



National Round Table on the Environment and the Economy
Table ronde nationale sur l'environnement et l'économie

SUSTAINABLE DEVELOPMENT: GETTING THERE FROM HERE

A Handbook for
Union Environment Committees and
Joint Labour-Management Environment Committees



Prepared by Ted Schrecker

with contributions by

Hugh Mackenzie

John O'Grady



Canadian Labour Congress



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Canadian Catalogue Information in Publication Data

Sustainable Development: Getting There From Here - A Handbook for
Union Environment Committees and Joint Labour-Management
Environment Committees
(National Round Table Series on Sustainable Development)
ISBN 1-895643-22-8

Cover Design

National Round Table on the Environment and the Economy

This book is printed on Environmental Choice paper containing over 50% recycled content, including 5% post consumer fibre, using vegetable inks. The cover board also has recycled content and is finished with a water based, wax free varnish.

Printed and bound in Canada by Mutual Press.

National Round Table on the Environment and the Economy
Table ronde nationale sur l'environnement et l'économie
1 Nicholas Street, Suite 1500, Ottawa, Ontario K1N 7B7

NATIONAL ROUND TABLE SERIES ON SUSTAINABLE DEVELOPMENT

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sont disponible en français.

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**NATIONAL ROUND TABLE SERIES
ON SUSTAINABLE DEVELOPMENT**

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PREFACE

In many ways, workers were the first environmentalists in the age-old struggle against workplace pollution and the pollution of communities adjacent to the workplace. The first concerns were directed at health and safety conditions at the workplace; more recently, labour concerns have been extended to embrace environmental sustainability of industrial activities. Workers have been caught in the middle of the conflict between environmental values and the demands generated by the creation of wealth on which the sustainability of employment ultimately depends. The quest for a positive balance between environmental protection and wealth creation is what has been referred to after the Report of the Brundtland Commission, *Our Common Future*, as sustainable development planning.

The aim of sustainable development has to be two-fold: to reconcile environmental protection with the well-being and prosperity of society, and to enable workers to be full participants with other stakeholders in shaping the required societal changes. The coming years to the end of this decade will be a critical time for industrial societies to adjust to environmentally sustainable ways to do business. The ability of nations to trade successfully will depend on their ability to manage their natural and industrial resources sustainably.

This manual will help to ensure that workers will have a prominent role in advancement of sustainable development as far as possible through co-operation with environmentalists, governments and employers. The handbook explains environmental issues from a workers' perspective, and provides guidance on applications in a workplace context. The handbook builds on the experience of Canadian unions at the local, regional and national levels.

The National Round Table which is a consensual forum involving industry, labour, environmental and government representatives, has been in the forefront of the national dialogue on environment and the economy, while internationally, the Canadian Labour Congress prides itself on being one of the very first labour bodies to adopt environmentalism as part of its social agenda.

The collaboration of the Canadian Labour Congress and the National Round Table in this important publication should convey a strong message that the two organizations share a commitment to sustainability, and will pursue that commitment through co-operation wherever possible.

Robert White,
President,
Canadian Labour Congress

and

Dr. George Connell,
Chair,
National Round Table on
the Environment and the Economy

May, 1993

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INTRODUCTION AND SYNOPSIS

In June of 1991, Brian Kohler of the former Energy and Chemical Workers' Union (now the Communications, Energy and Paperworkers' Union of Canada - CEP) first proposed to the National Round Table on the Environment and the Economy the idea of a handbook on sustainable development for use by workplace Joint Environment Committees. The National Round Table would provide financial support for preparation of the handbook, while the Canadian Labour Congress would assume responsibility for publishing and distributing it.

The result is the manual you are now reading. It can be read from start to finish; on the other hand, it has been written so that, as far as possible, each chapter stands on its own. At the end of many chapters, a list of selected sources of further information is included. These sources are especially important for Chapter 2, where we cannot possibly provide more than a bare outline of the environmental problems that gave rise to the concept of sustainable development.

Comments and suggestions for updates and improvements are more than welcome. Even more important are reports on how *you* have used the manual, and how your local, labour council, and national or international union is dealing with the challenges presented by making the transition to sustainable development. Information like this will help the labour movement play an active and informed role, on behalf of its members, in shaping policies for a sustainable future. Please contact:

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1. Sustainable Development: An Introduction

This chapter summarizes the background to the report of the World Commission on Environment and Development and outlines the Commission's key findings. It goes on to describe some of Canada's responses to the report, and the work of the National Round Table on the Environment and the Economy. It ends with an introduction to labour's perspective on sustainable development.

2. Major Environmental Problems

This chapter outlines the environmental problems that make sustainable development a necessity for the future. It begins with pollution, emphasizing the regional and global dimensions of pollution-related problems such as acid precipitation, ozone depletion and climate change. It goes on to discuss the management of resources, with a special focus on biodiversity, and finishes with a discussion of the importance of energy efficiency.

3. Working Toward Sustainability: Concepts and Strategies

This chapter presents a number of principles that are useful in coming up with more specific directions for sustainable development. These include the idea of industrial metabolism, the precautionary principle (avoiding unpleasant surprises), the connections between good environmental policy and sound economics, and the axiom that "pollution prevention pays."

4. Working Toward Sustainability: Concrete Approaches

Building on the previous chapter, this one sets out specific principles for reducing waste in industrial activity. It goes on to explain the concept of a waste reduction audit, as well as looking at the strengths and weaknesses of other kinds of environmental audits. Toxic Use Reduction programs and the principle of "zero discharge" of some pollutants are examined, as are principles for reducing energy waste.

5. Why a Joint Workplace Approach?

This chapter explains the reasons for labour, management, and environmental groups to cooperate on sustainability issues. It also explores the limits to cooperations, and explains the special stake that labour has in environmental questions as well as in protecting and providing jobs.

6. Working Toward Sustainability: Successful Union and Joint Initiatives

The efforts of labour and environmentalists in finding common ground on issues of British Columbia forest management begin this chapter. It goes on to describe cooperative efforts involving Sudbury, Ontario and Trail, B.C. locals of the Steelworkers, a Windsor local of the CAW, and locals of the Energy and Chemical Workers' Union (now the Communications, Energy and Paperworkers' Union of Canada - CEP). The chapter ends with some general conclusions about how unions should tackle environmental issues, and provides a number of useful supporting documents.

7. The Legislative and Regulatory Framework

This chapter provides an outline of the legal framework used to protect the Canadian environment, and evaluates a number of new approaches including economic instruments like effluent charges, environmental bills of rights, and requirements that major employers produce environmental plans in consultation with their workers.

8. A New Vision: Sustainable Prosperity

This last chapter of the handbook looks at the broader picture: the long-term prospects for jobs and the environment, ways of compensating people who lose out as a result of transitions to sustainable development, questions of environment and trade, and the connections between sustainable development and social justice on a global scale.

1. SUSTAINABLE DEVELOPMENT: AN INTRODUCTION

Sustainable Development: The Origins of a Concept

We hear a great deal about "sustainable development" these days. But what does it mean? Where did the idea come from?

The short answer is that although the idea had been around for some time, it became popular among politicians, the mass media and the public because of a book called *Our Common Future*. The book, which was published in 1987, was actually the report of an organization called the World Commission on Environment and Development, better known as the Brundtland Commission because its chairperson was Dr. Gro Harlem Brundtland, the Prime Minister of Norway. The Brundtland Commission, which received major support from the Canadian government, was set up in 1983, with endorsement from the General Assembly of the United Nations, to look ahead at critical environment and development problems and propose better ways and means for the world community to address them. Its outlook was, therefore, thoroughly global. Its 23 members came from the richest countries of the world as well as the poorest, from market economies and from centrally planned ones, yet the language of its report is often tough and uncompromising. Before examining the Brundtland Commission's recommendations, it is useful to look briefly at a few of the events of the decade before it was established.

From Stockholm to Brundtland

Concerns about environmental damage first became the topic of serious political discussion at the international level when the United Nations environment conference was held at Stockholm in 1972. Both the diplomatic meetings that went on before the conference and the conference itself showed that the governments of rich countries and those of poor countries had very different perspectives on the idea of environmental protection. Perhaps the most eloquent statement of these differences came from Indian Prime Minister Indira Gandhi: "How can we speak to those who live in the villages and in the slums about keeping oceans, the rivers, and the air clean," she asked, "when their own lives are contaminated? Are not poverty and need the greatest polluters?" In other words, one point of view was that pollution and other kinds of environmental damage might be the price which countries like India had to pay for improving their standard of living, much as the industrialized countries had done. Environmental protection, from this point of view, was a luxury that only the rich members of the global community could afford.

Yet, during the decade after the Stockholm conference, many of the same governments that in 1972 had doubted the importance of environmental protection changed their views, and began to make it a high priority policy objective. This was not because they became less concerned about the urgent need for economic growth in their own countries; far from it. Instead, their own experience suggested that environmental protection might be required if economic growth were to continue. At least as important was the realization that poverty functioned as a *cause* of environmental degradation. The Brundtland Commission described their reasoning this way: "Those who are poor and hungry will often destroy their immediate environment in order to survive: They will cut down forests; their livestock will overgraze grasslands; they will overuse marginal land; and in growing numbers they will crowd into congested cities." The result is a vicious downward spiral of environmental *and* economic degradation.

The World Conservation Strategy: Focus on Living Resources

By the time *Our Common Future* came out, this was not an original observation. Despite the friction between rich and poor countries at the Stockholm conference, the meeting did lead to a number of concrete actions. One of these was the establishment of the United Nations Environment Program (UNEP). As part of UNEP's research and education program, it commissioned the preparation of a document called the *World Conservation Strategy* (WCS), which was published in 1980 with the endorsement of two other United Nations agencies, UNESCO and FAO, the U.N. Food and Agricultural Organization, as well as UNEP. The Swiss-based organization that actually prepared the WCS is called the International Union for the Conservation of Nature and Natural Resources (IUCN); it's an umbrella group of more than 450 government agencies as well as non-governmental organizations in 100 countries.

According to the WCS: "Among the prerequisites for sustainable development is the conservation of living resources. For development to be sustainable," the strategy continued, "it must take account of social and ecological factors, as well as economic ones; of the living and non-living resource base; and of the long term as well as the short term advantages and disadvantages of alternative actions." Conservation was defined this way: "the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations."

The WCS saw living resource conservation not as being incompatible with development, but rather as essential to it, particularly for the world's poor. "For the 500 million people who are malnourished, or the 1500 million people whose only fuel is wood, dung or crop wastes, or the almost 800 million people with incomes of \$50 or less a year -- for all these people conservation is the only thing between them and at best abject misery, at worst death. Unhappily, people on the margins of survival are compelled by their poverty ... to destroy the few resources available to them. In widening circles around their villages they strip trees and shrubs for fuel until the plants wither away and the villagers are forced to burn dung and stubble" that are badly needed to restore nutrients to soil that is already damaged by erosion.

Conservation and Survival

The WCS went on to warn that: "People whose very survival is precarious and whose prospects of even temporary prosperity are bleak cannot be expected to respond sympathetically to calls to subordinate their acute short-term needs to the possibility of long term returns. Conservation must therefore be combined with measures to meet short term needs." The Brundtland Commission later picked up on this theme and expanded on it, saying that "many problems of resource depletion and environmental stress arise from disparities in economic and political power. An industry may get away with unacceptable levels of air and water pollution because the people who bear the brunt of it are poor and unable to complain effectively."

In addition, of course, they may depend on the polluting plant for their livelihoods, either directly or indirectly. They may work there; they may have jobs in communities where the plant provides the major source of income. This is a problem with which Canadian workers, and their counterparts in other countries, are all too familiar. They have been told that they must choose between jobs and environmental quality. Governments are in a somewhat similar position. They rely at least partly on the flow of tax dollars to provide benefits for their constituents, and they usually support economic development projects that will increase their revenues without requiring them to raise taxes, which is always a politically unpopular move.

This is true whether we're talking about: (a) a city or township government that is asked to give zoning approval for a new shopping centre development, even though it will increase traffic congestion and take farmland out of production, (b) a provincial government that has to balance jobs and tax revenues against possible environmental harm when is asked to approve a new mining development or to provide

cutting rights to supply a new pulp mill, or (c) a national government that is asked to provide incentives for offshore oil development, even when it is an example of failure to integrate environmental concerns and economic planning.

Living Resource Conservation

"Living resource conservation has three specific objectives:

to maintain essential ecological processes and life-support systems (such as soil regeneration and protection, the recycling of nutrients, and the cleansing of waters), on which human survival and development depend;

to preserve genetic diversity (the range of genetic material found in the world's organisms), on which depend the breeding programs necessary for the protection and improvement of cultivated plants and domesticated animals, as well as much scientific advance, technical innovation, and the security of the many industries that use living resources;

to ensure the sustainable utilization of species and ecosystems (notably fish and other wildlife, forests and grazing lands), which support millions of rural communities as well as major industries. (Ecosystems are systems of plants, animals and microorganisms together with the non-living components of their environment.)"

Source: World Conservation Strategy (Gland, Switzerland: IUCN, 1980).

Our Common Future: The Brundtland Report

The Brundtland Commission met and reported in what can only be described as an atmosphere of impending crisis. As the Commission itself points out, between the time it was set up and the time its report was published, African famines that resulted from a "drought-triggered, environment-development crisis" killed as many as a million people. Explosions with disastrous environmental consequences occurred at a pesticide plant in Bhopal, India and the Soviet nuclear reactor at Chernobyl. A warehouse fire in Switzerland spilled toxic chemicals into the Rhine River, which supplies drinking water for

parts of Germany and the Netherlands. Finally, "an estimated 60 million people died of diarrhoeal diseases related to unsafe drinking water and malnutrition; most of the victims were children."

Events shortly after the report was released made people in North America especially receptive to its message. The summer of 1988 saw drought, a record heat wave, and medical waste washing up along with raw sewage on beaches in the eastern United States. Symbolic of the newfound urgency attached to environmental problems was the fact that *Time* magazine's 1989 New Year's issue was devoted to "Endangered Earth: Planet of the Year". Two months after this issue of the magazine came out, one of the worst ocean oil spills in history occurred when the tanker Exxon Valdez ran aground off the coast of Alaska. The accident spilled almost 38 million litres of oil, which covered some 2,600 square kilometres of ocean and coastline and brought to worldwide attention the dangers associated with energy systems reliant on the long-distance tanker transport of oil.

Like the authors of the World Conservation Strategy, the Brundtland Commission dealt with conflicts between economic development and environmental protection by way of the concept of sustainable development. It defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs," and emphasized that: "The essential needs of vast numbers of people in developing countries -- for food, clothing, shelter, jobs -- are not being met, and beyond their basic needs these people have legitimate aspirations for an improved quality of life."

Sustainable Development Does Not Mean No-Growth

With these facts in mind, and reflecting its global orientation, *Our Common Future* argued very strongly that sustainable development does not mean no growth. "Far from requiring the cessation of economic growth," according to the Brundtland Commission, the idea of sustainable development "recognizes that the problems of poverty and underdevelopment cannot be solved unless we have a new era of growth in which developing countries play a large role and reap large benefits." *Our Common Future* also pointed out that "developing countries are part of an interdependent world economy; their prospects also depend on the levels and patterns of growth in industrialized nations." For these reasons, *reviving growth* was the first of several objectives it identified as "strategic imperatives."

Sustainable Development

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Source: Our Common Future (1987).

"The challenge of sustainable economic progress is leaving natural resources and systems sufficiently intact to permit continuing gains in economic welfare into the foreseeable future."

Source: Robert Repetto, Promoting Environmentally Sound Economic Progress: What the North Can Do (1990).

A background paper on Industrial Change and the Environment prepared for a recent conference of the International Chemical and Energy Workers' Federation (ICEF) puts this issue very well: "To deny the need for economic growth in a world plagued by poverty and undernourishment for the bulk of its population is as unreasonable as to insist that such growth can continue to destroy the natural habitat of mankind without interruption." Thus, the sustainable development concept requires that growth be revived, nationally and globally, *while conserving and enhancing the resource base* on which growth depends.

The Brundtland report raised some tough questions about the rich countries' present levels of energy and resource use, and about the volumes of pollution they discharge. For example, energy in one form or another is required for all forms of economic development, and "any realistic global energy scenario must provide for substantially increased primary energy use by developing countries." If the developing countries were to use as much energy per person as the rich countries by the year 2025, keeping in mind the increases that will occur in their populations during the intervening years, the world would be using five times as much energy as it does now. If this energy were to be supplied using today's energy sources, and today's technologies for producing and using energy, there would be very serious environmental consequences including acid precipitation ("acid rain"), speeded-up global warming as a result of the accumulation of carbon dioxide in the atmosphere, and increased risks of nuclear accidents.

There is a better way of providing the energy needed to support continued economic growth; it involves energy policies that start by concentrating on making more efficient use of energy, and supporting a shift towards less energy-intensive activities. The same approach must be taken to reducing air and water pollution, a substantial amount of which in fact is the result of either the production or the consumption of energy. All these changes require *reorienting technology*, which is "the key link between humans and nature," and *managing risk*.

Reorienting the technologies used in industrial production, for instance, is essential since the world would have to produce two and a half times as many manufactured goods as it does now if the consumption of such goods in developing countries "were to be raised to current industrial country levels." If this were to be accomplished using today's production technologies, the environmental impacts in terms of pollution, resource consumption and energy use would be extremely serious, to put it mildly. An entirely new set of priorities for technology development is clearly needed, along with a new set of policy measures and incentives to guide that process of development.

These projections of energy use and industrial pollution show that trying to meet tomorrow's requirements for economic growth with today's ways of doing things would clearly be unsustainable. "Producing more with less" should be the watchword.

Present ways of managing living resources are also unsustainable. The problems associated with past efforts to increase agricultural productivity illustrate the dangers of short-term solutions. These problems include "loss of genetic diversity ..., salinization and alkalization of irrigated lands, nitrate pollution of ground-water, and pesticide residues in food." These problems directly affect the ability of the land to feed the population that depends on it, meaning that long-term solutions have to be found if the world is to achieve the Commission's objective of *meeting essential human needs* in the world's poor countries.

There is far more to the goal of meeting essential needs than just living resource management and doing more with less. The Commission points out: "The most basic of all needs is for a livelihood: that is, employment. Between 1985 and 2000 ... new livelihood opportunities will have to be generated for 60 million persons every year" in developing countries. "The pace and pattern of economic development have to generate sustainable work opportunities on this scale and at a level of productivity that would enable poor households to meet minimum consumption standards." Consequently, it will be necessary to make use of new and different sorts of technology in order to sustain economic growth.

Combining Ecology and Economics

This brings us to the most important strategic imperative identified by the Brundtland Commission: *merging environment and economics in decision-making*. The way modern economies work results in "patterns of economic and ecological independence rarely reflected in the ways in which policy is made." The government departments responsible for making overall economic policy, or for the promotion of particular sectors of the economy rarely take environmental factors into account. (Examples of such agencies are Canada's Department of Finance, the various provincial Treasury Ministries, and federal and provincial ministries of agriculture, natural resources, and industry.) These departments have no mandate to consider environmental issues, yet "it is these agencies, through their policies and budgets, that determine whether the environmental resource base is enhanced or degraded and whether the planet will be able to support human and economic growth and change into the next century." Still, less often do such agencies take into account the connections among economic, environment and social factors: for example, what happens when the long-term future of a resource base is threatened because workers and communities depend on a particular resource-based industry for their livelihood, and have inadequate "safety nets" to provide alternative sources of income?

At several points later in this handbook, we will be referring to the work of the World Resources Institute, based in Washington, D.C., and especially to the work of Institute economist Robert Repetto. Repetto has provided the best one-sentence summary of what sustainable development is really all about: "The challenge of sustainable economic progress is leaving natural resources and systems sufficiently intact to permit continuing gains in economic welfare into the foreseeable future."

Responding to Brundtland

Even before the Brundtland Commission released its report, Canadian governments had begun to respond to its activities. After the Brundtland Commission's Ottawa hearings in 1986, the Canadian Council of Resource and Environment Ministers (CCREM) set up the National Task Force on Environment and Economy (NTFEE). The mandate of the Task Force, in the words of its 1987 report, was "to foster and promote environmentally sound economic development" recognizing both the activities of the Brundtland Commission and the conclusions of the World Conservation Strategy. The membership of the Task Force included politicians, senior executives of a number of

Canada's largest corporations (including Dow Chemical Canada Inc., Alcan Aluminum, and Noranda Forest Inc.), representatives of the Canadian Petroleum Association and the Canadian Chamber of Commerce, and two representatives of non-governmental environmental groups.

In its report, NTSEE defined sustainable development as "development which ensures that the utilization of resources and the environment today does not damage prospects for their use by future generations", and expressed "the fundamental belief that environmental and economic planning cannot proceed in separate spheres." This theme of integrating environmental concerns with economic planning runs through both the Task Force's report and *Our Common Future*. Beyond such general statements of principle, two specific points from the report are especially important.

First, NTSEE admitted that governments and industry had in the past just reacted to "problems created by past mismanagement of the environment," and that this approach just wasn't good enough. "In a phrase, the remedial, reactive approach would be replaced by 'anticipate and prevent' as the dominant concept underlying environment-economy integration." The Task Force went on to recommend that the processes of governmental decision-making should be changed to reflect this reality, for instance by ensuring that Environment Ministers sit on cabinet committees dealing with economic development issues, and by "ensuring that all government processes for screening, review and evaluation of economic development projects include both socio-economic and environmental criteria." This is a direct response to the Brundtland report's point about central agencies and economic development.

Second, NTSEE recommended that: "Each province and territory should form a multisectoral Round Table on Environment and Economy to bring existing organizations together to cooperate on environment-economy integration at the provincial and territorial levels," and that a National Round Table be established as well. The Round Tables, said the Task Force, "are intended to be forums in which senior decision makers can meet to candidly discuss environment-economy issues and make recommendations directly to the First Ministers of their respective jurisdictions," as well as to the public. It is this recommendation that had the most immediate effects. Some jurisdictions were quicker off the mark than others in responding, but by 1991 all 13 Canadian jurisdictions (the 10 provinces and two territories, as well as the federal government) had announced the establishment of Round Tables.

The membership and procedures followed by the Round Tables have varied widely. Round Tables are generally, although not always, chaired by a Cabinet minister (the National Round Table is a notable exception), and their mandates are also somewhat different from jurisdiction to jurisdiction. What they all have in common is that they are strictly advisory in orientation; they are not decision-making bodies, and do not replace existing government departments or agencies. There is also a trend to include organized labour in the membership of Round Tables and similar advisory bodies. The new federal Advisory Committee on Environmental Protection (ACEP) will include substantial representation from labour, and this handbook is just one of many indications that at the level of the National Round Table, both business and government recognize the essential partnership role that labour must play in making decisions about the future of the environment, and the economy.

The National Round Table on the Environment and the Economy: Structure and Activities

At present the National Round Table, which has 22 members, is chaired by former university president George Connell. The federal Ministers of Environment; Industry, Science and Technology; Finance; and Energy, Mines and Resources are members of the Round Table, as are two provincial environment ministers. Labour is represented by Reg Basken, National Director of the former Energy and Chemical Workers' Union (now the Communications, Energy and Paperworkers' Union of Canada - CEP); the rest of the membership includes a number of academics and senior corporate executives, as well as environmentalists.

The National Round Table aims to promote the principles and practices of sustainable development in all sectors of Canadian society. It does this by: bringing together the best information; providing advice to the government; promoting understanding and awareness; playing an active catalytic role; and forging new partnerships to promote dialogue, achieve consensus on issues and develop partnerships for change. Its work is organized by way of a number of Task Forces, involved in: Reporting and Accountability; Consensus Decision-Making; Education; Rural Renewal; and Trade and Sustainability. Recently the Round Table has provided advice to the Prime Minister on both Sustainability and Prosperity and the North American Free Trade Agreement.

The National Round Table, which is based in Ottawa, has a small staff of its own and strongly emphasizes partnerships with business and a variety of other sectors and organizations. One such

partnership, with the Royal Bank of Canada, resulted in the publication of *Sustainable Development: A Manager's Handbook*. Partnership with Nissan has resulted in the publication of an environmental guide for community colleges called the *Green Guide*. The handbook you are now reading is the product of another such partnership, with the Canadian Labour Congress.

Sustainability: A Labour Perspective

In many ways, workers were the first environmentalists. Workplace pollution has been a major concern of the labour movement for over a century, and when community pollution became a major issue, labour was quick to point out that the pollutants were often the same ones found in workplaces, with the same effects on life and health. Unions have been in the forefront of resistance to "job blackmail," the argument that pollution and other kinds of environmental damage have to be tolerated as the price of progress. And as long ago as 1978, the CLC held a national conference on the issue of jobs and the environment.

Over the past several years, labour has expanded its efforts in the environmental field. The CLC set up its national Environment Committee in 1987, the same year the Brundtland report was published; it became a full standing committee of the CLC in 1990, and in November, 1990, the CLC organized a national conference on Sustainable Prosperity. In addition, both the CLC and affiliated unions have cooperated with environmentalists on a large number of environmental issues and projects. Most recently, the CLC has named two members to a federal-provincial consultative committee with roughly 20 members, formed to develop regulations in support of a national policy initiative known as the Accelerated Reduction and Elimination of Toxic Substances (ARETS).

In addition, large numbers of national unions and individual locals have set up environment committees, and at least one provincial federation of labour (in British Columbia) has produced its own Task Force report on the Environment and the Economy.

