

FRASER

FORUM

THE FRASER
INSTITUTE

Critical Issues Bulletin:
a supplement to the monthly publication
from The Fraser Institute

The Case of BC Hydro: A Blueprint for Privatization

*by Bruce Howe
and Frank Klassen*

1996

About The Fraser Institute

The Fraser Institute is an independent Canadian economic and social research and educational organization. It has as its objective the redirection of public attention to the role of competitive markets in providing for the well-being of Canadians. Where markets work, the Institute's interest lies in trying to discover prospects for improvement. Where markets do not work, its interest lies in finding the reasons. Where competitive markets have been replaced by government control, the interest of the Institute lies in documenting objectively the nature of the improvement or deterioration resulting from government intervention. The work of the Institute is assisted by an Editorial Advisory Board of internationally renowned economists. The Fraser Institute is a national, federally chartered, non-profit organization financed by the sale of its publications and the tax-deductible contributions from its members, from foundations, and from other supporters; it receives no government funding.

Distribution

Fraser Institute Archival Publications are made available from <http://www.fraserinstitute.ca> in Portable Document Format (PDF) and can be read with Adobe Acrobat Reader, which is available free of charge from Adobe Systems Inc. To download Acrobat Reader, go to this link: <http://www.adobe.com/products/acrobat/readstep.html> with your browser. These archival publications are intended to provide, in a format easily accessible online, out-of-print studies that are still in demand on topics in economics and public policy.

Disclaimer

The authors of this publication have worked independently and opinions expressed by them are, therefore, their own, and do not necessarily reflect the opinions of the members or the trustees of The Fraser Institute.

Fraser Institute mailing address

The Fraser Institute,
4th Floor, 1770 Burrard St.,
Vancouver, BC, Canada V6J 3G7

Membership

For information about becoming a member of The Fraser Institute, please contact the Development Department via e-mail: membership@fraserinstitute.ca; via telephone: 604.688.0221 ext. 586; via fax: 604.688.8539. In Calgary, please contact us via e-mail: barrym@fraserinstitute.ca; via telephone: 403.216.7175 or, toll-free 1.866.716.7175; via fax: 403.234.9010. From Toronto, please telephone 416.363.6575 or fax 416.934.1639.

Media

For media enquiries, please contact Suzanne Walters, Director of Communications, via e-mail: suzannew@fraserinstitute.ca; or via telephone: 604.714.4582.

Publication information

Copyright ♥ 1996
The Fraser Institute
Date of Issue: November 1996
All rights reserved. No part of this publication may be reproduced in any manner whatsoever without written permission except in the case of brief passages quoted in critical articles and reviews.

(ISSN 0827-7893)

The Case of BC Hydro: A Blueprint for Privatization

by Bruce Howe and Frank Klassen

Contents

- 4** Abstract
- 4** About the Authors
- 5** Preface
- 6** Part One: Privatizing BC Hydro
- 13** Part Two: Restructuring BC Hydro
- 20** Part Three: The Base Case
- 22** Part Four: Getting Maximum Value for Privatized Assets
- 26** Summary and Conclusions
- 28** Appendix 1: Regulation
- 31** Appendix 2: Base Case Valuation
- 35** Chart 1: Privatization Structure and Distribution of Proceeds
- 36** Exhibit 1: Key Assumptions and Financial Parameters and Results
- 38** Exhibit 2: Statement of Operating Income and Retained Earnings
- 41** Exhibit 3: Statement of Change in Financial Position and Balance Sheet

Abstract

Is there a reason for continued state ownership of BC Hydro? Is a monopoly still necessary and desirable for electric utilities? Given major changes that are occurring in the electricity market throughout North America, the authors believe the answer to both of these questions is no, and it is timely to examine both the question of privatizing BC Hydro, and how the electricity industry in B.C. can be restructured to promote competition.

Our base case study estimates the market value of BC Hydro at just under \$14 billion. The proceeds of privatization—\$7.8 billion of Hydro's debt

along with \$4.4 billion cash—means a \$12.2 billion reduction in B.C.'s over \$30 billion debt, a dramatic improvement in the provincial balance sheet.

Electricity markets are in revolutionary change; deregulation, competition and restructuring are everywhere. A restructured and privatized BC Hydro would enable B.C. residents to benefit from these changes. Maintaining the status quo will only result in higher rates and debt levels, and lost economic development opportunities.

About the authors

Bruce Howe, Fraser Institute Visiting Fellow and President of Howe and Associates Ltd., has, among other capacities, served as President and CEO of Atomic Energy of Canada Ltd., as Deputy Minister of Energy, Mines and Resources Canada, and as Deputy Minister of the Western Economic Diversification Department. Bruce Howe began his career in the pulp and paper industry and rose to become the President and CEO of MacMillan Bloedel Ltd. before moving into the Crown Corporation and government arena.

Frank Klassen is a graduate of the University of Manitoba with a Masters Degree in Economics and Public Finance. After graduation he held a number of economic analysis and policy positions with the federal government in Ottawa. In 1980 he joined the British Columbia Ministry of Finance as Manager of the Tax Policy Branch, and in 1983 became a Director in Treasury Board Staff. In 1988 Mr. Klassen joined BC Hydro as Vice President of Finance and Administration, and Chief Financial Officer. During his tenure with BC Hydro, Mr. Klassen played a key role in privatizing several segments of the company, reorganizing the remaining elements, and restructuring the corporation's long term debt. As a result of these initiatives, BC Hydro's annual net income improved from \$25 million in 1987 to \$401 million in 1992. Since 1992, Mr. Klassen has operated his own consulting company.

Preface

by Michael Walker

The issue of privatization has never been far from The Fraser Institute's agenda. Starting with the path-breaking book, *Privatization: Theory and Practise*, published in 1979, (the first how-to-do-it book ever published on privatization) The Fraser Institute has maintained an active interest in the topic. Most recently, the institute sponsored a two-day conference examining the possibility of privatizing prisons.

The main reason for our interest in privatization is simple. It represents an opportunity to improve goods and/or services quality while reducing their costs to the taxpayer-customers. Privatization does not accomplish this because private sector participants are necessarily smarter or more industrious than public servants or the employees of crown corporations. Rather, the ingredient that makes privatization a winning recipe is the competitive pressure to which the privatized service is subjected.

A second consideration is the fact that privatization increases the size of the private, competitive sector, and reduces the size of the politically controlled public sector. As a consequence of the latter fact, fewer decisions in the economy are subject to political calculus and more are responsive to market forces.

So, for example, if the Insurance Corporation of British Columbia were a private company, the

premier of the province would probably not have thought it expedient, as an election ploy, to reduce insurance rates in the face of large increases in underwriting costs faced by the government monopoly. Nor, more to the point of this study, would he have thought it an option to freeze electricity rates if suppliers of electricity were numerous and privately owned.

The debt and deficit situation of government suggests yet another reason for privatization—to reduce the burden of the public debt. While the assets of the public sector act to offset the debt in a formal sense, their sale and realization of the equity would make it possible to provide taxpayers with a tax reduction equal to the saving in interest cost on the debt. The savings involved in the privatization proposed in this study would be very significant indeed, and the study merits close scrutiny for that if no other reason.

The current study is one of many that will be conducted under the leadership of Bruce Howe, the Institute's Visiting Fellow in the Study of Privatization. The authors of this study, Bruce Howe and Frank Klassen, have worked independently to produce their research. Accordingly, while The Fraser Institute is pleased to have supported the work, the views expressed may not conform with those of the Members or the Trustees of the Fraser Institute.

Part One: Privatizing BC Hydro

Benefits, politics, costs, issues

Arguments have erupted in Ontario and Quebec over the benefits of private power generation and the possible privatizing of these provinces' electric utilities. The debates have died down in Nova Scotia, where privatization has been successfully carried into effect, and Alberta, where government ownership of power generation never gained so much as a toehold. Saskatchewan seems to be proceeding with privatization, while various national and international fora are measuring the success of power privatization, deregulation and competition that has—and is—still taking place in the UK and US.

No visible public policy discussion about Hydro privatization is under way in British Columbia, although the Liberal Party's pre-election positions included privatizing BC Rail and one or two smaller Crown corporations and weighing the feasibility of privatizing more—moves that found echoes in the Reform platform. Except for a three-year Hydro rate freeze running up to this election, Glen Clark's NDP government has generally maintained silence on this issue, though it has been browsing in the other parties' centrist terrain with talk of downsizing the bureaucracy. As Minister responsible for BC Hydro, Clark would brush off questions about privatization: he wanted nothing to do with it because "it would only mean that an American company would come in and buy Hydro and take jobs away." Clark did not go on to explain how or why jobs would migrate south of the line.

Why should we be discussing BC Hydro privatization?

Several issues are germane here:

- Do we have a clear understanding of what if any public purpose is served by continued state ownership of the utility?
- Do we need to analyze and react to general North American trends regarding competition and regulation in the utility industry?
- Will the public benefit from privatization? For example, what would be the financial impact of selling Hydro and applying the proceeds to pay down the provincial debt? Also, could deregulation and competition for power supply forestall future major rate increases and create new opportunities for economic development and job creation?

BC Hydro became a Crown corporation originally because the government of Premier W.A.C. Bennett had a vision of developing a two-river policy to dam both the Columbia and the Peace that was resisted by the private utility of that day: the province simply took over and pushed ahead with its master plan.

That was then. The damming of the two great rivers is now virtually complete, with the remaining Site C and some small lower Columbia River projects that have no construction timeline and may never be developed.

This is now: 1996. Is there still a public policy reason for maintaining government ownership in BC Hydro?

Given an appropriate regulatory regime to protect the individual consumer and promote competition and efficiency, there would seem to be no obvious reason for maintaining public ownership.

The inside view

The argument for private ownership becomes more compelling when we look at the contemporary evolution of the North American market in electricity. BC Hydro's 1995 corporate review, "Change—the evolution of efficiency," declares that

the changing electric utility environment creates new challenges for BC Hydro in our commitment to provide superior customer service. During the past year we made some basic organizational changes that will enable us to be even more effective in serving the future needs of British Columbia.

Hydro's new structure is built around three distinct segments into which the new electric utility industry is separating:

- a) power supply
- b) transmission and distribution—that is, the management of the wires—and
- c) customer service

The report goes on to discuss other changes in the North American industry. Monopolies like BC Hydro are seeing their positions erode and become more vulnerable to market forces as new producers pop up with fresh supply options. Technological change has dramatically reduced the cost of generation and thus honed competition within the industry.

Electricity consumers are also becoming more sophisticated and industrial, and large commercial clients are demanding more choices and identifying more options for generation. To quote from the report:

While BC competes with other Canadian provinces for industry, its energy companies must provide competitive services to add value to their product for potential investors. Utilities can no longer rely on having captive customers.

These once captive customers can now install their own generating capacity, becoming Hydro's competitors, and then demand "wheeling" or carrying rights on Hydro's transmission lines to move power for their own or their clients' use. The old order of monopolistic power utilities is changing at a rapid pace, and a government-owned, bureaucratically controlled power monopoly is most unlikely to be discerning and swift in response to its changing environment.

The regulator's view

In its September 1995 review of the BC electricity market, the British Columbia Utilities Commission (BCUC) recommended that:

- the province reject retail competition as an option for BC's electricity market at this time
- the province move toward wholesale competition
- all electric utilities owning generation and transmission assets be required to establish fully separate operating divisions for them and eliminate cross-subsidies with other divisions
- there be mechanisms to ensure fair competition among utilities and independent power producers
- the power exchange operation among utilities be replaced with an optional "real time" pricing tariff
- the province eventually develop an independent wholesale power pool with a spot market
- utilities be required to submit wholesale transmission service tariff applications to the BCUC
- new customer service options for efficient operation and flexible service be promoted, and
- there be continued public consultation as various policy options are explored in detail

The BCUC review also canvassed the public vs private issue and concluded that existing generation, transmission, and distribution assets could be owned either publicly or privately. Transmis-

sion and distribution would remain regulated natural monopolies, but existing generating facilities would need constraints to prevent the abuse of market dominance. What this means in effect is that the sale of generation assets with their low imbedded production costs would require regulations or binding agreements to protect the consumer from unjustified rate hikes: this would not be difficult to do.

BCUC had this to say on the ownership question:

The Commission recognizes that the issue of private versus public ownership of the various segments of the electricity industry is related both to the desired degree of customer choice and competition within a segment of the industry and the extent to which the government or others wish to use the utility to achieve social objectives. In general, the Commission accepts that higher levels of private ownership are likely to give rise to greater levels of customer choice while public ownership of utilities allows them to be more easily used to achieve policy goals such as regional economic development initiatives.

Fashioning a consensus

Study of BC Hydro and BCUC reports serves to underline the changes taking place in Hydro's external world and the need for responsiveness on Hydro's part. If further emphasis is needed, Ken Peterson, the President of Powerex, a BC Hydro subsidiary which markets surplus power, had this recent comment:

It's going to be a really bumpy ride; nobody now doubts that competition is a fact. The institutions that we take for granted are not going to look the same. Things are not going to settle down. . . . In general, it's considered acceptable to compete at the wholesale level for loads. . . . Eventually we'll see the same thing happen as with the telephone industry, with access right down to the retail customer.

There is already some competition in BC, where Hydro's monopoly covers about 80 percent of the province's power. A few large industrial companies produce their own electricity, and the southeastern corner is fed by West Kootenay Power and Light. At this point, deregulation seems to be occurring at the wholesale level. This means that wheeling, paid power transmission will enable clients to buy from BC Hydro, other BC producers, Alberta, or the United States, on the basis solely of price and availability — not a whiff of monopoly involved.

