NATIONAL ROUND TABLE ON THE ENVIRONMENT AND THE ECONOMY
TABLE RONDE NATIONALE SUR L'ENVIRONNEMENT ET L'ÉCONOMIE

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DELPHI

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Delphi
Water and Wastewater Services

An Environmental and Economic Market Analysis of Environmental Infrastructure Services in Canada: Moving Towards a More Sustainable Future

Ottawa

London

Vancouver

Prepared for:

The National Round Table on the Environment and the Economy

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Contents

1.0 About this Market Analysis

A number of economic and market forces are catalyzing major changes in the delivery of environmental infrastructure services in Canada. The economic basis for the provision of water, wastewater and solid waste disposal services in municipalities throughout Canada is in a stage of drastic transformation.

Market dynamics are a consequence of several factors, including: unmet infrastructure capital requirements; population and urban growth; environment-oriented regulatory drivers; and, a reduction in the fiscal role of the federal and provincial governments.

Environmental infrastructure services in most regions and municipalities of Canada are characterized by two market distortions. First, consumer prices of water, wastewater and solid waste disposal services often do not reflect the true cost (i.e. operational, capital and depreciation) of these goods. Artificially low prices, due to various subsidies, distort consumer behavior by acting as an incentive to the over-use of scarce resources, and as a disincentive to resource conservation, waste diversion and eco-efficiency. Second, in many Canadian communities, environmental infrastructure services are not provided on a user-pay basis.

This situation leads to a reduction of demand for viable front-of-the-pipe environmental technologies. Consumers are not motivated to: adopt conservation-oriented lifestyles; invest in eco-efficient end-use technologies; advocate for more comprehensive conservation planning; and, demand more efficient treatment of water and wastewater, and disposal of solid waste.

For these reasons, the National Round Table on the Environment and the Economy (NRTEE), through its Environmental Technologies Task Force, commissioned a *Market Analysis* of environmental infrastructure markets in Canada, and hosted Round Tables to explore the subject.

This *Market Analysis* studies the current state and emerging trends in the delivery of environmental infrastructure services in Canada. Obstacles which mitigate against sustainability are highlighted. The differences between the water-based and waste infrastructure markets are noted. Based on secondary research, the *Market Analysis* uses environmental and economic precepts to dissect environmental infrastructure markets. However, the *Market Analysis* also recognizes that solutions will be more holistic, and will include a combination of economic, environmental, social and political factors.

Based on an assessment of the problem, the *Market Analysis* proposes that public-private partnerships appear to be the most effective means to address existing environmental infrastructure market requirements.

The fundamental value of the *Market Analysis* is a strategic framework to move towards more fair pricing of water, wastewater and solid waste disposal services, and the associated development of public-private partnerships in Canada. This will, in turn, boost demand for environmental technologies and services since they will be more competitive due to higher prices for environmental infrastructure services. This, in essence, is a more sustainable economic and environmental situation which would place an emphasis on front-of-the-pipe pollution prevention and resource conservation technologies.

As mentioned, the *Market Analysis* has been reviewed, and the issue of environmental infrastructure services discussed, at two Round Tables. Round Table participants, naturally, had different views about the subject. Thus, a unique element has been added to the *Market Analysis*. At the end of each section, a summary is provided which reflects the areas of consensus and divergence of opinions between Round Table participants. This approach identifies those issues for which there is broad-based support for action, and those which require further discussion within environmental infrastructure markets, and in the Canadian economy at large.

The Market Analysis was prepared by The Delphi Group, a Canadian environmental consulting and financial advisory firm which specializes in developing transition strategies to make markets more sustainable, and building companies that benefit from this economic transformation. The Delphi Group also facilitated the environmental infrastructure Round Tables.

2.0 A Survey of Environmental Infrastructure Services

2.1 Market Overview

Water, wastewater and solid waste disposal services are the elements that fall within the umbrella of environmental infrastructure services. In Canada, the provision of these services include the following features.

Service Definition

The following specific elements comprise environmental infrastructure services:

Environmental Infrastructure Services

- Water Treatment
  - Primary
  - Secondary
  - Water Metering
- Wastewater Treatment
  - Primary
  - Secondary
  - Tertiary
- Solid Waste Management
  - Multi-Materials Recycling
  - Resource Recovery
  - Waste Diversion
  - Yard Waste Composting

Environmental infrastructure services in Canada are generally provided/managed by local municipal governments, though, there are some larger service providers (e.g. Ontario Clean Water Agency). In North America, Western Europe and Japan the move over the last two decades has been to move towards secondary water treatment, secondary/tertiary wastewater treatment, and solid waste diversion, including reuse and recycling.

Market Size and Growth

Using data from municipalities, Industry Canada, and the US Environmental Protection Agency, The Delphi Group estimates that the annual expenditures (1993) on public environmental services in Canada are:

Operational Expenditures	$ 8.4 billion
Capital Expenditures	$ 5.6 billion

Operational expenditure growth is estimated at 3-5% annually, under current pricing regimes. This growth reflects four factors. First, modest population growth. Second, a move towards more expensive services (e.g. secondary/tertiary wastewater treatment, hazardous waste disposal) that are driven by regulation and environmental concerns. Third, growing urban concentrations in certain areas of the country (e.g. South and North shore of Montreal, Lower Mainland of BC). Fourth, slight increases in the per capita use of water over time.

Capital expenditure growth is difficult to estimate for the immediate or longer term. This is due to a significant gap between actual needs for capital expenditures versus the existing or potential financing.

Cost Coverage

The direct operational and capital cost of environmental infrastructure services is covered from a number of sources of revenue.

1. User-pay charges to customers, both from the residential and IC&I (Institutional, Commercial, Industrial) sector;

2. Operating subsidies from the municipal tax base (mill rate);

3. Capital budgets funded through locally-generated income and/or debt;

4. Ongoing operating and capital grants from provincial governments; and,

5. Special and occasional federal and provincial granting programs (e.g. the 1994/95 Federal Infrastructure Program).

In addition to these direct sources of revenue there are indirect types of support for environmental infrastructure services provided from established

overhead in municipalities (e.g. city engineers whose salary costs may not be allocated to public environmental services).

Save for the first source of revenue, user-pay charges, the rest represent types of subsidies for environmental infrastructure services. The magnitude and mix of the subsidies varies significantly by province and municipality. The level of subsidy for water and wastewater services is much greater than the subsidy for solid waste disposal. This is because capital costs are the single largest element of subsidy of environmental infrastructure services in Canada. There is also clear evidence that the level of subsidy for IC&I sector users is less than for residential customers, notably in the case of solid waste disposal.

Simply put, Canada's fiscal reality of environmental infrastructure services results in a massive direct subsidy (both operational and capital) to end users. This is just for internal costs (i.e. actual out-of-pocket costs). External costs related to the conservation and replenishment of resources (e.g. water table depletion) are not factored in. Neither are capital depreciation costs.

Based on the differential between user charges versus actual cost it is estimated that the annual subsidies throughout Canada are:

Operational Subsidies	$ 1.6 billion
Capital Subsidies	$ 3.7 billion

Usage, Charges and Pricing

A few facts about the use of water, wastewater and waste disposal services in Canada, and associated pricing systems.

- The breakdown of major water users (based on Ontario data) is:

  - Domestic (residential) 35%
  - Industrial 26%
  - Commercial/Institutional 23%
  - Unaccounted (meter error, fire fighting, etc.) 16%

- Water charges, which often include a "sewer surcharge" for wastewater treatment, are based on the following types of systems (Ontario data):

  - Flat Rate (same bill to all users) 33.2%
  - Declining Block (more water used, lower price) 34.1%
  - Constant Unit 32.5%
  - Increasing Block (more water used, higher price) .3%

- Residential water usage under flat rate systems averages 450 liters/person/day. Under pricing by volume usage averages 250 litres/person/day (Environment Canada, 1991 data). Volume systems require meters at the point of delivery to each user. The introduction of meters into areas previously under flat rate regimes, has resulted in a rapid decrease in per capita consumption, and within three to four years consumption stabilizes at the average volume rate of user systems.