In its statement of principles on the environment, the Canadian Auto Workers have stated the bottom line for labour very well: "Workers must have the right to choose both economic security and a healthy environment for ourselves, our families and future generations." For organized labour, economic security must mean, of course, providing and protecting jobs.

For Further Information

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World Commission on Environment and Development, *Our Common Future* (New York: Oxford University Press, 1987).

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2. MAJOR ENVIRONMENTAL PROBLEMS

The environmental problems that have led to the concept of sustainable development could be described in any number of ways ... and the description could take up many hundreds of pages. (In some of the more detailed sources listed at the end of this chapter, it does.) We have chosen here to discuss these problems under three general headings: pollution, natural resource conservation, and energy issues. These headings do not exhaust the list of problems by any means, but they are a useful way of getting a handle on them.

Pollution: An Overview

Industrial pollution is nothing new. Even before Confederation, sawdust dumped into the Ottawa river from the sawmills that were then the economic lifeblood of the region, fouled the water and gave rise to some of the country's first environmental lawsuits, and some of its first environmental legislation. The problem wasn't confined to Ontario; in fact, University of Victoria law professor John McLaren says that: "The statute books of New Brunswick and the United Province of Canada are littered with statutory attempts to deal with the problem of mill waste in the waters of those jurisdictions."

Air pollution, likewise, has been around for a while. Both industrial air pollution and the burning of coal in home furnaces created serious pollution problems long before anyone had heard the word environmentalism. Those problems only hit the headlines occasionally, for instance during the disastrous air pollution episode in Donora, Pennsylvania in 1948 or London's "killer fog" of 1952, which claimed the lives of some 4,000 people.

For decades, people who lived in places like Hamilton and Sudbury, Ontario, tolerated serious local air pollution. To an unacceptable degree, they still have to. Air and water pollution became major public issues during the 1960s and early 1970s, mainly as a result of a number of episodes in which industrial pollution appeared directly responsible for damaging people's health. Mercury pollution from a paper mill in northwestern Ontario and lead emissions from smelters in downtown Toronto are two examples. Episodes like these made people begin to realize that pollution could no longer be tolerated as the "price of progress"; the price in terms of human health was simply too high.

Contributing to this awareness, as well, was the worsening problem of photochemical smog in cities across North America. (Photochemical smog occurs when chemical reactions among pollutants in the atmosphere, mainly although not entirely from car exhausts, are triggered by sunlight.)

Analyzing the Sources of Pollutants

Perhaps the most familiar category of pollution is pollution from *industrial processes* or *point sources* like industrial plants of various kinds, coal- or oil-fired electric power stations, and mines. However, non-point sources are highly significant contributors to a number of pollution problems. These sources include runoff of fertilizers and pesticides from farmers' fields, rainwater that washes off urban streets into storm sewers, automobile emissions, and releases of chlorfluorocarbons (CFCs) used in aerosol sprays, car air conditioners, and almost all refrigeration equipment.

Another category is *waste disposal*, whether it involves municipal sewage, residential and commercial solid waste (most of which is landfilled in Canada) or industrial waste that is not discharged directly to the environment. (Much of this last kind of waste is also landfilled.) Finally, there are *accidental releases* resulting from spills and mishaps at sea, and *deliberate chemical applications*, such as those involving pesticides and road salt.

Not all waste necessarily results in pollution. However, environmental consultant Susan Holtz, a member of the National Round Table, points out that the production of waste products is an inescapable feature of industrial activity of any kind. "All the waste and waste energy are ultimately returned to the Earth's sinks, and the waste materials are broken down, over time, and often reenter various natural physical, chemical, and biological cycles. In some cases, such as the nutrient cycle for organic materials, waste eventually becomes part of a renewed resource base."

Some Progress, but Not Enough

Pollution laws have reduced the severity of many of these problems. For example, coal is generally no longer permitted as a home heating fuel. The typical new car in North America today emits just a fraction as much pollution as a new model in, say, 1973; many industrial plants have significantly reduced their discharges to the natural environment. However, there are a number of reasons not to get complacent about the problems of pollution.

The first of these is the increasing volume of pollution resulting from the combination of economic growth and population growth. On a global scale, the Brundtland commission has warned that: "The annual increase in industrial production today is perhaps as large as the total production in Europe around the end of the 1930s. Into every year we now squeeze the decades of industrial growth -- and environmental disruption -- that formed the basis of the pre-war European economy." This is not entirely accurate, since much of the industrial production that goes on today uses far less polluting technologies than were available in the 1930s, but the general argument remains valid. This is particularly true because, as with automobiles, an increase in the number of sources may cancel out improvements resulting from technology that is environmentally friendlier.

Some of the results: between 1960 and 1980, global emissions of nitrogen oxides from the burning of fossil fuels just about doubled, and emissions of sulphur oxides more than doubled. Pollution volumes in North America are similarly disturbing. Here are just a few examples. In 1986, B.C. pulp mills discharged roughly 125,000 kg of solid wastes *every day* into the ocean. Industries in Ontario generate some four million tonnes of wastes every year, in addition to those that are discharged directly to the air, to bodies of water or to municipal sewage systems. Four million tonnes of municipal solid waste (from households, businesses and construction sites) are generated every year just in the greater Toronto region. Legally permitted discharges of toxic pollutants to the Great Lakes from the U.S. side alone in 1990 included 7.3 million gallons of oil, 89,000 pounds of lead, 1,900 pounds of PCBs and 900 pounds of mercury, according to U.S. government figures.

New Pollutants, New Problems

These substances are among the many pollutants that break down very slowly, if at all, when discharged into the environment. Not only are they highly toxic, they persist in the environment for a long time. (For example, the increased consumption of leaded gasoline in Ontario after the late 1930s is indicated by sharply increased lead accumulations in sediments at the bottom of lakes in central Ontario.) These persistent pollutants are now being joined by large numbers of synthetic organic chemicals, most of which have been introduced to the market (and to the environment) only since World War II. This is a second reason for continued concern about pollution.

Little Health Information on Many Industrial Chemicals, Study Finds

In 1984, the U.S. National Research Council published the results of a study undertaken to set priorities for toxicity testing. They looked at the information available on a small, randomly chosen sample of the 47,000 or so chemicals in commercial and industrial use in the United States. No toxicity information at all was found to be available for about 80 percent of these substances. For only about ten percent was enough information found to provide the basis for what the Council called a "partial health hazard assessment." In many cases, the information that was available was compromised by serious problems with the completeness of the testing and the adequacy of the study designs used. In other words, it simply would not stand up to strict scientific examination.

We have found out the hard way about the toxic effects of some such chemicals, including PCBs (polychlorinated biphenyls) and a number of the organochlorine pesticides, whose production and use is now either prohibited or severely restricted. However, because of their persistence in the environment several chemicals of this sort remain on the International Joint Commission's list of 11 critical pollutants in the Great Lakes. In addition, the Commission has identified some 362 such chemicals that are present in the Great Lakes, but has incomplete information about the possible health effects of most of these.

Based on the information that was available, the International Joint Commission stated in 1990 that: "We have concluded from wildlife and laboratory animal information that persistent toxic substances in the Great Lakes Basin Ecosystem pose serious health risks to living organisms. Sixteen Great Lakes wildlife species near the top of the food web have had reproductive problems or declines in populations at one time or another since 1950. In each case, high concentrations of contaminants have been found in animal tissue. Together with available human data, the information leads us to conclude that persistent toxic substances in the Great Lakes environment also threaten human health."

We will never be able to determine with complete certainty that a particular substance in the environment is endangering human health, much less be able to calculate the size of the risk involved. This means that environmental strategies in a variety of cases must be based on common sense. This "precautionary principle" is discussed in more detail in the next chapter.

Regional Pollution: A New Concern

A third reason for being more concerned than ever about pollution involves the scale of pollution problems. "Environmental changes have occurred continually as part of human history," says Susan Holtz. What is now happening, she argues, is that "in this century, humankind has become so populous, and its technological reach so powerful, that we have collectively become a force for global environmental change on a scale with geological and cosmological factors."

Local pollution problems are now being joined by regional and even international ones. The most familiar example for many Canadians is acid precipitation. Sulphur dioxide is emitted in large volumes from coal- and oil-fired power plants and various industries in the eastern United States, and coal-fired power plants and smelters in Canada. Oxides of nitrogen are emitted both by industry and from car exhausts. These chemicals may travel hundreds of miles in the atmosphere before they combine with water vapour to form acids that come back to earth as acid precipitation ("acid rain") which results in destruction of aquatic life as well as costly damage to crops and forests.

Scientists continue to disagree about the severity of that damage, but there is less and less doubt that it is occurring. Evidence is also accumulating about threats to human health. John Spengler and his co-workers at the Harvard University School of Public Health recently warned that although air quality in cities has generally been improving on the basis of conventional measurements, "the formation of acid aerosols and gases is exposing millions of Americans and Canadians to potentially damaging contaminants."

In another illustration of the scale of today's pollution problems, many of the toxic chemicals like PCBs which contaminate the Great Lakes get there not from direct industrial discharges but from the air, often after the pollutants have been carried long distances. In many cases, such chemicals get into the atmosphere after solid wastes are incinerated -- another example of the importance of pollution from non-point sources.

Pollution on a Global Scale

In addition to these regional problems, important as they are, we now confront at least two pollution problems that are genuinely global in scope. The first of these is ozone depletion. Ozone is simply a molecule consisting of three oxygen atoms; concentrations in the upper atmosphere are important because ozone prevents most of a particular

kind of ultraviolet light known as ultraviolet-B (UV-B) from reaching the surface of the earth. UV-B appears to be the primary cause of skin cancer in human beings, and one estimate is that each one percent decrease in ozone concentrations in the upper atmosphere will result in a four percent increase in the rate of skin cancer.

There will be other effects of UV-B exposure. The more likely include increases in the number of cataracts, often resulting in blindness. Evidence from laboratory experiments also indicates that increased UV-B exposure may interfere with the operation of the immune system, making many kinds of infections more serious, and reduces the growth rates of a variety of crops. Finally, increased UV-B exposure may also damage plankton and other forms of sea life that are the basis of the marine food chain.

There is a natural level of ozone in the upper atmosphere, and that level is normally maintained by natural processes that both create and destroy ozone. However, when a variety of synthetic chemicals are released into the atmosphere, they are carried into the upper atmosphere. There, they are finally broken down by exposure to the sun's ultraviolet rays. When these chemicals break down, they release chlorine (usually) or bromine atoms that catalyze a series of chemical reactions that ultimately destroy the ozone molecule. Because these reactions are repeated over and over again, it is estimated that every chlorine atom released through the breakdown of an ozone-destroying chemical will destroy 100,000 ozone molecules.

The most common of these ozone-destroying chemicals are chlorofluorocarbons (CFCs). They are used as cooling agents in refrigerators and air conditioners, in the production of plastic foam (a use which is being phased out), as a solvent in the manufacture of electronic components, and in smaller quantities as aerosol propellants and ingredients in sterilant gas mixtures. (As an interesting bit of history, the first of the CFCs, freon, was invented by Thomas Midgley Jr., the same American chemist who developed tetraethyl lead as a gasoline additive.) Other chemicals include methyl chloroform (a cleaning solvent), halons (fire extinguishing chemicals), and carbon tetrachloride (a highly toxic cleaning solvent still heavily used in Eastern Europe and developing countries). Although we came to rely on CFCs very quickly, Brian Chemical of the Energy and Chemical Workers' Union (now the Communications, Energy and Paperworkers' Union of Canada - CEP) points out that "*none* of the industrial uses of CFCs were originally dependent on these chemicals."

A rapid end to the production and use of these chemicals is important because they are highly stable: even if they were phased out tomorrow, CFCs and other ozone-depleting substances now in the atmosphere would continue to react with ozone for decades to come.

Some atmospheric scientists were concerned as early as 1974 about the possibility of CFC-related ozone depletion. Although this concern was taken up by the United Nations Environment Program (UNEP) as early as 1976, it was only in 1985, after a group of British scientists published their findings about the "ozone hole" above Antarctica, was the ozone depletion problem taken seriously by most governments. The extensive international negotiations that followed resulted in a treaty known as the Montreal Protocol, which was signed in 1987 and revised and strengthened after another round of negotiations in 1990.

The revised Protocol, now signed by all the major producers and users of ozone-depleting chemicals, commits countries to end production of CFCs, halons, and carbon tetrachloride by the year 2000, and methyl chloroform production by the year 2005. However, some of these chemicals could be phased out much more quickly. Norway, Sweden, Australia and Germany have already made a commitment to end their use of CFCs by 1995; Canada is committed to ending the use of CFCs by 1997 (earlier for some uses like plastic foams and car air conditioners), and methyl chloroform by 2000. One of the interesting aspects of the phaseout is the speed with which industry has been able to find replacements for the substances covered by the protocol, despite their initial protests.

Energy and Global Warming

Another pollution problem with worldwide dimensions is global warming or, as it's sometimes called, the "greenhouse effect." The greenhouse effect is simply the process in which certain gases in the atmosphere allow sunlight to reach the earth's surface, but prevent some of the heat it generates from radiating back into space. In fact, it is only the existence of the greenhouse effect that keeps the earth's surface livable.

However, in recent years, human activity has been adding "greenhouse gases" to the atmosphere. In terms of its predicted contribution to global warming, the most important of these is carbon dioxide, whose estimated contribution to global warming is 55 percent. About 77 percent of the carbon dioxide emitted by human activity is accounted for by the burning of fossil fuels, with deforestation accounting for the rest. (This is why, although its fossil fuel consumption is relatively low, Brazil is the world's third most important contributor to greenhouse gas accumulation; the carbon dioxide comes from the burning of the Amazonian rain forests.) The second most important contribution to global warming, about 24 percent of the total, comes from CFCs and related gases. In addition to the damage these substances do to the ozone layer, they are

remarkably effective in trapping radiated heat in the earth's atmosphere. The remaining contributors, which are considerably less significant, are methane gas and nitrous oxide.

The most extensive scientific assessment of the global warming phenomenon was published in 1990 by the United Nations' Intergovernmental Panel on Climate Change (IPCC). In addition to providing the figures referred to in the previous paragraph, IPCC reviewed the available evidence on the speed of global warming and estimated that, if greenhouse gases continue to be emitted at current rates, an "effective doubling" of the greenhouse effect created by the levels of atmospheric carbon dioxide that existed before the industrial revolution will occur around the year 2030. This will probably result in an increase of global average temperature of between 1.5 and 4.5 degrees Celsius; the wide range of figures is due to the extreme complexity of the computer models used to predict global climate change, and disagreement among scientists about a variety of the processes involved in temperature change.

This temperature change does not sound like much, yet it has never occurred before in human history. To put it into perspective, the best evidence suggests that the average global warming that occurred between the end of the last ice age and the present was just 5 degrees Celsius! As climatologist Stephen Schneider puts it, "we are now looking at a similar increase in temperature but over 100 years rather than 10,000"; the last time this happened it "revamped the ecologic face of the planet." What will global warming mean? There is much uncertainty about the effects; among the most likely is a rise in the level of the earth's oceans averaging 30 to 50 centimetres, which would, according to one IPCC report, result in "serious problems for the low lying nations and coastal zones." A rise of one metre could flood as much as 15 percent of Egypt's arable land and 14 percent of the area now devoted to food production in Bangladesh. Another probable effect is a major shift in patterns of rainfall, leaving many important food-growing regions in the temperate zone with warmer and drier summers.

Unlike protecting the ozone layer, there is no international treaty to deal effectively with global warming; the treaty agreed to, at the recent United Nations Conference on Environment and Development, is more a statement of good intentions than anything else. A number of individual countries have made commitments to stabilize their emissions of greenhouse gases, and some to reduce them. The problem is that any individual country's efforts are by no means guaranteed to have a significant effect. Anything Canada does, for example, could be cancelled out several times over by an increase in coal-fuelled industrial development in China. Rich countries can

afford the substantial investments in new technologies for the production and use of energy, but poorer countries are understandably reluctant to bear the costs associated with replacing their cheap, but dirty, technologies with more expensive ones that are less harmful to the environment. Their funds are simply too scarce.

Resource Use and Management

"Fish shortage costs 1,000 jobs." That was the headline in a recent issue of *The Globe and Mail*, starting off an article that dealt with the economic impacts of the decline of the cod fishery in Atlantic Canada. The plant shutdowns reported on in the article didn't result from a reduction in the catch allowed by the federal government; those reductions came a few days later, in response to the latest in a long series of warnings by federal scientific advisors. The shutdowns came, instead, because the company in question simply couldn't get enough fish of commercial size to keep the plant running. The combination of this shutdown and the effect of the reductions in allowable catch of northern cod meant the loss of literally thousands of jobs.

There is an ongoing debate over how much of the decline of the Atlantic cod fishery is due to overfishing by Canadians, and how much is due to unregulated fishing by foreign boats operating just outside Canada's 200-mile limit. The fish, of course, don't know where that limit is, which makes the entire debate a bit bizarre from the point of view of sensible resource management. The simple fact that the Atlantic fishery has not in the past been managed in a way that will ensure its continued ability to support current levels of economic activity. As a result, many Canadians who depend on that resource base directly or indirectly face a future with no jobs, and nowhere to turn.

Many other Canadian living resource bases have been mismanaged in the same way as the Atlantic fishery. New Brunswick's forests and the Great Lakes fishery are just two examples. The former Assistant Deputy Minister of Forest Resources for New Brunswick (Gordon Baskerville) and a member of the Great Lakes Fisheries Commission (Henry Regier) have recently argued that both resource bases have continued to support regionally important industries only by exploiting progressively poorer quality resources. In both cases, an "industry, broadly defined, was sustained, but the productive structure of the resource was not." What this means for the future, quite simply, is that sooner or later, the New Brunswick forest industry and the Great Lakes fishery are doomed unless basic changes are made in living

resource management, along the lines proposed in the World Conservation Strategy.

Agricultural practices pose a threat to another renewable resource base. In 1984, a Senate committee warned after an investigation of Canada's record in soil conservation that the degradation of Canadian soils presented severe long-term threat to the economic viability of Canadian agriculture. On the Prairies: "Recent studies have shown that as much as 40 to 60% of the organic matter present in virgin prairie soils has been 'used up' by farm production. An equally startling fact is that, while the native soils in parts of the prairies originally released up to 125 pounds of nitrogen per acre per year, the same soil today may deliver as low as 9 pounds per acre if nitrogen fertilizer has not been used. The practical result for the farmer is that he must apply ever-increasing amounts of nitrogen fertilizer in an attempt to hold production at its current level."

Increased fertilizer use has environmental impacts of its own. Not all the nutrients contained in fertilizer are absorbed by the soil; as a result, agricultural runoff is a significant source of drinking water contamination. Agriculture Canada quotes estimates that the *direct* costs of soil degradation to Canadian farmers are in the hundreds of millions of dollars per year. They are probably considerably higher since estimates are not available for all regions. This is just one example, among many, of the rising costs that accompany degraded natural resource bases.

The Special Importance of Biodiversity

Biodiversity is the diversity of species, gene pools and ecological systems. It is a particularly important concern in the area of living resource management, because extinction is forever. Yet, in the words of the Brundtland Commission, "scientists have intensively investigated only one in every 100 of earth's plant species, and a far smaller proportion of animal species. If nations can ensure the survival of species, the world can look forward to new and improved foods, new drugs and medicines, and new raw materials for industry." For example, rain forest plant species have already provided the basis for valuable pharmaceutical products, and promise to provide many others.

Even the disappearance of genetic variation within existing species, like wheat, other cereal grains, and livestock can be of tremendous importance. According to the World Conservation Strategy, "primitive populations of crops and their wild relatives are an important source, and often the only source, of pest and disease resistance worth many millions of dollars, of adaptations to difficult

environments and of other agronomically valuable characteristics." Genetic diversity provides an insurance policy whose value is probably incalculable, in the truest sense of the word.

Yet plant and animal species are probably becoming extinct more frequently than ever before, and genetic variation within species is similarly being reduced. Over-harvesting is only one of the threats to biodiversity. Indeed, the most serious threat comes from the destruction of habitat caused by expanded settlement, forest clearance for cultivation (as in the case of the Amazonian rain forests), industrial pollution, mining, and other physical alterations to the environment that result from human activity. Consequently, planning to conserve biodiversity means much more than conventional "good management": it requires integrating environmental concerns and economic planning, always being aware of the benefits that may be permanently lost with the destruction of species or genetic variants. (Here is yet another application of the precautionary principle.)

One of the accomplishments of the recent United Nations Conference on Environment and Development was an international treaty on the conservation of biodiversity. However, the United States refused to sign the treaty. Even if it had, according to David Bennett of the CLC, "the trouble with the Biodiversity Convention is that it does not tell a nation how much biodiversity it must conserve" and contains few specific mechanisms for enforcement. He points out that this difficulty is bound to arise in future environmental negotiations, as well: international treaties in the past set out obligations for individual nations dealing with their behaviour toward each other. Meaningful agreements on living resource conservation, and on issues like global warming, will have to set out requirements for nations' own domestic economic and environmental policies. This will not be easy to achieve.

Managing Non-Renewable Resources

Non-renewable or stock resources like minerals and fossil fuels clearly present a distinct set of problems because they are inherently exhaustible. If we took sustainability literally, we might never use any fossil fuel resources, or any minerals that were not 100 percent recyclable given the present state of technology! This is clearly an unacceptable recommendation, and sustainability in this context "does not mean that such resources should not be used," according to the Brundtland Commission. It does, however, "require that the rate of depletion of non-renewable resources should foreclose as few future options as possible," for example by way of improving energy efficiency to conserve fossil fuels.

This concern about foreclosing options applies, of course, not only to the rate at which the resource is consumed, but to the impacts of its extraction and its consumption on other natural systems. Mining often results in serious environmental damage to both land and water. One mine alone in British Columbia dumps 45,000 tonnes of tailings per day into Rupert Inlet. Smelting the ore which contains minerals like nickel and copper involves emitting large volumes of pollutants to the atmosphere. Sustainable resource management in this case ("sustainable mining") requires controlling not only resource use itself, but also the environmental impacts of producing it.

The second task is easier to deal with, by reducing smelter emissions and the impacts of tailings disposal. The first requires increasing recycling rates not only by changing policies that discourage recycling, but by changing product designs to make it easier to recover and reuse materials. (Some auto manufacturers are now starting to design their products with this in mind.)

Energy Production and Consumption

Global warming is actually just one of the environmental problems associated with the production (or extraction), refining and use of energy. The Brundtland Commission recognized that these environmental problems deserve special attention because of the close connection that has historically existed between economic growth and growth in energy consumption. If people used the same amount of energy in 2025 that they do today, the world's population would be using about 40 percent more energy than it did in 1980, simply because of population growth. On the other hand, if all the world's countries used the same amount of energy per person as the industrial countries use, in 2025 the world's population would be consuming *five and a half times as much energy* as it did in 1980!

Energy and Growth

The problem is this: on the one hand, we should not only expect but welcome increases in energy demand to the extent that they are necessary as the basis for economic growth, especially in the poorer countries and regions of the world. On the other hand, producing, refining and using almost any form of energy, create environmental problems. Burning fossil fuels, of course, contributes to a variety of localized environmental problems like photochemical smog and acid precipitation. We are now finding out that these are often particularly severe in the developing world; Mexico City's devastating smogs and

the pall of industrial air pollution that hangs over much of Eastern Europe are just two examples.

Usually, this is a result of the fact that fossil fuels are burned -- in antiquated steelworks, for instance, or in old and poorly tuned cars with no emission controls. These localized problems can be reduced, at a cost, by replacing the hardware in question. What can't be cured, except by reducing the volume of carbon consumed in the form fossil fuels, is their contribution to the accumulation of greenhouse gases. This is why environmental scientists like John Robinson, who heads the University of British Columbia's centre for sustainable development, refer to the need for "decarbonating energy policy" to reduce reliance on fossil fuels.

Other sources of energy have different problems, but not necessarily less serious ones. Hydroelectric dams take large volumes of land out of production for other uses, have destructive effects on fish and wildlife, in tropical areas increase the risk of a variety of waterborne diseases like schistosomiasis, and (in practice) often require the displacement of indigenous peoples. Canadians are familiar with many of these impacts because of the controversy over the second phase of the James Bay hydroelectric project.

Nuclear power as an energy source involves not only the substantial environmental impacts of mining and refining uranium, both of which create large volumes of toxic and radioactive wastes, but also the admittedly remote chance of a major reactor accident with the associated releases of radioactivity, and the problem (which has so far not been solved) of finding a secure storage place for the highly radioactive spent fuel. On a global scale, the problem of proliferating nuclear weapons using materials produced in or diverted from "peaceful" nuclear power problems is also acute, as events in the Middle East have recently reminded us.

The Energy Solution: Doing More With Less

These points all suggest that improving the efficiency with which energy is used should be the highest energy policy priority, as the Brundtland Commission proposed. By now, there are literally dozens of studies around on how much energy can be saved and at what cost. None of these studies supports the argument that energy conservation means going back to caves and candles, or even that it is incompatible with sustained economic growth. One such study is of particular interest; it was carried out by a team of researchers led by Jose Goldemberg, a Brazilian scientist who became the country's environment secretary early in 1992.

Goldemberg started by looking at the "activity levels" (in households, in transportation, in manufacturing) that were typical of the Western European industrialized countries in 1975. He then asked: given the best available commercial technologies, or in a few cases technologies that were just in the process of being commercialized, how much energy would a country like Brazil need in order to support comparable levels of activity? In other words, if the objective were to give Brazilians the same standard of living Western Europeans had in 1975, how much energy would be needed?