The public policy question for 1996 regarding BC Hydro ownership is this: would power consumers be better served by maintaining the state monopoly or by splitting generation, transmission, and distribution up and, with appropriate regulation, selling them off to private investors? Both BC Hydro and the BCUC agree that the fundamentals of the North American electricity market are changing and that the utility should be split into three businesses with no cross—subsidization. Now, who can run these businesses more effectively — the private sector or the government?

Though BC Hydro is a relatively well-run state monopoly, there is clear evidence from Nova Scotia, the UK, New Zealand, and elsewhere that efficiency, effectiveness, client relations, and cost control are all enhanced by private sector operation. For example, a recent study commissioned by Ontario Hydro from the Adam Smith Institute in London found that UK power consumers had benefited from falling electricity prices and experienced dramatic improvement in customer service. The uniqueness of BC's situation stems from the fact that, because of the low historical cost of electricity production, the sale of generation assets would have to be accompanied by regulations and agreements to protect the individual customer.

Government interference in the affairs of BC Hydro would vanish with privatization: for example, the recent BC Hydro International scandals around project financing in Pakistan would have been precluded by normal stock-market disclosure rules and thus not temporarily paralyzed the BC government and BC Hydro's management.

The incompetence and lack of business experience on Hydro's board would be replaced by market expertise and accountability. Politically-driven announcements of three-year rate freezes—or shutting down Burrard Thermal—which make for great electioneering, would be replaced by a more economically sound rate-setting procedure.

When politicians promise rate freezes, no one seems able or willing to tell the public the real cost in either present or future economic terms. The three year rate freeze has real and serious economic consequences for BC Hydro. Profit margins are squeezed, cash flows are diminished, and borrowing will have to be increased. The best way to measure the impact of the politically-driven action is to capitalize the negative value of Premier Clark's three year rate freeze versus a rate increase of 2 percent each year for the next three years. (A 2 percent rate increase would still be at or below the rate of inflation.)

The capitalized amount is a *decrease* in the value of BC Hydro of \$1.25 billion. Political interference has its price!

Crown jewels

Another reason for considering privatization is the ethical question of intergenerational debt. The present generation of adult Canadians started their careers with virtually no public debt or annual deficits. Unless this generation takes action, the next generation will labour most of their lives under a debt burden abandoned to them. It is the ethical duty of the present adult generation to leave succeeding generations with approximately the same debt load as they started out with.

Where no public policy reason exists for maintaining public ownership of assets, the BC government should leave the business of doing business to the private sector: BC Hydro, BC Rail, and the 13 other BC Crown corporations with their 28,000 employees and \$28 billion in assets should be sold off to the private sector and the proceeds used solely for paying down the \$30 billion provincial debt.

The case for privatizing BC Hydro and dedicating the sale proceeds to provincial debt reduction is a compelling one: with appropriate regulation, the consumer will benefit, competition will flourish, and private sector efficiency will be brought to the privatized segments that will have long-term benefits for BC residents. In addition, allowing private power producers to compete for both domestic and export markets would create new economic development opportunities and jobs for British Columbians.

The case for Crown ownership—the details

Ghosts

The development of Crown-owned electric utilities in Canada has been substantially conditioned by economies of scale, environmental externalities—primarily over large-scale water storage and diversion and/or nuclear safety—plus private firms' inability to raise the large amounts of non-recourse financing required for big hydroelectric or nuclear projects. The "natural monopoly" commanded by electric utilities, along with government's desire to subsidize power rates for economic development and such social objectives as rural electrification, have also propelled public ownership over the last thirty or so years.

In BC Hydro's case these factors either no longer exist or are not as crucial as they once were.

No more cheap power

In the first place, almost all of British Columbia's low-cost, large-scale hydroelectric project potential has now been developed. The last remaining project on the Peace system—Site C—is estimated to have an acquisition cost of 5.5 cents/kwh as compared with private gas-fired thermal generation currently being bid to BC Hydro at 3.5 cents.

The remaining low-cost projects on the Columbia system (Keenleyside, Seven Mile, Waneta, and Brilliant) are estimated to have acquisition costs of 3.0 to 5.0 cents/kwh. There is considerable controversy, however, over whether these estimates are complete and fully comparable with private sec-

tor figures. The remaining higher-cost projects on the Columbia system (Murphy Creek, Duncan, and Border) are estimated at 6.5 to 9.0 cents/kwh. Identified big hydro projects on undeveloped BC rivers (the Liard, Stikine, Iskut, Homathko, and Elaho) have also been costed at 6.5 to 9.0 cents.

It is now being recognized that the environmental costs associated with hydroelectric developments—especially their impact on fisheries—have been woefully underestimated in the past. There is thus little likelihood that any more large-scale hydro projects will be allowed to proceed: future hydro development will likely be limited to small, run-of-the-river projects that do not divert or change water flows and do not involve dams or water storage. Such resources, which do not require highly specialized engineering and are small enough to be easily financed on a non-recourse basis, are currently being developed cost-effectively by the private sector. BC Hydro's high overheads prevent the Crown utility from tackling these small projects on a cost-effective basis.

Nuclear power is environmentally unacceptable in BC, and Ontario Hydro's cost experience with building and operating nuclear plants has shown nuclear power to be much more expensive than previously thought. Coal-fired thermal generation—using low-sulphur coal—still raises substantial environmental concerns despite advances in air-scrubbing technologies. Such alternative forms of generation as wind, tidal, solar, fuel cell, solid waste-burning, etc., are still relatively expensive, and lack the scale to produce large blocks of power.

Natural-gas generation: the way of the future

This basically leaves natural gas-fired thermal generation as BC's major source of new electricity for many years to come. Major technological strides have been made in this field over the past five years, chiefly in high-efficiency burners that substantially eliminate harmful emissions and high-efficiency turbines which have greatly increased electrical generation per BTU of gas burned. In addition, continuing discoveries of

large gas reserves have driven down fuel costs in both spot and long-term supply contracts. As a result, the private sector is currently offering BC Hydro an unlimited supply of gas-fired electricity at 3.5 cents/kwh. Further advances in technology may well give us even lower prices down the road. This is also why Bonneville Power in the US is unwilling to sign a long-term contract with BC for its remaining 30-year Columbia River downstream benefits entitlement, and why New York State recently cancelled large, long-term power contracts from proposed Hydro Quebec power developments.

Natural gas-fired generating plants, unlike hydroelectric facilities, can be located close to major load centres, eliminating the need for long and costly transmission lines. Small increments of new capacity can be added as needed with very short construction lead times (18 months or so). Large hydro projects cannot be scaled to match incremental demand, and so large amounts of surplus capacity are added to the system until demand catches up. In hydro projects, long lead times for construction (4 to 7 years) only heighten financing and forecasting risks. Their custom design and unique nature also expose hydro projects to uncontrolled cost overruns. Natural gas-fired plants use "off the shelf" designs and components that minimize any risk in construction cost.

BC Hydro has little or no expertise in developing and operating natural gas-fired generating facilities. Its Burrard thermal plant was developed over thirty years ago and mothballed when not needed. Only in the last seven years has the Crown utility made major efforts to redevelop and operate this plant.

No more big projects

The financial arguments for Crown ownership have focused on the private sector's inability to raise sufficient non-recourse financing for large-scale hydro or nuclear projects, plus the fact that governments can borrow more cheaply than the private sector and thereby reduce power charges to consumers.

As already noted, there is little likelihood that large-scale hydroelectric or nuclear plants costing several billion dollars will be wanted or needed in the near future, which will be dominated by relatively small natural gas-fired generating plants costing \$250 to \$500 million apiece and easily financed by the private sector on a non-recourse basis.

Moreover, the argument that governments can borrow more cheaply than the private sector is a specious one. Increasingly large government debt loads have considerably narrowed the gap with private sector borrowing rates in recent years. Also, the lower government borrowing rate simply represents a hidden financial risk passed on to electricity consumers and taxpayers without their knowledge.



When a private developer borrows for a power project, it does so on a non-recourse basis. If the project ends up costing 50 percent more than planned, the equity and debt holders are likely to lose a portion of their rate of return and/or original investment since they cannot increase the already contracted price of the electricity and have no other recourse for recovering their investment. Therefore, an additional user premium is added to the interest rate. However, when the government borrows for a BC Hydro project, the lender has complete recourse to the provincial electricity consumer and/or taxpayer to guarantee his original investment and rate of return.

For example, if a BC Hydro project goes 50 percent over budget, electricity rates are simply raised, or provincial taxes are raised, to recover the additional cost. The difference in borrowing rates thus represents nothing more than the risk premium between non-recourse and fully guaranteed borrowing.

The electricity consumer may actually be better served by purchasing private sector electricity at a somewhat higher but guaranteed price (because of the built-in risk premium) than by buying public sector electricity at a lower initial cost (due to the lower interest rate) but with a risk of rate and/or tax increases if the project goes over budget. If one were to take this argument of lower financing costs to its logical extension, all economic

production should occur in the public sector and private sector production must be stopped for consumer protection!

Subsidies not in vogue

The argument for Crown ownership to promote industrial and social goals no longer has relevance. First, most governments now recognize that subsidies simply create economic inefficiencies and misallocations of resources and are essentially counterproductive. If subsidies are deemed necessary they should be made explicit in money grants, not hidden in the price of a product or service.

Environmental protection could be improved with privatization

Crown ownership does not necessarily guarantee greater environmental protection. The recent draining of the Downton Lake reservoir by BC Hydro and its non-compliance with water licences in the past proves this. In fact, government may be more reluctant to fine, prosecute, and hold personally liable its own employees and appointed friends on the Board of Directors than it would a private company's officers and board members. Also, government may be more reluctant to impose environmental restrictions on a Crown corporation if it means a lower rate of return and annual dividend to the provincial treasury.

A privatized BC Hydro would still be subject to the same environmental laws and regulations that exist today, and would have to continue to comply with existing water licenses. This study proposes, however, that the Crown retain ownership of BC Hydro's large reservoirs due to the environmental sensitivities involved, international water flow treaties that must be observed, and the unique economic value of these assets that will be difficult to capitalize into an appropriate sale price.

The privatization expansion of Burrard Thermal would result in considerable extra value to the province—in the range of \$500 million to \$750 million. Part of these proceeds could be used to negotiate the small increase in air emissions that would

be created, and in fact, could actually improve the air quality of the Greater Vancouver Regional District (GVRD). For example, part of the proceeds could be used to give work grants to other industries producing air emissions in the GVRD, in order to implement new technologies to reduce pollution. Similarly, part of the proceeds of the privatization of the hydro electric facilities could be used for fish enhancement and stream and river rehabilitation.

“Natural monopoly”

The “natural monopoly” argument militates in favour of some form of regulation, though not necessarily Crown ownership. As a rule, government-owned utilities are unregulated. In the case of Ontario Hydro and Hydro Québec, for example, rate increases are simply decided by Cabinet, whereas the privately owned gas distribution, telephone, and cable TV utilities in these provinces are watched over by government-appointed regulators.

Up to the early 1980s, BC Hydro too was unregulated. Since that time, however, the utility has been subject to both government fiat and public regulation. This has led to a great deal of confusion and frustration for BC Hydro management as the government’s own moves to raise rates were frequently overturned by the very regulator it had put in place.

Moreover, any “natural monopoly” will apply only to the transmission and distribution components of a vertically integrated utility (i.e., the wires): the production and customer service component has no natural monopoly characteristics. Environmental matters can be handled with appropriate rules and restrictions rounded out by suitable compensation.

Hydro as a source of government revenue

Other arguments advanced for Crown ownership of Hydro include freedom from federal corporate income tax and maintaining the annual dividend to Victoria.

The corporate income tax case is specious. While electricity rates are lower than they would otherwise be because these taxes are not paid, this is simply the case of another hidden subsidy to electricity consumers at the expense of the general taxpayer. The argument is also made that privatizing BC Hydro will mean transferring provincial resources to Ottawa because the utility will be required to pay federal corporate income tax. It might be pointed out that BC has benefited from increased provincial corporate income tax revenue with the privatization of the federal Crown’s Air Canada and CN. In any case, a privatized BC Hydro would not be paying corporate income taxes for many years because of its accumulated unused capital cost allowances.

The savings in interest on the provincial debt that could be achieved with the net proceeds from BC Hydro privatization would more than offset the government’s loss in annual Hydro dividend payments.

Summary on public ownership

There is clearly no need for continued public ownership of most of BC Hydro. The only area where a case can be made for continued public ownership is that of existing reservoir and water flow management, given the environmental externalities and international treaties involved, and the fact that the economic value of the utility’s reservoir storage capacity cannot easily be capitalized into a sale price. This particular aspect is discussed at greater length elsewhere.

Part Two: Restructuring BC Hydro

Based on current trends in the electrical utility industry, BC Hydro should be restructured into the following components prior to or concurrently with any efforts at privatization. Each of these components would have different privatization objectives and strategies:

**Reservoir Management/
Energy Storage**
(unregulated and state owned)

Production/Generation
 – Peace (29%)
 – Columbia (35%)
 – Other hydro (15%)
 – Burrard thermal (8%)
 – IPPs (independent producers: 13%)
(unregulated)

Dispatch/Power Pool
(unregulated)

Transmission
(regulated)

Distribution/Customer Service
 – Lower Mainland
 – Vancouver Island
 – Northern Interior
 – Southern Interior
(regulated)

A) Production/generation

Privatization in other countries, such as the UK, has usually involved carving the state company's production assets up into "bundles" of generating capacity which became new companies and were sold off in that form. These smaller companies

then sold their output into power pools at competitive spot prices. This approach was used to promote competition in the sale of existing generation, adjust electricity rates to the marginal cost of new supply, and establish two or three "major players" to compete in supplying new incremental generation.

