA of policy holds many advantages. First, by focusing on budgets, the analyst can avoid the policy identification problem. Second, it allows the government to identify and assess those policies that contribute to the environmental problems the current "standards agenda" attempts to abate. Third, this approach enables analysts to assess the "revealed" environmental priorities of a government. Such assessments could lead to more informed and intelligent debates on the preferred direction for environmental policy. Fourth, with an emphasis on standardized indicators such as dollars spent and tax instruments in use, it becomes much easier to make cross-jurisdictional comparisons. These comparisons can positively influence domestic environmental policy. Fifth, budgets and the budgetary process provide excellent avenues for integrating environmental

values into the structure of government decision-making. Finally, EA of policy through budgetary analysis could merge with environmental and natural resource accounting and state-of-the-environment reporting into a formidable decision-making system that promotes sustainable development.

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