Better Living through Better Fridges?

This way of tackling energy problems is best illustrated with a few specific examples. Goldemberg assumed a Brazil in which there would be one 315-litre refrigerator-freezer per household. However, he calculated the amount of energy this would require based on the electricity used by "the most efficient 2-door unit available in Europe in 1982, a 315-litre unit requiring 475 kWh per year, which is less than one-third of the electricity required by the average refrigerator-freezer in use in the U.S." Similar assumptions were made for lighting, television, and a variety of other appliances.

In transportation, Goldemberg assumed that there would be about one car for every five Brazilians, driven 15,000 km a year; these were, once again, the same activity levels found in Western Europe in 1975. However, he assumed their fuel efficiency would be that of advanced prototype vehicles using just 3 l/100 km of fuel, or 79 miles per U.S. gallon. In the case of manufacturing, Goldemberg assumed that Brazil would be using 320 kg per person per year of raw steel, the average steel consumption in Western Europe in 1978; he calculated the amount of energy that would be needed to produce this steel based on the energy consumption of two processes being developed in Sweden.

These are just three examples; Goldemberg's calculations involved 22 separate categories of energy uses which, together, account for almost all the ways energy is used in a modern industrial economy. Adding up the figures, Goldemberg and his team came to the conclusion that the activity levels they assumed could be supported based on using just slightly more energy per person than Brazil was *already* using in 1982. The difference was all in the efficiency with which the various technologies in Goldemberg's scenario converted energy into usable services."

Saving Energy, Saving Money

Even more interesting were his tentative findings about cost: taking into account the amount of money that would be saved as a result of reduced energy consumption, these new energy-efficient technologies represented remarkably good value for money. One energy economist found that if Brazil were to invest \$4 billion (U.S.) in more efficient technologies for using electricity, it could put off investing some \$19 billion in new electrical generating stations.

This kind of analysis was originated by energy policy consultant Amory Lovins. Lovins developed the concept of a "soft energy path" emphasizing high levels of conservation combined with selective use of renewable energy sources. He has argued for many years that when the overall costs of new energy supplies are taken into account, it is far cheaper for countries like Canada and the United States to invest in conservation. Most recently the Rocky Mountain Institute, which Lovins heads, has estimated that investments in improved efficiency could reduce U.S. electrical consumption by 75 percent, without any change in lifestyles or industrial productivity.

The lesson for the industrialized countries should be clear: dramatic improvements in energy efficiency can be achieved without an overall erosion in our standards of living, and often without high economic costs to the society as a whole. We should be careful here to realize that there may be substantial costs to certain groups or regions within a society. For example, if North Americans' use of oil were to be reduced substantially, it's clear that workers in places like Alberta would suffer unless a new set of industries developed to replace the province's economic reliance on the oil and gas industry, and unless policies were in place to ensure the retraining and reemployment of displaced workers. For this reason, the Alberta Heritage Savings Trust Fund was a far-sighted idea in principle, however badly it has been managed in practice: it reflected a recognition that an oil-based economy is simply unsustainable in the long run.

We should also be careful in terms of the implications of numbers like Goldemberg's for energy supply on a global basis. For instance, Goldemberg points out that the energy required in his hypothetical Brazilian example is still twice as much energy per person as Tanzanians used in 1981, and almost three times as much as Indians used in 1978. This is why the Brundtland Commission warns that despite the promise of energy efficiency measures, "by the early

decades of the 21st century they will not alleviate the ultimate need for substantial new energy supplies globally." Even before then, on a global basis the challenge facing the industrialized world is to provide poorer countries not only with access to energy-efficient technologies, but also with a way of affording their initial costs.

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3. WORKING TOWARD SUSTAINABILITY: CONCEPTS AND STRATEGIES

Introduction

Sustainable development is not always easy to define. How do we make our definitions more workable, and once we have defined sustainable development, how do we get there from here? This chapter presents a number of principles that can help us do this. They are listed roughly in order from the most abstract to the most concrete, and from the most general to the most specific.

Industrial Metabolism

Robert Ayres is a professor of engineering at Pittsburgh's Carnegie-Mellon University. This is how he presents the problem of making industrial activity more sustainable: "We may think of both the biosphere and the industrial economy as systems for the transformation of materials." There is very little waste in nature. As Ayres puts it, "the biosphere as it now exists is very nearly a perfect system for recycling materials." The same is not true of human activities, which are characterized by extremely large volumes of waste.

Industrial economies have immense scope for improving the efficiency of their "metabolism" by reducing waste both of materials and of energy: "producing more with less." A very simple example is municipal solid waste, which the Canadian economy generates at the rate of 1.7 kg per day for every man, woman and child in Canada. As of 1985, just 2 percent of this material was recycled, with nine-tenths going into landfill sites. Across Canada, many of these are reaching capacity; the search for new landfills creates serious political conflict (as it is now doing in the Metropolitan Toronto region, for example) and the old landfills create a variety of pollution problems.

Industrial processes of all kinds generate wastes that often contribute directly to the pollution of air and water. In a number of fascinating examples, Ayres suggests that this kind of analysis should be applied to the materials that actually end up in products as well. Paints weather and crack, releasing the lead or zinc they sometimes contain into the environment; tires wear, leaving residues not only of rubber compounds, but also of the zinc and cadmium compounds they contain. And, of course, huge volumes of materials are contained in the municipal solid waste that ends up in landfills or, fortunately not very often, in incinerators. "Incinerator ash contains fairly high

concentrations of heavy metals from a variety of miscellaneous sources, ranging from used motor oil to plastics and pigments."

The same kind of analysis can also be applied to the consumption of energy resources. Ayres points out that each time we burn a ton of carbon, whether it is in the form of coal, oil, natural gas or wood, we produce something like 3.67 tons of carbon dioxide emitted to the atmosphere. (The exact amount depends on how much carbon is not transformed into carbon dioxide, but rather into other pollutants.) That carbon dioxide contributes to global warming. In addition, of course, both producing and consuming energy are associated with a variety of more localized environmental impacts.

We can, therefore, take a first step toward improving the efficiency of our economy's industrial metabolism by carefully analyzing the materials and energy flows involved in specific economic processes. This can be done at the level of a plant, an industry, or an entire economy. A key operating principle to keep in mind while doing this, which is really not much more than highly organized common sense, is that all the materials used in products and processes have to go somewhere. As Dr. Brundtland has recently said: "While absolute zero waste will be difficult to achieve, we should regard the production of waste as an incomplete economic process."

The Precautionary Principle: Minimizing Regrets, Avoiding Unpleasant Surprises

According to the Brundtland Commission, "economic development is unsustainable if it increases vulnerability to crises." One way to avoid increasing that vulnerability involves applying the "precautionary principle." As described by environmental economist Charles Perrings, this principle "implies the commitment of resources now to safeguard against the potentially adverse future outcomes of some decision." Describing one application of this principle, Evan Mills and his co-workers at Sweden's University of Lund have coined the term "no-regrets strategies" for their recommended approach to the problem of global warming. We don't have complete information either about the effects of global warming or about the costs of reducing emissions of greenhouse gases like carbon dioxide. Therefore, countries ought to concentrate on a particular set of policy measures: those that reduce emissions of carbon dioxide and also are economically attractive. In other words, there will be "no regrets" even if the pace of global warming turns out to be slower than now believed, or its effects less serious.

As you would expect, based on studies like Jose Goldemberg's examination of energy efficiency, they found literally dozens of such measures, most of them involving improvements in the efficiency of the end uses of energy but some also involving changes in the choice of fuel. Indeed, there are good reasons to place a high priority on policies to improve energy efficiency for reasons that have nothing to do with global warming. Such policies also reduce the localized environmental problems that are almost invariably associated with increased energy production and use. In addition, of course, eliminating the use of CFCs and related chemicals is essential even if we don't care about global warming, to reduce the destruction of ozone in the upper atmosphere.

What Buying Insurance Tells Us About Sustainable Development

Most of us buy insurance on our homes, our cars (at least to cover our liabilities if we cause an accident, even where it's not required by law) and our lives. We do not do this because we know exactly how likely it is that we'll have a fire or a burglary, be involved in a car accident, or contract a fatal illness. We buy insurance, instead, because we know that these things *might* happen and that the cost, to us or to our dependents, would be too high to make it worth taking the chance of remaining uninsured. We don't need more precise information than that.

This principle is not strictly speaking one of no regrets, but rather one of minimizing possible regrets, or avoiding unpleasant surprises. The principle can be applied to a variety of questions related to sustainable development. Stephen Schneider, an American climatologist who has written widely on the problem of global warming, is harshly critical of people who "simply cite the potential up-front capital costs of CO₂ controls or fuel taxes, write newspaper stories about how many billions or trillions it's going to cost, and scare people away from action." This is like writing about the costs of house or car insurance, without providing any information about the costs of not being insured.

In fact, Schneider continues, even if the United States economy were to spend US\$ 1 trillion to control carbon dioxide emissions over the next century, that works out on a yearly basis to just a few percent of the American defence budget. This sort of argument doesn't mean that cost should be no object when it comes to environmental protection. It does mean that in the context of sustainable development, cost figures are only useful information if we also consider what kind of insurance we're buying for the money.

This is just one example of many in the environmental policy field which involve decisions that have to be made under conditions of uncertainty. Here's another: Richard Benedick is an American diplomat who was involved in the negotiations that resulted in the Montreal Protocol. In his book *Ozone Diplomacy*, he argues that: "Governments may have to act while there is still scientific uncertainty, responsibly balancing the risks and costs of acting or not acting. By the time the evidence on such issues as the ozone layer and climate change is beyond all dispute, the damage may be irreversible, and it may be too late to forestall serious harm to human life and draconian costs to society."

Harvey Brooks, who teaches technology and public policy at Harvard University, has expanded on this principle. "The continual exposure of large numbers of people to substances not common in nature," he says, "is a potential source of future surprise, which is likely to decline only gradually as our scientific understanding of the specific biological mechanisms of carcinogenesis and mutagenesis slowly improves." (Mutagenesis is the process of causing mutations, or changes in cell structure; carcinogenesis means the process by which particular substances cause cancer.)

More on Avoiding Unpleasant Surprises

Regulatory decisions about toxic substances in the environment and the workplace routinely have to be made on the basis of incomplete information. Workers are all too familiar with the way this process has worked for decisions about regulating hazardous substances in the workplace. In any number of cases, industry and government have argued that more research was needed on the effects of a particular substance, because the evidence wasn't conclusive enough. In particular, the absence of epidemiological evidence (evidence from statistical studies on human populations exposed to the hazard) is often cited as grounds for delaying regulatory action, although as Brian Kohler of the Energy and Chemical Workers' Union (now the Communications, Energy and Paperworkers' Union of Canada - CEP) points out, epidemiology is extremely unsuitable for identifying the environmental causes of cancer or other diseases. "Reliance on epidemiology," he says, "has in general been a strategy used by industrial apologists to justify the absence of regulatory action."

"In the extreme," as environmental economist Talbot Page pointed out 15 years ago, this approach "requires positive evidence of 'dead bodies' before acting." Another environmental economist, Thomas Crocker, once referred to this as "a cigarette company standard of truth," referring to the tobacco industry's repeated insistence that the

role of smoking in causing lung cancer has not been scientifically demonstrated.

Once again, a strategy of minimizing regrets does not imply pollution control at any cost. It *does* imply very careful and systematic thought about the kinds of risks that we, as individuals and as a society, are willing to run based on incomplete information about the effects of human activity on the natural environment, human health and the resource base. The best axiom here may be a very simple one: "When scientists disagree, use common sense!"

The strategy of minimizing regrets can be applied to the management of living resources as well. For example, over the past few decades the forest products industry in New Brunswick has become heavily reliant on the intensive use of insecticides to control spruce budworm populations. This "worked," in the sense that production and employment were temporarily protected in the pulp and paper industry. However, the jobs and profits that were protected became, in the words of American scientist William Clark, "ever more vulnerable to catastrophic failure in the event that the budworm should escape from the control imposed by the insecticides."

This is just what happened, and "the unprecedented extent and intensity of this [budworm] outbreak left the surprised regional economy scrambling to sell off a sea of dead timber and wondering how to feed all the modern pulpmills that had been designed on the basis of surprise-free forecasts of wood supply."

When Good Environmental Policy is Also Good Economics

One of the themes of the Brundtland report was the need to integrate environmental, social and economic decision-making. This does not mean subjecting environmental policy decisions to a simple cost-benefit analysis. Neither does it mean assuming that conventional economic calculations as applied to resource management questions will necessarily provide answers that we can live with.

Consider the example used in a recent book by Frances Cairncross, the environment editor of Britain's *Economist* weekly. "Take the example of an entrepreneur cast away on a desert island which, by happy chance, lies on a busy trade route, in a convenient time zone. The entrepreneur cuts down all the trees and exports them to Japan, sells off the coral for jewellery and drills out all the oil. The proceeds are reinvested in building schools, homes and factories for a new Hong Kong Is this sustainable development or not?" Most of us would probably say that the answer is no, and that the environmental costs of such a strategy are being covered-up or passed on to future generations in an unacceptable way.

This is not, of course, an isolated example. Countries like Indonesia and Malaysia appear to have adopted a policy of systematically liquidating their tropical timber resources, rather than managing them in a way that could sustain yields more or less indefinitely. The short-term returns from adopting this policy simply look more attractive. In another example closer to home, agriculture in much of the western United States is possible only because of irrigation water drawn from a reservoir of groundwater that is rapidly being depleted. This situation is now causing considerable alarm, yet in 1962 a U.S. government official argued that "wholesale depletion [of groundwater] may be economically feasible in the long view if it results in building up an economy that can afford to pay for water from a more expensive source." Unfortunately for the economy of a number of the Plains states, that source has yet to materialize!

Discount Rates and Sustainability

In technical terms, these problems involve the choice of a discount rate. In conventional financial analysis, a benefit such as a lump sum payment when you retire is worth less in the future than it would be if you got the same benefits today. This is because if the money were in your hands today, you could simply invest it and collect (or reinvest) the interest or dividends until you retired. The higher the interest rate at a particular time and in a particular economy, the higher the discount rate, since your returns on investing today's benefit will be higher.

The problem with this line of reasoning as applied to many resource management and environmental issues is that even disastrous consequences that happen ten or twenty years in the future don't seem particularly serious if we look merely at the "present value" of the economic consequences. Robert Repetto gives an example with numbers. "At long-term interest rates of about 10 percent," he says, "an ecological loss of a million dollars expected to happen in a hundred years has a present cost of \$75. For consumers borrowing at 18 percent per year on their credit cards, it would have a present costs of \$0.06. The implication, obviously irrational, is that global climate change or loss of biological diversity, which risk potentially enormous losses over the next century, can be virtually ignored in current government and private decisions that will significantly affect those future developments."

This is not an imaginary problem. As two World Bank economists pointed out in an article several years ago, according to conventional economic criteria, the best management plan "for renewable natural resources that reproduce slowly (e.g. whales, tropical hardwoods) may

be to liquidate the easily harvestable resource completely, and then invest the profits elsewhere in a more lucrative enterprise." This is exactly what countries like Indonesia have been doing with their tropical forest resources. Because of the short-term economic attractiveness of over-harvesting forest resources, some Canadian provinces may have been doing exactly the same thing, without necessarily saying so.

The approach of minimizing regrets, on the other hand, suggests a lot more caution: can we really bet on being able to replace the groundwater, or the various environmental services provided by tropical forests? (Wood supply is only one of these services; others include preventing soil erosion, providing a habitat for various species of plants and animals, and converting atmospheric carbon dioxide into oxygen.) One way of approaching this question won't provide answers, but does at least provide better information. National income accounts conventionally treat the income received from resource use as a contribution to gross national product, without any offsetting entry for the depletion or destruction of the resource base.

This way of looking at things focuses attention on (for example) the income received from depleting living resources rather than the fact that a nation's capital stock may be being run down at the same time. Nations, like the free-spending children of the rich, may be inviting financial disaster by living on capital while not paying enough attention to their ability to earn income. Economists have now begun to develop systems for national accounting which correct for this oversight.

In one case study published by the World Resources Institute, Indonesia's impressively rapid (and largely resource-based) economic growth was reduced substantially once the figures were recalculated to take into account estimates of future economic losses resulting from logging practices, the depletion of petroleum reserves, and soil erosion. The obvious lesson of such exercises is simply that current growth is being achieved at the expense of the future, and at the expense of making the entire economy more vulnerable to surprises.

The Role of Pricing: When "User-Pay" Makes Sense

Despite the preceding discussion, there are many respects in which sound economics and good environmental policy go hand in hand. One of these involves the pricing of resource use, and is best illustrated by way of an example.

Consider the pricing of water. First, we have to understand that there are two distinct kinds of water use: instream and withdrawal uses. Water may be withdrawn from a river and a lake, purified and

used for drinking and flushing toilets, and then returned to the body of water it came from. Alternatively, water may be used "instream" as a source of hydroelectric power or as a dumping ground for pulp mill wastes, city sewage, or waste heat from an electrical generating station. In terms of energy flows, each unit of energy generated by a coal-fired or nuclear generating plants produces about two units of energy in the form of waste heat which, like all other energy flows, has to go somewhere.

What will happen if these various uses of water are underpriced -- or, as is often the case with industrial water pollution, not priced at all? Users will have little reason to reduce costly uses, or to reduce the destructive impacts of their uses. The first point was shown in a study of two Canadian cities, Calgary and Edmonton. In Calgary, residential water use was unmetered; in Edmonton, residential users were billed according to the amount of water they used. Not surprisingly, residents in Calgary used "30 to 40 percent more water every year than Edmonton, its completely metered 'twin' city to the north."

We have to be cautious about support for "user pay" programs of any kind, for example because of their possible effects on low-income individuals. However, the general principle that appropriate pricing encourages appropriate use is an important one. We don't have to be as cautious in cases like the one in which, according to a U.S. government study, farmers in California's Central Valley are paying \$5 per acre-foot for federally subsidized irrigation water. If the water had been priced on the basis of the cost of building and operating the irrigation system, the figure would have been \$24 per acre-foot! (An acre-foot is simply the amount of water that would be needed to cover one acre of land to a depth of one foot.)

So long as we accept that we are in a market economy, the principle of appropriate pricing (or at least avoiding severe underpricing) is even more important when applied to pricing the use of water for waste disposal. Industries and municipalities that discharge effluents into the nearest river are, in effect, getting a free garbage pickup. People downstream pay the price, in the form of reduced water quality, damage to health, and so on. The same is true for discharges of pollutants into the atmosphere. Most direct waste discharges into bodies of water are "priced," if at all, only to the extent that pollution standards exist, and are enforced. The same is true of air pollution. At the present, this is a rather uncertain process.

Even in situations where users are charged for waste disposal, for instance when industries pay for the use of municipal sewage systems, the system is imperfect. Small industries like metal plating plants may discharge chemical residues which are extremely toxic and costly to

treat, and may indeed shut the system down altogether, but aren't reliably billed for the costs involved. This is bad environmental policy, and bad economics. The general principle was expressed by Nicholas Ridley, formerly Environment Secretary in Britain's Conservative government. He was recently quoted in the British newsweekly *The Economist* as saying that: "Pollution, like fraud, is something you impose on others against their will so that you can perhaps gain financial advantage. It is an ill for which the operation of the free market provides no automatic cure. Like the prevention of violence and fraud, pollution control is essentially an activity which the State, as protector of the public interest against particular interests, has to regulate and police."

When governments do this, all they are doing is putting a price on uses of the natural environment which were previously free, in the sense that the user didn't pay the cost, although other people did. This is why many advocates of sustainable development are now paying more attention to policy instruments like effluent charges, which are in effect a tax on every unit of pollution emitted by a company; increased landfill charges as a way of stimulating waste reduction and making recycling efforts more attractive; and "carbon taxes" on fossil fuels. The argument in this last case is similar to the one involving the pricing of waste disposal. The price paid by users of fossil fuel doesn't give them a reliable signal about the long-term costs of their actions in terms of contributions to global warming. Once again, we have to be very cautious about proposals like these, both because of their general effects on working people (they're like any other form of sales or consumption tax) and because of the local effects they might have on, for instance, the automobile industry. More about these "economic instruments," and their implications, in chapters 7 and 8.

Demand Management

The example of the pricing of water is just one instance where demand management (looking at ways to limit demand for a particular resource by improving the efficiency with which it's used) is both good environmental policy and good economics. Another example, even more important in both environmental and economic terms, is that of energy.

The basic idea is that we should look at ways to get the same services from energy that we do now, while using less of it. People and industries don't buy energy for the sake of buying energy; they buy it for the sake of the services it can provide for them: "hot showers, cold beer, lit rooms, and spinning shafts" on electric motors,

in the words of Amory Lovins. Almost always, these services can be provided using less energy than we now use.

Some ways of doing this are extremely simple; compact fluorescent bulbs last several times longer than incandescent ones, and use just a fraction as much electricity, thus more than paying for themselves. Other approaches are more complicated. For example, according to Lovins, "upgrading a typical office fluorescent lighting system can be accomplished by installing computer-designed reflectors, which deliver virtually the same light from half as many lamps; new lamps that give off more light per watt and nicer colour; sophisticated high-frequency electronic ballasts ... and several kinds of controls." In all these cases, and a multitude of others, the dollar savings are as impressive as the energy savings. This illustrates the general point that it's routinely cheaper to invest in saving energy than in extracting or generating additional energy to meet the demand for those services. This is why Ontario Hydro has recently announced a major program of investing in conservation.

If saving energy is such a good investment, why isn't it already happening? One answer is that energy users may demand very short payback periods (the amount of time it takes to recover their investment) for the money they spend on conservation. This problem is particularly important in the electrical power field, since electrical utilities can invest in plants that take thirty years to pay for themselves. However, many kinds of investments in energy efficiency will pay for themselves in reduced energy bills, within two years or less. An even more important reason many such investments aren't made is that especially during periods of recession households, and industries, may just not have the up-front cash.

A classic case is the \$15 high-efficiency fluorescent lightbulb. These pay for themselves quickly in longer life and lower electrical bills, but how many people you know can budget \$15 to replace each lightbulb as it burns out? How many new home buyers can scrape up the extra cash to meet the higher monthly payment on an energy-efficient home, even if it is a "good investment" in the abstract? Looking at things this way, a Mercedes-Benz is a good investment too, because it depreciates so little ... but so what?

Because of factors like these, there's a lot of scope for government programs to reduce the up-front costs of energy efficiency. To give just one example, an electric utility in the northeastern United States is now "renting" high-efficiency lightbulbs to consumers for 20 cents a month; users can simply return them when they burn out. There's also a lot that can be accomplished simply by analyzing energy uses in individual workplaces (another application of the concept of industrial metabolism).

"Pollution Prevention Pays"

Over the past few decades, conflicts between business firms and environmentalists over specific forms or incidents of pollution have been frequent and often bitter. In fact, a textbook on business-government relations in Canada published in 1986 included environmental groups among the "natural enemies" of business in terms of influencing public policy. All too often, of course, labour has been caught in the crossfire.

However, the idea that pollution prevention pays is one very concrete example of the Brundtland Commission's point that economic growth and environmental protection are not incompatible. The idea is not a new one; as long ago as 1975, the 3M Corporation started a program called "Pollution Prevention Pays" in an effort to look for profitable ways to reduce the environmental impact of its operations. By 1979, the company was able to report "significant environmental gains, plus a worldwide savings of some \$20 million." The basic principle involves applying the idea of industrial metabolism by using non-waste technologies to *prevent* pollution, rather than just containing it, capturing it, or reducing the damage it does.

Very often, the incentive for such technological changes comes from regulations that mean firms have to find ways of reducing their pollution control costs, or eliminate certain technological options altogether. To give just one example, Northern Telecom Ltd. was able to replace the 1,000 tonnes of CFCs it used as solvents in 42 circuit board manufacturing plants by developing a process that eliminated the need for the solvents altogether. (An additional benefit, of course, was the elimination of worker exposure to the solvents.) According to a recent *Globe and Mail* story, although the process "cost Nortel \$1 million to develop, it is expected to save the company \$50 million in solvent costs by 2000."

In other cases, reductions in environmental impacts are achieved as a consequence of modernization of industrial processes driven purely by economic considerations. As *Our Common Future* points out, advanced closed-cycle technologies in pulp and paper manufacturing could cut water use to 20-30 cubic metres per ton of pulp; older mills typically use about six times as much water. This is just one example; many others can be found of industries where the oldest plants, that are the most costly to operate, also use the most energy and cause the most pollution. This is why modernizing the antiquated industrial plants and power stations of Eastern Europe will result in dramatic improvements in the quality of the environment.

Modernization would have this effect even if no one cared about the environmental destruction that has accompanied those countries' efforts to industrialize rapidly.

Planet Earth, Inc.: What happens when the shareholders revolt?