- Ten million households in Canada, including some in urban areas, received unmetered water services in 1991 (Environment Canada).

- Waste disposal services for residential users are largely provided on a flat rate, local tax funded basis. Dumping charges in rural areas, and, increasingly, per bag charges in urban areas constitute the other pricing systems.

- In larger municipalities, the IC&I sector must often pay for the private collection of waste in addition to paying taxes for this service. In effect, they are subsidizing residential waste disposal costs.

Existing prices for environmental infrastructure services in Canada demonstrate that consumer prices should be higher. To reflect full-costs, it is estimated that the price of water and wastewater services should rise 30-160% dependent on the level of subsidy in any given municipality. Recent developments in Dartmouth and Moncton provide evidence of this "gap" between full cost rates and those charged to the consumers. To meet infrastructure needs, both cities are considering plans to double water rates over several years. The rate of increase of waste disposal services is estimated to be more modest, and ranges from 10% to 40%.

2.2 The State of Capital Stock in Canada

Environmental infrastructure services are capital intensive. Water-based services require: water distribution systems, sewers and water/wastewater treatment systems. Waste disposal requires collection systems, landfill sites and multi-materials recycling facilities. Environmental infrastructure capital stock is characterized by:

- Long lead times required for planning, design and approvals;

- Major land use and access (i.e. right of ways) issues;

- A greater weighting on construction versus technology costs;
- High operational and maintenance costs; and,
- Gradual depletion (or use) of capital stock. The rate of infrastructure degradation escalates rapidly after 35-40 years (in the case of landfills) to 40-50 years (in the case of sewers).

The basic fact is that much of Canadian environmental infrastructure is in dire need of major upgrading if not wholesale replacement. Some sewers in older urban areas pre-date confederation. Landfill space for metropolitan Toronto is bursting at the seams and a solution has been elusive.

Existing financing has been used to address critical environmental infrastructure needs. Anything beyond the urgent is a luxury for many Canadian municipalities. In this situation, water-based infrastructure assets are deteriorating, maintenance is deferred, and service delivery is inefficient. Investments required to develop waste diversion systems and replace landfills are considered less and less.

2.3 Global Comparisons

United States

Environmental infrastructure services south of the border are delivered through both public and private systems. Approximately 25% of the US population depend on investor-owned water-based services (i.e. private systems) - the remainder are public utilities. While generally serving smaller centres, investor-owned utilities also exist in cities such as St. Louis, New Jersey and Indianapolis. The presence of investor-owned entities is more common for waste disposal services.

Investor-owned utilities are regulated by state authorities and have the latitude to operate independently under environmental and quality conditions. This includes raising capital for infrastructure development and maintenance. Investor-owned utilities receive no federal or state support.

Pricing, as one would expect, is higher with investor-owned utilities (either water-based or waste disposal). As a result, the state of infrastructure in public utilities tends to be more degraded than in investor-owned utilities.

Overall, the situation in the US is not that dissimilar to Canada. A significant majority (75%) of water, and a slight majority of waste disposal systems, are comparable to the Canadian scene. For these, the US Environmental

Protection Agency (EPA) estimates that there is an existing backlog of US$ 90 billion (1991 data) in water-based environmental infrastructure. This does not include future needs. For this reason, the movement in the US is towards investor-owned systems, either through outright privatization or public-private partnerships, to address environmental infrastructure requirements.

Britain

The Thatcher government in its latter years approved a simultaneous flotation of 29 public water companies in Britain. This radical move to privatization saw the general public purchase equity in companies which provided them with water services. While there clearly was an ideological motive behind the government's action, the economic basis for privatization was a need for massive infrastructure investment in excess of $50 billion (US) over 15 years. Legislators also took the view that it was desirable to separate the provision of water services from the enforcement of quality standards.

Five years after the fact, Britain's water services privatization is looked upon favourably by investors and managers, and somewhat less enthusiastically, or negatively, by customers. Services are generally more efficient and of higher quality. British water companies have also been very successful in springing from their domestic base to penetrate new environmental infrastructure markets, particularly in emerging economies. On the other hand, prices have risen substantially. There is also a concern that base salary and incentive compensation to senior utility managers has risen exorbitantly, and is out of line with market conditions.

Waste disposal services in Britain are provided by local authorities and involve a large amount of sub-contracting to private service providers. Per capita waste generation is much lower than in North America, therefore, infrastructure demands are somewhat less pressing. There is, however, pressure to enhance waste diversion efforts due to landfill limitations in the British Isles.

France

Private companies have managed the provision of water and waste services in France through most of the 1990s. A variety of arrangements exist, the most common of which are leases and concessions. Leasing mechanisms involve a private company operating and maintaining environmental infrastructure services on contract with a local authority. Concession

arrangements go further and also include responsibility for financing new assets. In both cases, the municipality retains ownership of infrastructure assets, either during or at the end of the contract.

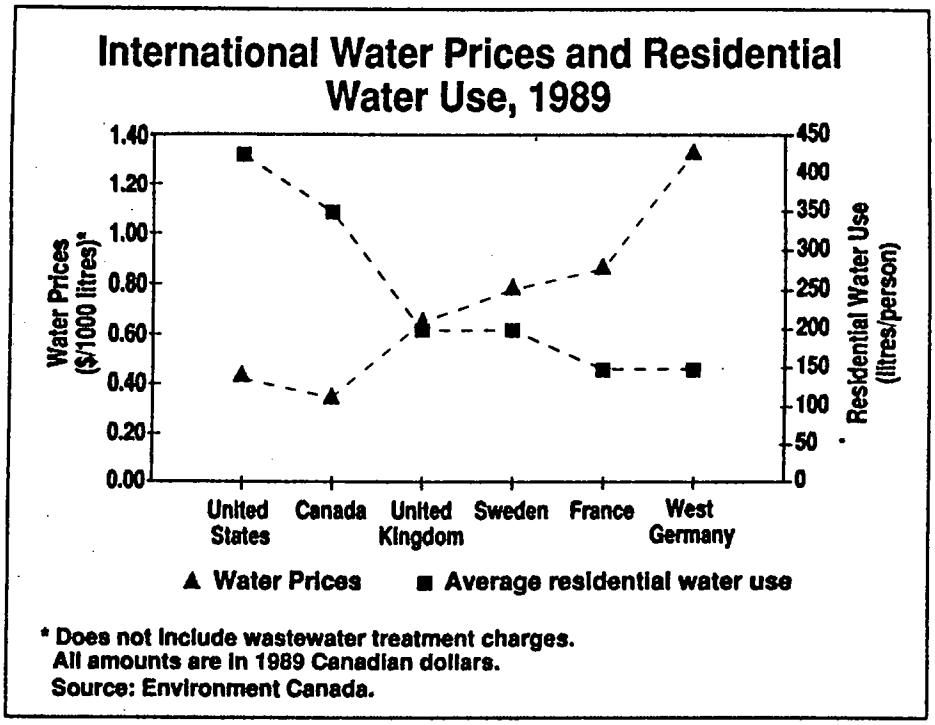
France has perhaps the strongest national example of public-private partnerships for environmental infrastructure services. Strong local control of services coupled with incentives for private sector efficiency have resulted in a balance between full-cost pricing principles and public interest. The French model has also fostered a competitive environmental infrastructure (notably in water and wastewater) presence in global markets.