However, this process has been limited, for the most part, to thermal generating assets that are independent of one another and operate with a secure fuel supply at pre-established output levels during the year; where good management control of operating and fuel costs can considerably reduce prices and increase profitability; and where few environmental externalities or public safety issues are involved.

This strategy is not entirely applicable to the unique nature of British Columbia's hydroelectric system: some modification will be required.

The four companies proposal

Generating assets that are downstream of one another on the same river cannot operate independently: they need coordination to optimize output. Considerable synergy can also be achieved by coordination of generating operations on different river systems. For example, if water levels are unusually high in the Peace reservoir system and low in the Columbia system, it makes sense to reduce output from the Columbia generators and build up water levels in those reservoirs while increasing production from the Peace generators and reducing water levels on that system. This will reduce the risk of water levels getting too high in either system and forcing a "spill" which represents lost future generation and revenue.

Power generation also has to be carefully managed and scheduled to maintain water flows required for fisheries and remain in compliance

with water licences and interprovincial and international water flow agreements. Finally, nearly 90 percent of the price of power generated from hydroelectric facilities represents debt servicing and equity returns, depreciation, and taxes. For this reason, improved management of operating and maintenance costs will achieve little improvement in price and/or profitability.

At the very most, BC Hydro's hydroelectric assets could be split into three companies: all generating assets on the Peace River system, all generating assets on the Columbia River system, and all other hydro assets—these last assets are small and would be uneconomic to split up. Such a division would ensure continued coordination on the major rivers, while all reservoir assets would be retained by BC Hydro and remain under public control.

Each of the three generating companies would be guaranteed an annual average flow of water. If water flows fell below the annual guarantee, BC Hydro would make an offsetting cash payment to the affected company: if water levels exceeded the annual guarantee, however, all the resulting extra revenue would go to BC Hydro. In this way, water levels throughout the province would continue to be optimized and the companies would not suffer from erratic cash flows due to uncertain water conditions. Over the course of a year or two, BC Hydro would simply break even on the difference between cash payments and cash receipts. BC Hydro would also have continued responsibility for ensuring compliance with water licences and interprovincial and international water flow agreements—a continuing role further detailed under "Reservoir management" below.

The three hydro companies would then sell their power into the "power pool" described next. The issue of whether they would sell at daily spot market rates or under long-term contracts is discussed under "Competition" below and elsewhere in this paper.

Apart from continuing environmental restrictions, the three hydro companies would be totally unregulated. BC Hydro employees associated with operating, maintaining, and administering

these assets would be transferred to the respective companies.

Power brokers/aggregators

With free, open and competitive markets for the supply of electricity, brand new companies will be created to participate in the power pool called "Power Brokers/Aggregators." Acting as middle man, they will buy large blocks of power from producers, and sell it in smaller lots to consumers. They will, in effect, become wholesalers, arbitragers, and hedgers in the market place, taking risks that producers and/or customers may not be willing to take. For example, they may buy power from producers on a long term basis, at long term prices, and sell it to customers on a short term interruptible basis at spot prices, and vice versa. This will provide more consumer choice, and their role as arbitragers and hedgers will make the power pool economically efficient.

Burrard thermal stands alone

The Burrard thermal plant, along with its associated employees, would be treated as a separate company which would sell its output into the power pool on an unregulated basis.

All existing BC Hydro contracts with independent power producers for the purchase of electricity would be assigned to the power pool.

In summary, BC Hydro's generating assets would be split into, at most, four unregulated generating companies and then sold to the private sector.

B) Dispatch/power pool

The dispatch/power pool component is really a subset of the transmission function. The dispatch role is to get precise forecasts of hourly, daily, weekly, and monthly power requirements from distribution utilities and other consumers connected to the transmission grid (domestic and export) and then schedule appropriate output from the generating companies based on existing long-term contractual commitments and/or short-term spot sales.

The power pool is essentially the market clearing system. For example, if 150 Gwhrs of electricity are required for the day and 120 Gwhrs are already guaranteed from producers under existing long-term contracts, dispatch will confirm that the contracted generators can meet their commitments and then canvass all generators for a spot bid to meet the extra 30 Gwhrs of demand. The pool will then contract to purchase the lowest-priced spot power available.

The power pool bills distribution utilities and other customers (industrial and export) based on customers' long-term contracts with generators and the amounts of spot power purchased for these customers. Charges are added for pro-rata shares of power pool administrative costs and the transmission of electricity from the generator to the user.

Similarly, generators bill the power pool for energy supplied under long-term contracts and spot sales and the transmission company bills the pool for costs incurred in transporting the electricity. With recent developments in computer technology and the technology for energy monitoring and metering, such complex transactions can be processed at little cost. The fact that this was not the case a few years back helped to keep the utilities vertically integrated.

A free market in energy!

The power pool is totally unregulated. It is managed and controlled by its market participants. Any generator is free to join the pool as long as its generating facilities and quality of power output are technically acceptable for connection to the grid. Similarly, any industrial or distribution utility customer can join as long as it can connect to the transmission grid.

BC Hydro employees currently performing some of these duties would be transferred to the new organization, while additional skills would have to be recruited. The extent of assets involved is relatively small.

C) An electricity transmission company

This includes all high-voltage transmission lines connecting generators to customers—distribution utilities, industrial users, and export clients. Substations are not included as they belong to customers.

The suggestion here is to combine all these BC Hydro assets and their associated employees into one company for privatization purposes. Revenue would be derived from common carrier toll rates for transporting electricity from generators to customers. This would be a fully regulated company operating like a natural-gas transmission concern—Westcoast Energy, for example.

This company would be given the exclusive franchise to operate the provincial transmission system, expanding and upgrading it as required. New generators deciding to bypass the power pool and dedicate their power to one or more customers could build their own transmission lines to those customers and operate them free from regulation. They would not, however, be allowed to carry any power but their own.

D) Distribution

This function includes all substations, low-voltage power lines, customer transformers, and metering equipment. Also included are all customer service functions including connects, disconnects, metering, and billing. Actually, these customer services are sometimes discussed separately from distribution and could be outsourced as separate business units—an option discussed in greater detail under “Unbundling.”

Preparing for privatization, the options are to consolidate all BC Hydro distribution assets into one company or to establish four regional distribution companies. At present the utility has its distribution divided into four regional divisions: this makes the most sense from a geographical and operational perspective. The divisions are: the Lower Mainland, including the Fraser Valley and South Coast; Vancouver Island, including the Gulf Islands; the Southern Interior or the remain-

ing southern half of the province; and the Northern Interior or the northern half of the province including the North Coast and the Queen Charlottes.

The advantage of having four regional distribution companies is to encourage different electrical rates in different parts of the province—rates based on actual supply costs instead of the current pan-provincial “postage stamp” rate. However, there is no reason why this strategy could not also be carried into effect within a single distribution firm.

The whole issue of moving away from “postage stamp” rates is fraught with political danger. The many customers in the Lower Mainland would receive a very small rate reduction, while Vancouver Island and Southern Interior users would see substantial increases. And even with four different regional rates, there would still be inequities within regions—rural customers not paying enough, urban customers paying too much.

However, there is nothing about privatization that rules out subsidies to consumers in various areas. The only difference between our current arrangements and those which could be made in a privatized industry is that subsidies would have to be explicit and paid openly to private power companies or consumers. At the moment, subsidies are collected from those paying too much already—the city dwellers—and paid to those already paying too little: mainly rural customers.

Another advantage advanced for having four separate distribution utilities is that they would spread head office employment out of Vancouver into areas like Nanaimo, Vernon, and Prince George. While this may be a good political selling point for privatization, it is likely to increase costs, duplicate administration, and reduce the selling price.

Finally, having four different distribution utilities would ensure increased competition among customers in the power pool. Utilities might be encouraged to compete against one another for cost-efficiency. Smaller regional utilities could

also foster local innovations and be more responsive to their customer base.

All distribution utilities in the province would be precluded by regulation from owning generating assets. This would be to ensure complete, fair, and totally unregulated competition among generators.

E) Reservoir management/energy storage

To optimize water flows and privatization income, BC Hydro will have to retain ownership and management of the large reservoirs associated with the Peace and Columbia systems. Given the sensitive environmental, recreational, commercial, and political issues connected with the management of these water levels, privatization would be an easier “sell” with public reservoir ownership retained.

These reservoir assets have almost no book value to potentially reduce the proceeds of privatization. However, they do have an intrinsic value that would be awkward to capitalize into a sale price and might thus be lost to the people of the province.

BC Hydro and Hydro Québec have the largest storage capacities of any utilities in the world. These big reservoirs allow energy to be bought, stored for a long time, and then sold at a later date. This is a unique asset for an electrical utility. For example, if the spot price for energy is suddenly depressed in the Pacific US by heavy rains or snow melts, BC Hydro can buy this cheap energy and use it in the domestic system while shutting down generation at its own facilities and letting reservoir levels rise. Later in a year, if US spot prices are high because of a heat wave, BC Hydro can then use its stored water to generate electricity in excess of domestic requirements to sell profitably into the States.

What makes this value especially difficult to capitalize into a sale price is that it is unpredictable and usually requires coordination of all provincial reservoir systems. However, if BC Hydro con-

tinues to own and operate the reservoirs it will still be able to generate income for the province.

The authors therefore recommend that BC Hydro retain ownership and operation of the reservoirs and continue to buy and sell energy on the spot market.

After full privatization, BC Hydro would be left with only the reservoir assets and approximately 100 employees to operate and maintain them, coordinate water flows to the three private sector hydro generators, and buy, store, and sell electricity in the competitive spot market component of the power pool—both domestically and for export. BC Hydro would be prohibited, however, from entering into long-term contracts for supply.

F) Unbundling

As noted under Distribution, several customer service functions could be outsourced as separate businesses. Hiving them off before privatization could well enhance the utility's total sale price, it being likely that any new owners would do this themselves to enhance value and profitability.

The most obvious of these functions is billing. BC Hydro continues to do meter reading and billing under contract to BC Gas on top of its own electricity service. A private company could probably perform this service more cost-effectively and even acquire other billing business from telephone and cable utilities.

Connects and disconnects could be done by private sector contractors. BCTel has recently moved in this direction.

All commercial real estate, including office buildings and warehouse facilities, should be stripped out of BC Hydro prior to sale and sold separately with long-term leasebacks to maximize sale value.

All data processing functions should be outsourced prior to privatization, again to maximize sale value.

The vehicle fleet and all vehicle and equipment maintenance facilities should be sold off with cap-

ital and operating leases and contracts taken back prior to privatization to maximize value.

Other areas that could be outsourced include rights of way administration and vegetation management.

G) Other issues

West Kootenay Power and Light

West Kootenay Power would have to be included in our electricity market restructuring, either divesting its generating assets or putting them into an arm's-length, independent company that would sell production into the power pool. All power supply contracts with West Kootenay would be assigned to the pool. Similarly, West Kootenay's transmission assets would have to be sold to the new transmission utility, or "grandfathered" appropriately.

All of this could trigger unfavourable tax consequences for the company and rate increases for customers unless special arrangements were made. All other electric utilities in the province—including New Westminster, Yoho, Princeton, and Nelson—are exclusively distribution utilities and would be unscathed by the restructuring process.

Columbia downstream benefits

The authors believe that the provincial government should make every possible effort to sell this electricity into the US market under long term contract. The government has already incurred a substantial loss in value for this asset by not selling it earlier, and its value in future years will continue to decline with declines in the cost of new electricity supply. If this proved impossible, the government would have to sell this power into the power pool at competitive spot rates.

Water rentals

At present, BC has the highest water rentals in Canada—several times higher than Ontario or Quebec. As a result, water rentals represent a 0.5 cent/kwh tax on hydro-generated electricity. Wa-

ter rentals have swelled to these levels because they represented an easily hidden tax for the province: instead of seeing a general provincial tax increase, consumers saw electricity rate increases and blamed BC Hydro instead of the BC government.

Since BC Hydro has been the only hydro generator of significance and there was no competition for generation, this “tax” could be siphoned off without detrimental impact. However, if the electricity market is being reorganized for fair competition among all producers from all sources, water rentals have to be eliminated. Clearly, the province cannot simply forgo the \$250 million annual revenue: a new electricity generating tax could be applied to all generated electricity at 0.5 cents/kwh. The tax would weigh solely on electricity sold for resale to third parties domestically. Export sales and industrial users producing their own electricity for internal consumption would be exempted.

BC Hydro International

This BC Hydro subsidiary would be wound up and all its contracts sold off or terminated. Since its inception it has contributed little if anything to BC Hydro’s profits. The recent effort by the government to expand its role has proven disastrous. This is one area that should be left exclusively for the private sector.

Rights of way

While BC Hydro’s assets would be sold off in the privatization process, existing rights of way, either fee simple or statutory, would be retained by the province and leased back to the privatized entity for \$1. This would secure the use of these existing corridors for such other public infrastructures as roads, pipelines, rapid transit, etc. without paying windfall benefits to the private successor company.

H) Competition

Competition would be introduced on the following basis.

Production/generation

All generators, including privatized BC Hydro units and future power brokers/aggregators, would be unregulated and compete with one another, selling electricity into the power pool on either a long-term contract and/or spot sale basis. There would be no barriers to market entry.