"Would you invest in a firm managed as we manage planet Earth? Consider the case of Earth Inc., a multinational conglomerate with a comprehensively diversified range of products and services. Earth Inc. has, for some time, allowed a group of preferred shareholders to take dividends at a level which is supportable only if the enterprise continues to allow its capital equipment and resource stocks to deteriorate. The burgeoning number of common shareholders of Earth Inc., dependent upon the success of the firm for their entire livelihood, have received a very small portion of the benefits of significant growth. Meanwhile, management of the firm has continued to deplete its natural resource stocks in the hope that the research department will discover something which will propel the firm into a continuous growth mode. To continue the analogy, in recent years the firm has all but eliminated the maintenance department and has failed to pay its insurance premiums; apparently the money was used to redecorate the executive suite and to pay for increased security patrols around the managers' club and at stockholders' meetings. Recently, some major regional subsidiaries have folded, or been put into receivership. Management is concerned that on the futures market, Earth Inc. stock is being sold short, and significant blocks of shareholders are demanding a shakeup in management.

These images are used to demonstrate that normal business approaches and common sense, applied at a global scale, might yield different patterns of management and investment for the greater security of each shareholder and of the global commons. Good environmental management is fully compatible with good business practice, and in the long term is essential for the survival of businesses and of the planet."

Source: "Changing Attitudes Towards Environmental Management," an unpublished paper by geographer E.W. Manning of Environment Canada.

For Further Information

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David Pearce, Anil Markandya and Edward Barbier, *Blueprint for a Green Economy* (London: Earthscan Publications, 1989). A report originally prepared for the U.K. government; somewhat more technical than Cairncross, and less critical of the assumptions of cost-benefit analysis.

4. WORKING TOWARD SUSTAINABILITY: CONCRETE APPROACHES

Introduction

Until quite recently, controlling environmental impacts meant remedial, "end-of-pipe" approaches to pollution control. However, there is a widely acknowledged need to move away from this model, which is expensive and often not effective, and toward the reduction of energy and materials waste throughout the production processes. This means thinking in terms of source reduction as distinct from release reduction.

Reducing Waste

A 1986 report by the U.S. Congressional Office of Technology Assessment (OTA) provides some useful background for the idea of waste reduction at source. "Waste reduction," the report said, "refers to in-plant practices that reduce, avoid, or eliminate the generation of hazardous waste so as to reduce risks to health and environment."

Using the concepts on which the OTA report was based, it is important to distinguish between waste reduction and waste management. Waste management has been the only kind of effort made by most waste generators until quite recently. Waste management starts only after waste is generated; it may involve recycling or reuse away from the source of waste generation; treatment; and disposal. According to OTA, "often what is called treatment of waste is simply removal and transfer." Even when treatment is genuinely effective, or disposal is carried out to high standards (which is often not the case), some environmental risk is involved. This is why, according to OTA, waste reduction is the preferred approach: "all waste treatment and recycling facilities pose some environmental risk and thus require effective regulation. The most certain means of preventing environmental risk is through waste reduction."

There are five major ways to go about reducing waste, which are explained in more detail on the following pages. These can be applied to almost all industrial operations, although obviously the particular technological options available will vary from industry to industry.

These approaches need not, and should not, be restricted in their application to the generation of toxic or hazardous wastes. They can be applied to the flow of all forms of materials (and energy) through the production process.

Recycling in-process wastes

Materials are returned to the production process within existing operations. The ideal solution is a "closed-loop" process which eliminates all but accidental discharges of waste to the environment. Although not quite achieving this objective, since some off-site waste disposal is required, at least two Ontario auto parts plants have installed ultrafiltration (UF) systems which make possible the recycling of most of the volume of forming compounds used on stamped metal parts and the cleaners used to remove the compounds.

Similarly, a Toronto area printing plant has installed a carbon adsorption solvent recovery system that, it says, recovers 85 percent of the solvents in printing inks, and another Ontario printer anticipates that it will soon be able to recover and recycle more than 98 percent of its waste ink, at a cost saving of \$160,000 per year.

Redesigning, modifying or modernizing production technology

For example, a U.S. Air Force base was able to replace chemical paint stripping with plastic bead-blasting. The generation of almost 5 tonnes of chemical sludge and 200,000 gallons of wastewater in the course of stripping one aircraft is replaced by the generation of 320 pounds of dry paint waste, and no wastewater. Although a sizable capital investment was required, reductions of more than 90 percent in raw materials costs and almost 50 percent in energy costs mean that according to OTA, "payback is just over 1 month based on operation cost savings." An even more important advantage is the elimination of worker exposure to the hazardous chemicals used in paint stripping. Another example, among many, is the substitution of powder coating for liquid paints in some applications.

Changes in raw material inputs

These are often associated with either changes in process technology and equipment or with changes in product design. For example, Northern Telecom has eliminated solvents containing CFCs for cleaning printed circuit boards. It did this not by switching to another cleaning agent, but by adopting new soldering processes that made cleaning unnecessary. Here, again, there is the added benefit

of eliminating worker exposure to the solvents used in the old process. The use of water-based inks, or inks with a vegetable oil base, to replace organic solvent-based inks in printing is another example of the use of changes in raw material inputs to reduce waste.

Changes in product design or formulation

These may avoid the use of particular hazardous raw materials. Eliminating of CFCs as refrigerants and as ingredients in disposable plastic cups is one example. Although they may not address the problems of hazardous waste which were of principal concern to OTA, new product developments incorporating what used to be "waste" materials, like the roadside sound barriers one Ontario company has started to manufacture of ground-up rubber from discarded car tires, should also be considered part of this category.

Improved plant and process management and housekeeping

This can be as simple as reducing inventories of toxic substances kept on hand. In the words of British chemical engineer Trevor Kletz, "what you don't have can't leak." In addition, as Brian Kohler of the Energy and Chemical Workers' Union (now the Communications, Energy and Paperworkers' Union of Canada - CEP) points out, "it has been calculated that a significant portion of the hydrocarbons released to the atmosphere get there through leaking valves, seals, packings and gaskets." As another example, a California chemical plant reduced the amount of organic chemicals in its waste water by 93 percent, and reduced wastewater volumes themselves, by changing its procedures for cleaning and rinsing filters, rinsing reactor vessels, and transferring phenols from tank cars to storage tanks.

Waste Reduction Audits

At the level of the individual firm or plant, the basic tool for identifying opportunities for waste reduction is the waste reduction audit, defined by OTA as "systematic, periodic internal reviews of a company's processes and operations designed to identify and provide information about opportunities to reduce wastes." The use of the word "audit" is a bit misleading here, for reasons that are explained in the section of this chapter on environmental audits, but since the term is widely used, we are probably stuck with it.

The steps for conducting a waste reduction audit can be described in a number of ways. For example, in its useful manual *Profit from Pollution Prevention*, Pollution Probe suggests the process that is outlined, in modified form, in the next section of the handbook.

Pollution Probe actually suggests ten steps, but some have been combined for our purposes. However the steps are described, a basic tool is the process flow diagram. When it is prepared carefully, the result is a detailed picture of what materials are going into the process, and where materials losses (waste) are occurring. In the best waste reduction audits, the process flow diagram is then used as the basis for mass-balance analysis: information on raw material purchases, the raw materials content of finished products, and sampling of waste streams are used to put numbers on the diagram, indicating the exact source of materials losses. This information then provides the basis for workers and management to evaluate the options for waste reduction. Just going through the process of developing the diagram is often valuable, even without the numbers.

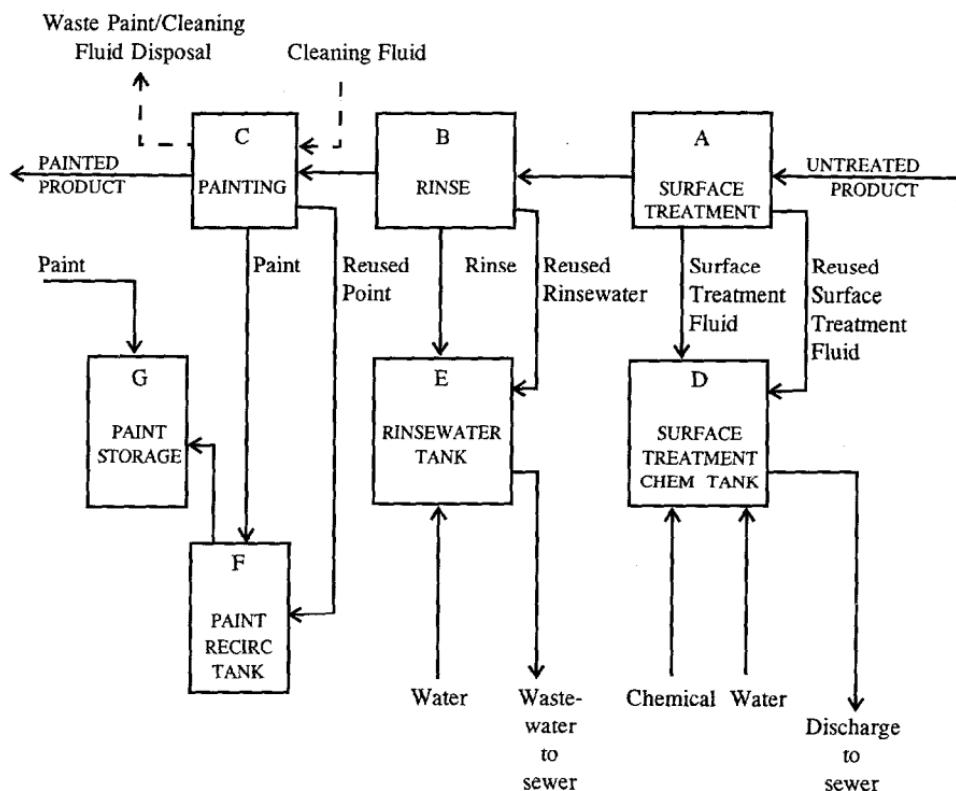
Although the processes are different, the principle is just as valid for large service-sector workplaces (say, the office building housing a university faculty of social science) as it is for industrial plants. Applying the principle in this case leads to some fairly obvious conclusions: "Blue Box" recycling collection programs for newsprint and fine paper; switches from one- to two-sided copying. (In many public-sector organizations, the same price per copy is charged back to a particular budget unit, whether the copies are one-sided or two-sided. This is a fine example of an inappropriate price signal, since it hides the reduced environmental impacts associated with cutting the consumption of paper in half.) There are questions with less obvious answers, as well, such as: What happens to used containers for photocopier chemicals? What disposal methods are used for wastes from school biology classes, university laboratories, and hospitals?

Six Steps to Waste Reduction

1. *Identify plant operations* in detail, and then develop a process flow diagram that shows the connections between process components, and shows the nature and destination of all waste streams.
2. *Collect information*, including an inventory of all materials (including not only basic materials but also catalytic agents, cleaners, machinery coolants, lubricants, process water, etc.) and energy-using steps in the production process. This information should be incorporated into the flow diagram, of the kind shown in simplified form at the top of the next page. Ideally, this step will also include taking samples of waste streams (especially emission to the air and to water or sewage systems).

3. *Track wastes* that are taken off-site for treatment or disposal, with as much detail as possible.
4. *Conduct a materials balance:* this step reflects the basic principle of industrial metabolism, that all the materials used in the production process must go somewhere, even if (as is often the case) they are gradually dissipated into the environment as the end product wears out. This step requires detailed information about materials consumption at various stages of production, and is not always necessary, especially in "first-cut" waste reduction audits.

A Simplified Flow Diagram of an Industrial Process



Source: Ontario Waste Management Corporation,
Industrial Waste Audit and Reduction Manual (1989).
Reproduced with permission.

5. *Identify and evaluate options* for waste reduction. OTA lists a number of possibilities that are applicable to a variety of industrial settings:

- Replacement of organic solvents
- In-process solvent recovery
- Substituting mechanical for liquid processes
- Preventing vapour losses
- Reducing the use of process water

The technical evaluation of these options will describe the necessary technological changes in detail and will deal with such questions as the proved nature of the technology, reliability, and (crucially important) effects on workplace health and safety. Options which improve workplace health and safety should obviously be given highest priority; options whose effects are uncertain, or which may actually create new hazards, should be rejected. The economic evaluation of these options will include capital and operating costs, cost savings (in terms of recovered materials and reduced waste disposal costs), employment gains (or losses), and an estimate of the "payback time" (the length of time before the investment will pay for itself).

6. *Prepare an evaluation report* that includes a summary of the waste reduction audit, technical and economic analysis of options for waste reduction, and recommendations for further study.

Follow-up is Critical!

A principle that should be applied to the results of all environmental audits, or exercises that call themselves that, is: *Follow-up is critical!* The purpose of the audit is not just to provide interesting information, but to identify areas for improving the environmental performance of the organization. Every compliance problem identified, every opportunity for waste reduction and energy conservation discovered should be followed up. The audit process should lead directly to the development of a schedule for making the needed changes. In addition, steps 2, 3 and 4 should be repeated after implementing any changes to see whether they have achieved the desired results.

Environmental Audits: Pros, Cons, and Limitations

Two important kinds of exercises are also sometimes called environmental audits, but they are oriented toward specific, restricted purposes. *Compliance audits*, which are probably the most frequent kind, are aimed at determining compliance with existing legislation and standards ... which may, of course, be entirely inadequate or subject to policies of quiet non-enforcement! *Pre-sale audits* are assessments of how environmental damage may create financial liabilities for the future owner of an industrial plant or site. Banks that provide financing for such deals are increasingly insisting on such audits, to protect themselves against liabilities for clean-up that are higher than the worth of the property that secures the loan or mortgage.

Ideally, environmental audits would be much more comprehensive, and much closer in spirit to financial audits. Financial audits are required so that shareholders can benefit from an informed outsider's evaluation of the accuracy and completeness of a corporation's financial statements. The concept of the "informed outsider" is a key one. Organizations can't just have their own accountants also serve as their auditors. They have to hire an outside firm, and have to give it detailed enough access to the firm's books for it to reach conclusions about the accuracy of the firm's financial statements.

At their best, environmental audits serve a similar, but broader purpose: they provide an information base for evaluating the environmental policies and performance of a firm or an organization. They are a starting point for answering the question: "How well does the firm's environmental performance stand up, and what could be done better?"

There are at least three important differences between environmental and financial audits. First, firms aren't yet required to carry out environmental audits, much less to disclose the results, although there are some proposals to do this, at least in the case of large firms or organizations. Second, there are not yet any generally accepted and agreed-upon principles for environmental auditing, or indicators of environmental soundness, in the way that there are for financial accounting. Neither is there a comprehensive set of standards for environmental performance. Third, because of these two factors, there is no reliable and convenient answer to the question of "who audits the auditors"?

In addition, the concept of an environmental audit implies that the environmental problems created by or associated with a particular operation may not be obvious. In some cases, this is true; for example, detailed examination of how energy is used in the workplace may be needed to identify major opportunities for improving

efficiency. Very often, however, the problems are all too obvious, and the real issue is how to change management's priorities so something gets done about them.

Partly for this reason, it is important for labour to work toward *full participation* in environmental audits. This does not mean simply getting a copy of the audit report when it's completed, but being involved (through local union environment committees or joint labour-management committees) in each step of the audit process. It is also important to understand the limitations of various kinds of exercises called "environmental audits," some of which aren't really. In its guide to *Greening the Workplace*, Britain's Trades Union Congress (TUC) warns that "a superficial one-off review of environmental performance would not classify as an audit, especially if it did not include ordered information gathering, checklists, interviews, site inspections or examination of documentation."

If they are done thoroughly, environmental audits may be uncomfortable for management. An article in a recent issue of the *Sloan Management Review* warns that "corporations must be savvy about the handling and maintenance of auditing records. Records that fall into the wrong hands can be extremely damaging evidence in lawsuits or regulatory proceedings." This is true, but it also indicates a mind-set that is probably incompatible with serious commitments to sustainable development.

On the one hand, full disclosure of audit results might discourage organizations from carrying out such audits, since the evidence generated could be used against them in court. On the other hand, it could be argued that just as financial auditors are professionally and legally obliged to disclose evidence of fraud, so those who participate in environmental audits should be obliged to disclose environmental violations. As with the laws against (for instance) fraud, full compliance should be taken for granted!

Toxics Use Reduction

"Toxics use reduction: in-plant changes in production, processes or raw materials that reduce, avoid or eliminate the use of toxic or hazardous substances or generation of hazardous by-products per unit of production so as to reduce overall risks to health of workers, consumers or the environment without shifting risks between workers, consumers or parts of the environment."

Source: Massachusetts *Toxic Use Reduction Act* (1989), s. 2.

Toxic Use Reduction (TUR) Programs: The Massachusetts Example

In the U.S. state of Massachusetts, legislation has specifically given priority to waste reduction as it applies to toxic substances. The state's *Toxic Use Reduction Act* (TURA), which sets the objective of reducing the volume of hazardous waste generated in the state by 50 percent by 1997, requires firms using more than a certain quantity of a number of specified toxic substances to develop Toxic Use Reduction (TUR) plans. These plans, which are a specialized form of environmental audit covering only hazardous substances, must set out two-year and five-year goals for reducing the use, not just the discharge, of these substances.

According to Ken Geiser, the director of the Toxic Use Reduction Institute at the University of Massachusetts at Lowell, Mass.: "The objective of toxics use reduction is the reduction or elimination of toxic chemicals in production whether the chemicals appear as wastes, by-products, intermediaries, feed-stocks or constituents of finished consumer products." The contrast with the conventional approach to pollution control is obvious.

Geiser, whose Institute was established under TURA to conduct research and development on waste-reduction technology, points out that laws like TURA "neither require risk assessments nor establish thresholds for chemical exposure. Instead, they set up reporting and planning responsibilities for firms that handle specified toxic substances." TURA incorporates a list of techniques for toxics use reduction which is basically the same as the one given here; it also specifically says that improved waste management techniques do not qualify as toxics use reduction.

Under the *Act*, more than 600 Massachusetts firms are required to develop TUR plans. The plans are, in effect, detailed waste reduction audits concentrating on toxic materials. To be completed by 1994, the plans must include information on current and projected uses of toxic chemicals; a detailed analysis of technological options for achieving toxics use reduction; the economic impacts of each chemical used; a set of goals for reducing toxics use; training, technologies and procedures to be implemented, and anticipated cost savings; and a schedule for the implementation of toxic use reductions.

Companies covered by TURA must file annual reports after 1994 on their progress toward meeting their waste reduction goals, and their TUR plans can be examined by state officials. However, business in Massachusetts successfully resisted a demand by environmentalists that individual TUR plans themselves be available to the public.

"Zero Discharge"

Approaches like TUR and environmental auditing are ultimately means to an end. Ideally, this would be "zero discharge" of *selected* pollutants into the environment. (It is important to distinguish between this objective and zero discharge of all pollutants, which would mean the end of industrial activity!) We can prohibit the manufacture and use of particular environmentally damaging substances (such as CFCs), achieve almost complete recovery of potential pollutants through closed-loop processes, and substitute less dangerous processes and chemicals for more environmentally damaging ones.

Goals like the *virtual elimination* of inputs of persistent toxic substances to the Great Lakes are within reason. This is not a pie-in-the-sky objective. It was agreed to in principle by the national governments of Canada and the United States in the 1978 Great Lakes Water Quality Agreement. That agreement calls on the Commission to report biennially to both governments on the state of the Great Lakes. The Commission's *Sixth Biennial Report on Great Lakes Water Quality*, issued in 1992, concluded that "persistent toxic substances have caused widespread injury to the environment and to human health" in the Great Lakes environment, and went on to say this about zero discharge:

"The *philosophy* of zero discharge thus must become a *reality* as soon as technologically possible. As the Commission has stated previously and reiterates here, a zero tolerance for the entry of any persistent toxic substance into the Great Lakes environment (including the St. Lawrence River in its entirety) from human sources should be adopted and acted on immediately by all sectors of society in order to begin to virtually eliminate all human inputs of persistent toxic substances to the Great Lakes system."

"It might not be possible," said the Commission, "to achieve total elimination of all persistent toxic substances from the system." However, the Commission said, "the concepts of virtual elimination and zero discharge are consistent ... The overall strategy or aim regarding persistent toxic substances is virtual elimination, and the tactic or method to be used to achieve that aim is through zero input or discharge of those substances created as a result of human activity."

There will obviously be long and heated disagreements about which particular chemicals should be treated as persistent toxic substances for purposes of achieving this goal. However, those disagreements should not distract us from the application of the principle. "Zero discharge," said the commission, "means just that: halting all inputs from all human sources and pathways to prevent any opportunity for persistent toxic substances to enter the environment as a result of human activity."

.... [Z]ero discharge does not mean less than detectable. It also does not mean the use of controls based on best available technology, best management practices, or similar means of treatment that continue to allow the release of some residual chemicals."

This is why use reduction, and the complete elimination of particular hazardous substances, are so important. Virtual elimination is a practical application of the precautionary principle. Our knowledge about the effects of persistent toxic substances in, for instance, the Great Lakes is not complete, and probably never will be. What we do know, however, suggests that the risks associated with any approach other than virtual elimination may not be worth taking.

Energy: Principles for Improving Efficiency

Because energy is used in very diverse ways in the workplace, it is particularly difficult to provide a simple set of principles for improving efficiency. The list that follows describes a few of the most productive approaches. Many waste reduction initiatives pay off in reduced use of energy as well! Perhaps the most important single principle is this one: *what workers know about the workplace and the production process is an essential resource in reducing energy consumption.*

Better housekeeping

More careful and frequent maintenance of belts, motors, and (perhaps especially) vehicles can substantially reduce energy use. Money spent on maintenance is often made up very quickly by energy savings. In addition, leaks in fuel systems such as pipelines obviously add to energy costs!

Insulation and leak-plugging

Much of the energy used to heat industrial and commercial buildings is lost to the outside air, not because of poor insulation, but because of air leakage. Often, energy use can be reduced with no capital investment (for example, by being sure warehouse doors are closed when not in use) or with minimal spending on caulking and weather sealing. The insulation of heated parts of industrial processes is often inadequate, and can be improved in the same way that home insulation can be improved.

We need to be cautious about going too far with leak-plugging unless workers' health is kept in mind as the most important consideration. Workers in many office buildings have discovered that

a lack of outside air leads to what some have called "sick-building syndrome," and a variety of health problems. These are not necessarily side-effects of energy conservation programs; they usually reflect poor design of heating and ventilating systems, and a lack of involvement by the people who actually use the building.

Since steam is a widely used industrial heat source, leak-plugging also applies to careful maintenance of steam pipes, valves, and related equipment.

Cascading

Many industrial processes use relatively high-temperature heat sources without making any attempt to recover heat; it's simply treated as "waste heat." Cascading involves recovering heat from high-temperature industrial processes for use where lower temperatures are required; for example, process steam can be used for space heating.

Energy-efficient design and equipment

Very often, it's easiest and cheapest to reduce the energy consumed by a particular piece of equipment by taking energy use and costs into account when it's replaced. This is true whether we're talking about lightbulbs, photocopiers, refrigeration equipment, or (once again) vehicles. Many managements already do this; some don't.

The involvement of workers is particularly important here, as it is in making decisions about *modifying buildings and office space*, where energy savings can be substantial. For example, natural light can be used as much as possible (for instance by choosing light interior colours and using room dividers with reflective tops); switches for banks of lights can be replaced with individual switches.

Recycling materials

Whether paper or metal scraps are involved, using recycled materials almost always saves energy. (The most dramatic example is aluminum, where making a cast aluminum part from recycled aluminum requires only 5 percent as much energy as making it from "virgin" materials.) Unfortunately, the dollar benefits of these energy savings often aren't captured by the individuals or firms doing the recycling.

Cutting down freight and passenger transportation mileage

Many companies are now using computers to plan the shortest delivery routes for their trucks, with associated fuel savings. Others encourage the use of car pools, for instance by giving preferred access to parking, or are setting up their own van pools. A City of Toronto task force on energy and transportation recently recommended that employers with more than 100 workers develop "trip reduction plans"; Vancouver's Task Force on Atmospheric Change recommended a bylaw *requiring* employers with more than 25 workers to develop such plans.

For Further Information

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Ontario Waste Management Corporation, *Industrial Waste Audit and Reduction Manual* (Toronto: OWMC, 1989). \$40 plus \$2.80 GST from OWMC, 2 Bloor St. West, 11th Floor, Toronto, Ontario M4W 3E2).

5. WHY A JOINT WORKPLACE APPROACH?

Introduction

Organized labour has a long history of involvement with environmental policy issues. At the same time, the relationship between labour and environmentalists has sometimes been uneasy, if not actively hostile. This is because a variety of hazards associated with industrial activity affect exposed workers first, and worst. Workers are also familiar with the argument that they must choose between jobs and the quality of the workplace environment, and between jobs and environmental quality in the areas where they live. At the same time, when society's demands for environmental quality result in the prospect of job losses, it is the workers already victimized in these senses who bear the greatest burden of economic sacrifice.

These points are expanded upon by Hugh Mackenzie in the article that follows this chapter. Fortunately, there are a number of reasons for a cooperative approach between labour and environmentalists. The most basic of these is simply that pollution inside and outside the workplace tends to originate from the same sources, and to have the same kinds of health effects. Workers' health was devastated by the effects of such pollutants as lead, mercury, asbestos and vinyl chloride long before these became recognized as dangers to the general population.

As Brian Kohler of the Energy and Chemical Workers' Union (now the Communications, Energy and Paperworkers' Union of Canada - CEP) says: "Occupational health is, in many ways, just an environmental issue with an imaginary jurisdictional fence around it." In addition, as Hugh Mackenzie points out, "working people as a class bear a disproportionate share of the costs of pollution" because of the way it affects their own neighbourhoods.