Emerging Economies

It is worthy to note that as economies grow and per capita income rises, the newly industrialized countries of Asia and Latin America are gravitating towards full-cost, user-pay systems for environmental infrastructure, largely delivered through public-private partnerships, if not outright privatization. In Malaysia, The Indah Water Konsortium, of which North West Water is a member, is privately financing the upgrading and construction of a national sewage system, which will be funded by user fees. Grupo Gutsa of Mexico, a construction company, is bringing more potable water to city residents and installing water meters to cover costs. Similar trends are at play in countries such as Taiwan and India for the management of solid waste. Emerging economies appear to be taking a private financing approach to environmental infrastructure, and charging full-cost to users.

Comparative Pricing and Water Usage

One of the most fascinating aspects of global environmental infrastructure comparisons is the relationship between water prices to residential per capita consumption. The graph on the next page tracks these two variables in six industrialized countries (data 1989). The correlation is clear. The higher the price of water (in effect, the move towards full-cost pricing) the lower per capita utilization. US figures appear to be the only ones which vary somewhat from the trend. Analysis shows, however, that US data can be separated into the experiences of investor-owned versus publicly-owned water utilities. When this is done the correlation is confirmed. Publicly owned utilities generally have lower prices and greater levels of usage, and the reverse is true in the case of investor-owned water companies.



A similar, though less profound, relationship exists between price and consumption for industrial and institutional customers.

Global price and waste generation relationships are more difficult to discern. Per capita waste generation varies in industrialized countries. The per unit of cost of waste disposal is highest in Europe, lower in Japan, and least costly in North America. Disposal methods allowed by regulation also vary. Incineration is much more common in Europe and Japan, and less in vogue in North America. Waste generation appears to be affected by a combination of disposal prices, disposal regulations, recycling and reuse incentives and cultural norms. Price clearly has an impact, though, at a lesser magnitude than for water services.

Summary of Global Experiences

The global experience of environmental infrastructure services leads to the following conclusions:

1. There is a strong interest in ensuring that some public control over services delivery and water quality is retained;

2. Moves toward public-private partnerships, and outright privatization, have been driven by capital requirements for water services;

3. There is a clear and strong inverse relationship between the price of water and per capita consumption;

4. Price is one factor which reduces the per capita generation of waste.

2.4 Environmental and Economic Sustainability

How do consumers in jurisdictions with user-pay, higher price (i.e. full-cost pricing without subsidy) regimes reduce per capita water consumption and waste generation? As price increases, both residential, institutional and industrial customers do five things.

1. They change behaviour, and simply start doing without (does the lawn really have to be watered twice a week, if at all?);

2. They respond to existing, or advocate for new, systems which reduce consumption such as maximizing use of 3Rs systems or taking advantage of municipal programs for water use efficiency;

3. They make significant changes to operating systems such as green procurement practices which result in less waste generation (e.g. less packaging of goods bought);

4. They make small investments in low-tech water efficiency (e.g. low flow shower heads, faucet aerators) and waste diversion (e.g. home and industrial composting) technologies; and,

5. They make major capital expenditures in operating systems ranging from improved piping systems to more water efficient appliances to the introduction of manufacturing technologies which use less water and generate less waste. These expenditures are made over time as opportunities arise.

Where markets have undergone a transition towards full-cost, user-pay pricing the importance of public participation and communication cannot be over-stressed. Nobody likes to see prices rise for products they buy. If,

however, communities are fully informed about the reasons for price increases and have a direct say into how change will be introduced and managed, acceptance is higher.

In addition to consumer-based behavior, price and revenue increases associated with full-cost systems provides incentives to water, wastewater and solid waste disposal service providers to:

1. Upgrade and replace existing, or build new infrastructure, using technologies which promote efficiency. This often requires a greater level of investment which is viable at higher prices;

2. Make operations more efficient since no subsidy support exists; and,

3. Maximize, in the case of private managers or financiers, the net operating position of a utility (i.e. cost versus revenue) to provide better returns to owners or investors.

Conservation and eco-efficient behavior appears to be much more important for water-based services in comparison to solid waste disposal. First, the degree of waste disposal subsidization is substantially less, and the main problem is largely an absence of user-pay systems. Second, there is a competitive aspect to waste markets that promotes competition and private participation. Third, capital requirement for waste disposal is much less than for water and wastewater.

The actions consumers and service providers take as prices rise are desireable in both economic and environmental terms. The fact that these practices are not currently optimized illustrates that the existing market for environmental infrastructure services in Canada is flawed. The current system promotes an inefficient use of scarce resources, and unnecessarily environmentally-damaging behavior. It discourages the sustainable use of resources and the development and introduction of eco-efficient technologies and services. The market is giving the wrong signals, and the big losers are Canadians at large, and the country's environmental industry in particular.

2.5 Views from the Round Tables

Round Table Participants found consensus and agreed that:

- Most of the findings of the Survey of Environmental Infrastructure Services section of the *Market Analysis* were accurate;

- Canada's environmental infrastructure was in major need of upgrading; and,

- Current pricing and charging regimes did not encourage sustainability.

Round Tables participants had a difference of view about:

- The extent of subsidy for environmental infrastructure services; and,

- Whether the relatively lower scale of problems with the solid waste sector merited a similar or different analysis.

Round Table participants pointed to:

- The need for more empirical data to measure of the degree of subsidies in Canada, and in specific communities; and,

- The value of information about environmental infrastructure services in Canada, and a need to distribute more information to decision-makers and the general public.

3.0 Canadian Environmental Infrastructure Market Trends

3.1 Infrastructure Financing Requirements

Environmental infrastructure requirements in Canada are a sum of two accounts - existing unmet needs and new demands which will arise in the medium to long term.

On the first account, capital costs of sewers, water/wastewater treatment systems and landfill sites have largely been covered by various types of public subsidy. The current infrastructure shortfall is, in large measure, a consequence of gradual retreats by the federal and provincial governments from this arena since the early-1970s. It was at this point, that revenue streams were starting to show signs of stress. As a percentage of GDP, public infrastructure financing in 1971 was 3.5%, and dropped to slightly above 2% in 1990. The trend has continued downwards through the 1990s with the exception of the blip caused by the Federal Infrastructure Program.

After nearly four decades of uninterrupted increases in environmental infrastructure financing from the public purse, fiscal supply could not keep pace with capital demand. Governments wisely began thinking about reducing their role during the recession of the early 1970.

As a result of this history, in 1995, there is a large unmet need to maintain and refurbish existing environmental infrastructure, particularly for sewage capital stock. In essence, by avoiding the problem for the last 15-20 years, governments have exacerbated the situation since repair bills rise exponentially over time.

Estimates of the amount of unmet capital infrastructure needs range from $44-$58 billion. This represents the amount of capital needed to ensure that existing capital stock, and asset valuation, is maintained.

On the second account, pressures to maintain existing environmental infrastructure are compounded by a need to respond to new demands for the following reasons:

1. Urban growth in areas such as Halton Region, Ontario, and Surrey, BC;

2. More stringent regulatory drivers (e.g. storm water treatment, sludge disposal restrictions);

3. Gradual and growing per capita water consumption;

4. Separation of waste streams to address hazardous and toxic wastes; and,

5. Public health/environmental concern and desire for better water (both drinking and in waterways) quality, and enhanced recycling/reuse systems;

The Delphi Group, based upon several projections made by governments, municipalities and industry association, conservatively projects that *new* capital demands for environmental infrastructure will exceed $53 billion by the year 2015 under current pricing regimes. In total, Canadian capital requirements for environmental infrastructure would be $97-111 billion over the next twenty years. These projections assume a static market, and do not reflect a move towards more conservation-oriented practices, and full-cost, user-pay pricing systems which promote sustainability.

All in all, this represents an enormous fiscal burden. Can this fiscal need be met, or could it be reduced?