However, power generators could not be owned by distribution utilities. They would also have to comply with any technical specifications and operating rules established by the power pool.

Dispatch/power pool

The power pool would be an unregulated, free, competitive market governed by the market participants—generators, distribution utilities, and industrial customers.

New generators would have the option of selling their power into the pool through competitive long-term contracts and/or spot sales.

Former BC Hydro units would sell their power into the market under long-term, stable “price-capped” contracts. The rationale for this price capping is explained in more detail in part four of this study.

BC Hydro’s remaining reservoir management operations would be allowed to buy and sell energy into the power pool at competitive spot prices but would be excluded from long-term contracts.

Industrial customers would have three options: (1) continuing to receive their proportionate shares of “price-capped” electricity from former BC Hydro generating assets plus market-priced energy from the power pool for all new demand; (2) purchasing all their power from the power pool at market prices, or (3) signing their own sole-supply contracts with generators.

Distribution utilities would purchase all their electricity from the power pool. Sole-supply contracts with generators would be prohibited as harkening back to the old vertically integrated architecture. Distributors would continue to receive their proportionate shares of “price-

capped” electricity from former BC Hydro generating assets, together with market-priced energy from the power pool for all new demand.

The export market would be totally deregulated: BC Hydro’s Powerex export subsidiary would be disbanded and the export market integrated into the domestic power pool. Meanwhile, existing BC Hydro generating sources would be price capped and dedicated to existing domestic demand. All new incremental domestic demand would be combined with export demand and the required electricity purchased from new generators at market prices established through the power pool. This process would establish a competitive, integrated, free-trade market for electricity on the west coast of North America and stimulate the construction of export power plants in BC.

The same process would also enlarge the power pool to accommodate more generators and customers, ensure fair competition without any one player seizing market dominance, and increase overall economic efficiency. All long-term power contracts (not spot sales) for export would still require federal energy removal certificates from the National Energy Board.

Transmission

This company would operate as a fully regulated natural monopoly with a franchise right for all of BC: no competition would be allowed. All existing BC Hydro and West Kootenay Power and Light transmission assets would be transferred to this company. Sole-supply generators could own and operate their own transmission lines to dedi-

cated customers, but they would be prohibited from transporting any other electricity over these lines—i.e., they would be precluded from being common carriers.

Distribution

These firms would operate as fully regulated natural monopolies with exclusive franchise rights on their territories. Commercial and residential customers of distribution utilities would still be prohibited from contracting elsewhere for their power requirements.

At present, distribution customers have not expressed a strong demand for unfettered competition and are comfortable in continuing with regulated distribution monopolies. However, consumer groups have expressed a desire that distribution utilities “unbundle” their product, offering more consumer choice and value added services, such as interruptible versus firm supply pricing, hour of day and time of year pricing, high load factor versus low load factor pricing, and quality of power pricing. All new tariffs would be based on competitive market rates and costs and subject to regulatory approval.

In five to ten years’ time, with the power pool fully developed and retail customers used to the concept of competition, retail competition could be introduced: retail customers would buy directly from power wholesalers. The distribution companies would then simply charge fees for using their networks to carry the power. This is a major and complex change—one to be phased in gradually.

Part Three: The Base Case

The purpose of this evaluation is to provide an estimate of the market value of BC Hydro at April 1, 1996, and to assess what impact BC Hydro's privatization would have on the provincial government's annual operating deficit and outstanding debt. Any valuation will naturally depend on a number of factors, including:

- the process used to sell or privatize the Crown corporation
- the future structure of BC Hydro in particular and of energy markets in British Columbia and North America in general
- future allowable customer rate increases, regulation, and competition
- federal and provincial tax regimes
- the ability to effect future operating efficiencies under private management, and
- prevailing debt market interest rates and equity market capitalization ratios

Summary of results

Impact on the provincial debt

The market value of BC Hydro at April 1, 1996, based on its current structure, is estimated at just under \$14 billion.

After defeasing and/or extinguishing BC Hydro's estimated outstanding book debt of \$7.8 billion at April 1, 1996, and after paying all costs of privatization including a reserve for future representation and warranty claims, the province would be left with \$4.4 billion in cash to apply against other direct government debt.

The total provincial debt reduction would therefore approximate \$12.2 billion.

Impact on the provincial deficit

The provincial government's assumed operating deficit would be reduced by \$203 million a year, namely:

- \$340 million in annual interest savings from the \$4.4 billion reduction in direct government debt at 7.75% per annum, plus
- \$9 million in increased provincial capital tax revenue due to the higher capitalized value of a privatized BC Hydro, less
- \$146 million in lost annual dividend payments from BC Hydro—based on the dividend estimate contained in the 1995/96 provincial budget

Although BC Hydro as privatized would remain income tax-free for its first several years while it used up unclaimed capital cost allowances (CCAs) accumulated as a Crown corporation, it would ultimately pay 16.5 percent of its net income to the province and 28.8 percent to the federal government. This would reduce the annual provincial operating deficit by a further \$100 million in future years. In addition, a privatized BC Hydro would be in a better position than a Crown entity to seek out new business opportunities outside BC and Canada, thereby further increasing employment and tax revenues in the province.

Assumptions

These valuations have been based on the following main assumptions:

- BC Hydro would be sold as a complete entity with no change in the existing regulatory or competitive environment
- BC Hydro would, however, be precluded from developing any new electrical generating facilities and required to purchase all new

energy supplies from private sector developers on a competitive bid basis. The company would be permitted to continue with its Power Smart conservation program

- BC Hydro customers would be protected by capping rate increases for the next 10 years to no more than the annual increase in the Consumer Price Index (i.e., an assumed average of 2.5 percent a year). The provincial government currently lets BC Hydro raise its rates annually by a maximum of the CPI *plus* 2 percent
- a one-time operating, maintenance, and administrative efficiency cost saving of 10 percent
- BC Hydro would be recapitalized to achieve an approximate debt to equity ratio of 60/40 and an interest coverage ratio of 3.0, and
- BC Hydro would be sold through a widely distributed general share offering—similar to the recent CN share offering—at market prices with no one owner holding more than 10 percent of the shares. This study has assumed for valuation purposes that Government of Canada 10-year bonds would be yielding 7.35 percent and that BC Hydro shares would have a 6.25 percent dividend yield per market share price, a 12.0 price to earnings ratio, and a 1.44 market-to-book price ratio

Variables which could cause a major change in the valuation of BC Hydro are limited essentially to changes in base assumptions concerning customer rate increases, interest rates, share price to earnings ratios, and operating efficiency savings. The sensitivity of this valuation price to such changes is noted in table 1.

Obviously, BC Hydro’s market value will be substantially increased or reduced by customer rates, interest rates, and equity capitalization ratios. For example, the 3 percent drop in long-term interest rates over the last three years and the rise in stock markets which has seen price earnings ratios for utilities go from 11.0 to 12.0 over this same period have combined to add approximately \$3.2 billion to BC Hydro’s market value. As a result, current interest rates and equity market conditions are ideal for achieving maximum returns from privatizing BC Hydro.

Table 1: Sensitivity of BC Hydro Valuation Price to Changes in Key Assumptions

Change in base assumptions	Change in BC Hydro Valuation Price (\$ millions)
Cap customer rate increases at 0.5 percent below CPI each year	-1,050
Raise or lower borrowing costs by 1 percentage point	+775
Raise or lower share price earnings ratio by 1.0	+900
Operating, maintenance, and administrative cost reduction of 20 percent instead of 10 percent	+150

BC Hydro would represent the largest privatization and share offering in Canadian history. It would be unrealistic to assume that \$6.1 billion in share capital could be traded overnight. If this privatization approach was used, shares would have to be sold gradually over about a two or three year period with the use of share-purchase warrants. This overhang of shares could considerably reduce the share price assumption used in this valuation. There would also be an opportunity cost to government from not immediately realizing all of the cash proceeds.

An alternative approach would be to restructure BC Hydro into several generating, transmission, and distribution companies and reorganize the electricity market to introduce competition and “incentive-based” regulation. This strategy could actually add something like \$500 million to the total valuation price, since generating assets could be more highly debt-leveraged and equity returns higher with incentive-based regulation. This approach would also allow for speedier disposal of Crown ownership by tapping more investment markets. Economic efficiency would also be better served by reconfiguring markets to expand competition.

The tables at the end of this paper detail the base case privatization structure, basic assumptions, and supporting 10 year financial pro formas.

Part Four: Getting Maximum Value for Privatized Assets

A) Production/generation

Two issues affecting generation asset value

Two restructuring issues will affect BC Hydro's valuation price. The first has to do with the price newly privatized generators will be able to get for their electricity. The second relates to the capital structure and sale process used.

Since detailed segmented financial data are not published by BC Hydro, we can only prepare "ball park" estimates of the incremental value that could be created by restructuring this utility.

The impact of electricity pricing on value

Most state-owned generating utilities have higher historical costs and rates than the marginal cost of new supply. These assets are often described as "stranded" because they have ceased to be competitive and are often badly managed. The goal of privatization in such cases will obviously be to reduce consumer electricity rates to the cost of new supply — sell state-owned assets for less than book value and hope the new owners can achieve efficiency savings to further reduce rates and heighten profitability. Increasing competition and reducing rates are the priorities: the actual sale proceeds are secondary.

But British Columbia is not like these other jurisdictions: its historical power production costs less than new supply. Accordingly, BC's privatization goals are to generate maximum sale proceeds to reduce government debt and introduce competition for new supply. There is no desire for further rate reductions: to encourage economic efficiency, in fact, existing rates should be gradually edged up towards the higher marginal cost of new supply. The three-year rate freeze announced by the

Clark government should be immediately rescinded on grounds of economic efficiency.

British Columbia's present electricity rates are already among the lowest in the world. Based on the existing rate structure, BC Hydro's average cost of production—excluding all transmission and distribution costs—is about 3.2 cents/kwh. This figure, however, includes provincial water taxes: if these extremely high taxes are excluded, BC Hydro's production cost is 2.7 cents/kwh as compared with 3.5 cents for new private sector gas-fired thermal supply. This can get confusing, but the fact is that the cost of a new hydroelectric project like Keenleyside or Site C may be considerably higher than new private sector gas-fired thermal, but BC Hydro's existing generating facilities remain much cheaper than new private sector supply.

Privatizing BC Hydro's generating facilities and allowing the new owners to sell the electricity into the power pool on an unrestricted basis at today's competitive spot price of 3.5 cents/kwh—the marginal cost of new supply from private sector generators—would result in an overall rate increase of over 20 percent for industrial customers, 18 percent for commercial customers, and 15 percent for residential customers. The sale price of BC Hydro would increase from \$14 billion to \$17 billion if this extra revenue stream was capitalized into the price!

Options for pricing generation

Several pricing options could be considered for BC Hydro's privatized generation.

Option One

First, privatized generators could be required to sell their entire output into the power pool for the next 60 years at today's price of 2.7 cents/kwh with slight annual escalations for increased operating

and maintenance costs and adjustments in financing charges. This output would be dedicated to domestic customers based on past consumption patterns.

This procedure has been referred to earlier in this paper as “price capping.” Alberta, by forcing its utilities to dedicate their generation assets, is taking this capping approach for its existing low-cost generating assets. In this scenario, consumer rate increases would approximate those in the base case valuation: CPI minus 0.5 percent for the first three years, CPI for the next four years, and then CPI plus 0.5 percent each year thereafter. As more higher-marginal-cost generation is added, rate increases have to be higher than the general rate of inflation.

Privatizing the assets on this basis would represent nothing more than a long-term sale lease-back arrangement. Since this approach is implicit in the base case evaluation, BC Hydro’s valuation price is therefore unchanged.

Option Two

A second option would follow the approach outlined above but add a proviso that if the market price of electricity ever dropped below the price cap the market price would prevail. This would guarantee consumers that they would never have to pay more than the marginal cost of new supply. It is possible, though unlikely, that further technological advances might reduce the current marginal cost for existing generation from 3.5 cents/kwh to below 2.7 cents. Such an eventuality would probably lower BC Hydro’s valuation somewhat from the base case, but not much.

Option Three

A third option would duplicate Option Two but permit a percentage of output to be removed from the price cap each year and sold at market rates. In Year 1, for example, 100 percent of output would be subject to the price cap; in Year 2, 95 percent of output would be price-capped and 5 percent could be sold at market rates; in Year 3, 90 percent of output would capped and 10 percent sold at market rates—and so on until Year 21, when the

entire output could be traded for what it could fetch in the marketplace.

This approach would let average rates adjust gradually upwards toward higher marginal rates so that by Year 21 the marginal and average rates would be the same. Rate increases to consumers would obviously be somewhat higher than under the base case valuation, especially in later years. The potential for higher profits as the years progressed would more than offset the downside risk from marginal costs of new supply dropping below 2.7 cents. Accordingly, BC Hydro’s valuation price would be slightly higher than the base case.

It should also be remembered that the Columbia and Peace generators would initially represent nearly 65 percent of all power pool sales. They would obviously dominate the market in the early years and wield considerable market control that could be abused if their prices were not capped. Over the years, however, the market would expand, especially if exports were added, and new generators would come in: the Columbia and Peace generators’ market influence would gradually lessen, making it possible to achieve a phased elimination of the price cap without market abuse.