Labour and Environmentalists: Working Together

Over the long term, labour and environmentalists tend to have similar concerns about the management of living resources, in particular: how can they best be managed over the long term to ensure both their ecological integrity and their ability to support employment? When problems arise, as in the case of disputes over logging in wilderness areas, they tend to involve conflicts about how the costs of moving from short-term to long-term resource management approaches ought to be distributed. For example, in December, 1989, two university professors published an article in *The Globe and Mail* arguing that proposals to expand logging access in the

Temagami region of northern Ontario were "an affront to the public interest."

The article appeared in the midst of a lengthy battle about logging policy in Ontario's northern forests. It argued that past mismanagement of the region's forests made disruptions in employment almost certain in the near future, regardless of how rapidly logging was allowed to proceed. This was, and is, probably true. However, university professors almost never have to bear the economic costs of such arguments about "the public interest"; loggers and sawmill workers do.

If labour ignores the power of appeals like this one, without directing public attention to the way in which the costs of environmental improvement are distributed, workers run the risk of being left out in the cold as environmental protection is pursued with scant concern for the job and income losses that may result.

Ensuring Equity in Sustainable Development Costs

"One of the basic tenets of sustainable development is equity in the distribution of benefits and costs of resource use and environmental management. This is a multi-faceted issue in that it involves relationships between present and future generations; between developed and developing nations; and among various sectors and groups within our own society. One of the key barriers to sustainable development is environmental damage arising out of inequities in the distribution of energy and resources. To address these issues, means must be found to examine the ways in which the interests of various sectors coincide; identify who will benefit from change, who will pay the costs and who will be least able to bear those costs; attempt to resolve competition over scarce resources; and develop institutional mechanisms to safeguard local needs and interests at the provincial, national and international levels."

Source: National Round Table on the Environment and the Economy,
Report to Canadians (June, 1991).

Partly because of the Brundtland Commission's insistence that environmental integrity and economic security are objectives that have to be pursued at the same time, environmentalists have come to understand and accept many of these points over the past several years. The result has been a rapid expansion of the cooperative links between labour and environmentalists.

For example, the CLC joined all the major national environmental groups in seeking amendments to toughen the federal government's proposed environmental impact assessment legislation (Bill C-13), and worked closely with the Canadian Environmental Network in arguing for changes to the federal process for registering and reviewing pesticides. A variety of union locals and labour councils have worked closely with environmental organizations in setting up environment committees and local action networks such as the Windsor (Ontario) and District Labour and Environment Project. In a particularly important initiative, Local 1-80 of the International Woodworkers of America-Canada (IWA-Canada) and a number of British Columbia environmental groups have reached an agreement on forest management and land use objectives on southern Vancouver Island, an area where conflicts between logging and wilderness preservation have been especially intense.

Labour and Business: Environmental Allies?

Neither business nor the B.C. provincial government, whose decisions ultimately determine the range of acceptable land uses, was directly involved in the agreement among the groups. However, the reasons for business and labour to take a cooperative approach to issues of sustainability are even more compelling. Changes in production processes motivated by a concern for sustainability have often been shown to result in substantial cost savings even over the short term. Even more immediately, the days are long past when profit objectives could be pursued in isolation from questions of social responsibility. The public's level of concern for environmental quality makes an environment-indifferent approach to production destructive of the interests of managers, shareholders *and* workers.

This point can be illustrated with two examples. The first of these involves persistent rumours of a European boycott of Canadian (or at least B.C.) forest products, driven by comparisons between Canadian clearcutting practices and those which are leading to the destruction of the Amazonian rainforests, and by concerns about the water pollution that results from chlorine bleaching of pulp. It would be easy to dismiss this as merely a public relations problem, but it's much more than that, and these environmental concerns are shared by a substantial proportion of the Canadian public, as indicated by the national controversy that surrounded logging on the Queen Charlotte Islands.

Green Investing?

The second example is a 1990 report published by the Gordon Capital Corporation called *Of Blue Chips and Blue Boxes: Do Green Laws Mean Red Ink?* The report's authors were concerned with the way management practices that did not respond to public and governmental concerns about sustainability might increase financial risk to investors. Banks, for example, may be exposed to major losses if they take over ownership of a property and find themselves faced with major environmental cleanup costs; the report found that some banks had taken more extensive steps to examine the environmental records of corporate borrowers than others ... and, therefore, presented lower risks to investors. Industries may have to make major (and often overdue) investments in plant and equipment in order to meet pollution requirements, and may be exposed to major financial liabilities for the environmental damage they cause.

The mining sector was rated as a "high risk" because of potential future cleanup costs, although some major companies (with better environmental records) represented lower risks than others. The same company-to-company variations in risks were observed in the consumer products, industrial products, and oil and gas sectors, among others. On the other hand, the entire forest products sector was rated as a "very high risk" both because of the costs of meeting tougher pollution regulations and because of uncertainties about future timber supply. "Public environmental pressure," the report warned, "has reached the point where governments are having to exercise their prerogative as title-holders [of public forest lands] to impose stricter controls on environmental performance and leasing procedures."

The message was clear: investors now care about a company's environmental record. They can't afford not to. Their decisions about the level of environmental risk associated with a company's operations directly affect the ability of a company to raise capital for new investment. That ability is more important than ever in an increasingly competitive international economic environment. The report concluded that: "In Adam Smith's terms, businesses must now recognize that it is in their own 'enlightened self-interest' not to cause environmental degradation. Corporate ethics, public opinion and most importantly, rigorous regulation and enforcement all weigh against it."

Workers have, if anything, an even larger stake in such decisions than do corporate managers: as Hugh Mackenzie points out, it is much harder for workers faced with job and income losses to "diversify" than it is for managers or shareholders.

The Valdez Principles

The best single illustration of the costs of bad environmental management is probably the *Exxon Valdez* disaster, which cost the company involved some \$2 billion (at last report). In addition, the disaster led a non-governmental organization called the Social Investment Forum, including both environmentalists and investment managers, to draft a set of guidelines for corporate conduct called the Valdez Principles. There is no mechanism for enforcing these principles, other than (possibly) the withdrawal of some investment from firms that don't indicate acceptance of the principles. However, so far relatively few firms have subscribed to the principles.

Statements like the Valdez Principles represent an impressive shift in management thinking. At the same time, they have all the usual weaknesses of approaches that rely on voluntary compliance or self-regulation, as well as relying (in the case of the Valdez Principles) on such generalities as "minimizing the environmental, health and safety risks" to workers and communities. The rest of the handbook, and in particular the next two chapters, deal with the more difficult task of moving from principles to practice.

As this task is carried out, labour will obviously continue to have conflicts with both business and environmentalists, and must remain in control of its own agenda by supporting full employment and safeguarding the livelihoods of its members as well as meeting the demands of environmental protection. However, the basis for cooperation on a broad range of issues clearly exists.

Government, Regulation, and Competitiveness

And what of government? It has to be said that the traditional approach taken by business and government to the relationship between environmental regulation and the goal of maintaining growth and prosperity is now thoroughly out of date. Firms have often resisted environmental performance requirements on the basis that they required too much "unproductive" investment, and would result in the loss of market share to foreign (or domestic!) competitors. Governments have all too often agreed, based on legitimate worries both about job protection and about declining tax revenues from personal and corporate taxes. Workers, once again, have been caught in the middle.

We need not rely on the Brundtland report for an assessment of why this way of doing things doesn't work. We can turn instead to Michael Porter, of the Harvard Business School, and his recent report on the state of the Canadian economy. "Strict environmental

regulations," he said, "do not undermine competitive advantage against foreign rivals; indeed, to the extent that they anticipate international trends, they can enhance it. The result, in many cases, is a process that is not only cleaner but that lowers costs or improves quality." He went on to note that strict regulation of particular industrial sectors in Germany and the Scandinavian countries had resulted in technological leadership in those sectors, and that if anything, Canadian environmental standards have been too weak: they "have not been anticipatory in a way that could have pushed Canadian companies more forcefully toward innovative processes and strategies." In other words, pollution prevention pays, and it pays at the level of government policy as well as at the level of decisions by the individual firm.

For Further Information

Stephan Schmidheiny with the Business Council for Sustainable Development, *Changing Course: A Global Business Perspective on Development and the Environment* (Cambridge, Massachusetts: MIT Press, 1992). Although written from a business perspective, it provides a valuable set of arguments for sound environmental citizenship, and case studies of management initiatives.

Document 1: The Valdez Principles

1. Protection of the biosphere: We will minimize and strive to eliminate the release of any pollutant that may cause environmental damage to the air, water, or earth or its inhabitants. We will safeguard habitats in rivers, lakes, wetlands, coastal zones and oceans and will minimize contributing to the greenhouse effect, depletion of the ozone layer, acid rain, or smog.
2. Sustainable use of natural resources: We will make sustainable use of renewable natural resources, such as water, soils and forests. We will conserve nonrenewable natural resources through efficient use and careful planning. We will protect wildlife habitat, open spaces and wilderness, while preserving biodiversity.
3. Reduction and disposal of waste: We will minimize the creation of waste, especially hazardous waste, and whenever possible recycle materials. We will dispose of all wastes through safe and responsible methods.
4. Wise use of energy: We will make every effort to use environmentally safe and sustainable energy sources to meet our needs. We will invest in improved energy efficiency and conservation in our operations. We will maximize the energy efficiency of products we produce and sell.
5. Risk reduction: We will minimize the environmental, health and safety risks to our employees and the communities in which we operate by employing safe technologies and operating procedures and being constantly prepared for emergencies.
6. Marketing of safe products and services: We will sell products or services that minimize adverse environmental impacts and that are safe as consumers commonly use them. We will inform consumers of the environmental impacts of our products or services.
7. Damage compensation: We will take responsibility for any harm we cause to the environment by making every effort to fully restore the environment and to compensate those persons who are adversely affected.

8. Disclosure: We will disclose to our employees and to the public incidents relating to our operations that cause environmental harm or pose health and safety hazards. We will disclose potential environmental, health or safety hazards posed by our operations, and will not take any action against employees who report any condition that creates a danger to the environment or poses health and safety hazards.
9. Environmental directors and managers: We will commit management resources to implement the Valdez Principles, to monitor and report upon our implementation efforts, and to sustain a process to ensure that the Board of Directors and Chief Executive Officer are kept informed of and are fully responsible for all environmental matters. We will establish a Committee of the Board of Directors with responsibility for environmental affairs. At least one member of the Board of Directors will be a person qualified to represent environmental interests to come before the company.
10. Assessment and annual audit: We will conduct and make public an annual self-evaluation of our progress in implementing these Principles and in complying with all applicable laws and regulations throughout our worldwide operations. We will work toward the timely creation of independent environmental audit procedures which we will complete annually and make available to the public.

A LABOUR PERSPECTIVE: FINDING COMMON GROUND

by Hugh Mackenzie

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Notes for remarks presented to the Jobs and Environment Conference, Ontario Environmental Network, Hamilton, Ontario, November 22, 1986. This article was originally published in *Alternatives: Perspectives on Society, Technology and Environment*, volume 14 (August/September, 1987). It is reprinted here by permission of the author and Alternatives, Inc.

As the research director for Canada's largest industrial union (the United Steelworkers of America), which represents more workers in environmentally sensitive heavy industry than any other, and as someone for whom environmental issues were the driving force behind my first active involvement in politics, I know that the links between the labour and environmental movements have been a very long time coming. Why has it taken so long for those links to develop?

The labour movement and the environmental movement would seem to be a natural fit. There is certainly a good deal of ideological common ground. Labour activists and environmentalists find themselves fighting the same corporate vested interests. And often, the fundamental issue is the same: the right of corporate decision makers, public or private, to make decisions that take into account nothing but their corporate bottom line. In both the labour movement and the environmental movement, we deal with that fundamental question -- and its consequences -- every day.

There is common ground at a very practical level as well. Many environmental pollution problems are health and safety problems that have escaped from the plant. Exactly the same concerns over chemical hazards, for example, are found on the shop floor and among environmentalists.

Finally, working people as a class bear a disproportionate share of the costs of pollution. When you walk out the gates of Dofasco or Stelco in Hamilton, you find yourself in a working class neighbourhood. The neighbourhoods around the controversial lead

smelters in Toronto are working people's homes. When pollution problems close beaches in Toronto, it is the people who don't have the option of a cottage in Muskoka or a vacation trip to the Caribbean who pay the price. And long before the "superstack" at Inco spread the problem of acid rain to middle-class cottagers in Muskoka, sulphur dioxide emissions had turned the area in and around the mining community of Sudbury into a moonscape.

With all of these factors pointing towards common interest and common cause, why are examples of common action on environmental issues the exception rather than the rule? Why is it, in particular, that the workplace health and safety and environmental movements developed essentially in parallel, when the scientific, economic and political logic linking the issues is so obvious?

Part of the reason is political. As a social movement, labour in Canada has found its political expression through affiliation with the New Democratic Party. Although the environmental movement may have found common ground on substantive issues with the NDP, it was in no position to formalize that connection in any way, even had it wished to do so. That tended to give social activists in the labour movement a view of environmentalists as neither fish nor fowl.

The environmental movement was limited in the alliances that it could strike. As a fledgling movement, without an independent political and financial base, its finances were dependent on grants from governments, corporate foundations and corporations. A political link with the labour movement would have jeopardized an already-shaky funding base. The membership and financial base of the labour movement has given it an independence and a freedom-of-action that institutions dependent on government and other institutions for financial support will never have.

At the same time, the labour movement found it difficult to be receptive to the concerns of environmentalists. To a certain extent, that reflected the constant tension between those who think their unions should focus exclusively on issues directly related to bargaining and those who see their unions as part of a much broader social movement.

But there were other problems as well. The workers' health and safety movement itself challenged traditional approaches at all levels of the labour movement. The United Steelworkers of America, at Elliot Lake, in Sudbury and in Hamilton played a central role in pushing "industrial safety" to "occupational health and safety" as a regulatory focus. High cancer and silicosis rates among miners in Elliot Lake, cancer rates at Inco's sintering plants in Sudbury and Port Colborne and at Stelco's sintering plant in Hamilton, along with asbestos among Johns Manville workers were at the focal point of

NDP Leader Stephen Lewis' campaign for new health and safety laws in the mid 1970s in Ontario. In the labour movement generally, the change was not made without difficulty. Corporations responded to pressures for health and safety improvements with the same kind of job blackmail that they used to defuse demands for environmental clean-up.

Environmentalists didn't exactly help. Pollution issues were addressed with a blissful neglect of the health and safety of the workers who were on the firing line. To the surviving workers, and the relatives of the victims, of the sintering plant at Inco in Sudbury, for example, the concerns of environmentalists about acid rain seemed more than a little abstract and academic. "Where were they when ..." was a common rhetorical question. Obvious opportunities for common action -- whistle-blower legislation, for example -- were passed up.

A more fundamental question, however, concerned the relationship between jobs and environmental protection. At their most insensitive, environmentalists refused to take jobs into account at all and bad-mouthed as reactionary anyone who raised concerns about employment impacts.

Perhaps the most extreme example was the limits to growth fad. The pet project of Italy's most wealthy and influential industrialist, Giovanni Agnelli, and his Club of Rome, the original *Limits to Growth* report preached against the evils of economic growth without addressing any of the employment, equity or distributional issues. It was clear that industrial workers were going to bear the brunt of the transformation contemplated by Club of Rome theorists.

Some talked blandly about some jobs having to be sacrificed in the interests of a cleaner environment, without addressing in any way the interests of the people affected. Workers who deal with such trade-offs every day wondered what they had to learn from people whom they could characterize as a bunch of middle-class academics.

Today, however, the environmental movement is increasingly conscious of the need to address employment issues as it presses for tougher regulations. To date, the focus has been on aggregate economic questions, looking at the overall labour intensity of the economy with and without various environmental restrictions.

Although this broader approach is a positive development, it has fallen far short of convincing working people that they should be on the front lines in the fight to clean up the environment, sacrificing their jobs in the fight.

Attempts to convince working people that an environmentally-sound economy would be more, not less, labour-intensive than the economy is today fail because they don't address the fundamental questions for individual workers who will lose their jobs: where are

these new jobs? how do I know they'll really be there? will I be able to get one of them? will they pay a decent wage? and what, specifically, is going to be done to make sure that I still have a livelihood when I've finished sacrificing my job to the broader interests of society?

Unlike the environmental activist, or the state, or even the corporate owner of a plant, workers and the unions that represent them have an overriding interest in the survival of the particular plant in which they work or in the sales of the particular product which they produce.

Even if and when the decision-making process takes into account the employment impact of a decision, it is the employment impact in the aggregate that is considered. So, for example, the fact that alternatives to nuclear power might result in more employment is enough to put the job balance into the black.

But the importance of answers to the questions posed by our hypothetical worker is ignored.

The corporate owner has an interest in the economic viability of the enterprise as a whole, but has no overriding interest in the continued existence of any particular operation. The corporate owner can close an older plant that creates pollution problems and move production to a newer facility, or simply write the plant off and put its money somewhere else. A corporate owner can "diversify."

The worker doesn't have that flexibility. It is the worker, not the state or even the corporate owner, who has the greatest stake in the continued operation of his or her workplace.

In the language of cost-benefit analysis, the individual job impact is another externality -- like pollution itself -- whose cost is not picked up by the market. The total loss resulting from a lost job is greater than the wage associated with that job. These external effects are most obvious in an industry like uranium mining, where skills are quite specialized, and where the loss of a job means picking up and moving, because there is no alternative employment available.

The problem is more than a technical one of picking up all of the external effects. The cost-benefit approach to decision-making is based on the notion that, with a positive cost-benefit ratio, it would be possible for all of the winners from a decision to compensate all the losers and still have a net benefit remaining. But the compensation is strictly notional -- the winners don't actually compensate the losers.

In the absence of compensation, environmental regulation often has a perverse and unacceptable distributional impact: working people pay the price; society as a whole derives the benefit.

When compensation is in fact paid, it is generally paid not to workers but to the corporate owners of enterprises forced to clean up.

Let me illustrate the problem with a couple of examples. In recent years, the federal and provincial governments have spent literally hundreds of millions of dollars to subsidize a clean-up in the pulp and paper industry in Ontario. Special grants and tax incentives have been paid to compensate industry for the costs of upgrading facilities, despite government studies (such as that conducted by Donnan and Victor for the Ontario Ministry of the Environment in 1976) that suggested they could have afforded to pay for the changes without assistance.

Almost without exception, the new facilities have been modern automated facilities which employed fewer people than the older facilities they replaced. Jobs were lost. Was there a special pulp and paper pollution fund created to assist the workers who lost their jobs as a result of the government's programme to cut down pollution? No, there wasn't. The impact on workers wasn't part of the decision-making process.

Another example is that of acid rain. Both the federal and provincial governments have set aside money for pollution control in the smelting industry. In the case of Inco, particular emphasis has been placed on encouraging the company to install a new smelting process as the preferred way to cut down on acid gas emissions. Special grants have been offered as inducements. A new smelter would employ fewer people than the old one. Has anyone suggested a special fund to compensate the smelter workers who would lose their jobs?

The union at Inco, Steelworkers' Local 6500, decided to take its responsibility seriously, whether government was interested or not. It established a Pollution Control Committee, which supported the construction of a new smelter anyway -- a tribute to local 6500's social responsibility, not to the environmental decision-making process.

In fact, I cannot think of a single example in which workers were explicitly involved in planning for an environmental change that affected their jobs. It just doesn't happen. And from the perspective of the environmental movement, such failures are all too often politically fatal. Working people are very effective lobbying against change when their jobs are affected. The reason for this is apparent. Jobs that are threatened by a particular change are very real. The new jobs created in an alternative scenario are hypothetical. And hypothetical jobs don't pay real bills.

Anyone who doesn't appreciate the force of this argument should try talking to a pipefitter about nuclear power and energy conservation, or to a refinery worker about lead in gasoline. For obvious reasons, neither is likely to be very impressed with ideas

about new jobs in energy conservation retrofitting or in automotive production. Neither is going to get the new jobs that replace the jobs lost.

The lack of an effective mechanism for involving workers in environmental decisions and taking their interests directly into account is a major obstacle to environmental change. It makes job blackmail available to anyone who wants to exploit the (justified) fear of workers and communities affected by environmental policies.

We can, with debatable precision, integrate employment and other economic considerations onto environmental decision making at an analytic level. We can analyze the social impacts of decisions to improve environmental quality. Ultimately, however, action to improve environmental quality depends on building an effective political constituency for such action, and not on analysis.

Readers of public opinion polls might well argue that it isn't necessary to build a political constituency for action, because it already exists. After all, survey research confirms that environmental quality is a primary concern of Canadians, and particularly of (politically important) urban Canadians. I was involved in the planning for the New Democratic Party's 1985 Ontario election campaign, and our survey results showed both a significant degree of concern for environmental quality generally and a strong response to individual environmental issues. Reports of a survey recently conducted by Decima Research suggest that, at least when it comes to chemical pollution, Canadians place a higher value on preserving environmental quality than they do on jobs.

That does not add up to an effective political constituency for tough environmental action. The results mean that politicians who make the right general noises about environmental quality and manage high-profile crises effectively will be politically popular. But when it comes to making specific decisions, the overall poll results do not alter the fundamental fact that at the micro level, the threat of lost jobs is still there to be manipulated by those who profit from pollution. People whose jobs are affected by an environmental crackdown will still object to the change. Unions like the Steelworkers will still fight to preserve the jobs of their members.

And more often than not, they will win, because the workers and communities affected by environmental regulation will almost inevitably be a more coherent and easily identifiable political constituency than those who show up in polls as supporters of better environmental quality. At its most simplistic level, politics is a game of counting. Real people affected by a decision are easier to identify

and to count than survey research results. Consequently, when a group of people affected by a decision turns up, politicians are going to look for ways to make them happier.

Unless we are prepared to let the chips fall where they may in the on-going conflict between equally legitimate objectives, we have to find the political mechanisms that will bring workers affected by decisions about environmental regulation into the process.

In the abstract, that seems like a fairly straightforward proposition. In fact, it isn't. Effective mechanisms do not exist for dealing with the layoffs and plant shutdowns that plague our economy today, quite independently of environmental issues. On occasion, unions are able to negotiate decent severance packages. But public policy in this area is extremely narrow in scope. "Employee adjustment" is not the accepted part of public economic policy that it should be.

Considering a comprehensive approach to environmental decision making means breaking new ground, at least for North America. The first essential element of any such approach is participation in some way in decisions affecting the environment. That same principle should apply to workers affected by those decisions. If anything, workers have a more legitimate claim to participate than do the owners of the businesses in which they work.

Second, a commitment must be made reconciling competing interests. If the purpose of "participation" is to communicate a firm decision that has already been made and to dictate the terms under which that decision will be implemented, participation is pointless. In our society, a commitment to resolving differences implies negotiation. In this case, the process might even produce some surprises for those who make the decisions. Corporations have begun to discover that workers often know more about production processes and how to improve their efficiency than their supervisors. The same is probably true of improving production processes that produce pollution.

Third, if society as a whole is going to benefit from a particular environmental decision, and a group of workers is going to pay the price in the loss of the equity they have built up in their own jobs, the burden of adjustment costs must be borne by society as a whole as well as by the employers whose operations have created the pollution problem in the first place. Adjustment compensation can't simply be provided as an afterthought. It must be on the table, up front. Without compensation, society is asking working people to be environmental kamikazes.

Fourth, every process has to have an end point. In this case, each side has an incentive to reach an agreement. For workers, the incentive is that government might decide to tough it out and proceed regardless. For society as a whole, the incentives are that a successful

end to the process may be the one thing that will make an environmentally beneficial change politically possible, and that it is inherently fairer to bring about change this way than to do so on the basis of unilateral decisions.

Establishing a process for resolving jobs-environment conflicts will not make the conflicts go away. But if ways can be found to get the conflicts in to the open and the issues discussed and resolved, environmental change will be far less painful to implement.

This point can be illustrated with two examples. The best example I have seen of how not to implement environmental change is the tar ponds clean-up at Sydney Steel. USWA were in the throes of one of their annual fights to save the steel mill and the 1,250 jobs that it provides. They were fighting for the federal and provincial support that is needed to modernize the steel mill and place it on a secure footing.

In the midst of all this, the federal Department of Environment dropped the bombshell that the tar pond clean-up was contingent on the closure of the coke ovens. In addition to the loss of 125 jobs in a Cape Breton community in which unemployment reaches 30 percent, the closure of the coke ovens would also deprive the steel mill of its source of coke. That, in turn, would make it impractical to run the blast furnace that makes the iron that is destined for the modernized steelmaking facilities. And without the blast furnace, employment could drop from about 1,200 to about 500.

In addition, the closure of the coke ovens would also deprive Devco, the federal government-owned coal mining corporation, of its major market for high-value metallurgical coal.

The second example is a lot more positive, even if it is less concrete. At the 1982 NDP convention, the issue of nuclear power promised to be one of the most contentious issues. A contingent of Steelworkers from Elliot Lake came to the convention determined to beat some sense into the woolly-headed academics from Toronto and Ottawa. A contingent of woolly-headed academics from Toronto were just as determined to get a ban on nuclear power onto the books of NDP policy.

The fight didn't happen. A group of New Democrats interested in heading off a conflict got the groups talking. We convinced the environmental caucus that the job concerns of the uranium miners were legitimate. And we convinced the uranium miners that the environmental caucus was sincere in its commitment to deal with those job concerns. A consensus of sorts was reached. That's obviously not the same thing as resolving a real problem. But it suggests potential.

A new approach to environmental decision making -- one which acknowledges explicitly the job and job disruption questions -- could be extremely important in making environmental decisions more effective.