3.2 The Reality of Deficit Reduction

Racing down the track is the deficit reduction train. All levels of government, particularly the provincial and federal governments, have been compelled to undertake *drastic* measures to reduce deficits. The impact of deficit reduction on environmental services will also be *drastic.*

As governments seek to reduce their deficits, municipalities will experience, and have begun to encounter, a cumulative effect on their financial health. As the federal government cuts provincial transfer payments, many of which have stagnant tax bases, there is great pressure to reduce any grants to municipalities and such organizations. This trend is readily apparent today, and will accelerate as the full impact of federal and provincial deficit reduction is felt over the next decade.

Environmental infrastructure services are particularly vulnerable targets as cost reduction (or transfer) becomes a catch phrase because of the capacity to pass on hitherto subsidized costs directly to the user. If this happened, painful as the adjustment process might be, Canadians may be better off.

These factors suggest that a catastrophic future lies ahead for Canada's public environmental infrastructure and services. The barreling deficit train will drastically reduce subsidies (The Delphi Group believes this will occur quite

rapidly and over the next three years), forcing prices up somewhat, but not really meeting capital requirements, either for refurbishing or new infrastructure.

3.3 The Economic Impact on Canada's Environmental Industries

Canada's environmental industry is growing gradually, at a rate of approximately 4%-7% annually, and includes a large number of small companies which operate in local markets. The sector has yet to take off and experience the growth rates predicted.

Unmet expectations for environmentally eco-efficient technologies related to the use of water or the generation of waste is largely a function of price. When the price for water and waste is lower than full-cost, and is not assessed directly to the user, there is limited incentive to introduce more efficient technologies.

The following types of environmental technologies are, therefore, not as cost competitive as would be the case in a free market system:

- Water efficiency technologies, either generation or end-use focused;
- Recycling technologies and systems;
- Process technologies which use less water and generate less waste in production; and,
- Waste recovery technologies;

Subsidized prices of environmental infrastructure services is one of the reasons Canada's environmental technology market is less vibrant than expected. The lack of success and growth experienced by many environmental enterprises in environmental infrastructure markets has contributed to a general caution in the industry about developing new technologies and services. Low, subsidized prices for environmental infrastructure services has also resulted in a paucity of risk capital seeking environmental technology investment opportunities in the sector.

This situation compounds itself since environmental technology companies work together with construction, project and facility management, and environmental engineering firms to build and manage environmental infrastructure services.

The extent to which low water and waste prices due to capital subsidies and limited user-pay systems (particularly for water services) has negatively affected Canada's environmental industry has yet to be fully appreciated.

3.4 Canada's Environmental Infrastructure Future

Environmental infrastructure market trends are converging towards a rather unappealing future. Water and waste are viewed as public goods. Infrastructure financing requirements are already considerable and will rise over the medium term. Fiscal pressures are reducing the level of government capital subsidies. Environmental technologies cannot compete on existing price terms to reduce demand for water and waste services.

It does seem like a particularly vexing dilemma. Simply increasing prices will be inadequate to address financial requirements, or introduce greater efficiency. Tinkering at the edges will not prompt the kind of market shift that will be more environmentally and economically sustainable.

A quantum shift in the delivery of environmental infrastructure services, therefore, merits attention. The change begins with conservation-oriented land-use planning policies, watershed management and regulations, and treating water and waste as scarce goods, rather than as public rights. It also includes introducing the costs of externalities (e.g. the cost of arable land-use) into consumer price, as mechanisms are developed to measure and quantity these social costs.

Addressing the economic aspects of the solution involves a move towards full-cost, user-pay pricing for environmental infrastructure services, and opening the sector to massive private financing and management. Indeed, both elements of the solution are complementary. Full-cost, user-pay pricing creates incentives to reduce consumption of public environmental services. Private financing and management promotes greater efficiency since there is an incentive to private return on investment. Public-private partnerships also offer know-how and access to capital that can shift the market.

These innovations will have a dramatic effect on the market. Environmental infrastructure services will be managed in a more comprehensive manner. Prices will rise and private interests will enter a field previously dominated by public service providers. Raw fiscal and infrastructure realities make the market changes proposed unavoidable.

It is of critical importance to ensure that there is a healthy amount of public participation in any market transitions. To make changes from strictly an economic basis risks alienating present and future customers.

The challenge is how to shift the market in a planned, incremental and managed way to protect eco-systems, minimize economic losses, service disruptions and environmental degradation. The future Canadian market for environmental infrastructure services must also balance investor/manager stakes with public interests. Not an easy agenda.

3.5 Views from the Round Tables

Round Table Participants found consensus and agreed that:

- There was a substantial need for infrastructure financing;
- Public participation and communication was of vital importance;
- The impact of price increases on lower socio-economic groups should be moderated through direct or indirect fiscal supports, though, the specific means to do this were not identified;
- Public deficit reduction would drastically reduce the amount of capital financing for environmental infrastructure; and,
- Full-cost, user-pay system would boost demand for eco-efficient environmental technologies.

Round Tables participants had a difference of views about:

- Comprehensive land-use and watershed management should be a necessary aspect of market change; and,
- The viability of adding the cost of externalities into the price of environmental infrastructure services. There was, though, a general view that if this were done, it should be a long term goal.

Round Table participants pointed to:

- A need to quantify the amount of infrastructure both across the country, and in individual communities.

4.0 The Public-Private Partnership Response

4.1 The Public-Private Partnership Approach

The essence of public-private partnerships is straightforward. They are relationships between governments and private entities to either provide services for which there is widespread public demand, or ones which have been historically managed by governments, or both. The drivers for public-private partnerships are several. First, a need for capital investment. Second, a desire to improve operating efficiency. Third, a need to diversify risk away from the public purse.

Public-private partnerships can range from the contracting out of publicly provided services to outright privatization. Partnerships with private decision-making normally have a full-cost, user-pay basis. For example, full-cost pricing of water and wastewater services would involve:

- Inclusion of all costs, including allowances for the depreciation of systems;
- Charges tied to actual water used based upon metered measurement;
- Revenues dedicated exclusively for the operation, maintenance, upgrading and growth of sewer, water main, and water/wastewater treatment systems; and,
- Adoption of a universal water services accounting system by municipalities.

Public-private partnerships appear to offer the most effective means to ensure that full cost, user-pay systems for the delivery of environmental infrastructure services are introduced. For waste disposal services, however, additional factors are at play. First, waste is a resource that moves and, therefore, it is more difficult to introduce higher prices. Second, waste has both volume and weight measures. Third, there is already a substantial amount of private participation in waste disposal. For these reasons, full-cost, user-pay systems and public private partnerships have less utility in the solid waste sector.

4.2 Benefits & Risks Associated with Public-Private Partnerships

Public-private partnerships, however, are by no means a panacea. In and of themselves, they do not represent a solution to the challenge of addressing environmental infrastructure requirements.

On the plus side, if effectively structured, public-private partnerships offer a number of benefits to consumers, governments and private interests.

- *Improved Efficiency:* There is substantial evidence that over time public-private partnerships are more efficient and reduce the cost of water, wastewater and solid waste disposal services. The incentive of bottom line returns provide public-private partnerships with the motivation, and the capital, to seek out and acquire technologies and to introduce operating practices that increase efficiency.

- *Better Service Quality:* Access to capital, expertise and private sector customer service ethics tends to enhance the quality of service in public-private partnerships.

- *Asset Preservation:* As future earnings are dependent on preserving assets, public-private partnerships appear to do a better job in maintaining and upgrading capital stock. This is generally funded through asset depreciation and other such charges, and reflects private sector commitment to promote long-term relationships with public bodies.

- *Cost Control:* Cost ceilings and growth limits in many public-private partnership contracts allow public agencies and regulators to plan for the future with more confidence, and reduces budget versus actual variances.