The effect of capital structure and sale procedures

The second issue that bears significantly on the value that could be realized from the sale of B.C. Hydro is the capital structure and manner of sale of the utility’s generating assets. The base case assumes that generating assets would be included in the sale of a regulated, vertically integrated, operating utility. The capital structure of such a utility has a maximum debt to equity ratio of 60/40, with a 7.75 percent interest rate on debt and a 12 percent after-tax return on equity: the overall cost of capital is therefore 9.45 percent.

If these assets were to be sold as an unregulated, sole-purpose generating company, the debt to equity ratio would change to 80/20 with a 8 percent interest rate and a 14 percent after-tax rate of return, for a total cost of capital of 9.2 percent. This 2.7 percent reduction in the overall cost of capital, when applied to the \$4.8 billion base case valua-

tion of generating assets, would increase the total valuation price of BC Hydro by \$130 million.

Moreover, if the generating assets were organized as general partnerships rather than a corporation, with limited partnership units sold to investors, additional income tax savings could be achieved—especially if the limited partnership units were purchased by non-taxable entities such as pension funds. Under limited partnership units, the pre-tax income of the general partner (in this case, the generating asset) is flowed back to the investor and taxed at the investor's tax rate. Since pension funds are non-taxable, no income tax would be payable on their share of pre-tax income.

Generating assets are long-term assets with economic lifespans of sixty years and more. Under the pricing options discussed above, privatization would represent little more than a long-term sale lease-back transaction at minimal risk. This investment vehicle is ideally suited to pension funds. The capitalized value of these tax savings could represent an increase over the base case of \$120 million in BC Hydro's valuation price.

Postscript: Burrard thermal

Discussion has so far been confined to BC Hydro's hydroelectric generating assets. Burrard thermal, however, could also create added value if properly organized. First, Burrard thermal would be a very attractive asset to both BC Gas and Westcoast Energy: both organizations could achieve further synergies if they acquired Burrard, and this potential would be capitalized into their bid prices for the asset, resulting in a higher than normal price.

Secondly, Burrard thermal has expansion potential beyond its current base generating volume of 3,500 Gwhrs a year at a very low marginal cost of about 2 cents/kwh. If Burrard could be licensed to increase output to an annual 6,000 Gwhrs and this added output could be sold into the power pool at the marginal cost of 3.5 cents, annual before-tax profits could be enhanced by \$37.5 million. Assuming a 40 percent rate of tax, after-tax profits would amount to \$22.5 million. Using a 9.2 per-

cent cost of capital, the capitalized value of this added income would be approximately \$250 million.

B) Transmission

Restructuring transmission into an independent regulated utility would not change BC Hydro's valuation price, as this structure is already implicit within the vertically integrated utility base case.

C) Distribution

Restructuring BC Hydro to provide for a single regulated, independent, distribution utility would not change BC Hydro's valuation price, as this structure is already implicit within the vertically integrated utility base case.

However, if BC Hydro's distribution assets were split up into four separate distribution utilities, value would be reduced. The Lower Mainland utility accounting for over 60 percent of all BC Hydro customers would still be big enough to allure stockholders, and a 12 times price earnings ratio would probably still be applied to its after-tax earnings. But the other three utilities would be much smaller and less attractive to investors, and thus an 11 times price earnings ratio would probably apply to after-tax earnings.

As noted in the base case analysis, a 1.0-point drop in the price earnings ratio for all BC Hydro earnings would spur a \$900 million reduction in the valuation price. The three smaller distribution utilities would account for approximately 17 percent of BC Hydro's after-tax earnings. The valuation price would therefore be reduced by \$150 million ($\$900 \text{ million} \times .17$) if four distribution utilities were created, assuming no increased administrative costs due to the existence of the multiple utilities.

D) Unbundling

BC Hydro has considerable non-income real estate on its books at nominal values. Sold separately, these holdings could create value in excess of the base case scenario. The utility's head office

and regional offices could be sold separately with long-term leasebacks. This approach would allow the assets to be more highly debt-leveraged than if they were held within an operating utility—the argument here is the same as was used above for generating assets. A ballpark estimate of obtainable increased value here is about \$100 million.

Further value could also be realized by spinning off other customer service functions such as billing, meter reading, etc. Other functions could also be outsourced including computer services and vehicle fleet ownership and maintenance. The capitalized value of the annual operating cost savings resulting from this outsourcing could amount to something like \$50 million.

Summary

To sum up, then, restructuring could produce a net increase in value for BC Hydro of between \$500 million and \$65 million, as summarized in table 2.

Table 2: Incremental Value from Restructuring BC Hydro

	Increase in Valuation Price (\$ millions)
Restructuring hydraulic assets into three companies	250
Sale of Burrard thermal as an independent company	250
Restructuring distribution assets into four companies	(150)
Selling BC Hydro real estate independently	100
Unbundling and outsourcing customer service and business functions	50
Total increase in value over base case	500*
<i>*\$650 million is distribution sold as one unit.</i>	

Summary and Conclusions

There is a compelling case for restructuring and privatizing BC Hydro.

Economic reasons

- the estimated market value is about \$14 billion
- restructuring would produce a further \$0.5 billion

If the sale proceeds were applied to the debt, total provincial debt reduction would be about \$12.2 billion:

- \$7.8 billion of BC Hydro debt removed from BC's books
- \$4.4 billion cash to reduce direct government debt

The total provincial debt would be reduced from \$30 billion to about \$18 billion by this privatization alone!

The province's annual operating deficit would be reduced by over \$200 million.

Also, allowing free private sector competition for domestic and export supply would create more economic development opportunities and jobs for British Columbians.

Public policy reasons

There are no compelling public policy reasons for retaining government ownership in this state monopoly: the historical justifications are no longer valid.

Developments in both North American electricity markets and generation technology and costs point to private sector expertise: there will be no need to build new dams in the foreseeable future.

Conflict between government objectives and corporate efficiency is no longer acceptable. Ministers should run their departments, not interfere with and try to micro-manage organizations like BC Hydro.

The individual consumer can be protected against unacceptable rate increases by a well-devised regulatory regime that is transparent in its proceedings and independent of government.

The only public stake after privatization would be the ownership and management of the large reservoirs. This will ensure optimal management of the river systems and compliance with international obligations while retaining these valuable assets for the future. The reservoirs have value that is difficult to quantify, particularly when the political risks of selling them are taken into account.

Improved customer responsiveness, corporate efficiency, competition, and cost reduction will not proceed with any speed as long as government ownership is maintained.

Regulatory reasons

The regulatory regime should give corporations maximum incentives to reduce costs and share in benefits while ensuring that individual consumers are protected against unacceptable rate hikes.

The current rate of return regulation should be scrapped in favour of a "price cap" form of regulation—with productivity offsets—to protect consumers and provide producers with an incentive to reduce costs and become more efficient.

The present politically motivated rate freeze should be rescinded immediately and replaced by orderly regulation, free of government interference that ignores BC Hydro's economic health for

short-term political gain. The citizens of BC already enjoy extremely low hydro rates which should slowly be brought up to the current costs of new supply to encourage more economic power production in the future.

In summary, privatizing BC Hydro would:

- reduce the provincial debt, dramatically helping to reduce the burden on the future;
- improve the efficiency and effectiveness of the privatized corporations;
- introduce an incentive-based regulatory regime;
- protect the consumer through regulation, and
- reduce the size of government and eliminate political interference in utility management.

Appendix I: Regulation

Current regulatory framework

Regulating the electric utility industry in BC is currently the responsibility of the British Columbia Utilities Commission (BCUC). The BCUC is made up of its chairman and several commissioners appointed by orders-in-council for stated terms. It has a staff of approximately thirty. The BCUC's budget is provided by a \$10 vote in the provincial estimates, which means that it has an unlimited budget provided all its costs are recovered from the utilities it serves. Its baseline budget is recovered on a pro-rata basis from all utilities, while the actual costs of specific hearings are recovered from the utilities involved.

The BCUC has broad-ranging powers to approve, disapprove, modify or set conditions over the following major items:

- major energy projects
- energy exports from the province
- matters of public convenience and necessity, and
- tariffs and standards of operation

All major energy projects, private or public sector, where the energy will be used by someone other than the developer, must receive BCUC approval. This includes all generating plants over 20 MW. The BCUC approval process is over and above the provincial government's environmental review.

All BC energy exports require BCUC approval even if they have already been approved federally by the National Energy Board.

All major energy infrastructure projects required for public convenience or necessity—important electrical or gas transmission lines, gas storage reserves, etc.—require BCUC approval.

Finally, all tariffs for the sale of energy and their associated service and operating standards must have BCUC approval.

The BCUC has the power to determine whether public hearings will be required on these matters. It is free to establish its own guidelines and methodologies for approving projects and setting tariffs. Under s. 3(1) of the *Utilities Commission Act*, however, “the Commission shall comply with any general or specific direction it receives from the Lieutenant-Governor-in-Council, with respect to the exercise of its powers and functions.” This effectively allows Cabinet to exempt items from regulation and tell the Commission how to use its regulatory powers.

BCUC decisions can be appealed to the courts only on the grounds that the Commission erred on a point of law or natural justice.

Reforms needed to accommodate change

Based on the restructuring proposed for BC Hydro in particular and the electric utility industry in general, the scope, powers, and direction of the BCUC will have to be modified in the following areas:

Major energy projects

If the power pool is to be completely deregulated and competitive there will be no need for the BCUC to review and approve major electrical generating projects. Environmental issues can be covered through the provincial environmental assessment review process.

Export market

If the export market is to be totally deregulated and integrated into the domestic power pool,

there should be no need for the BCUC to review export sales. Exceptions might be made for contracts that involve extremely large amounts of power for an extensive period. Since these agreements could affect domestic supply, they might still be reviewed: however, such cases will probably be quite rare.

Public convenience

Since transmission and distribution will continue as regulated monopolies, proposed major transmission and substation projects would still need BCUC approval before proceeding.

Tariffs and standards of operations

Since transmission and distribution will continue as regulated monopolies, the BCUC will continue to review and approve these matters. However, incentive-based regulation should be introduced in this area.

Incentive-based regulation

Problems with current approach

The BCUC currently uses the classic “rate base methodology” for setting tariffs. The criterion is that tariffs be set at levels sufficient to recover all operating, maintenance, and administration costs, taxes, acceptable amounts of depreciation, and a “fair” return on invested capital.

The problem with this approach is that it encourages utilities to overspend on plant and equipment in order to increase the rate base—a practice that is often referred to as “gold-plating.” Also, because all savings in operating costs have to go towards tariff reduction, there is no incentive for the utility’s management to reduce costs. Under this form of regulation, utility managers become excessively risk-averse and unwilling to try new approaches: after all, the regulators will disallow costs related to bad decision making but insist that all benefits from good decision making go towards rate reduction, not higher returns to the shareholder.

Finally, there is a danger under this form of regulation that regulators will assume too much con-

trol over decision making and start to run the utility instead of management—a situation that tends to blur the lines of responsibility and accountability. Consumers may actually be penalized rather than protected under this form of regulation, since there is no real incentive to control costs or innovate.

Price cap alternative

The United Kingdom and other countries are now moving to various forms of “incentive-based” regulation and rate setting. Although there are many different models around, they tend to be variants of either “price cap” or “baseline” regulation.

Under “price caps,” a utility first establishes appropriate rates for its customers and then receives permission to increase these rates annually by an amount equal to the Consumer Price Index (CPI) minus 1 or 2 percent for a period of 3 to 5 years without further regulator approval. If the utility’s managers can keep cost increases below this level, the savings can be passed on to the shareholders in a higher rate of return. If costs increase beyond this level, however, the shareholders end up with a lower rate of return.

Consumers are protected by having rate increases “capped” below the rate of inflation, and managers have incentives to operate the utility more efficiently. The utility still has to meet certain service levels, operating standards, and public safety requirements set by the regulator, and is thus prevented from making higher rates of return by cutting back on required maintenance or reducing service levels to the customer. At the end of the 3 or 5 years, the utility would have to go before the regulator, again justify the existing rate level, and agree on a new CPI-minus formula for the next 3 to 5 years. The CRTC has implemented a modified form of “price cap” regulation for cable TV companies.

Baseline alternative

A second form of incentive-based regulation is known as the “baseline” approach. Here, the utility agrees with the regulator on a baseline of operating and capital expenditures needed to

cost-efficiently manage the utility. If managers can push costs below the baseline, a percentage can go towards a higher return to the shareholder, with the remainder going to tariff reduction.

For example, for the first 5 percent reduction in costs, three quarters might go to rate reduction and one quarter to the shareholder. For cost reductions between 5 and 10 percent below the baseline, one half would go to rate reduction and the rest to the shareholder. For cost reductions exceeding 10 percent below the baseline, one quarter might go to rate reduction and three quarters to the shareholder.

By the same token, if costs increase above the baseline, only a certain percentage can be recovered through higher tariffs: the rest has to come from a lower rate of return to the shareholder.

Both systems set a maximum shareholder rate of return, usually 2 or 3 percentage points above the normal rate of return allowed for a utility.

Investor-owned utilities in BC would likely welcome such a change in regulation. Consumer

groups would also be hard-pressed to argue against a form of regulation which kept rate increases below the rate of inflation.

Of course, this form of regulation would apply only to commercial and residential customers—distribution customers. Industrial users would purchase electricity in the totally unregulated power pool.

Exemption window for BC Hydro restructuring

An exemption window will be needed for the sale of BC Hydro's transmission and distribution assets, just as BC Gas was granted a period of grace while acquiring BC Hydro's Lower Mainland gas distribution assets. This window will give the new companies time to reorganize for enhanced efficiency without having to worry about regulatory control. Tariffs would simply be allowed to increase at CPI or CPI minus 0.5 percent each year for the first three years after sale. The companies would have to continue to meet established service levels and operating standards in order to maintain the exemption: after three years, they would come back under BCUC regulation.