The most important effect of such a change would be the removal of the one major obstacle to the forging of a powerful coalition between environmentalists and labour activists in the fight for a clean environment, safer working conditions and secure employment. That goal is much closer than it was ten years ago.

6: WORKING TOWARD SUSTAINABILITY: SUCCESSFUL UNION AND JOINT INITIATIVES

The preceding chapter outlined the reasons for a cooperative approach involving both environmentalists and management. This one looks at a number of situations where unions have put this approach into practice.

B.C. Forests: Labour, Environmentalists Find Common Ground

Perhaps nowhere in Canada have conflicts over forest land uses been more bitter than in British Columbia. These local conflicts became high-profile issues when national opposition developed to expanded logging on Meares Island and the South Moresby region of the Queen Charlotte Islands, but these are only two areas among many involved. In the Upper Carmanah valley, conflicts between loggers and environmentalists erupted into incidents of vandalism, rumours of vigilante action, and letters to workers calling environmentalists "individuals or organizations which threaten the existing TFL [Tree Farm Licence] 44 land base and, consequently, your job." And in September, 1991, for example, more than 80 protesters were arrested by RCMP officers for blocking a logging road in the Hasty Creek area in defiance of a court order.

Conflict, however, is not inevitable. On the same day as the arrests, Local I-80 of IWA-Canada and five B.C. environmental groups announced the signing of an agreement on principles for forest management on southern Vancouver Island, including the Carmanah and Walbran valleys. Among the groups signing the South Island Forest Accord, as the agreement was called, were the Western Canada Wilderness Committee and the Sierra Club. Both are organizations which have been active in the fight against expansion of logging rights throughout British Columbia.

"Overcutting and environmental degradation," the accord said, "have seriously depleted both employment opportunities and original old-growth forests." The accord went on to say that "wilderness preservation is not the greatest threat to forest industry jobs. However, preservation could worsen an already bleak situation unless drastic changes are made now."

Among the changes proposed were the creation of more jobs by replacing the export of logs and slabs of unprocessed lumber with value-added manufacturing, and expanded public consultation over forest management policy. (The lack of such consultation has been a recurring theme in environmentalists' criticisms of forest management

in the province.) Bill Routley, the president of local I-80, was quoted in news reports as saying: "We know there are issues on which we can't agree, but we want to isolate those issues that allow us to work together." Clinton Webb, a director of WCWC, added that "there has to be job-creation strategies in place to compensate for those jobs losses that would result from additional wilderness preservation."

The forest sector was also the focus of another sustainable development initiative, this one on a province-wide level: the Task Force on the Environment and the Economy set up by the B.C. Federation of Labour in 1989. The Task Force included representatives from five major B.C. unions as well as the Valhalla Society (a wilderness preservation group) and the Okanagan Indian Band. "The evidence," said its Report, "indicates that we are currently logging at a rate which cannot be sustained in the future. We must reduce the annual allowable cut to a sustainable level, increase intensive silviculture and add more value to our wood products. Otherwise we face massive job losses due to a dwindling resource."

The Task Force's Report went on to call for "a strong forest stewardship act which requires ecologically responsible and balanced forestry uses and places strict environmental controls on road building and logging methods on both Crown and private lands." It also called for stricter enforcement of the terms of forest tenure agreements, which it said should include employment guarantees as well as the more conventional requirements, and rejected the replanting of forests as single-species "fibre farms for pulp mills," supporting instead the re-creation of varied species forests.

Among its recommendations for policy toward the forest industry, the Task Force called for the termination of exports of raw logs and pulp. In addition, it argued for the fair and speedy resolution of native land claims, and argued that: "Corporations, not the public, must bear the costs of rehabilitation and intensive silviculture." In addition, the Task Force argued that "a process must be put in place to provide interim compensation and training for workers. The principle must be that workers continue to have full employment with minimal need for compensation for lost jobs or reduced wages resulting from environmental programs or technological changes." To implement this principle, the Task Force urged the B.C. Ministry of Forests to find alternate sources of timber supply when logging or milling operations are affected by the process of developing land use plans and resource inventories.

Cooperation is Key

One theme that comes out of the B.C. experience is that cooperation between labour and environmental groups is not only possible, but essential. This point is echoed by Don Aitken of the Alberta Federation of Labour which, like its B.C. counterpart, has been heavily involved in efforts to improve forest management in the province. "We have over the years worked quite closely with a number of organizations," including the Alberta Environmental Network and native organizations, "to ensure that we do preserve the forests and at the same time develop it in a way that is sustainable."

"We should not have jobs at any price," he continues. "Our position is that if we're going to do it, let's do it right. We're asking for environmental impact assessment of all logging in northern Alberta. We have a very fragile situation in northern Alberta. It takes a long time to grow a tree, and we don't want to see them completely gutted."

A similar point about cooperation on a national level is made by Colin Lambert of the Canadian Union of Public Employees (CUPE), a union that has been particularly active in supporting improved municipal recycling and waste reduction programs in order to address what Lambert calls "the environmental impact of the garbage mountain." "Without the environmentalists and the citizens' groups," he says, "we would have a much more difficult time." Local citizens' groups, he continues, "are integral in any strategy we put together. We work with Greenpeace, we work with other national groups, and we wouldn't think of mounting a campaign without them."

Steelworkers' Local 6500 and the Inco Experience

The Sudbury mine, mill and smelter complex operated by Inco Ltd. has achieved notoriety as the continent's largest single source of the sulphur dioxide emissions that are a major precursor of acid precipitation. As the result of new regulations imposed by the Ontario government in the mid-1980s, the company is now engaged in a \$500 million program of pollution control investments, which will cut emissions of sulphur dioxide to just 10 percent of 1969 levels.

The Steelworkers' Local 6500, which represents the several thousand men and women who work at Inco's Sudbury operation, has a long history of cooperation with local environmental groups. For example, in 1970, it was Local 6500's Safety and Health Committee chair who first obtained and made public copies of the annual report the Ontario Ministry of the Environment had been producing, every

year since 1953, on the damage done by sulphur dioxide pollution to vegetation in the Sudbury area.

More recently, the Steelworkers have initiated a cooperative approach to environmental policy through collective bargaining. The collective agreement with Inco provides for joint Safety, Health and Environment Committees at both the operation level and the area level. It further provides for a General Safety, Health and Environment Committee appointed by the local union; the chairman of this General Committee or his designate is given paid leave of absence to attend to committee business. The General Committee is entitled to meet with the Safety Manager and other company officials within 14 days of a request from the local union and a proposed agenda for the meeting.

Perhaps more striking is the fact that in 1991, Inco and USWA established a senior-level Environmental Awareness Committee, chaired jointly by the Vice-Chairman of Inco Ltd. and the Steelworkers' Canadian National Director. The other union representatives on the committee, which must meet twice yearly, are the presidents of Local 6500 and Local 6200 (the Steelworkers' local at Inco's Port Colborne, Ontario plant) and the Chairman of Local 6500's General Safety, Health and Environment Committee. In addition to the Vice-Chairman, Inco is represented by three senior managers, one of whom must be a vice-president.

The Environmental Awareness Committee is just one result of the environmental action plan and awareness program the Steelworkers' began in 1991. Based on the argument that environmental issues and workplace health and safety issues are "different sides of the same coin," in the words of Steelworkers' Health and Safety Staff Representative Andrew King, the program specifically targeted workplace health and safety activists.

Andrew King explains: "As far back as 1968 we worked with the Sudbury community to address the problem that the community was facing, with the devastation of all the crops around the Sudbury area, and combined that with addressing the problems the workers were having" with high levels of in-plant pollution that destroyed their respiratory systems.

"The same is true, for example, of the lead smelter in Trail, where workers were being exposed to lead at a level far in excess of anything that should be healthy. In addition, the entire valley in which Trail is located was itself being physically devastated. We specifically promote," says King, the idea that "you can't talk about the health and safety of workers without talking about the impact on the environment, and you can't talk about the impact on the environment without talking about the health and safety of workers. They're the same thing."

"When you're talking about your health as a worker in the plant, or your health as a member of the community two miles down the road outside of that plant, you're talking about the same person," he points out. Workers "may be willing to tolerate for themselves a double dose of the pollution, but when you start seeing the statistics that show their families are exposed to that same environmental hazard, then I think that issue is driven home even harder."

King says that, partly because the Steelworkers' emphasis on the connections between the environment and workplace health and safety, almost all locals that have set up environment committees have seen their operations integrated with those of the joint health and safety committees. "There's that table already there that they can bring the issues to." In most of these cases, he adds, either members of the local as individuals or the local as a group has also started talking to community environmental groups, a process he (like other unionists) sees as extremely important.

Trail, B.C.: Hard Decisions

As an example, consider the Cominco Ltd. lead-zinc smelter in Trail, B.C. In 1990, a public health task force released information showing that the average blood lead level in Trail children was 13.8 micrograms per decilitre of blood. Some children had blood lead levels as high as 40 micrograms, almost *four times* the 10 microgram level considered a "community intervention level" by the U.S. Centres for Disease Control. An extensive body of research dating back almost 20 years shows that blood lead levels higher than this in children are associated with increased risks of lower intelligence and permanent mental impairment.

Local 480 of the Steelworkers represents the smelter workers. Tom Wynn started working at the smelter in 1974, in what he says were "pretty shitty conditions," and eventually became the Local's full-time safety coordinator. "I remember in the early days of the union," he says, "we were at war forever" with the company. He contrasts this with the more cooperative approach that is now being taken. "There's got to be a cooperative effort between the union and the company," despite their disagreements. He points to a number of environmental control measures taken as a result of union initiatives, including better controls of contaminated surface drainage. All in-plant roads have been paved, and a containment system routes all rain water into a lagoon. In addition, ore stockpiles and residue piles that are not in use have been totally covered with plastic, and the piles that are in use are now sprayed with an acrylic binder to reduce fugitive emissions.

According to Tom Wynn, Local 480 was the first Steelworkers local in Canada actually to seek out community members for consultation on environmental issues. He now represents the Trail and District Environmental Network on the Trail Community Lead Task Force. The Task Force, which was established in 1990 after the release of the public health study, is a committee chaired by the Mayor of Trail; it includes some other local politicians; two representatives of Local 480; the Manager of Environment and Health for Cominco; representatives from the provincial Ministries of Environment and Health; and a number of community members. The Task Force is financed jointly by the B.C. government, Cominco and the City of Trail; it has a budget of more than \$770,000 for 1992.

Part of the budget finances the operations of a Lead Program Office with a full-time staff in the city of Trail. The Task Force's terms of reference state that it will "identify health and risk of exposure situations and will evaluate their significance. Recommendations will be submitted to appropriate provincial or local agencies regarding their assessment of practicable strategies, policies, and programs for the remediation of significant exposure situations." Its activities include operating a blood lead screening program for children, with follow-up interventions for families with children whose blood lead levels are above 15 micrograms per decilitre.

Energy and Chemical Workers' Union (now the Communications, Energy and Paperworkers' Union of Canada - CEP): Joint Environment Committees with Clout

A number of Energy and Chemical Workers' Union (now the Communications, Energy and Paperworkers' Union of Canada - CEP) locals have well developed structures for cooperation in the area of health, safety and environment. One of these is Local 666, at Celanese Canada Inc.'s Edmonton plant, where a joint health and safety committee has been established for many years. Unlike most other jurisdictions, Alberta does not require joint health and safety committees in industrial workplaces. The committee's mandate has recently been expanded to include environmental questions.

In the province of Ontario, joint health and safety committees are required in most industrial workplaces, but they have no environmental mandate. ECWU Locals 800 and 848, which represent workers at the Shell Chemical facility in Sarnia, Ontario, have adapted the principle of joint committees to the environmental area. Along with Shell management, they have set up a Joint Environmental Steering Committee (JESC) co-chaired by union and management representatives. The committee's work is supported by a number of

Area Contact Groups (ACGs), which submit recommendations for environmental improvements in a variety of areas. Recently, the committee was looking at issues ranging from the use of recycled paper and two-sided photocopiers, through in-plant recycling programs, to a variety of changes in production processes that would reduce environmental impacts and improve working conditions.

The JESC's terms of reference state that it will meet 10-12 times a year to "receive reports on environmental issues and source control ideas from Area Contact Groups" and "receive reports from support staff on legislation and environmental technology/issues." The ACGs are not just talking shops. There is, for instance, a New Projects ACG that actively participates in researching the feasibility of process modifications. Recently, that ACG was considering the proposal to adopt an "environmentally best available technology philosophy" when selecting any equipment for plant operations. The JESC's terms of reference also state that at least one member of the committee will assist in environmental audits and investigations of environmental incidents; the role of the ACGs now includes tracking reports of accidents or environmental incidents in their particular areas. (The terms of reference are reproduced at the end of this chapter.)

Canadian Auto Workers Local 444

Like Local 6500, members of the Windsor-area locals of the Canadian Auto Workers (CAW) have a long history of involvement with community environmental issues. Rick Coronado chairs the environment committee of Local 444, which represents Chrysler Canada workers in Windsor. He points out that in the early 1970s some 15-20 percent of the members of the area Pollution Probe chapter were union members.

More recently, interest in environmental issues among members of the local, and the Windsor community, was stimulated by two situations. First was the extensive 1985 media coverage of the "toxic blob" in the St. Clair River. The blob was actually 11,000 litres of dry cleaning fluid spilled into the river by Dow Chemical; the fluid picked up contaminated sediment from the bottom of the river, creating the blob. Second was a conference on jobs and the environment organized later that year by the Ontario Environment Network, with strong labour involvement. CAW President Bob White was a keynote speaker at the conference; the article by the Steelworkers' Hugh Mackenzie which is reprinted elsewhere in this handbook was originally presented at the OEN conference.

This pattern of working with environmental groups has continued, and contributes to the effectiveness of the local's efforts. "We do a lot of work with international groups in the Great Lakes Basin," says Coronado. "We do a lot of work with Greenpeace, with major national groups; we're involved in the Ontario Environment Network and the Canadian Environmental Network. So we have local, provincial, national and international contacts in the environmental movement." (In 1991, the Ontario Environment Network set up a Labour and Environment Caucus.)

The local is part of a national union that has a strong commitment to environmental issues. Says CAW's Annie Labaj, "We have a number of active locals, because part of our constitution mandates that local unions have environment committees." Local 444's was set up in 1986, the same year that the Windsor and District Labour Council set up its own environment committee. Local 444, however, has achieved at least two significant breakthroughs in its operations.

First, the local's 1990 contract negotiations with Chrysler Canada resulted in the establishment of a National Environmental Committee, consisting of two labour and two management representatives, which is required to meet three times annually to discuss and make recommendations on a variety of environmental issues. (The committee's mission statement is among the documents reproduced at the end of this chapter.) Despite some initial suspicion on the part of the company, says Coronado (who sits on the Committee), "we've found over the first four meetings we've had that there's more trust there now, and we're able to sit and candidly talk about the issues we want to discuss, what the ultimate objectives are, and how we're going to proceed with those."

Second, in 1991, Local 444 signed a two-year contract with Environment Canada, as part of the federal government's Pollution Prevention Strategy, to promote a Toxics Reduction and Elimination Project whose objective was to educate both workers and management on ways and means of eliminating toxic chemical hazards in the workplace and the necessity of taking such action in terms of both human and ecosystem health. When completed, the contract will result in the production of a final report that will look at methods of creating an Ontario Toxics Reduction Act as well as policy instruments such as toxics user fees. CAW's activities have contributed to at least three specific changes at Chrysler: the planned elimination of chlorinated solvents, the introduction of water-based (rather than solvent-based) degreasers, and the planned elimination of lead-based paints as the auto industry, as a whole, moves in the direction of more environmentally friendly paints like the water-based ones now being manufactured by BASF.

Local 444 took a slightly different approach to environment committees from that taken by the Steelworkers. "When we first started," says Coronado, there was a move to have the environment committee hooked on to the health and safety committee, but we wanted to have an autonomous committee, a standing committee of the local, to give people some identity as to what they were doing and what they were involved in, and it did involve a lot more community work, working with community groups."

"The interesting thing about that now is that after five years, six years, we are starting to see that the issues we are working on now, that involve toxics and how they get into the environment, and where they're coming from, and how workers are handling those toxics that are getting out into the community, we are relying a lot more on the expertise of safety and health people, inviting them to come to our meetings, having joint meetings with safety and health people, tapping their resources."

Rick Coronado also has some useful words of advice for those organizing environment committees, especially in association with community groups. "Make sure," he says, "that people who are involved in these committees feel that they're a part of the committee, that they have something to do, that they're not just taking up a seat, and showing up for a meeting, and going home."

Some General Conclusions

There is obviously no single "right" way for local unions to proceed on environmental issues; the diversity of situations they are likely to confront is just too great. We can, nevertheless, suggest a few general principles.

1. *Always keep in mind the connections between workplace and environmental pollution.* This point has been made several times, but it's worth making it again, this time using the words of CUPE's Colin Lambert: "The environment inside the workplace is exported to the outside. In fact, what happens to workers on the inside is a precursor of what happens to citizens on the outside."
2. *Find common ground with community and environmental groups.* This may often mean putting aside disagreements on other areas, but it's essential for two reasons. First, it's the best way of making the point about the connections between workplace health and the general environment. Second, if we don't find such common ground, there is a risk of situations where community environmental concerns are set

against the need for workers to protect their jobs and their livelihoods. The conflicts that result benefit no one!

3. *Cooperation with management can be achieved*, once again on the basis of finding common ground even on a limited range of issues. However, it should be achieved wherever possible on the basis of provisions of a collective agreement. Informal agreements and working arrangements with management should be incorporated into the provisions of the next collective agreement. Otherwise, union and joint environment committees are really just advisory groups with no power other than that of moral suasion. That's important, but it's not enough.

Document 2: Questions to be Asked When Setting Up Union Environment Committees (Source: CLC)

1. What do we have to do before we set up an environment committee to ensure that it will be effective?
2. What do we have to do to ensure its continuing success?
3. What should be the mandate and the reporting relationship of the environment committee? (Structures and options may differ from union to union.)
4. What is the best relationship among the union environment committee, the union health and safety committee and the joint workplace health and safety committee? (Structures and options may differ from union to union.)
5. How can we best influence our employers on environmental issues?
6. What should the union's agenda be in terms of collective bargaining on environmental issues? What can the union do to obtain successful collective bargaining on environmental issues?
7. How can the union best fight "job blackmail" on environmental issues?
8. How can the environment committee, and the union, best ensure that the entire membership is involved in environmental issues?

Document 3: Environmental Protection and Collective Bargaining
(Source: United Steelworkers of America, Canadian Policy Conference Policy Paper no. 1, Environment [1989])

It is a general principle of Canadian labour law that an employee owes a duty of loyalty to his or her employer. This means that an employee who acts against the interests of his or her employer may be dismissed for violating that duty. As a result, employees who inform environmental regulators of suspected violations of regulations risk dismissal for acting in the public interest.

Because employees are on site at all times, they are often best placed to monitor the environmental actions of their employers. To strengthen this potentially valuable role for industrial workers, employees who report suspected environmental infractions to authorities should be protected from any reprisals from their employers.

1. So-called "whistle-blower" protection should be introduced in all labour and environmental statutes in Canada to protect employees who report suspected environmental infractions to government authorities from discipline, dismissal or other reprisals.
2. Until such legislation is in place, Steelworker collective agreements should be amended to include a "whistle blower" clause as follows:

A worker who has reason to believe that:

One or more aspects, in whole or in part, of his/her employer's work, undertaking or business constitutes an immediate or longer term environmental threat and who consistent with that reasonable belief communicates with persons inside or outside the employ of his/her employer

1. for the purpose of advising of the existence of the environmental threat; or
2. for the purpose of providing information as to the nature, scale, scope, level, type of, or otherwise clarifying the environmental threat;

shall not be subject to any recriminatory, discriminatory or any other action in the nature of a reprisal, by the employer or by any person acting on behalf of the employer.

Document 4: Background on the Joint Environmental Steering Committee (JESC), Shell Chemical Sarnia Manufacturing Centre (January, 1991)*JESC Mandate*

Role of the Committee is to provide an opportunity for management and employees to work together to promote environmental awareness and address environmental issues at SMC.

The functions of the Committee are summarized as:

- To identify situations that might be a source of environmental concern.
- To make recommendations for improvements to SMC's environmental performance.
- To obtain information respecting the identification of environmental hazards, and develop guidelines for work practices and standards.
- To encourage employee involvement to identify potential areas for environmental improvements.
- To review recommendations of Area Contact Groups (ACGs). Assign priorities to appropriate ideas and either approve/champion their implementation or approach site management for the necessary resources and approvals to proceed.
- To keep ACGs apprised of decisions and status of their ideas for environmental improvements.
- To develop environmental awareness programs.

Membership

1) Members

- Environmental Manager
- Operations Management - Chemical Plant
- Operations Management - Refinery
- Local 848 Representatives (2)
- Local 800 Representatives (2)
- Engineering or Process Engineering staff

2) Support

Environmental technical staff
Secretariat - Environmental analyst

Protocols

There are two co-chairmen (one from management, one from Union). Normally alternate meetings.

If a committee member or support staff person is unable to attend, he/she will be responsible for finding a replacement.

At least one of the committee members will assist in environmental audits of the work place. At least one committee member will also assist in investigations of environmental incidents.

The committee will meet 10-12 times per year to:

Receive reports on environmental issues and source control ideas from Area Contact Groups.

Receive reports from support staff on legislation and environmental technology/issues.

The Committee will review and discuss Incident/Accident reports or other reports relating to environmental matters to ensure necessary steps have been (or are being) taken to prevent recurrence.

Area Contact Groups

Represent specific issues and/or areas of SMC.

JESC to resolve mandate and role of the Area Contact Group.

Document 5: Chrysler Canada/CAW Joint National Environmental Committee Statement (1991)

The Joint National Environmental Committee will endeavour to address mutual environmental concerns through the initiation and promotion of environmental programs that will recognize the importance of a healthy ecosystem.

Objectives:

Promote environmental awareness of all Chrysler Canada employees.

Encourage Chrysler employee participation in all existing and future environmental, reduction, reuse, recycling and energy conservation programs adopted by Chrysler.

Develop and recommend proactive measures with a view to improving the environment through employee participation.

Develop and issue educational materials to employees and their families to inform and encourage participation at work and in the Community.

Raise public awareness of Chrysler Environmental Achievements and in so doing promote Chrysler's public image.

Signed by Committee members

For the CAW:
Mike Raymond
Rick Coronado

For Chrysler Canada:
Ron Hunter
Paul Hansen

7. THE LEGISLATIVE AND REGULATORY FRAMEWORK

Introduction

There are literally hundreds of laws whose operation affects the Canadian environment. Jurisdiction over the environment is shared by both levels of government in Canada. Provincial governments, for example, have clear constitutional jurisdiction over most areas of natural resource management, but the federal government holds jurisdiction over inland and offshore fisheries and can legislate for the protection of human health as well. At both federal and provincial levels, environmental law is changing quite rapidly after a period of lack of interest on the part of governments. We cannot do more here than provide a guide to some major features of Canadian environmental law that are likely to be of particular interest now and in the future.

Many Canadian laws which directly protect the environment consist of (a) statutes or acts that contain general prohibitions against pollution and authorize the making of more specific regulations, and (b) regulations that limit the allowable discharges of certain kinds of pollution, or set standards of other kinds.

Kinds of Standards

The production and use of some substances may be prohibited altogether; this is obviously the most effective way of preventing a substance from entering the environment. A variant of this approach, in which governments announce that all production and use will be prohibited after a certain date, as they have done for some ozone-destroying chemicals, is known as a "sunsetting" standard. (Sunsetting standards can also be applied to particular industrial processes with severe environmental impacts, like chlorine bleaching in the pulp and paper industry.)

More usually, standards are set for either the volume (loading) of a pollutant discharged into the environment, or the concentration (in, say, parts per million) in effluent or stack emissions. The first kind of standard is obviously preferable, since the other kind invites the "dilution solution." In general, these are known as performance standards; "zero discharge" or the virtual elimination of persistent toxic substances are also forms of performance standards.

"Virtual elimination," however, raises the question of how close to an objective we can get, and could lead into an approach to standard-setting which looks not at pollutant levels at all, but at

processes. Thus, for example, firms may be required to use the best available technology (BAT) or best available technology economically achievable (BATEA). These particular requirements are examples of a more general category of standard referred to as a design or specification standard, rather than a performance standard. Design or specification standards refer to the technology or hardware used in an industrial process, rather than to what it will do.

For example, a requirement that all cars be fitted with catalytic converters is a specification standard; a requirement that all cars have emissions below a certain level is a performance standard, although in practice they may amount to the same thing if the only way of achieving the required emissions is by using a catalytic converter.

Specification standards involving "best technology" requirements invite long arguments about what firms can or can't afford. These arguments can be avoided, given the political will, by way of performance standards set at levels the affected industry says cannot be achieved using current technology. This is referred to as a technology-forcing standard. The stringent U.S. workplace exposure limits imposed for vinyl chloride in the 1970s were an example, as were many of the exhaust emission standards the auto industry has now successfully complied with, despite initial protests.

In all these cases, the standards that are contained in regulations may cover pollution from all sources, pollution from specific kinds of industries (as in the pulp mill regulations under the federal *Fisheries Act*), or even pollution from a single individual source (as in control orders under Ontario's *Environmental Protection Act*).