- *Access to Capital:* Investors and lenders tend to attach greater comfort to privately managed infrastructure operations. Financiers take the view that public-private partnerships meet service and financial targets effectively. Further, private companies have greater financial expertise in terms of acquiring and retiring capital investments.

- *Capital Availability:* Capital market financing sourced by public-private partnerships frees up public capital for other pressing needs.

- *Public Debt Rating:* Private infrastructure financing coupled with full-cost, user-pay systems is more fiscally responsible than using public capital. This is a favourable factor in debt rating by independent agencies. Higher ratings increase the borrowing capacity of governments and reduce public capital costs.

- *Trade Competitiveness:* Global environmental infrastructure trends are clearly towards public-private partnerships. Domestic experience will enhance the capacity of private companies to compete more effectively against foreign firms in international markets. Domestic experience also offers private companies the opportunity to build strategic alliances and consortia (i.e. bringing together project management, environmental engineering, environmental technology, legal, and financing capacity).

On the down side, there are major risks to public-private partnership which arise because relationships/contracts are poorly structured, or private partners under perform. Risk can compromise the very essence of a public-private partnership.

- *Loss of Public Control:* All levels of government, notably municipalities, have a major public interest in the delivery of environmental infrastructure services. If the scale is tipped too far in favour of private partners, the arrangement may not satisfy the service quality and other desires of governments and public agencies.

- *Choosing Private Partners:* Local governments usually follow a competitive process in selecting various private partners. Limited competition and a flawed competitive process are risks that can arise.

- *Labour Opposition:* Labour unions often have concerns about certain types of public-private partnerships which may contravene collective bargaining agreements and threaten jobs. Labour opposition (either legitimate or unfair) could scuttle a public-private partnership before final approval, or make the transition to a new environmental infrastructure service system more difficult.

- *Middle Management Intransigence:* Middle managers at the facility or administrative level are often threatened by public-private partnerships and are afraid of job losses. Experience has shown that these fears are largely unfounded and private managers/owners have tended to train and equip managers to

perform better. However, the middle management job loss undercurrent can make introducing a public-private partnership a sensitive issue.

- *Financing Costs:* The federal, provincial and larger municipal governments in Canada can generally obtain financing at a better price than all but the largest private companies. This is for a simple reason - governments will in all likelihood be around for a long time, but companies do not have the same longevity. They sometimes go bankrupt, withdraw from certain markets or dissolve in the normal course of business.

- *Poor Private Performance:* Private does not necessarily mean better than public. Some private partners will not perform (either in construction or operations) as expected and contracted, and a public alternative may be more secure.

It is important to weigh the benefits and risks associated with any potential public-private partnership. In the case of Canada's environmental infrastructure services, public-private partnerships appear to address key market shortcomings. Utilizing the most appropriate public-private partnership model, and crafting clear contractual/legal agreements are the best ways to mitigate risk.

4.3 Alternative Public-Private Partnership Models

There are a spectrum of public-private partnerships models for environmental infrastructure services. Models vary in the degree of decision-making and functional responsibility held, respectively, by public and private partners, in a number of key areas.

1. *Ownership:* Which party owns which infrastructure assets.

2. *Financing:* Which party is responsible for raising infrastructure capital, and how are financing decisions made.

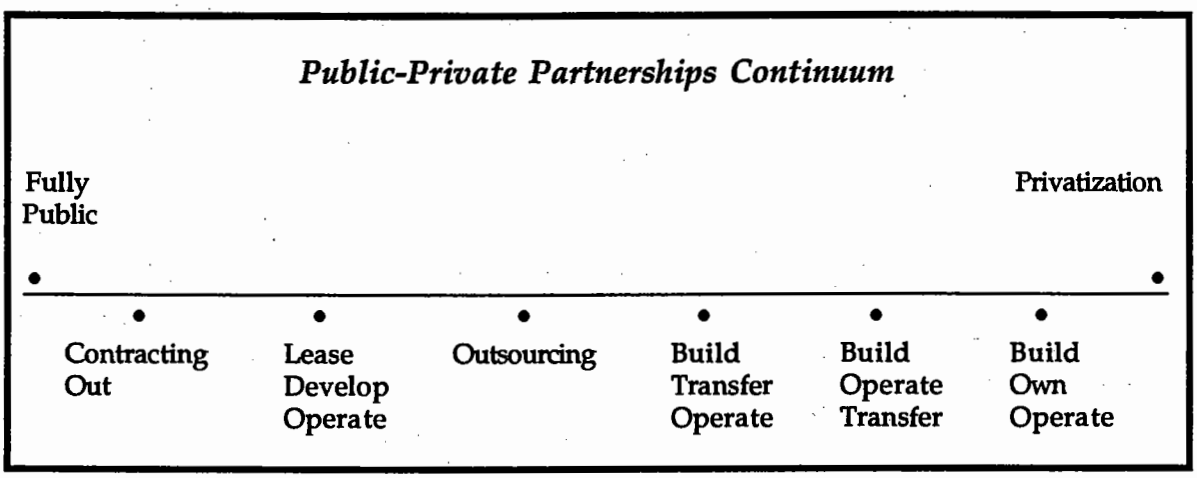
3. *Construction:* Which party is responsible for new infrastructure construction, and bears the short and long-term risk.

4. *Upgrading:* Which party must upgrade existing capital stock.

5. *Operations:* Which party manages day to day facility and utility operations, responds to customer complaints/concerns and maintains infrastructure.

6. *Control:* How and when do the parties share decision-making, make unilateral decisions, communicate and report, and resolve disputes.

Alternative public-private partnerships for environmental infrastructure are illustrated below.



Before providing a description of various models the two ends of the continuum should be mentioned. In the Fully Public approach governments own, manage and operate all aspects of environmental infrastructure services. Governments finance infrastructure and hire employees to provide services, and issue tenders for outside expertise from time to time. The majority of environmental infrastructure services in Canada fit into the category of the Fully Public approach. Privatization is the wholesale ownership, management, operation and financing of environmental infrastructure services without any significant governmental involvement save for public health and environmental regulations.

Contracting Out

The Contracting Out model entails the private sector providing operations and maintenance services to public bodies, generally, on an open competitive basis. Private capital is not part of the picture. The first stage of a deal between the Regional Municipality of Hamilton-Wentworth and Philips Utilities Management Corporation is, essentially, a contracting out arrangement. Another example is Halton Region contracting out it's BioSolids Recycling Program to Terratec Environmental Limited.

Lease, Develop, Operate

The Lease, Develop, Operate model involves a long-term lease to operate and expand an existing facility. The private developer agrees to make a capital infusion to upgrade environmental infrastructure and recovers its investment, including a reasonable rate of return, over the term of the lease. Governments continue to retain ownership of the asset. The Regional Municipality of Ottawa-Carleton entered into Lease, Develop Operate arrangement with a French water company for part of its re-building program of one of Canada's most modern wastewater treatment centres.

Outsourcing

In the Outsourcing model capital assets are sold to the private sector. Capital and operational responsibility, and employees, are transferred to the new private owner. A long-term contract is negotiated for the private sector to provide services back to the government. The Ontario Clean Water Agency (OCWA), created in 1994, is a hybrid example of this model.

Build, Transfer, Operate

The Build, Transfer, Operate model addresses the need for private infrastructure capital, public ownership, and private operation. In this model, public entities define the capital need, usually a new water/wastewater treatment or solid waste disposal facility, and tender a construction (design and build) contract to the private sector, including the added incentive of private operation. Often, capital assets are leased back to private operators. A recent Request for Proposal issued by York Region suggests this is the model which will be utilized.