Appendix 2: Base Case Valuation

The following chart and exhibits provide information on the assumptions, key financial parameters, and results used in establishing a base case valuation for BC Hydro.

Chart 1: privatization structure and distribution of proceeds

This study assumed that BC Hydro would be sold as a complete, vertically integrated utility, in its current form. To effect this transaction, a new, non-government taxable corporation would be created called "Newco." BC Hydro would transfer all of its assets, contracts, obligations, employees, and franchise rights to Newco. BC Hydro would retain only its current assets (accounts receivable) and current liabilities (accounts payable). In exchange, BC Hydro would receive \$12 billion in the following form:

- \$7,810 million in Newco debt, and
- 419 million Newco shares, with a par value of \$10 each (\$4,190 million)

This \$12 billion value was established by developing a detailed, interactive, financial and operational computer model of BC Hydro. Based upon assumptions adopted for rate increases, inflation, demand growth, export sales, costs for existing energy supply, costs for new energy supply, operating costs, efficiency savings, property income and capital taxes, interest rates and future capital expenditures, the model calculated the maximum capital value for BC Hydro's assets, while still achieving and maintaining certain financial and operational ratios required by the financial markets. These ratios include return to shareholders' equity, interest coverage ratios, debt-to-equity ratios, and operating expense ratios. Input data were obtained from BC Hydro's audited financial statements, annual reports, forecasts filed with the BCUC, and published resource planning documents.

The authors assumed that the debt issued by Newco would identically parallel the maturity profile of BC Hydro's existing debt portfolio, but would carry current market interest rates instead of BC Hydro's historical imbedded interest rate. For example, if BC Hydro issued a \$100 million ten year bond 5 years ago, which would mature on April 1, 2001 (5 years hence) at an interest rate of 10 percent, Newco would provide to BC Hydro a note for \$100 million also maturing on April 1, 2001 with an interest rate of 6.5 percent—the market interest rate Newco would have to pay today to issue a 5 year bond. Where BC Hydro's bonds are in foreign currencies, Newco would issue similar foreign currency notes.

In aggregate, BC Hydro has a current debt portfolio of \$7,810 million with an average term to maturity of 11 years and a weighted average interest rate of 9.9 percent. Therefore, Newco would issue back to BC Hydro notes with an average term to maturity of 11 years but with a weighted average interest rate of 7.75 percent, which represents the current market interest rate for an 11 year Newco bond. These notes would be subordinated to Newco's future bond issues, in order to improve Newco's ability to refinance the notes as they mature.

To extinguish BC Hydro's debt from the government's books, an "in substance defeasance" would have to be carried out. This is a recognized financial and accounting procedure, routinely carried out by governments and corporations. Under this arrangement, BC Hydro and the Minister of Finance would enter into an irrevocable trust with a major trust company (the trustee) to which the government would transfer BC Hydro's existing debt portfolio together with Newco's notes to BC Hydro. In doing so, the government would relinquish any legal right of ownership to, or claim against, Newco's notes. Newco would make its annual interest payments on these

notes to the trustee, and as the Newco notes matured, Newco would refinance them by going into the public debt market, issuing new bonds in their own name, and paying the proceeds to the trustee. The trustee would use these funds to pay the annual interest and principal repayment requirements of the BC Hydro bonds.

However, because the BC Hydro debt has a higher interest coupon than the Newco notes, there will be an annual shortfall in interest payments each year. Using a discount rate of 7.75 percent, the net present value of this interest shortfall over the remaining term of BC Hydro's debt portfolio is calculated at \$1,214 million. Therefore, to keep the trustee whole, an additional cash payment of \$1,214 million will have to be made to the trustee by BC Hydro and/or the Minister of Finance, upon establishing the defeasement trust. The trustee would then be in a position to invest these funds, so that sufficient money would be available to meet all interest payments.

Upon the trustee certifying that sufficient cash and Newco notes have been received to pay off BC Hydro's debt, the trustee would issue a certificate to the Minister of Finance stating that all conditions have been met for an "in substance defeasance" and this debt could now be eliminated from the governments books.

It should be noted that under the assumptions used, Newco would be essentially self financing for the first 10 years of its operations, having to issue very little new debt. Its borrowing requirements over this period of time would be mainly confined to refinancing its notes to BC Hydro. This would approximate \$600 million per year, which should be quite manageable. This also assumes that Newco would be prohibited from investing in new generation, and would instead have to purchase new energy supplies from independent producers. Newco would continue, however, to invest in Powersmart and other conservation programs.

Once BC Hydro received the equity shares from Newco, it could then sell them to the general public. Although the shares have a \$10 par value, it is estimated BC Hydro could sell them to the public

at a market value of \$14.70 each. This market price is based on Newco's 10 year projected financial statements and achieving a 12 time price-to-earnings ratio, a market-to-book price ratio of 1.44, a dividend yield-to-market share price of 6.25 percent per annum, and an average annual earnings growth rate of 3.3 percent. These ratios represent an average of similar ratios for TransAlta Utilities, Canadian Utilities, Nova Scotia Power and BC Gas. The cash proceeds from the sale of all shares would total \$6,159 million. Since BC Hydro is income tax exempt, no capital gains tax would attach to the sale of its Newco shares.

For valuation purposes, this study assumed that all shares would be sold at once. Given the relatively large amount involved, this is unrealistic. Several offerings over a 2- to 3-year period may be required, together with the use of share purchase warrants. This would obviously reduce the net present value of the proceeds somewhat. However, we also believe that BC Hydro would be a very attractive share offering, especially with the generous dividend payment assumed, and that these shares could sell at a somewhat higher price-to-earnings ratio than the conservative ratio that has been used. This could, in turn, lead to higher than estimated sale proceeds.

Once BC Hydro received the \$6,159 million in cash for the shares, it would use \$1,214 million of this amount to defease BC Hydro's debt, as previously explained. Also, the authors estimate that BC Hydro would incur privatization costs of \$545 million which would have to be paid out of the proceeds. These costs are explained below. This would leave \$4,400 million cash that BC Hydro could "dividend out" to the provincial government. The government could then apply this amount to reduce direct government debt.

The \$545 million costs incurred for privatization include the following estimates:

- \$185 million in commissions and other costs to distribute and sell Newco shares on a world wide basis;
- \$15 million for legal, appraisal, accounting, and other professional service costs;

- \$65 million to cover the costs of accrued employee liabilities transferred to Newco, including earned but unpaid vacation and severance entitlements, disability pensions, and certain unfunded retirement and pension benefits;
- \$80 million to cover the working capital deficiency BC Hydro would be left with on April 1, 1996 (ie. its remaining current assets would be \$80 million less than its remaining current liabilities); and,
- \$200 million for a general reserve that would be retained to cover asset-related deficiencies the new owners find, and claim for in future years.

This study assumes that the government would exempt BC Hydro from having to pay provincial sales taxes and property purchase taxes on these transactions, as it simply represents a “financial” wash for the provincial treasury. All of these estimates are consistent with cost ratios incurred by BC Hydro when it sold its gas division assets to BC Gas.

Once the entire process was completed, total provincial debt would be reduced by \$12.2 billion, including BC Hydro’s debt of \$7.8 billion plus \$4.4 billion of direct government debt. In addition, the annual provincial deficit would be reduced by \$203 million, consisting of:

- interest savings of \$340 million per year on the \$4.4 billion reduction in direct debt (assuming an interest rate of 7.75%);
- an increase in annual provincial capital taxes of \$9 million, due to the higher capitalized value of Newco; less
- \$146 million in annual dividend payments from BC Hydro, which will no longer exist.

While it is estimated that Newco would not pay income taxes for 7 years (while unclaimed capital cost allowances are used up), once it did start paying income tax, an additional \$100 million or more per year would flow into the provincial treasury.

This valuation of BC Hydro is subject to the following main sensitivities.

Sensitivity of BC Hydro Valuation Price to Changes in Key Assumptions

Change in base assumptions	Change in BC Hydro Valuation Price (\$ millions)
Cap customer rate increases at 0.5 percent below CPI each year	-1,050
Raise or lower borrowing costs by 1 percentage point	+775
Raise or lower share price earnings ratio by 1.0	+900
Operating, maintenance, and administrative cost reduction of 20 percent instead of 10 percent	+150

The main parameters that affect value are consumer rate increases, interest rates, and price-earnings ratios.

The 3 year rate freeze recently introduced by the government will reduce the value of BC Hydro by \$1,250 million from the amounts determined in this study. Our base case valuation assumed annual rate increases of 2 percent during this period.

The state of interest rates and equity markets will also greatly affect the value of BC Hydro. For example, if BC Hydro was sold three years ago when interest rates were 300 basis points higher than they are today, and the stock market was not as buoyant, requiring price-earnings ratios of 11.0 for utilities, its value would have been \$3.2 billion lower.

If government continues to impose arbitrary rate freezes, and should equity and debt markets back up to where they were three years ago, BC Hydro’s total market value could drop below its \$7.8 billion debt value.

Clearly, the time is opportune to privatize BC Hydro and maximize proceeds for the BC taxpayer.

Exhibit 1

This exhibit details the key assumptions and key financial parameters and results used to value BC Hydro.

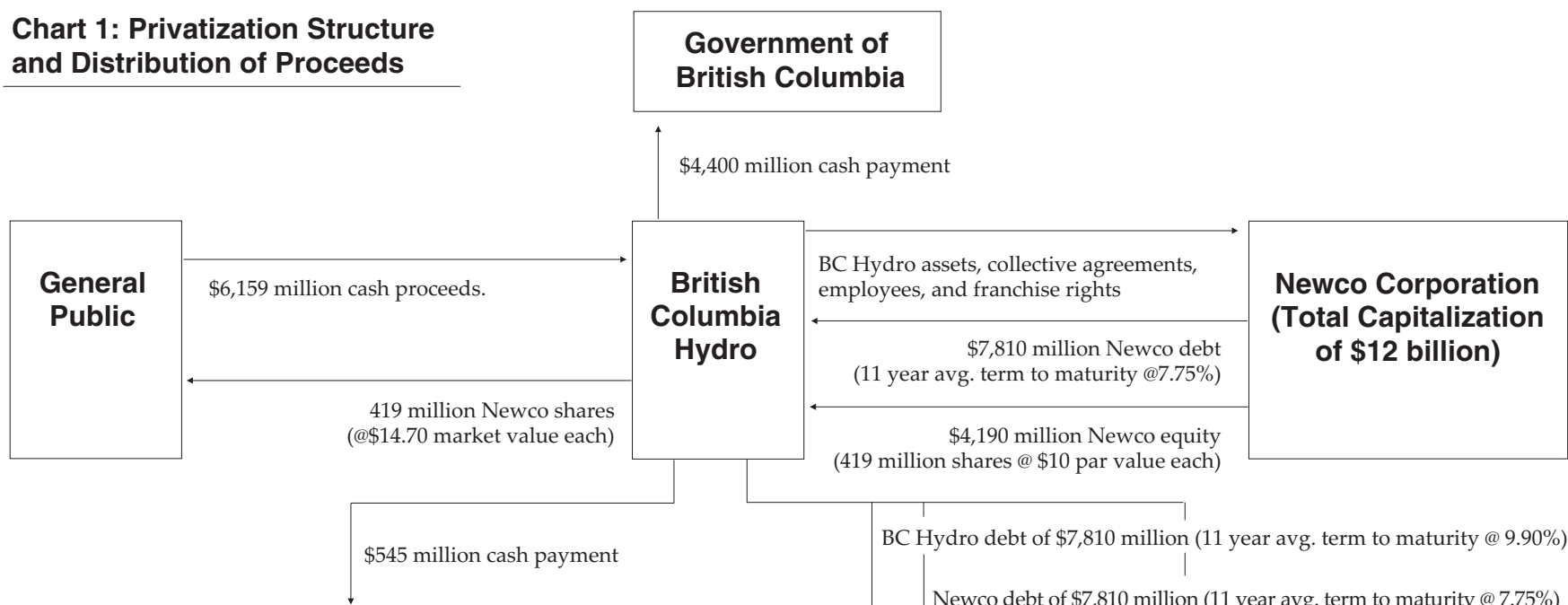
Exhibit 2

This exhibit presents 10 year financial *pro formas* for Newco, based on the key assumptions and parameters, including complete statements of operating income, equity and retained earnings, change in financial position, and balance sheets.

Exhibit 3

This exhibit presents detailed calculations of book depreciation, capital cost allowances, interest payments, income and capital taxes, electrical supply and demand forecasts, and costs of energy.