The Limits to Regulation

Whatever kind of standard is being enforced, there are a number of problems with the existing approach to pollution control. First, as in the case of the *Canadian Environmental Protection Act* under which the federal government may regulate toxic substances, the content of environmental protection law often is contained almost entirely in the regulations made under a particular act. However, there is rarely a requirement that government "shall" regulate particular kinds of environmental damage; environmental legislation merely gives it the option to do so. There may or may not be adequate public consultation before regulations are made, although the tendency now is for governments to consult widely with groups like environmentalists, as well as with business, even when they are not required to do so. (Some environmental legislation, especially recent legislation like the Yukon *Environment Act*, requires public consultation before regulations are made.)

In addition, penalties for violating environmental regulations can be imposed only after a violator is prosecuted and convicted. Even when the fines provided for in environmental legislation are sufficiently high to act as a deterrent, which has not generally been the case until very recently, problems arise because of the high standard of proof that is demanded: "beyond a reasonable doubt," the same standard of proof as in criminal cases.

A more serious problem is that enforcement tends to be highly discretionary. It depends on decisions made by inspectors and by their superiors, and as in the workplace health and safety field, even clear violations are often not prosecuted. Governments tend to prefer bargaining with the firms they deal with to a policy of aggressive enforcement. This amounts to a policy of "licensing pollution" without admitting that this is going on.

Historically, governments have often been reluctant to adopt aggressive enforcement policies because of "job blackmail", a corporate tactic that is fortunately being abandoned by progressive employers. Governments' unwillingness to prosecute is also a consequence of the high costs of prosecuting polluters, and of the fact that polluters may be able to avoid conviction through use of the "due diligence" defence, which is based on the argument that the company took all reasonable steps to avoid the environmental discharges involved.

Despite these problems, the fact is that tough enforcement and high penalties will bring results, and they are being adopted with increasing frequency. In the United States, the federal Department of Justice set up an Environmental Crimes Unit as long ago as 1982, and the first head of the unit said in 1989 that "the level of apprehension" on the part of corporate polluters "is not yet at a healthy level." Many states now have stiff criminal penalties, and aggressive enforcement efforts, aimed at deterring the unsafe dumping of hazardous waste. In Canada, Inco Vice-President Roy Aitken, a member of the National Task Force on the Environment and the Economy, has warned industrialists to act in advance of new regulations that "will be punitive with multi-million-dollar fines and jail terms."

This is, in effect, an admission that tough regulation and aggressive enforcement work. At the same time, interest is growing in a number of alternative ways to achieve environmental change, that do not involve criminal penalties and the time-consuming proceedings they require.

Economic Instruments

The category "economic instruments" includes a variety of distinct policy tools. *Effluent charges* are simply a price charged to polluters for every unit of pollution emitted into the environment, whether air or water. These have the advantage that they are, at least in theory, automatically collected and provide a constant financial incentive to reduce waste discharges. Charge schemes are used in a number of European countries, to recover treatment costs from industries that discharge into municipal sewer systems; these are sometimes referred to *user charges*, although the effect can be the same and in fact, all forms of effluent charges operate on the principle of charging "users" of the environment for waste disposal purposes, rather than letting them use it free of charge, as is often the case now.

As economist Anthony Cassils points out, "charges benefit the environment directly," rather than just raising revenue for cleanup activities or waste treatment, only "when they have become sufficiently large to change substantially the behaviour of polluters." A recent study of economic instruments by the Organization for Economic Cooperation and Development (OECD) concluded that in at least one European country, the Netherlands, effluent charges "are so high that they constitute a strong incentive to clean up water pollution," but that this was seldom the case for user charges.

Landfill fees are a variation on user charges. Rapid increases in landfill fees have served as major incentive for reducing municipal and industrial solid waste volumes in Canada. The logical extension of this principle, already applied in a few U.S. cities, would see householders and commercial waste generators charged directly for the volume of waste they send to the landfill. However, such fees have their limitations. Some kinds of garbage cannot be reduced in volume without rules to limit the volume of packaging, like the recently enacted German requirement that retailers take back and recycle excess packaging.

Product charges like the Ontario and U.S. taxes on "gas guzzling" automobiles or the federal excise tax on car air conditioners are sometimes referred to as green taxes because they provide a disincentive to purchase certain kinds of products that involve damage to the environment, by raising their cost. These taxes could be set to vary depending on a product's environmental impact. For instance, rather than setting emissions standards that every new car must meet, some economists have proposed using a tax that varies depending on a car's emissions: the higher the emissions, the higher the tax.

One example is the *carbon tax* which has been proposed by environmentalists as a way of limiting fossil fuel consumption. The

idea is to tax fossil fuels based on their carbon content, both discouraging fossil fuel consumption in general and creating a price advantage for relatively "cleaner" fuels (at least in terms of their contribution to global warming). Another variant of green taxes is the *loop tax*, which raises revenue ("dedicated revenue") that is supposed to be devoted to the environmentally safe disposal of the product or the waste associated with its production. The taxes levied on the sales of certain chemicals in the United States under the federal *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA, or the Superfund law), are an example. These taxes go into a pool of funds, admittedly inadequate, that are allocated for cleaning up toxic waste sites. Loop taxes can also be used to fund environmental programs of other sorts.

Pollution credits or tradeable permits set an overall limit to the allowable discharge of pollution, and then allow companies to buy and sell rights to pollute among themselves. The idea is that the companies that can least expensively reduce pollution will do so; those for which costs will be much higher will be able to buy additional pollution rights. For these to work satisfactorily, the pollution sources should all be in the same general area and have the same kinds of environmental effects; allowable pollution limits have to be set on a basis that will require major reductions from current levels; and the scheme has to be properly and consistently administered, without special exemptions. (The same is true, of course, of an effluent charge system.) All of these conditions, of course, are by no means guaranteed. One apparent advantage of such schemes is that they do away with the "need" for repeated negotiation of compliance deadlines. This is also, of course, a disadvantage in that they imply accepting the inevitability of tradeoffs between jobs and environmental quality, rather than creating incentives to eliminate situations where workers and communities face such tradeoffs.

The Value of Economic Instruments

"Today, increasingly, market incentives dominate the search for and adoption of new technologies. Since waste discharge is usually free, except for the regulatory limits, there are few incentives to seek and adopt waste reducing technologies unless environmental efficiency actually shows up on the quarterly company balance sheet.

Output per unit of natural resources and per unit of wastes discharged is an important, neglected dimension of productivity. Emission charges, marketable emissions permits, non-compliance charges linked to emission standards, deposit and return systems are among the policies that will discourage pollution."

Source: Gro Harlem Brundtland, Address to World Congress, International Confederation of Free Trade Unions, Caracas, March, 1992.

Environmental Bills of Rights

For a number of years, some environmentalists have been arguing that environmental quality should be treated as a right. Like other kinds of rights, most notably property rights, they argued that it should be enforceable through the courts, independently of decisions by government officials. More than twenty years ago, Michigan lawyer Joseph Sax argued that a citizen seeking protection of the environment had to deal with government as "a supplicant, requesting that somehow the public interest be interpreted to protect the environmental values from which he benefits." However, he argued that citizens' environmental concerns were simply too important to be left "to some bureaucrat to vindicate when, and if, he determines them to be consistent with the public interest."

In the province of Ontario, opposition political parties for many years proposed an environmental bill of rights that would limit the discretion of governments in two areas: regulation-making and enforcement. The bill would give citizens the right to sue both polluters and the government agencies responsible for controlling them whenever "an activity has contaminated or degraded or an activity is likely to commence, is commencing or is continuing that threatens to contaminate or degrade the environment."

Where no standard covering the activity existed in legislation or regulation, courts would have the authority to establish such standards. Where standards had been established, compliance would constitute a

defence against the lawsuit "unless the plaintiff can establish, on a balance of probabilities, that the activity has caused or is likely to cause severe or irreparable contamination or degradation to the environment."

If such damage had been demonstrated, or if violation of an existing standard could be proved, the bill would allow courts to grant injunctions (orders to stop or limit a particular activity), make orders for the remedying of environmental damage, award damages, "impose conditions on the defendant or make such other order as the Court may consider is necessary." Courts would also have the power to refer technical questions to the province's Environmental Assessment Board. (The Board is a tribunal that already exists in order to conduct hearings under the province's *Environmental Assessment Act*.)

In addition, the Board would be given the power to review existing environmental permits, licences and applications if citizens could make a reasonable case for such a review. (At the moment, there is no way for citizens to start this process other than writing nice letters to the Ministry of the Environment, waiting, and hoping; the same is true in most other jurisdictions.)

Some of the features of the proposed environmental bill of rights can already be found in legislation in other jurisdictions. For example, the Yukon *Environment Act* allows citizens to sue the territorial government if it has failed to fulfil its public trust "to protect the natural environment from actual or likely impairment," although this right to sue may be restricted in regulations. Citizen lawsuits to enforce existing laws are provided for under most U.S. federal environmental legislation, and the state of Michigan recently passed legislation that allows citizen groups to sue polluters directly, and imposed tough liability standards for toxic pollution. (In the first case to come to court under that legislation, a company which had been dumping pollution into a local river for 16 years agreed not only to pay a \$1 million fine to the state, but also to donate land for game and wildlife areas and to provide financial support for a high school environmental education program.) Similarly, under the Massachusetts *Toxic Use Reduction Act*, citizens can sue both polluters and the state government to get its provisions properly implemented.

Unfortunately, most proposals for environmental bills of rights are not specific about the particular rights of workers. For example, what happens when workers are threatened with disciplinary action or firing for giving information about a company's environmental violations to government, or to the media? And a more difficult question: what

particular rights (if any) would workers have under an environmental bill of rights when a plant is closed, or a particular operation suspended, because of legitimate community concerns about environmental quality?

Administrative Sanctions

In most Canadian jurisdictions, occupational health and safety requirements are enforced the same way as environmental requirements (and, for that matter, in the same way as traffic laws or the *Criminal Code*). Enforcement involves a prosecution for violating a particular section of the legislation or regulations made under it. At least when a violator has lots of time and money, this process can drag on literally for years. In British Columbia, however, the Workers' Compensation Board has the responsibility for enforcing health and safety laws as well as providing compensation, and with this responsibility comes the authority to levy financial penalties against employers who violate regulations, without going through the time-consuming and uncertain routine of prosecutions. These penalties are collected as part of the routine process of collecting WCB assessments. Some unionists, as well as the Law Reform Commission of Canada, have suggested that the system deserves study in other jurisdictions as well.

It is possible to imagine a similar system of penalties for violating certain environmental regulations. There is not an existing agency directly comparable to Workers' Compensation Boards, so one might have to be established. Legislation in at least one jurisdiction (Ontario) already gives the Ministry of the Environment authority to require "performance bonds" from the operators of certain kinds of environmentally risky facilities. Expanding this authority to other classes of operations might be one way of ensuring environmentally sound operations.

Environmental Assessment

Command-and-control regulation, economic instruments, administrative sanctions and even environmental bills of rights are essentially reactive or backward-looking. On the other hand, legal requirements for environmental impact assessment are forward-looking. Ideally, they lead governments to discover, evaluate, minimize, and plan around the environmental effects of *future* activities.

The contribution of environmental assessment to planning for sustainability has been widely recognized. The World Conservation

Strategy recommended that environmental assessments be carried out for "all major actions (both public and private) requiring government authorization." The Brundtland Commission made a similar recommendation, and both argued that environmental assessments should be carried out not only of specific projects but also of macroeconomic policies and government programs.

Why should such assessments be legally required? Understandably, democratic governments tend to respond to pressures from specific client groups, regions and economic interests. However, environmental considerations, particularly as they relate to the integration of environmental and economic planning, are inherently long-term. They will often get lost in the shuffle unless there is a strong incentive for governments to investigate and make public the long-term consequences of actions and policies motivated by short-term expediency.

Requirements for environmental assessment that are applied without exception can set in motion the process former Environment Minister Lucien Bouchard wisely referred to as changing "the culture of the federal institutions" of government. If not required to carry out environmental assessments, even when they make political waves, governments are least likely to do so precisely when environmental assessments are most needed.

The experience in the federal jurisdiction illustrates this point: most government departments to which the Environmental Assessment and Review Process (EARP) applied treated it as discretionary and optional until 1989. Then, the first of a series of decisions by the Federal Court of Canada and, ultimately, the Supreme Court held that the 1984 regulation setting out guidelines for environmental assessment of federal "undertakings" had the force of law. As a result, environmental review panels were quickly set up to evaluate a number of other federal initiatives, and the federal government hastily introduced legislation to replace the so-called Guidelines Order that was the basis of the court rulings. Ray Robinson, the former head of the Federal Environmental Assessment and Review Office (FEARO) that administered the EARP guidelines, stated the obvious conclusion this way in speaking to a Parliamentary committee: "Where there is little sanction, there is often little action."

Unfortunately, the federal legislation in its present form (Bill C-13, the *Canadian Environmental Assessment Act*) still contains too many opportunities for discretionary decision-making about whether and how environmental assessments should be conducted. It still does not apply to government programs or policies, despite the arguments of environmentalists that this is perhaps the most important area for environmental assessment. Experience tells us that despite the best

stated intentions of government, if environmental assessment of programs and policies is treated as optional, it is least likely to be taken seriously precisely where it is most needed.

In other Canadian jurisdictions, the story is similar. Ontario, for instance, has one of the stronger pieces of legislation in the country (the *Environmental Assessment Act*). An independent tribunal (the Environmental Assessment Board) holds hearings under the *Act*, and a substantial program of public funding for groups participating in these hearings. However, public hearings are held only at the discretion of the Minister of the Environment, who can also exempt particular projects from the hearing process altogether. In addition, as in other jurisdictions, environmental assessments are generally carried out, and hearings held, only on projects like major highway expansions and, especially, new landfill sites. A few programs (like Ontario Hydro's long-term nuclear generation plans and the province's timber management policies on Crown lands) have recently been subjected to assessment, but these remain the exceptions that demonstrate the rule.

Cooperation and Conflict: The Limits to Legalism

All the elements discussed so far have their place in a legal framework for sustainable development, yet at the same time all have their shortcomings. With the exception of environmental assessment laws, all are reactive in nature. With the exception of some forms of economic instruments, the court system plays a major role in implementation and enforcement. There may be no way around this, at least if we want environmental requirements that are genuinely binding at the end of the day. The same is true in labour law. Despite the fact that Canada's industrial relations system emphasizes the role of collective bargaining, labour codes rely on the fact that remedies for persistent violations can be sought in the courts, and that court action can be sought as a last resort to enforce the orders of labour relations boards. Unfortunately, citizens as a whole have no mechanism for reaching "collective agreements" with industry or government that is directly comparable to the process of negotiating a contract with an employer. Although keeping these questions in mind, we should also realize that the involvement of the courts in environmental protection decisions creates three further problems.

First, achieving environmental protection through the courts, like doing almost anything else through the courts, costs far too much and takes far too long. Second, the substance of the controversy tends to get lost in the legal technicalities. This process is familiar to those who have studied environmental policy in the United States, where

litigation is a routine way of settling environmental differences and the courts are often used by industry to delay the implementation of new environmental (and workplace health and safety) standards. The same problems are beginning to show up in forums like the hearings of the Ontario Environmental Assessment Board, where legal representation is often a practical necessity if people are going to participate effectively.

Finally, bringing in the courts makes any set of institutions inherently adversarial. Most courtroom settings are organized around deciding who is right and who is wrong, around finding winners and losers. This is fine and indeed essential in some situations. However, it works against the establishment of the long-term cooperative relationships between workers and management that are essential to integrating economic and environmental planning. Clearly stated legislation may be (indeed, probably is) needed to encourage the development of those relationships, for example by requiring the development of pollution prevention and control plans with labour and management involvement, as proposed in the CLC's National Pollution Prevention Strategy.

However, this is not the same thing as delegating the *routine* resolution of environmental conflicts to the courts. This is the reasoning behind (for example) the CLC proposal to require joint environment committees in much the same way that joint health and safety committees are now required in many workplaces in almost every Canadian jurisdiction.

For Further Information

Robert Boardman (ed.), *Canadian Environmental Policy: Ecosystems, Policy and Process* (Toronto: Oxford University Press, 1992).

Lynne Huestis, Moira McConnell and Geoffrey Thompson (eds.), *Environmental Law and Business in Canada* (Aurora, Ont.: Canada Law Book Co., forthcoming late 1992).

Doug Macdonald, *The Politics of Pollution* (Toronto: McClelland & Stewart, 1991).

**TOWARD COOPERATION ON
SUSTAINABLE DEVELOPMENT:
PROPOSALS FOR FURTHER ACTION**

by John O'Grady

The material which follows is reproduced with the permission of John O'Grady and the Ontario Round Table on Environment and Economy from a discussion paper on "Integrating Sustainable Development Into Workplace Governance" prepared for the Ontario Round Table. The participation of the Ontario Round Table in carrying out and financing this work is hereby acknowledged. The views and ideas expressed are those of the author and do not necessarily reflect the views, policies or opinions of the Round Table. Mention of trade names or commercial products does not constitute endorsement of or recommendation for their use.

**Sectorally-based Joint Labour/Management Studies
on the Impact of Environmental Sustainability
on Human Resources**

It is suggested that the government consider providing support to studies on the impact of environmental sustainability on human resources. These studies would be conducted at a sectoral level by joint labour-management committees. In all likelihood, interest in such support would be confined to sectors in which labour-management sectoral bodies already exist or are in the process of being formed. Support for jointly sponsored research would strengthen these joint sectoral initiatives. More importantly, such support would widen the potential scope of these sectoral initiatives at an early stage in their development to include consideration of environmental issues.

The impact of environmental sustainability on human resources will differ among industries. In the resource-based industries, in particular, this type of research will be important. Both labour and management are likely to perceive this immediately. A strategically conceived, co-operative research project could help to avoid the "war in the woods" syndrome that appears to have emerged in British Columbia between the industry and the environmental movement. As evidence of probable interest in this area, it should be noted that the Canadian Paperworkers Union is currently using provincial support

under the Technology Adjustment Research Programme to undertake preliminary research into the relationship between forest management and sustainability of the forest products industry.

In manufacturing industries, a shift towards waste reduction and recycling will affect both the type of jobs that will be created and their location. Stricter emission control, by raising production costs, also will have employment implications. If these implications are to be seriously addressed then their magnitude needs to be estimated and the adjustment costs need to be taken into account.

We should also recognize that investment has been channelled into productivity-enhancing purposes. This trade-off has implications for the potential growth of real wages in the short term. The trade-off is also one of the unavoidable implications of a commitment to sustainable development. It ought to be addressed openly. Compensating job creation in environmental industries also needs to be examined.

Some or all of the following sectors could be expected to take up the offer of support for research into the human resource implications of sustainable development:

- basic steel industry,
- hard rock mining,
- forest products industry,
- auto assembly/auto parts,
- retail food industry,
- poultry and meat processing,
- electrical and electronics industry,
- aerospace and aeronautics industry,
- municipal sector,
- education sectors (public, separate, college and university),
- health care, and
- Ontario government.

Research projects on this scale usually run from \$200,000 to \$350,000 per project. Specific project costs will depend on the industry, the complexity of the issues faced by the industry and the adaptability of existing macro-models to alternative environmental assumptions. The authority to provide research support already exists in sections 3(d) and 3(g) of the *Environmental Protection Act*. If all identified sectors were to take up the offer of research support, total costs could run from \$2.4 to \$4.2 million plus an allowance for administration. These expenditures need not be made over one year. Indeed, it is unlikely that more than 5 or 6 projects could be initiated in any single year. This would imply annual costs in the range of \$1.2 to \$2.1 million.

This proposal to support joint labour-management research on a sectoral basis would be consistent with the government's interest in promoting "new partnerships." It would also be consistent with the philosophical statement set out by the Treasurer in budget Paper E.

Joint Workplace Committees

As noted in the earlier discussion, two of the key provisions of the *Occupational Health and Safety Act* are the requirement for joint workplace committees and the provision that at least some of the members of these committees receive training. OHSA relies on a certification requirement to enforce the training obligation. Both of these provisions of the *Act* were strengthened by Bill 208. Experience with the *Occupational Health and Safety Act* suggests a number of steps that might be considered.

The least interventionist measure would be to urge employers and unions to establish joint committees and to make funds available to train the members of these committees. An appeal to establish such committees on a voluntary basis should be sanctioned by a joint statement involving the Ontario Federation of Labour and its counterparts in the business community. The Round Table or some other body might undertake the consultations that would lead to the framing of such a joint statement.

Because these committees would be voluntary, no legislative or regulatory changes would be needed. If it were deemed appropriate to confer a certain status on these committees, they might be recognized under 3(i) and 3(j) of the *Environmental Protection Act*:

"The Minister, for the purposes of the administration and enforcement of this Act and the regulations, may...

- (i) appoint committees to perform such advisory functions as the Minister considers advisable;
- (j) with the approval of the Lieutenant Governor in council, enter into an agreement with any government or person relating to the protection or conservation of the natural environment."

A more interventionist measure would require employers and unions to establish above a certain size (perhaps 500 employees) to establish Joint Environmental Committees. This step would entail an amendment to the *Environmental Protection Act*. Regulations to the *Act* would have to set out the minimum size of committees, their manner of selection, the rights of members, training requirements for

members, necessary employer support (e.g., meeting facilities, opportunity to meet during working hours) and the responsibility of committees and committee members.

The primary purpose of Joint Environmental Committees would be to work towards a consensus on how a company (or public sector body) could improve its environmental performance in five key factors:

- emission abatement (where relevant),
- waste reduction,
- noise reduction,
- resource conservation (where relevant), and
- resource renewal (where relevant).

The Joint Committee might be required to report annually to employees and shareholders (or public authorities in the case of a public agency) on the progress towards improved environmental performance. The Environmental Roundtable could publish a useful précis of progress made under these Joint Committees. Conferences or colloquia could be used to further disseminate results.

An important factor in the potential impact of Joint Committees would be a requirement that some or all of both the union and the management members of these committees receive a specific minimum of training in environmental issues. A training obligation would impose a lost wage cost on employers -- probably in the order of one week's lost wages per committee member. As well the government would need to fund an agency or agencies for carrying out this training. If government preferred to make certification of joint committees voluntary, it might be necessary to offer a subsidy to cover the lost wage portion of training costs.

The table at the top of the next page summarizes the number of employers by sector with more than 500 employees. As can be seen, a rule requiring certified, joint committees to be established only by employers with 500 or more employees would affect 1,332 businesses and cover roughly 47.2% of the employed work force, using 1986 data. While far from being comprehensive, a mandatory committee rule for large employers clearly would have sufficient coverage to have an impact. If we estimate that these committees would average 10 members, there would be training needs for roughly 13,000 to 14,000 persons. This training could be staggered over two or three years. *After a few years of operation, the committee structure and the training associated with it would create a significant "environmental constituency" both within trade unions and within management.* This could prove to be of considerable long run importance.

Distribution of Large Employers In Ontario, 1986

	No. of Employers with More than 500 Employees	No. of Employees in Large Establishments (1,000's)	Per Cent of All Employees
All Sectors	1,332	2,065.3	47.2%
Primary Industries	2	n/a	n/a
Mines, Quarries	36	20.8	58.1%
Manufacturing	480	538.5	51.7%
Transportation & Communications	78	182.8	63.2%
Wholesale Trade	73	36.4	15.5%
Retail Trade	70	218.0	39.4%
Finance and Real Estate	106	175.5	56.5%
Community Services	32	386.6	64.3%
Business and Personnel Services	161	154.4	22.0%
Public Administration	58	334.4	91.1%

Source: Statistics Canada - Business Microdata
 (4 May 1988) File: 139660

Environmental Plans

A potentially significant measure would be a requirement that both private companies and public agencies adopt *Environmental Plans*. It may be practical to require this only of large companies and public agencies. The government might wish at a later time to extend a modified version of this requirement to middle-sized companies. An *Environmental Plan* would address the following:

- emission abatement (where relevant),
- waste abatement,
- noise abatement,
- resource conservation (where relevant),
- resource renewal (where relevant), and
- human resource implications of the Plan.

The duty to adopt an *Environmental Plan* should be founded in the *Environmental Protection Act*. This would require an amendment to the *Act*. The amendment also should provide that where there is a union, the employer and the union would be required to meet and to exchange proposals for an *Environmental Plan*. The amendments would further oblige the parties to make a good faith effort to achieve agreement on an *Environmental Plan*. The *Ontario Labour Relations Act*'s criteria for good faith bargaining would apply to this process. As noted before, the Labour Board's test for good faith includes the disclosure of necessary information within a reasonable timeframe. Finally, the amendments should require that the completed *Plan* be posted in the workplace and be available on request. In the event that there was no agreed upon *Plan*, the employer's proposals would prevail.

Details of the union's dissent, however, would be included. *Environmental Plans* would have a term of three years.

The requirement to adopt an *Environmental Plan* would be a strongly pro-active measure. However, given the other workplace-related legislation that the government is contemplating, this proposal could be viewed as too interventionist at this time. Indeed, greater experience with joint committees might be desirable before imposing duties and functions which subsequently could prove to be unrealistic. Notwithstanding these reservations, the government may wish to require large, public sector bodies to adopt *Environmental Plans*.

Disclosure Requirements and Obligation to Discuss

If it were decided not to proceed with a legislated duty to bargain Environmental Plans, other measures would be required to ensure that unions had the means engage in potentially fruitful discussions. In particular, it should be noted that in Labour Relations Board jurisprudence the "duty to bargain" implies a number of subsidiary obligation. The most important of these are:

- the duty to provide the information necessary for reasonable discussion to take place,
- the duty to meet and to discuss fully, and
- the duty to make proposals.