Build, Operate, Transfer

The distinction between the Build, Operate, Transfer model and the previous approach is subtle yet significant. The Build, Operate, Transfer model involves higher risk to the private sector, since they both build, finance and operate the environmental infrastructure service for a period of time until assets are transferred to the municipality at a future date. Under a franchise system, private operators collect user fees to cover both financing and operating costs. This model does not appear to be as popular for environmental infrastructure services at this time, though, the City of Montreal may take this approach to manage future water and wastewater infrastructure requirements. The model is being used for the PEI - Fixed Link project.

Build, Own, Operate

The Build, Own, Operate model is an "in perpetuity" arrangement to build, own and operate environmental infrastructure services. In most instances, the private owner is given actual or implicit monopoly power, and is subject to government regulation, and in some cases, pricing controls. US investor-owned water and waste utilities are a good example of this model. The City of Calgary has also announced a plan to sell the city's water and wastewater system. This model is de facto privatization.

The models presented illustrate the range of approaches to public-private partnerships for the provision of environmental infrastructure services. The models reflect how individual situations require unique arrangement to balance decision-making and responsibility for ownership, financing, construction and operations.

4.4 Public-Private Partnerships Models for Canada

No one model for public-private partnerships is ideal. Case by case flexibility is desireable - Canadian models will naturally be diversified given geographic, size, age and financial strength differences between and among communities.

However, the challenge of meeting Canadian demands for environmental infrastructure financing, coupled with a move towards full-cost, user-pay systems, suggests that public-private partnership models should reflect certain principles.

Canadian PPP Principles

1. Exclusive public environmental control of water quality and land use to promote a comprehensive conservation-oriented system.
2. Exclusive public control of environmental preservation.
3. A fair degree of public control over asset preservation, particularly for assets with a long life span (e.g. sewers).
4. Shared public-private decision-making with respect to service quality.

5. Largely private responsibility and authority for customer service.

6. Private control of design and construction of facilities.

7. Private management and operations of facilities and services.

8. Largely private financing.

9. Transparent financial reporting according to a standard accounting system for environmental infrastructure services.

10. Primarily public ownership of assets, and private ownership in unique situations.

11. Full cost, user-pay pricing that sends a conservation message to the consumers.

The above principles reflect the ethic that individual public-private partnership should benefit the parties, and also contribute to Canada's environment and economic sustainability, including the growth of environmental industries.

Certain public-private partnership models reflect the principles well. These are: Lease, Build, Operate; Outsourcing; Build, Transfer, Operate; and, Build, Own, Transfer. These models are conducive to arrangements which can translate the principles into an operating reality.

In any public-private partnership it is important to preserve an element of competition. It is quite viable, for example, to privately finance a wastewater system, and open up its management to competition, allowing the existing public managers to be bidders. Even over the term of an agreement it is desireable to maintain a degree of competition over certain elements of the relationship.

As evidence indicates some Canadian communities are moving towards the public-private partnership arrangements, however, wide-spread consideration of this approach is being stalled. This is because the environmental infrastructure market needs to overcome various market obstacles that are impeding a more sustainable future. In the next section, it this issue and related transition strategies to which this *Market Analysis* now turns.

4.5 Views from the Round Tables

Round Table Participants found consensus and agreed that:

- A public-private partnership approach is an effective means of addressing many of the problems inherent in Canada's environmental infrastructure market;
- It is important to ensure overall public interest in environmental preservation;
- Facility operating decisions should be based on cost, environmental and public health guarantees by operators; and,
- An independent rate-setting entity should set or approve rates rather than the private operator.

Round Tables participants had a difference of views about:

- Ownership of environmental infrastructure. Some participants felt that there was no particular reason to forbid the private sector from owning assets, and this would provide some security of assets to financiers. Others believed that continued public ownership of assets provided for better protection of broader societal interests; and,
- Public versus private sector performance. Some participants felt that the private sector had the incentive and expertise to both raise capital and operate facilities more efficiently. Other took the position that as long as systems operated in a open and competitive manner, public sector operators would perform as well as the private sector.

Round Table participants pointed to:

- A need to tailor public-private partnership models to individual communities.

5.0 A Transition Strategy Towards a Level Playing Field

5.1 Key Market Obstacles

Canada's environmental infrastructure market is sending out the wrong economic and environmental signals. To use resources more sustainably a more competitive market within a conservation-oriented framework needs to arise. There are a number of types of market obstacles that prevent the development of a level playing field in Canada's environmental infrastructure markets.

Regulatory Obstacles

Provincial governments regulate what municipalities can or cannot do. Most provinces have strict regulations about the amount of financing and debt that a municipality can incur. A host of other regulations require capital and design approvals, and adherence to service standards. These regulations vary significantly from province to province. For example, in some provinces, water and sewer revenue cannot be separated out from general revenue.

In part, these regulations are driven by legitimate public health and environmental concerns. Many regulations, however, are a product of historical provincial involvement in the delivery of water and waste services.

A major regulatory barrier is the host of regulations of a technical nature which specify the technological process to be utilized for water-based or waste disposal services. These types of regulations inhibit innovation and efficiency. In circumstances which regulations, they should be performance rather than process based.

As provincial governments retreat from financing environmental infrastructure services, as fiscal pressures dictate that they must, these regulations become a straightjacket which limit more innovative forms of public-private partnerships.

Public Capital Financing Obstacles

Ironically, the existing federal and provincial capital financing of environmental infrastructure is an obstacle to market change. While public financing of infrastructure has declined for the past two decades, municipalities still rely on this capital, especially to address pressing maintenance problems. These is a stopgap solution. Major upgrades and

new infrastructure needs cannot be dealt with at current levels of public financing. To do this it is also important to measure capital requirements to maintain existing assets and build new infrastructure.

Hard decisions about full-cost, user-pay systems will be deferred until public financing is very limited, and restricted to special situations.

Municipal Obstacles

The lack of political will at the municipal level has been cited as a major reason for reticence about public-private partnerships. This is a symptom. The cause has several elements. First, municipalities have come to rely on public financing. One can't fault them when major initiatives such as the Federal Infrastructure Program are announced. Second, most municipal elected officials and senior staff still are not well informed about the benefits and risks of public-private partnerships, and the technical mechanics of considering such an option. Third, there is a view that voters will remember politicians responsible for water and waste fee increases at the ballot box. No politician likes to be held responsible for introducing new "taxes". Fourth, labour and municipal middle managers often oppose or are intransigent about public-private partnerships.

Take a closer look at these causal issues. Some municipalities have introduced new or higher water and waste charges such as garbage per bag charges, or individual water bills once meters have been installed. Electorate backlashes against elected officials that have made these decisions appear rare. Rate payers are smart enough to know there is no free lunch. They appreciate that the choice is either higher local taxes or paying the full price for what you consume.

Labour and middle managers are naturally concerned about job losses if private developers are involved in the delivery of environmental infrastructure services. Experience in Canada and offshore has, though, demonstrated that private operators are inclined to absorb managerial employees, and respect collective bargaining agreements. As time progresses, private operators will introduce efficiencies as attrition occurs, and often retrain employees and managers to perform better. They also try to renegotiate greater flexibility into collective agreements as they expire. Labour and managers thrive in well managed private companies, and there is no reason why this cannot be the case for environmental infrastructure services.

One issue for smaller municipalities and rural communities to address is the challenge of raising capital due to smaller economies of scale. Strategies may be required to promote greater collaborations or partnerships between various

municipalities to raise required funds. It is advisable to determine which type of system is more logical from an economic and environmental perspective for rural and small communities, and then seek out the necessary financing. There is also an argument for some flexibility in environmental regulations and their application in smaller communities some distance away from large urban centres.

The nature of municipal obstacles illustrates that the real reason for caution among municipal governments is a need for a better understanding about public-private partnerships, and the fiscal incentives to take the first step.