Chart 1: Privatization Structure and Distribution of Proceeds



Privatization Costs (\$ millions)	
(1) Commissions on Securities Sales	185
(2) Legal, Appraisal, Accounting & Other Costs	15
(3) BC Hydro Working Capital Deficiency	80
(4) Reserve for Accrued Employee Liabilities	65
(5) Reserve for Future Rep. & Warranty Claims	200
Total Privatization Costs	545

Impact on Annual Provincial Budget From BC Hydro Privatization (\$ millions)	
Interest Savings on \$4,400 million Govt. Debt Reduction	340
Increase in Capital Tax Payments by Newco	9
Loss of BC Hydro Dividend Payment	-146
Net Reduction in Annual Budget Deficit	203

British Columbia Hydro Debt Defeasance/ Extinguishment Trust Fund (\$ millions)	
Net Present Value of BC Hydro Debt Portfolio	9024
Less Net Present Value of Newco Debt Portfolio	-7810
Debt Defeasance / Extinguishment Shortfall	1214

Summary of Total Government Debt Elimination Resulting from BC Hydro Privatization (\$ millions)	
Book Value of BC Hydro Debt Defeased / Extinguished	7,810
Net Proceeds Available to Reduce Other Govt. Debt	4,400
Total Government Debt Reduction	12,210

EXHIBIT 1: KEY ASSUMPTIONS AND FINANCIAL PARAMETERS AND RESULTS

Assumes sale of BC Hydro assets—and assignment of BC Hydro's collective bargaining agreements, employees, and franchise rights and areas—to Newco on April 1, 1996, for the following considerations

Newco Debt	\$ 7,810 million	(Average term to maturity of 11 years with an average interest rate of 7.75%)
Newco Shares	<u>\$ 4,190 million</u>	(419,000,000 shares with a par value of \$10 per share)
Total Purchase Price	<u>\$12,000 million</u>	

Assumes BC Hydro's Working Capital (Current Assets and Liabilities) at April 1, 1996 are retained by BC Hydro

1996	NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)					
	1997 Normalized* Projections	1998 Normalized* Projections	1999 Normalized* Projections	2000 Normalized* Projections	2001 Normalized* Projections	2002 Normalized* Projections	2003 Normalized* Projections	2004 Normalized* Projections	2005 Normalized* Projections	2006 Normalized* Projections	

Key Assumptions

Total Annual Domestic Demand Growth (%)	2.80%	2.80%	2.80%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%
Annual Export Sales (\$millions)	122	125	127	130	132	135	138	141	143	146	149
Cost of Annual Export Sales (\$millions)	73	75	76	78	79	81	83	84	86	88	90
Domestic Annual Rate Increase (%)	0.00%	2.00%	2.00%	2.00%	2.50%	2.50%	2.50%	2.50%	3.00%	3.00%	3.00%
Annual BC Consumer Price Index (CPI) (%)	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
Annual Cost of New Energy Supplies (¢ per kwh.)	3.28¢	3.36¢	3.45¢	3.53¢	3.62¢	3.71¢	3.80¢	3.90¢	4.00¢	4.10¢	4.20¢
Oper. Main. & Admin. (OM&A) One Time Cost Reductions (%)	0.00%	5.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
OM&A Annual Productivity Factor (%)	0.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Annual Property Tax Real Growth Rate (%)	0.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
BC Capital Tax Rate (%)	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%
Annual Long Term Debt Interest Rate (%)	NA	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%	7.75%
Average Book Depreciation Rate (%)	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%	2.40%
Average Capital Cost Allowance Rate (%)	NA	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
Annual Net Capital Expenditures (\$millions)	479	482	486	461	487	514	543	573	604	637	673
Dividend Payout Ratio (%)	67.90%	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%

EXHIBIT 1: (Continued)

	1996	NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
		1997 Normalized* Projections	1998 Normalized* Projections	1999 Normalized* Projections	2000 Normalized* Projections	2001 Normalized* Projections	2002 Normalized* Projections	2003 Normalized* Projections	2004 Nor- malized* Projections	2005 Nor- malized* Projections	2006 Nor- malized* Projections
<i>Key Financial Parameters and Results</i>											
After Tax Return on Equity (Stabilized Earnings) (%)	NA	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%
After Tax Earnings per Share (Stabilized Earnings) (\$)	NA	1.22	1.26	1.30	1.34	1.39	1.44	1.51	1.56	1.60	1.64
Annual Increase in Earnings per Share (%)	NA	NA	3.09%	2.58%	3.30%	3.71%	4.07%	4.38%	3.51%	2.49%	2.47%
Price / Earnings Ratio	NA	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Market Price per Share (\$)	NA	14.70	15.15	15.54	16.05	16.65	17.33	18.09	18.72	19.19	19.66
Book Price per Share (\$)	NA	10.21	10.52	10.79	11.15	11.56	12.03	12.56	13.00	13.33	13.65
Market / Book Price Ratio	NA	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
Dividend per Share (\$)	NA	0.92	0.95	0.97	1.00	1.04	1.08	1.13	1.17	1.20	1.23
Dividend Yield per Share (Market Price) (%)	NA	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
Interest Coverage Ratio	NA	2.16	2.28	2.39	2.47	2.55	2.64	2.73	2.84	2.92	3.01
Debt to Equity Ratio (%)	NA	64.6/35.4	64.4/35.6	63.7/36.3	62.9/37.1	62.0/38.0	60.9/39.1	59.8/40.2	59.5/40.5	59.2/40.8	59.0/41.0
Operating Expense Ratio (%)	NA	30.5%	29.0%	28.3%	28.4%	28.5%	28.6%	28.7%	28.5%	28.4%	28.3%
Effective Federal & Provincial Income Tax Rate (%)	NA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	17.09%	21.38%	24.00%

Note: *Assumes normal weather and water levels for the year. Fiscal Years ending March 31. Totals may not add due to rounding.

EXHIBIT 2: STATEMENT OF OPERATING INCOME AND RETAINED EARNINGS

Statement of Operating Income	BC HYDRO OPERATIONS			NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
	1995 Audited Actuals (\$ mil-lions)	1995 Normalized* Actuals (\$ mil-lions)	1996 Normalized* Forecast (\$ mil-lions)	1997 Normalized* Projections (\$ millions)	1998 Normalized* Projections (\$ millions)	1999 Normalized* Projections (\$ millions)	2000 Normalized* Projections (\$ millions)	2001 Normalized* Projections (\$ millions)	2002 Normalized* Projections (\$ millions)	2003 Normalized* Projections (\$ millions)	2004 Normalized* Projections (\$ millions)	2005 Normalized* Projections (\$ millions)	2006 Normalized* Projections (\$ millions)
<i>Revenues</i>													
Residential	792	803	819	848	877	902	927	953	980	1,007	1,035	1,064	1,094
General	774	779	795	814	834	851	869	887	906	925	944	964	984
Transmission	466	480	499	513	527	538	550	561	573	585	597	610	623
Other	113	103	108	110	113	116	118	121	124	127	130	133	136
Total Domestic Revenue Before Rate Increases	2,145	2,165	2,221	2,285	2,351	2,407	2,464	2,523	2,583	2,644	2,707	2,771	2,837
Domestic Rate Increases	0	0	0	46	95	147	216	290	369	453	559	673	794
Total Domestic Revenue After Rate Increases	2,145	2,165	2,221	2,331	2,446	2,554	2,680	2,813	2,951	3,097	3,266	3,444	3,631
Gross Export Sales	142	120	122	125	127	130	132	135	138	141	143	146	149
Total Revenues	2,287	2,285	2,343	2,456	2,574	2,684	2,813	2,948	3,089	3,238	3,409	3,590	3,780
<i>Annual Percentage Increase in Total Revenues</i>	4.7%	4.7%	2.5%	4.8%	4.8%	4.3%	4.8%	4.8%	4.8%	4.8%	5.3%	5.3%	5.3%
Cost of Energy	523	483	512	553	575	602	660	722	788	858	932	1,010	1,094
<i>Annual Percentage Increase in Cost of Energy</i>	18.6%	9.5%	6.0%	8.0%	4.0%	4.7%	9.6%	9.4%	9.1%	8.9%	8.6%	8.4%	8.3%
Gross Margin	1,764	1,802	1,831	1,903	1,999	2,082	2,152	2,225	2,301	2,380	2,477	2,579	2,687
<i>Annual Percentage Increase in Gross Margin</i>	1.1%	3.3%	1.6%	3.9%	5.0%	4.2%	3.4%	3.4%	3.4%	3.4%	4.1%	4.1%	4.2%
<i>Operating Expenses</i>													
Operating, Maintenance & Administration OM&A (Baseline)	397	397	388	403	418	434	450	468	485	504	523	543	563
Less One Time Cost Savings	0	0	0	-20	-42	-43	-44	-45	-46	-47	-48	-49	-51
Plus Onetime Restructuring Costs	23	23	0	10	10	0	0	0	0	0	0	0	0
Net OM&A	420	420	388	393	387	391	407	423	439	457	475	493	513
<i>Annual Percentage Increase in OM&A</i>	2.4%	2.4%	-7.6%	1.3%	-1.5%	1.0%	4.1%	3.9%	3.8%	4.1%	3.9%	3.8%	4.1%

EXHIBIT 2: (Continued)

	BC HYDRO OPERATIONS			NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
	1995 Audited Actuals (\$ mil-lions)	1995 Nor-malized* Actuals (\$ mil-lions)	1996 Nor-malized* Forecast (\$ mil-lions)	1997 Nor-malized* Project-ions (\$ mil-lions)	1998 Nor-malized* Project-ions (\$ mil-lions)	1999 Nor-malized* Project-ions (\$ mil-lions)	2000 Nor-malized* Project-ions (\$ mil-lions)	2001 Nor-malized* Project-ions (\$ mil-lions)	2002 Nor-malized* Project-ions (\$ mil-lions)	2003 Nor-malized* Project-ions (\$ mil-lions)	2004 Nor-malized* Project-ions (\$ mil-lions)	2005 Nor-malized* Project-ions (\$ mil-lions)	2006 Nor-malized* Project-ions (\$ mil-lions)
Property & School Taxes	141	141	143	148	153	159	164	170	176	182	188	195	202
Provincial Capital Tax (0.3%)	30	30	30	39	40	40	41	41	42	43	44	44	45
Total Taxes	171	171	173	187	193	199	205	211	218	225	232	239	247
<i>Annual Percentage Increase in Taxes</i>	0.6%	0.6%	1.2%	8.1%	3.2%	3.1%	3.0%	2.9%	3.3%	3.2%	3.1%	3.0%	3.3%
<i>Total Operating Expense Ratio (As a percentage of gross margin)</i>	33.5%	32.8%	30.6%	30.5%	29.0%	28.3%	28.4%	28.5%	28.6%	28.7%	28.5%	28.4%	28.3%
Earnings Before Interest, Depreciation & Taxes (EBID&T)	1,173	1,211	1,270	1,324	1,419	1,492	1,541	1,591	1,644	1,698	1,771	1,847	1,927
<i>Annual Percentage Increase in (EBID&T)</i>	0.8%	4.0%	4.9%	4.3%	7.2%	5.1%	3.3%	3.2%	3.3%	3.3%	4.3%	4.3%	4.3%
Earnings Before Interest, Depreciation & Taxes (EBID&T)	1,173	1,211	1,270	1,324	1,419	1,492	1,541	1,591	1,644	1,698	1,771	1,847	1,927
Gross Interest Expense	748	748	776	611	621	625	625	625	623	622	624	631	640
Less Interest During Construction (IDC)	-24	-24	-26	-22	-22	-20	-21	-22	-23	-24	-26	-27	-28
Net Interest Expense	724	724	750	590	600	605	604	602	600	597	598	605	612
<i>Interest Coverage Ratio</i>	1.57	1.62	1.64	2.16	2.28	2.39	2.47	2.55	2.64	2.73	2.84	2.92	3.01
Book Depreciation	287	287	305	150	305	317	328	340	353	366	380	395	411
Net Before Tax Income	162	200	215	584	514	571	609	649	691	735	792	847	904
Federal & Provincial Income Taxes (45.34% Statutory Rate)	0	0	0	0	0	0	0	0	0	0	135	181	217
Federal Large Corporations Capital Tax (0.2%)	0	0	0	26	26	27	27	28	28	28	29	30	30
<i>Effective Federal & Provincial Income Tax Rate</i>	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.1%	21.4%	24.0%
Net After Tax Income— Before Stabilization	162	200	215	558	487	544	582	621	663	706	628	636	657

EXHIBIT 2: (Continued)

	BC HYDRO OPERATIONS			NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
	1995 Audited Actuals (\$ mil-lions)	1995 Normalized* Actuals (\$ mil-lions)	1996 Normalized* Forecast (\$ mil-lions)	1997 Normalized* Projections (\$ millions)	1998 Normalized* Projections (\$ millions)	1999 Normalized* Projections (\$ millions)	2000 Normalized* Projections (\$ millions)	2001 Normalized* Projections (\$ millions)	2002 Normalized* Projections (\$ millions)	2003 Normalized* Projections (\$ millions)	2004 Normalized* Projections (\$ millions)	2005 Normalized* Projections (\$ millions)	2006 Normalized* Projections (\$ millions)
Transfers (To) / From Stabilization Account	79	79	0	-45	42	-1	-21	-40	-58	-75	26	34	30
Net After Tax Income— After Stabilization	241	279	215	513	529	543	561	581	605	632	654	670	687
<i>Annual Percentage Increase in Stabilized After Tax Earnings</i>	-17.5%	-4.5%	-22.9%	NA	3.1%	2.6%	3.3%	3.6%	4.1%	4.5%	3.5%	2.4%	2.5%
<i>Annual Percentage Return on Equity</i>	21.4%	24.4%	18.8%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%
Statement of Equity and Retained Earnings													
Total Number of Shares Issued With Par Value of \$10	0	0	0	419 million	419 million	419 million	419 million	419 million	419 million	419 million	419 million	419 million	419 million
Total Share Capital	0	0	0	4,190	4,190	4,190	4,190	4,190	4,190	4,190	4,190	4,190	4,190
Retained Earnings at Beginning of Year	1,063	1,063	1,106	0	128	261	396	536	682	833	991	1,154	1,322
Net After Tax Income— After Stabilization	241	279	215	513	529	543	561	581	605	632	654	670	687
Less Annual Dividend Payment	-198	-198	-146	-385	-397	-407	-420	-436	-454	-474	-490	-503	-515
Retained Earnings at End of Year	1,106	1,144	1,175	128	261	396	536	682	833	991	1,154	1,322	1,493
Stabilization Account Balance at Beginning of Year	79	79	0	0	45	3	5	26	66	124	198	172	138
Transfers To / (From) Account	-79	-79	0	45	-42	1	21	40	58	75	-26	-34	-30
Stabilization Account Balance at End of Year	0	0	0	45	3	5	26	66	124	198	172	138	109
Total Equity at Beginning of Year	1,142	1,142	1,106	4,190	4,363	4,454	4,591	4,752	4,937	5,147	5,379	5,516	5,650
Total Equity at End of Year	1,106	1,144	1,175	4,363	4,454	4,591	4,752	4,937	5,147	5,379	5,516	5,650	5,792
Average Equity During the Year	1,124	1,143	1,141	4,277	4,409	4,522	4,672	4,845	5,042	5,263	5,448	5,583	5,721

Note: *Assumes normal weather and water levels for the year. Fiscal Years ending March 31. Totals may not add due to rounding.