In the absence of a legislated "duty to bargain" it would be necessary to explicitly establish disclosure obligations. Indeed, trade unions are likely to regard disclosure obligations as a minimum recognition of the role of unions by the *Environmental Protection Act*. A disclosure provision might read approximately as follows:

"A trade union may make a written request of an employer for information that is reasonably necessary and reasonably available to determine the adverse effect on the environment of products, equipment or processes used by or otherwise under the control of the employer. Upon receipt of such a request an employer shall make every reasonable effort to supply information requested. When a dispute arises as to the appropriateness of disclosure of information or the availability of information, an application may be made to the Director for an order requiring the disclosure of such information and the decision of the Director shall be final and binding."

A further measure that should be included in the *Environmental Protection Act* is a duty to discuss. The *Act* should provide as follows:

"No employer shall refuse to meet with a trade union representing any of its employees to discuss fully any matters raised by the union concerning the possible adverse effect on the environment of products, equipment or processes used by or otherwise under the control of the employer."

Summary

The thrust of this Discussion Paper has been that environmental policy in Ontario needs to address workplace governance along with minimum standards if it is to achieve the stated objective of "bringing environmental considerations into the mainstream of economic decision-making." The central argument of this Paper has been that the social responsibilities that are assumed by private corporations reflect the structure of workplace governance. The experience of the Federal Republic of Germany illustrates this relationship most clearly. The need to address workplace governance rather than rely exclusively on minimum standards is also evident in the treatment of human resource development issues and problems related to labour adjustment.

It was also argued that the most important vehicle for co-determinative governance in Ontario workplaces is collective bargaining. The radical decentralization of bargaining structures and the narrow construction of the "duty to bargain" were seen at the principal impediments to bringing environmental issues into collective bargaining. In this regard, environmental issues parallel human

resource development, labour adjustment and occupational health and safety issues. In common with these issues, environmental policy requires a degree of "joint responsibility."

Promoting joint responsibility will require labour-management initiatives outside the framework of collective bargaining. It was noted that in a number of areas of public policy, government had created through legislation rights, duties and functions that paralleled those in the *Labour Relations Act*, but were not subsumed by the procedures and traditions that the *Act* has fostered. On the basis of this analysis, specific proposals were made for consideration.

Document 6: Principles for Breaking the Vicious Circle of Jobs and the Environment (Source: United Steelworkers of America, Canadian Policy Conference Policy Paper no. 1, Environment [1989])

We propose the following:

1. That the principle that workers whose jobs are affected by environmental reforms should be fully compensated be recognized in all government grant and regulatory programs dealing with environmental questions;
2. That a special workers' environmental defence fund be established to compensate workers for adjustment costs resulting from environmental enhancement;
3. That all government grants for environmental protection include an allocation for workers' adjustment costs; and
4. That environmental protection regulations require explicitly that workers whose jobs are adversely affected be fully compensated by the employer as part of the compliance requirement.

Document 7: Workers' Environmental Rights: A Proposal

(Source: adapted from CLC, *A National Pollution Prevention Strategy*, endorsed by CLC National Environment Committee, February, 1992)

1. *The right to joint union-management environment committees:* This is sometimes called the right to participate. Provincial law should institute the right to joint environment committees with rights, functions and authority equivalent to those of the joint health and safety committee. Specific environmental powers should include the right to participate in workplace environmental audits, which would be required by law as part of the National Pollution Prevention Strategy, and the right to participate in the framing of Pollution Prevention and Control Programs, which would also be required.
2. *The right to refuse to pollute:* This is parallel to, and an extension of the legal right to refuse unhealthy or unsafe work. Just as in the case of refusing unsafe work, employers must not be able to ask another worker to do the job that has been refused until the outcome of the case has been resolved. Allowing employers to do this simply invites situations where workers are pitted against each other. The right to refuse to pollute has been partly recognized in some jurisdictions. For example, Ontario prohibits reprisals against workers for complying with provincial environmental legislation. However, the right is protected only and indirectly, through appeals to the Labour Relations Board, leaving workers to bear both the costs of job loss and the substantial costs of seeking reinstatement and compensation.
3. *The right to environmental information:* Workers' environmental rights are ineffective without full prior knowledge about the nature and extent of pollution (as well as all other matters, such as energy use, which bear upon environmental protection). The joint environment committee should have access to all available information relating to pollution by an enterprise, public or private. Naturally, this right can only be effective if there are laws requiring the testing and measurement of emissions and effluent.

Employers will raise the issue of trade secrets. In the case of pollutants, no trade secrecy can be justified. Even if it is true that revealing the identity of a pollutant would breach trade secrecy, the public interest has to override trade secrecy. In the case of substances whose use of transformation results in pollution, we accept only WHMIS [Workplace Hazardous Materials Information System] rules on the chemical identity of substances and the procedure for handling trade secret claims.

4. *Whistle-blower protection:* This is the right of workers to divulge information to the public, the media or to the government which concerns pollution, excessive use of energy or waste of natural resources on the part of an employer. Several jurisdictions protect whistle-blowers to some degree. For example, Ontario's *Environmental Protection Act* prohibits reprisals against employees for seeking the enforcement of environmental laws, giving information to inspectors or testifying against the employer in an environmental case. However, as in the case of refusal to pollute, the right is protected only by way of appeals to the Labour Relations Board. The right should be unqualified, and there should be entirely adequate remedies in the event of breach of the law, e.g. full reinstatement with pay, and a penalty placed on employers who violate the right.
5. *Transition measures:* The right to compensation and retraining in the event of environmental layoff, when due to an employer's inability or unwillingness to conform to environmental regulations or, conversely, due to the employment effects of compliance with environmental rules.

8. A NEW VISION: SUSTAINABLE PROSPERITY

Jobs and the Environment

Over the past decade, economists in a number of countries have tried to assess the impact of environmental protection requirements on economic growth and job-creation. One of the conceptual problems they face is that economic growth measures the society's output of *marketed* goods and services. There is no market for clean water or breathable air, meaning that an economy's "production" of these doesn't show up in Gross National Product (GNP) figures ... although, of course, investments in pollution control equipment and new industrial processes do show up in GNP.

These are sometimes referred to as defensive expenditures. Unfortunately, when people require additional health care as a result of polluted air and water, this too shows up in GNP. This is one of the reasons some economists argue for a basic rethinking of the way in which national output measures like GNP are calculated. They claim that these measures have less and less to do with the actual well-being of the citizens of a particular country, or province.

This debate is at least partly academic, yet at the same time it helps us to understand something very important. The available evidence, which admittedly is far from complete, suggests that the impact of environmental protection requirements on growth and employment has been relatively small. This is what we might expect. Spending money on modifications to plant and equipment in order to reduce environmental impacts creates jobs, just like spending on plant and equipment for other purposes. The same is true when governments spend money on building or improving facilities like sewage treatment plants. In both instances, what is happening is that investment is being directed toward different kinds of goods and equipment, but the investments are nevertheless being made.

Employment and Environment: Some Numbers

One of the most detailed studies of the effect of environmental protection requirements on the U.S. economy, carried out by economists Roger Bezdek, Robert Wendling and Jonathan Jones, concluded that: "Environmental protection and the industry that has been created play a key role in the U.S. economy today, and they will continue to do so well into the future." The study went on to say that far from wiping out jobs, "the business investments made in 1985 in

air, water, and solid-waste pollution control and abatement created US \$19 billion in sales, generated US \$2.6 billion in corporate profits, and provided 167,000 jobs for workers of varying skills and occupations."

Similar findings were reported early in 1992 by a Canadian Labour Market and Productivity Centre (CLMPC) research team headed by Kirk Falconer. Falconer's team reviewed a number of studies of the economic impact of environmental requirements, including a projection by the consulting firm Informetrica of the economic impacts of environmental policy in Canada between now and the year 2012. The Informetrica study suggested that there might in fact be some negative impacts on Canadian economic growth over the long term, but that the employment impacts of environmental requirements would be consistently positive: in other words, other things being equal, there would be more jobs for Canadians than in the absence of those requirements.

The Falconer report warned, however, that although the overall economic effect of environmental policy was likely to be relatively small, there might be considerably larger impacts at the sectoral level. Between 1985 and 1987, for example, Statistics Canada data showed that almost 80 percent of Canadian private sector pollution abatement and control expenditures were made by firms in just three industries: primary metals, paper and allied industries, and chemicals.

This point is particularly important since, in the words of the report, "a number of Canadian industries with consistently large environmental costs also operate in intensely competitive home and global markets. Many of these industries are among the nation's top exporters and have been hit hard by pressures from a multitude of sources in recent years." An analysis carried out for the Ontario government of the economic impact of tougher air pollution regulations that have been proposed came to similar conclusions, warning about impacts on the competitiveness (and, by extension, on the ability to create jobs) of a number of industries. These included kraft pulp and newsprint, iron foundries, and nonferrous smelters.

There is a basic conceptual problem with this kind of analysis, one that is not merely academic. It fails to take into account the possible economic benefits of new production technologies which may also reduce environmental impacts, either directly (for instance, through waste reduction) or indirectly (for instance, by reducing energy requirements). If we carry on with conventional, end-of-the-pipe approaches to environmental protection, it is far more likely that the competitive position of some Canadian industries will be damaged, and that jobs will be lost. The federal government's *Framework for Discussion on the Environment* called this "the costly react-and-cure

approach to dealing with environmental problems"; it is costly both economically and environmentally.

This is not an argument against tough environmental requirements. It is an argument *for* policies that encourage a variety of industries to take a comprehensive approach to upgrading their process technology, and their product lines. As more industries adopt clean technologies and carry out basic redesigns of their production processes, it will become increasingly difficult to come up with a figure for capital investments undertaken specifically for environmental protection, since many of the investments which reduce environmental impacts will have been undertaken at least partly for other reasons.

Facing the Facts: There Will Be Losers

Nevertheless, we should face the reality that the transition to sustainability will not always be easy or economically painless. There will be losers, and the losers are likely to be working people whose economic options are limited, at least at the moment.

At the extreme, in the words of the Falconer report: "For industrial activity that is based on an environmentally unfriendly product or product input -- and for which no substitutes can be found -- another likely outcome is rapid or gradual extinction." The CLC's Policy Statement on the Environment acknowledges this problem in "those which environmentalists claim are environmentally unfriendly (period) and for which there are virtually no alternatives."

This is not just a short-term problem, involving shutting down particular plants or phasing out the production and use of particularly hazardous materials like CFCs and tetraethyl lead, or finding substitutes for them. In fact, the long-term aspects of the problem are likely to be at least as disruptive, since changes in the structure of regional and national economies are likely to occur. As Falconer's study said, the concept of sustainable development "means, after all, converting the very material and productive foundations of Canadian society." For example, if newsprint producers rely much more heavily on recycled fibre, it will make less sense to locate production facilities near forested areas. The preferred locations will be near metropolitan centres, with their abundance of recyclable raw materials.

More generally, Canada has historically relied on exporting resources in order to finance our imports of manufactured goods, even though exporting raw or semi-processed resources also meant exporting jobs. What will happen when we are no longer able to do this, as seems likely since the general trend is for a given volume of resource exports to be worth less in terms of the manufactured goods it will pay for?

In all these situations, we have to ask what is to become of workers in the industries involved. "Without some mechanisms involving retraining and compensation to assist in the conversion to a sustainable economy," warns the CLC environment policy, "most workers will be unable to support it." Why should they? As the policy goes on to say, "to refuse to address the issue of transition is to say that the environment has no special or central place on the political agenda, that those at the sharp end of environmental change have no special claim on the resources of the community."

Environmental Damage and the International Economy

One of the realities of life in an open international economy is that some corporations will pursue cost advantages by shifting operations to countries that allow them to ignore environmental damage, just as they now pursue cost advantages by moving operations to countries (like Mexico) with low labour costs.

There are obvious precedents in economic history. The environmental damage done by industrial activity in England during the early years of the Industrial Revolution was appalling. So were the conditions in which the urban working class lived and worked. For the people who experienced them, those conditions meant a life of bitter hardship, often followed by early death. Long and bitter political struggles were required to change those conditions, just as they were required in North America to change attitudes toward workplace health and safety that regarded workers as simply so much expendable raw material.

More recently, Japan achieved postwar economic success while ignoring, until quite recently, the environmental destruction caused by its industries. Those who argued that the price being paid for industrial progress was too high were ignored, or worse. The same is true today of some industrializing countries such as Indonesia and Brazil, despite growing global awareness of the costs of environmental damage.

An internal memorandum written by the chief economist of the World Bank in 1991, which was leaked to the British newsweekly *The Economist*, implies that this process is a good thing. The memorandum suggested, for instance, that "a given amount of health-impairing pollution should be done in the country with the lowest wages," because this would result in the lowest foregone earnings from death and illness.

There are some genuinely complex issues here. For example, can we envision a situation where the democratically elected government of a poor country (and at the moment, there are almost none of these) might legitimately decide that the welfare of its citizens would be better served by accepting pollution over the short term, at levels that would not be tolerated in the rich countries, as the price of attracting investment and generating jobs and economic growth?

On the other hand, for union members the implications of such arguments are clear. The unrestricted workings of the "free market" might lead to the wholesale migration of many kinds of industrial jobs to countries where wages are low and union activity restricted or even banned, often as part of a national strategy of keeping wages low. (This was the strategy adopted by the South Korean government, until very recently, as a way of stimulating investment.) Similarly, the World Bank's logic would tolerate, and indeed encourage, the migration of various hazardous industries to countries where the level of economic hardship is higher than it is in North America, and people are more willing to put up with the destruction of their health and the natural environment as the price of earning a living.

It may make no more sense to say that high pollution levels and the associated environmental risks are the result of free choice in those countries than it does to say that risks on the job are the result of free choices made by the workers who are exposed to those risks.

There are obvious connections here to be made between trade policy and environmental policy. When we import goods from countries whose environmental standards lower than they are here, are we in effect exporting pollution? Should lower environmental standards on the part of our trading partners be treated as subsidies, to the extent that they enable firms to produce products at lower costs? Conversely, what happens when our trading partners claim that their environmental standards are higher than ours, and that we are subsidizing exports by being willing to put up with the environmental damage associated with producing them? As environmental awareness increases throughout the world, these questions are bound to come up with increasing frequency.

Environment and Trade in the Global Economy

"With the globalization of markets, we will face a dilemma when products manufactured in countries where environmental standards are low compete with products from countries and companies which have made large investments in safe and sound modern production equipment. And those who work in state-of-the-art production plants will be unlikely to understand why competing products are allowed to endanger their jobs when the competitor does not have to take environmental considerations.

Many international companies today operate by the same high environmental standards regardless of country of operation. However, there are a number of free riders, and their activities actually threaten free trade as a global economic system. In fact, they are often located in countries that would suffer immensely if the system of free trade is not upheld."

Source: Gro Harlem Brundtland, Address to World Congress, International Confederation of Free Trade Unions, Caracas, March, 1992.

Environmental Unemployment Insurance

As long ago as 1975 John Sheehan, then Legislative Director of the United Steelworkers, suggested the concept of environmental adjustment assistance for displaced workers. He argued that "if, as a result of a change in society's attitude as expressed in governmental regulation ... there is caused a lay-off of workers, then these workers are entitled to special compensation in addition to benefits derived from the regular unemployment compensation system." More recently, the 1990 report of the Steelworkers' Task Force on Environment argued that "companies that curtail operations temporarily in order to install new equipment, or to comply with pollution regulations, should be required to continue the earnings of affected workers." Some leaders of the Oil, Chemical and Atomic Workers in the United States are now proposing state-level legislation to create a "Workers' Superfund" that would provide up to four years' full pay and benefits, plus college tuition, for workers displaced from environmentally sensitive industries. The fund would be financed by taxes on those industries.

A similar principle was supported by Friends of the Earth Canada, in a 1985 brief to the Royal Society Commission of Inquiry on Lead in the Canadian Environment. "If we are prepared to argue (as we have, in the case of lead in gasoline) that incremental costs to consumers are more than justified by the avoidance of potential harms to health and the environment," said the brief, "then surely we should also argue that society should be willing to pay the relatively minor additional costs of adjustment assistance for those workers who are being asked to bear a far larger cost."

Solutions like this one are necessary, yet incomplete. Over the long term, the best unemployment insurance is an economy that is expanding in a way that does not threaten workers with the all-too-familiar choice between employment and environment. This means a rather basic change in our approaches to both economic and environmental policy.

"For example," says the report of the Steelworkers' Task Force on Environment, "the U.S. Department of Energy has joined with several major steel companies to develop a direct steelmaking system that bypasses coke ovens and blast furnaces. The new method could greatly cut steel plant pollution, and increase the competitiveness of North American companies, but without proper planning, it could affect thousands of jobs and further impoverish steel communities. Technological improvements are essential to a cleaner environment. However, new technology ... must be subject to democratic planning, and introduced in a way that protects the economic interests of workers and communities, as well as companies."

This kind of approach may be where the common ground among labour, environmentalists and business will be found.

Our Common Future: A Broader Vision

We have to remember that the Brundtland report's vision of sustainable development has to do with far more than just environmental protection, or even the redesign of patterns of industrial production and consumption. It has to do, as well, with the inexcusably unequal distribution of resource, both within and between nations. As highlighted by the priority the Commission assigned to basic needs, that distribution is one that leaves hundreds of millions of people around the world without the most basic necessities of life. Nor should we forget Canada, where close to a million children live below the poverty line and Canadians are relying on food banks in record numbers.

On a global level, the unequal distribution of both economic resources and political power means even minor expenditures that

could eliminate vast amounts of human suffering, and environmental destruction, do not get made.

Jim MacNeill, the Canadian who served as Secretary-General of the Brundtland Commission, gives an eloquent example of the widely publicized famines in the Sahel region of Africa. "The growth of deserts," he says, "has been logged by the scientific community for over 30 years," yet governments worldwide failed to come up with the funds to support a plan of action drafted by an international conference on desertification in 1977.

"Then, the predicted happened in the Sahel: the drought, the ecological collapse, the famine" which happened in 1983 and 1984. In response to the televised images of starvation, governments provided relief that amounted to "well over two billion. Unfortunately, this relief, however generous, was too late for the millions who died, and much of it was wasted."

"Suppose," asks MacNeill, "that governments had taken seriously their pledges to support the action plan to combat deserts. What would it have cost? According to UNEP, the plan called for an expenditure of \$50 million a year for four years in Ethiopia or \$108 million a year for four years in eight countries of the Sahel."

To put this figure into perspective, the countries of the world spend approximately as much *every five hours* on weapons as the \$432 million that would have been needed over four years to combat Sahelian desertification. This is obscene. The Brundtland Commission's vision of sustainable development is also about this grotesque distortion of global priorities.

It is also about the need for a change in the international economic system that, since the debt crisis of the early 1980s, has seen billions of dollars' worth of capital that is desperately needed for development leaving the poor countries of the world every year, partly as their rich minorities shift their assets to more lucrative investments elsewhere in the world, and partly as their firms and governments struggle to meet their financial obligations to rich country banks and lending agencies that have largely ceased providing new investment capital. The situation is perhaps most acute in Latin America, where "natural resources are being used not for development or to raise living standards, but to meet the financial requirements of industrialized country creditors," according to the Commission. This, too, must change.

In its 1989 annual report on *The State of the World's Children*, the United Nations Children's Fund (UNICEF) directly linked the deteriorating situation of children in the world's poorer countries to the debt crisis and the "austerity programs" that often accompany development assistance to those countries worst affected by it. In the

1990 report, UNICEF identified a number of low-cost strategies that would save the lives of literally millions of children, by eliminating the scourge of malnutrition and providing basic primary health care.

"The financial resources implied by these commitments are not large," wrote the report's authors. "If the back of the debt problem can be broken in the early 1990s, then the *additional moneys* required to seize the specific and obvious opportunities for protecting children ... would be in the region of \$2 billion to \$3 billion a year by the mid-1990s."

This is roughly equivalent to one day's global military expenditures each year, and the challenge for those concerned about global equity and sustainable development is clear: designing institutions, and defending political priorities, that attach more weight to the basic needs of poor children than to the economic interests of bankers and the fantasies of generals.

For the labour movement, there is a special challenge in all of this. We hear much these days about "globalization" and its economic implications. However, it remains to be seen whether globalization will mean the reassertion of the priorities that now govern economic and political life on the international level, and their extension into domestic policy and politics, or whether globalization will result in policies that embody the Brundtland vision of sustainable development.

For Further Information

Alex Davidson and Michael Dence, eds., *The Brundtland Challenge and the Cost of Inaction* (Ottawa: Institute for Research on Public Policy, 1988).

Kirk Falconer, *Environmental Protection and Jobs in Canada: A Discussion Paper for Business and Labour* (Ottawa: Canadian Labour Market and Productivity Centre, 1992). Contact the Centre, 66 Slater St., Ottawa, Ontario K1P 5H1.

UNICEF, *State of the World's Children* (New York: Oxford University Press, annual).

**Document 8: The CLC Position on Transitions to Sustainability
(Source: CLC National Environmental Policy, 1991)**

Workers whose jobs are affected by environmental reforms should be fully retrained and compensated. This must be recognized in all government grant and regulatory programs dealing with environmental questions.

All new environmental policies and programs should honestly state all anticipated economic repercussions (as well as their distribution) and make provisions for appropriate adjustment measures.

Financing industrial adjustment in Canada as a whole should be a larger priority for governments; improved effort should have a clear environmental component.

Environmental organizations should specifically support environmental retraining and compensation schemes as a positive means to full and environmental protection.

Document 9: Sustainable Prosperity -- A Broader Perspective
(Source: Shirley Carr, President, Canadian Labour Congress, Speech to CLC National Environment Conference, November, 1990)

"We can be quite confident that in the longer run, jobs and the environment are quite compatible. Some environmentally friendly practices are labour-intensive, but the transition to a sustainable economy is not going to be easy and it will be tempting to the government -- to any government -- to ignore the plight of workers caught up in environmental change.

Several remedies have been suggested, including an environmental compensation scheme and a properly financed environmental retraining scheme.

But, if this problem is not hard enough, I want to suggest that we have an even bigger problem which even progressive governments such as those in Scandinavia, have found hard to resolve. The dilemma is this. Our present economy, based on resources, primary processing and some manufacturing, is not enough to sustain full employment. We have serious unemployment, underemployment, unjust pay-inequity and job-inequity and major regional disparities. Environmental activism can make these industries cleaner and friendlier to workers, but it cannot increase employment in these areas in any major way. Perhaps the reverse is true: that technology that befriends the environment is *in these major industries* less labour-intensive, compounding the employment problem, not resolving it.

The only answer, as I can see it, is to adopt an industrial strategy that will create clean high-tech industries in Canada. Again, Scandinavia is the model, though we have something to learn from Austria and even, dare I say it, from Japan on account of its industrial energy efficiency.

Only if we combine industrial strategy with environmental protection will we get sustainable prosperity."

Document 10: Twelve Steps to Global Consciousness (Source: Reprinted from National Round Table Review, the newsletter of the National Round Table on the Environment and the Economy, Fall, 1991)

"This program will show you the rigours of Third World life.

While there is much to be admired and preserved in the cultures of Third World people, current economic, political and social conditions prevent millions of people from truly enjoying their cultures. Instead, they practise survival.

It is generally very difficult for North Americans -- surrounded by the detritus of decades of industrial production -- to comprehend the realities of daily life for the billion-plus people who constitute the poorest of the poor. To get you in touch with the reality of life in much of the Southern hemisphere, try -- or at least imagine -- following this 12-step program.

First, take the furniture out of your home. Leave a few old blankets, a kitchen table, maybe a wooden chair. You've never had a bed, remember?

Second, throw out your clothes. Each person in the family may keep the oldest suit or dress, a shirt or a blouse. The head of the family has the only pair of shoes.

Third, all kitchen appliances have vanished. Keep a box of matches, a small bag of flour, some sugar and salt, a handful of onions, a dish of dried beans. Rescue those mouldy potatoes from the garbage can: they are tonight's meal.

Fourth, dismantle the bathroom, shut off the running water, take out the wiring and the lights and everything that runs by electricity.

Fifth, take away the house and move the family to the toolshed.

Sixth, by now all the other houses in the neighbourhood have disappeared; instead there are shanties -- for the fortunate ones.

Seventh, cancel all the newspapers and magazines. Throw out the books. You are now illiterate. One radio is left for the whole shantytown.

Eighth, no more mail carriers, firefighters, government services. The two-classroom school is three miles away, but only two of your seven children attend anyway, and they walk.

Ninth, no hospital, no doctor. The nearest clinic is now 10 miles away with a midwife in charge. You get there by bus or by bicycle, if you're lucky enough to have one.

Tenth, throw out your bankbooks stock certificates, pension plans, insurance policies. You now have a net worth of \$5.

Eleventh, get out and start cultivating your three acres. Try hard to raise \$300 in cash crops because your landlord wants one-third and your moneylender wants 10 percent.

Twelfth, find some way for your children to bring in a little extra money so you have something to eat most days. But it won't be enough to keep bodies healthy -- so lop off 25 or 30 years of your life."

N R T E E M E M B E R S

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SUSTAINABLE DEVELOPMENT: GETTING THERE FROM HERE

A Handbook for Union Environment Committees and Joint Labour-Management Environment Committees

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