Industry Obstacles

Private companies, particularly construction and engineering companies, have benefited from the traditional contracting system for environmental infrastructure services. The business culture of these companies is based on a tender-bid approach to revenue generation. Public-private partnerships require a different commercial approach, one which is more risk oriented, including the capacity to place capital.

Industry, therefore, needs to "tool-up" to meet the challenge of Canada's environmental infrastructure future. Companies should be more cognizant about working in an entrepreneurial climate, and form the alliances and partnerships necessary to seize opportunity in the emerging infrastructure market. This means that engineering firms will have to ally with project managers, construction companies, legal firms, environmental technology enterprises, financiers and insurers to provide "packaged", comprehensive services to municipalities.

There is evidence that industry is starting to respond. Of the bidders which qualified to compete for the York Region's water supply public-private partnership, six were consortia of multiple firms which brought a range of skills, technology and expertise to the opportunity.

Financial Obstacles

A number of financial obstacles should be addressed. First, the GST cost factor should be removed. Currently, municipalities are exempt from charging GST on water bills. If infrastructure assets are transferred/sold to private operators GST charges will have to be added to invoices. This represents windfall revenue for the federal government. This situation can be addressed through a third party relationship between private operators and public authorities (i.e. there is a public billing agency).

Second, capital gains tax regulations on infrastructure assets owned by the private sector should be reviewed. It is worthwhile to consider providing the private sector with a capital gains incentive, with an upset limit and a horizon date, to attract the initial tranches of private capital into environmental infrastructure projects in the short term.

Third, there is the issue of an income tax level playing field. Crown corporations and public agencies are exempt from levies whereas they are a reality for private operators. There needs to be a uniform standard.

Fourth, and most importantly, provinces will need to review their guarantee/final recourse positions on environmental public-private partnerships. It is highly desireable that provincial sovereign guarantees be available under certain conditions (e.g. for small and rural communities) to reduce financing costs.

5.2 Transition Strategies and Stakeholder Roles

A managed change process is required to create a new environmental infrastructure market in Canada. This does not imply that someone, or some organizations, should "manage" the change process but, rather, stakeholders should work together to alter the financial playing field and the market.

In any change process the dissemination of information of crucially important. Any cost of getting clear and up-to-date information into the hands of consumers and decision-makers is money well spent.

The elements of this proposed Transition Strategy are:

Liberalizing the Regulatory Framework

- Provincial governments should review and consider liberalizing various regulatory frameworks which govern private financing of environmental infrastructure and capital projects in the short term.

- Provincial governments should develop transitional and end stage environmental infrastructure policies that signal to municipalities that full-cost, user-pay systems are the way of the future, and provincial regulation will be harmonized with this policy.

Leveraging Public Capital

- In the short term (2-3 years) conditions should be placed upon public financing of environmental infrastructure. The federal and provincial governments must ensure that public capital leverages additional investment from the private sector.

- Incentives can be both fiscal or "fast-tracking" of approvals with public-private arrangements.

- In the medium (3-5 years) to long-term (greater than 5 years), public financing should be tied to specific public health, environment and economic interests.

- There is a strong argument to use public financing to make non-marketable projects marketable through either preparing projects for public-private partnership or reducing the costs of financing.

- Provincial governments should determine under what conditions sovereign guarantees will be offered. This effort should also involve discussions with bond ratings agencies to ascertain the impact (positive or neutral) of capital funding reductions over the medium to long-term coupled with private-public partnerships sovereign guarantees.

Public-Private Partnerships Tools for Municipalities

- Municipal associations such as the Federation of Canadian Municipalities (FCM), the Canadian Association of Municipal Administrators (CAMA) and the Canadian Water and Wastewater Association (CWWA) at the national level have an important role to play in improving municipal understanding about public-private partnerships, and full-cost, user-pay systems. Provincial municipal organizations for both elected officials and senior staff have a major role to play in helping individual municipalities make environmental infrastructure decisions.

- Municipalities also need various contractual tools, and independent, non-advocacy advice on how best to enter into and structure public-private partnerships.

- Canadian municipalities would be well served if environmental infrastructure service accounting is standardized, both on the cost and revenue sides of the ledger. The current hodge podge of

accounting makes comparisons virtually impossible. Standardized accounting systems allows for cost efficiency comparisons, and will better equip Canadian municipalities to choose private partners. This challenge could be addressed jointly by municipalities and accounting associations.

Industry Development

- Environmental technology, construction, and environmental engineering companies need to forge alliances with finance, project management, insurance and legal firms. Industry associations can play a key brokerage role in fostering these linkages.

- Private companies keying on environmental infrastructure markets need to boost their technological capacity and look to appropriate-use technologies. Such technologies tend to focus on eco-efficiency and conservation.

- Small and medium-size companies, in particular, need to be sensitized to what environmental infrastructure public-private partnerships, and full-cost, user-pay systems mean to them. These companies will experience a more diverse customer base, as large private companies (or consortia) will replace some traditional public customers.

Financial and Tax Measures

- All levels of government and private capital markets should explore the potential of creating a tax-exempt municipal bond market for Canada. In the United States capital gains from municipal bonds are tax exempt - a transitional incentive that is worthy of consideration in Canada. A tax-exempt, Canadian municipal bond market can reduce the capital costs associated with funding environmental infrastructure projects.

- There also appears to be support for the principle that growth should pay for itself. That is, tiered or variable pricing regimes may be the norm. In some communities, new developments in suburban areas may require that users of new infrastructure "pay their own freight", and be assessed higher charges than inner city users.

- The federal government should consider a GST neutral policy for environmental infrastructure services provided by the private sector.

- The federal government should explore facility-based capital gains incentives in the short to medium term for infrastructure investments.

The roles of stakeholders in prompting market changes requires discussion. In some instances, government or private interests can advance matters unilaterally. In most cases, collaboration is required.

The Transition Strategy presented appears to point towards a Utility-Type model for environmental infrastructure services in Canada. Delivering services through utilities, either public or private, has several advantages:

1. Costs and revenues can be discretely accounted;

2. The utility will focus on delivering cost efficient, quality services to its customers rather than being a division of a larger municipal organizations which may have competing political priorities;

3. Capital is easier to raise since the entity is clearly defined, and repayment is simpler to track and secure;

4. Performance incentives and penalties are facilitated; and,

5. A utility has the incentive to investment in long term conservation options.

This is not to suggest, that the Utility-Type model is free to operate as it wishes. Apart from being subjected to provincial regulation, rates would also be set/approved by an independent body, and thus utilities would, in effect, be regulated monopolies. Urban systems planning should also be a function retained by the municipality with significant participation from utilities.

5.3 A New Environmental Infrastructure Playing Field

The environmental infrastructure market changes proposed are more economically and environmentally sustainable than the current situation in two respects. First, Canada's environmental infrastructure needs are more adequately addressed. Second, the market would provide incentive for water conservation and reduce waste generation. The combined outcome can add value to Canada's environmental and economic accounts. Why is this?

Reducing consumption lies at the heart of environmental preservation. Full-cost, user-pay environmental infrastructure initiatives do several things that are environmentally beneficial. First, higher levels of capital expenditure

reduce water losses. Second, more enhanced (i.e. secondary, tertiary) levels of water treatment are introduced over time. This means better water quality in public water ways. Third, as noted earlier, higher prices provide incentive to consumers to invest in technologies and introduce practices which reduce demand. Fourth, higher waste disposal costs make many waste recovery and 3Rs technologies more competitive. Fifth, as public-private partnerships are more efficient, fewer input resources are needed to treatment water and wastewater and dispose of waste.

The combination of the above factors yields another very major macro economic gain for the Canadian economy. Since fair, user-pay pricing systems promote consumption of fewer resources, less infrastructure is needed. Precise figures are difficult to calculate, however, consider this scenario. If water prices rise by 100% over time, water usage will *decline by approximately 30%*. Thus, the actual amount of infrastructure financing suggested in section 3.1 (i.e. $97-111 billion) is an over-estimate, and could likely be reduced by 20-30%.

This means that infrastructure should not be built to accommodate straight-line demand projections based upon historical experience. Rather, the amount of new infrastructure should reflect lower price-induced demand. Further, higher, full-cost prices for environmental infrastructure services opens the door to more sustainable service delivery approaches, and attention should be devoted to considering such innovative options.

Full-cost, user-pay systems based on public-private partnerships also promote economic growth. Private capital which pays for the design, building and operation of new environmental infrastructure, and the refurbishment of existing capital stock creates jobs in construction, project management, environmental engineering, environmental technology, finance, insurance and legal companies. The scale of this job creation potential is vast. There will be a large amount of investment in environmental infrastructure over the next twenty years in a market with a level playing field. The direct and multiplier-driven job creation outcome is substantial, though, the generation of specific figures requires further study. However, one can observe that employment will be created in the following areas:

- Capital Markets;
- Construction and Project Management Firms;
- Environmental Engineering Companies;
- Environmental Technology Enterprises; and,
- Legal and Insurance Firms.

Economic growth will also be generated through a rise in demand for front-of-the-pipe water/wastewater/waste disposal treatment systems, and end use technologies. This growth will be a substantial boost to the domestic and international market strength of Canada's environmental industries.

Simply put, the environmental infrastructure market changes proposed in this *Market Analysis* have concrete environmental and economic benefits.

5.4 Views from the Round Tables

Round Table Participants found consensus and agreed that:

- There were a number of interrelated barriers to a more sustainable environmental infrastructure market;
- A planned and incremental process of change was highly desireable;
- A regulatory review process to eliminate regulations which inhibit efficiency and innovation was long overdue;
- Labour issues did not appear to be a major factor, and private operators were largely respecting collective agreements;
- Municipal leaders, elected and staff, needed a great deal of education about public-private partnerships, and independent, non-advocacy advice;
- Public capital should be used to leverage private capital as long as public interests are preserved;
- A Utility-Type model had significant appeal and was appropriate to the infrastructure challenge; and,
- The tax playing field should be created;
- Short term fiscal incentives to bridge the higher costs of municipal versus provincial/federal borrowing should be introduced to aid market transitions; and,
- Small and rural municipalities would require transitional and on-going support in a more open system with less public capital financing.

Round Tables participants had a difference of views about:

- The specific role of utility regulatory bodies;
- How larger watershed and system planning would be undertaken; and,
- The reduction in role of the municipality and elected officials in the delivery of environmental infrastructure services.

Round Table participants pointed to:

- A substantial need for information and advice to municipalities;
- Development of the Utility-Type model, and related regulatory measures;
- The desirability of a "Jobs Study" of environmental infrastructure markets, and future directions;
- A need for forums at which groups of stakeholders could collaborate on changes to Canada's environmental infrastructure market on an on-going basis, with a potential role for the NRTEE in this regard; and,
- The fact that infrastructure markets are already in transition.

6.0 Closing Summary

This *Market Analysis* has proposed a different way of financing, managing and delivering environmental infrastructure services in Canada. Arguments have been advanced that public-private partnerships offer the most effective means to address Canada's environmental infrastructure requirements, and introduce full-cost, user-pay systems.

It has also been demonstrated that there are substantial environmental and economic benefits associated with a different environmental infrastructure market reality. In particular, there are benefits to Canada's environmental industries.

A Transition Strategy has been proposed for the consideration of various stakeholder groups. This has been followed by a summary of the Views from the Round Tables.

The National Round Table on the Environment and the Economy believes the *Market Analysis* and Round Table discussions achieved three things. First, they added to the body of thinking on the future of public-private partnerships, and how they can boost environmental and economic sustainability through full-cost, user-pay systems.

Second, the initiative was a forum for various stakeholders to share and reconcile different views on the issue and, identify opportunities for collaboration, particularly in the development of public policy.

Third, the *Market Analysis* and Round Tables provided municipalities and private companies considering environmental infrastructure partnerships with approaches to advance their interests to their mutual benefit.

The National Round Table on the Environment and the Economy believes this is a valuable contribution to the country's future.

Acknowledgments & References & Attendees

Acknowledgments

This Market Analysis is a product of secondary research efforts which included consultations with leading experts in the fields of environmental infrastructure, and reference to the literature. Much of the data and information presented, and the views advanced, should be credited to the individuals and organizations noted below in the consultation and reference lists. The text does not include specific attribution for ease of readability. Generally, however, numerical and market experience-oriented material is sourced from others, and specific attributions can be provided. Further, analytical conclusions/statements and market projections have mostly been made by The Delphi Group, based upon the research.

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45. Interview - Ken Morrison, R.V. Anderson.

46. Interview - Peter Osmonde, Region of York.

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Attendees

The following individuals attended one of two Round Tables on the subject of environmental infrastructure services hwld in Toronto in November, 1995.

The National Round Table on the Environment and the Economy, Sam Hamad, Chair, Enviromental Technologies Taskforce

Sorema Management Inc., Mr. Angus Ross, President, Member, National Round Table on the Environment and the Economy

The National Round Table on the Environment and the Economy, Gene Nyberg, Corporate Secretary/Acting Executive Director

Allen Associates, Greg Allen, President

Borden & Elliot, Morton Gross, Partner

Canada Trust, Robert J. Cummings, Senior Vice-President

Canadian Council for Public-Private Partnerships, Price Waterhouse, Terry Stephens, Partner, Corporate Finance

Canadian Environmental Industry Association, Carole Burnham

Canadian Union of Public Employees, Peter Leiss

CN Watson and Associates, Cameron Watson, Principal

Enviromega Ltd., John Bell, President

Environment Canada, Bob Slater, Assistant Deputy Minister for Environmental Conservation

Environment Canada, Donald Tate, Head, Environmental Economics Section, Canadian Wildlife Service
Environment Canada, Jeff Harris, Economist, Regulatory and Economic Assessment Branch
Environmental Equity, Kevin Mercer
Gore & Storrie, John Anderson, Vice President
Industry Canada, Environmental Affairs, Don Stewart, Senior Advisor
KPMG, Will Lipson, Partner
LURA, Sally Leppard, President
Lyonnaise des Eaux, Alain Rosier, Director of Development
Martineau Walker, Pierre Meunier, L'ancien sous-ministre de l'environnement
Ministry of the Environment and Energy, Brian Nixon, Director, Environmental Planning and Analysis Branch
Office of Infrastructure, Treasury Board, Hani Mokhtar, Senior Advisor
Ontario Clean Water Agency, Robert Falconer, Corporate Project Finance Specialist
Ontario Ministry of Municipal Affairs, Dale Taylor, Municipal Finance Branch
Philip Environmental Inc., Stan Spencer, VP Public/Private Partnerships
RBC Dominion Securities, Ann Louise Vehovec, Vice President of Government Finance
Region of York, Peter Osmond, Director, Capital Works & Approvals
Regional Municipality of Halton, Art Leitch, Commissioner of Planning and Public Works
Regional Municipality of Hamilton-Wentworth, Leo Gohier, Director of Infrastructure Operations, Environmental Services Department
Regional Municipality of Ottawa-Carleton, Judy Wilson, Director, Water Environment Protection Division
Safe Sewage Committee, Deborah Kyles
Safe Sewage Committee, Kerri Shinn
The Delphi Group, Chris Henderson, CEO and Managing Director
The Delphi Group, Diana Cartwright, Project Manager
Water Matrix, Ian Stewart, Vice President
Wood Gundy Inc., David Leith, Vice President & Director