EXHIBIT 3: STATEMENT OF CHANGE IN FINANCIAL POSITION AND BALANCE SHEET

Statement of Change in Financial Position	BC HYDRO OPERATIONS			NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
	1995 Audited Actuals (\$ millions)	1995 Normalized* Actuals (\$ millions)	1996 Normalized* Forecast (\$ millions)	1997 Normalized* Projections (\$ millions)	1998 Normalized* Projections (\$ millions)	1999 Normalized* Projections (\$ millions)	2000 Normalized* Projections (\$ millions)	2001 Normalized* Projections (\$ millions)	2002 Normalized* Projections (\$ millions)	2003 Normalized* Projections (\$ millions)	2004 Normalized* Projections (\$ millions)	2005 Normalized* Projections (\$ millions)	2006 Normalized* Projections (\$ millions)
<i>Operating Activities</i>													
Net After Tax Income—Before Stabilization	162	200	215	558	487	544	582	621	663	706	628	636	657
Depreciation	296	296	315	150	305	317	328	340	353	366	380	395	411
Working Capital Changes & Other Non Cash Items	67	67	0	0	0	0	0	0	0	0	0	0	0
Funds Provided by Operating Activities	525	563	530	708	793	861	910	961	1,016	1,073	1,008	1,031	1,068
<i>Investing Activities</i>													
Capital Asset Expenditures	-424	-424	-478	-478	-478	-450	-472	-494	-518	-543	-569	-596	-625
PowerSmart (Demand Side Management) Expenditures	-59	-59	-65	-70	-75	-80	-86	-92	-99	-106	-113	-121	-130
Customer Contributions in Aid of Construction	60	60	62	64	65	67	68	70	72	74	76	77	79
Asset Recoveries	2	2	2	2	2	2	2	2	2	2	2	2	3
Funds Needed by Investing Activities	-421	-421	-479	-482	-486	-461	-487	-514	-543	-573	-604	-637	-673
Dividend Payments	-198	-198	-146	-385	-397	-407	-420	-436	-454	-474	-490	-503	-515
<i>Dividend Payout Ratio (as a % of after tax stabilized earnings)</i>	82.2%	71.0%	67.9%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Net (Increase) or Decrease in Debt	-94	-56	-95	-159	-90	-7	2	12	19	26	-86	-108	-120

EXHIBIT 3: (Continued)

	BC HYDRO OPERATIONS			NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
	1995 Audited Actuals (\$ millions)	1995 Normalized* Actuals (\$ millions)	1996 Normalized* Forecast (\$ millions)	1997 Normalized* Projections (\$ millions)	1998 Normalized* Projections (\$ millions)	1999 Normalized* Projections (\$ millions)	2000 Normalized* Projections (\$ millions)	2001 Normalized* Projections (\$ millions)	2002 Normalized* Projections (\$ millions)	2003 Normalized* Projections (\$ millions)	2004 Normalized* Projections (\$ millions)	2005 Normalized* Projections (\$ millions)	2006 Normalized* Projections (\$ millions)
Balance Sheet													
<i>Assets</i>													
Capital Assets in Service at Beginning of Year (Original Value)	12,049	12,049	12,532	12,000	12,482	12,968	13,429	13,916	14,430	14,973	15,546	16,150	16,787
Less Accumulated Depreciation	-3,764	-3,764	-4,079	-150	-455	-772	-1,100	-1,440	-1,793	-2,159	-2,539	-2,934	-3,345
Plus Current Year Capital Additions	327	327	347	482	486	461	487	514	543	573	604	637	673
Net Capital Assets in Service at End of Year	8,612	8,612	8,800	12,333	12,513	12,657	12,816	12,990	13,180	13,386	13,610	13,852	14,115
Current Assets (Receivables & Prepaid Expenses)	700	700	700	734	769	802	840	881	923	967	1,018	1,072	1,129
Deferred Costs / (Credits)	297	297	273	0	0	0	0	0	0	0	0	0	0
Total Assets	9,609	9,609	9,773	13,067	13,282	13,459	13,656	13,871	14,103	14,353	14,628	14,924	15,244
<i>Liabilities</i>													
Long Term Debt at Beginning of Year	7,622	7,622	7,716	7,810	7,969	8,059	8,066	8,064	8,052	8,033	8,007	8,093	8,202
Net Increase or (Decrease) in Debt During the Year	94	56	95	159	90	7	-2	-12	-19	-26	86	108	120
Long Term Debt at End of Year	7,716	7,678	7,811	7,969	8,059	8,066	8,064	8,052	8,033	8,007	8,093	8,202	8,322
Current Liabilities (Accounts Payable & Accrued Expenses)	787	787	787	734	769	802	840	881	923	967	1,018	1,072	1,129
Equity & Retained Earnings at End of Year	1,106	1,144	1,175	4,363	4,454	4,591	4,752	4,937	5,147	5,379	5,516	5,650	5,792
Total Liabilities	9,609	9,609	9,773	13,067	13,282	13,459	13,656	13,871	14,103	14,353	14,628	14,924	15,244
<i>Debt-to-Equity Ratio</i>	<i>87.5/12.5</i>	<i>87.0/13.0</i>	<i>86.9/13.1</i>	<i>64.6/35.4</i>	<i>64.4/35.6</i>	<i>63.7/36.3</i>	<i>62.9/37.1</i>	<i>62.0/38.0</i>	<i>60.9/39.1</i>	<i>59.8/40.2</i>	<i>59.5/40.5</i>	<i>59.2/40.8</i>	<i>59.0/41.0</i>

Note: *Assumes Normal Weather and Water Levels for the Year. Fiscal Years Ending March 31. Totals May Not Add Due To Rounding.

EXHIBIT 4: SUPPORTING INFORMATION

	Base Assumptions	NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
		1997 Normalized* Projections (\$ millions)	1998 Normalized* Projections (\$ millions)	1999 Normalized* Projections (\$ millions)	2000 Normalized* Projections (\$ millions)	2001 Normalized* Projections (\$ millions)	2002 Normalized* Projections (\$ millions)	2003 Normalized* Projections (\$ millions)	2004 Normalized* Projections (\$ millions)	2005 Normalized* Projections (\$ millions)	2006 Normalized* Projections (\$ millions)
<i>Calculation of Book Depreciation</i>											
Average Depreciation Rate Used	2.40%										
Straight Line Depreciation on Purchased Assets	12,000	144	288	288	288	288	288	288	288	288	288
Straight Line Depreciation on Year 1 Net Capital Expenditure	482	6	12	12	12	12	12	12	12	12	12
Straight Line Depreciation on Year 2 Net Capital Expenditure	486	0	6	12	12	12	12	12	12	12	12
Straight Line Depreciation on Year 3 Net Capital Expenditure	461	0	0	6	11	11	11	11	11	11	11
Straight Line Depreciation on Year 4 Net Capital Expenditure	487	0	0	0	6	12	12	12	12	12	12
Straight Line Depreciation on Year 5 Net Capital Expenditure	514	0	0	0	0	6	12	12	12	12	12
Straight Line Depreciation on Year 6 Net Capital Expenditure	543	0	0	0	0	0	7	13	13	13	13
Straight Line Depreciation on Year 7 Net Capital Expenditure	573	0	0	0	0	0	0	7	14	14	14
Straight Line Depreciation on Year 8 Net Capital Expenditure	604	0	0	0	0	0	0	0	7	14	14
Straight Line Depreciation on Year 9 Net Capital Expenditure	637	0	0	0	0	0	0	0	0	8	15
Straight Line Depreciation on Year 10 Net Capital Expenditure	673	0	0	0	0	0	0	0	0	0	8
Total Annual Book Depreciation		150	305	317	328	340	353	366	380	395	411
<i>Calculation of Capital Cost Allowance</i>											
Average Capital Cost Allowance Rate Used	8.00%										
Value of Purchased Assets	12,000										
Less Value of 100% CCA Assets (Mainly PowerSmart)	-370										
CCA Pool Start of the Year—Excluding PowerSmart	11,630	11,630	11,561	11,030	10,514	10,057	9,658	9,311	9,014	8,764	8,559
Net Capital Expenditure for the Year—Excluding PowerSmart		412	411	381	401	422	444	467	491	516	543

EXHIBIT 4: (Continued)

	Base Assump-tions	NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
		1997 Nor-malized* Project-ions (\$ mil-lions)	1998 Nor-malized* Project-ions (\$ mil-lions)	1999 Nor-malized* Project-ions (\$ mil-lions)	2000 Nor-malized Project-ions (\$ mil-lions)	2001 Nor-malized* Project-ions (\$ mil-lions)	2002 Nor-malized* Project-ions (\$ mil-lions)	2003 Nor-malized* Project-ions (\$ mil-lions)	2004 Nor-malized* Project-ions (\$ mil-lions)	2005 Nor-malized* Project-ions (\$ mil-lions)	2006 Nor-malized* Project-ions (\$ mil-lions)
CCA Allowance on CCA Pool		-465	-925	-882	-841	-805	-773	-745	-721	-701	-685
CCA Allowance on Annual Capital Expenditure		-16	-16	-15	-16	-17	-18	-19	-20	-21	-22
Total CCA Allowance		-482	-941	-898	-857	-821	-790	-764	-741	-722	-706
CCA Pool End of the Year—Excluding PowerSmart		11,561	11,030	10,514	10,057	9,658	9,311	9,014	8,764	8,559	8,395
<i>Calculation of Income Taxes</i>											
Earnings Before Interest Depreciation & Taxes (EBID&T)		1,324	1,419	1,492	1,541	1,591	1,644	1,698	1,771	1,847	1,927
Less Net Interest Costs		-590	-600	-605	-604	-602	-600	-597	-598	-605	-612
Less Annual Capital Cost Allowance		-482	-941	-898	-857	-821	-790	-764	-741	-722	-706
Less 100% CCA Assets (Mainly PowerSmart)		-255	-260	-80	-86	-92	-99	-106	-113	-121	-130
Less Loss Carry Forwards		0	-3	-385	-475	-481	-406	-251	-20	0	0
Equals Taxable Income		-3	-385	-475	-481	-406	-251	-20	298	399	478
Federal & Provincial Income Taxes Payable	45.34%	0	0	0	0	0	0	0	135	181	217
<i>Calculation of Capital Taxes</i>											
Average Liabilities for the Year		12,166	12,423	12,585	12,737	12,903	13,085	13,283	13,498	13,731	13,983
Plus Current Liabilities		734	769	802	840	881	923	967	1,018	1,072	1,129
Capital Tax Base		12,900	13,192	13,387	13,577	13,783	14,007	14,250	14,516	14,803	15,112
Provincial Capital Tax Payable (with \$1.25 million exemption)	0.30%	39	40	40	41	41	42	43	44	44	45
Federal Capital Tax Payable (with \$10 million exemption)	0.20%	26	26	27	27	28	28	28	29	30	30
<i>Calculation of Interest</i>											
Average Debt Outstanding for the Year		7,890	8,014	8,063	8,065	8,058	8,043	8,020	8,050	8,147	8,262
Gross Interest Cost Before IDC	7.75%	611	621	625	625	625	623	622	624	631	640

EXHIBIT 4: (Continued)

	Base Assump-tions	NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
		1997 Nor-malized* Project-ions (\$ mil-lions)	1998 Nor-malized* Project-ions (\$ mil-lions)	1999 Nor-malized* Project-ions (\$ mil-lions)	2000 Nor-malized Project-ions (\$ mil-lions)	2001 Nor-malized* Project-ions (\$ mil-lions)	2002 Nor-malized* Project-ions (\$ mil-lions)	2003 Nor-malized* Project-ions (\$ mil-lions)	2004 Nor-malized* Project-ions (\$ mil-lions)	2005 Nor-malized* Project-ions (\$ mil-lions)	2006 Nor-malized* Project-ions (\$ mil-lions)
<i>Domestic Demand Growth Assumptions (Annual percentage increases)</i>											
	1996 (%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Residential	3.50%	3.50%	3.50%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%	2.80%
General	2.40%	2.40%	2.40%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%
Transmission	2.80%	2.80%	2.80%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%
Other	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%
Total Demand Growth	2.80%	2.80%	2.80%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%
<i>Domestic Demand Requirements (Annual GWhrs. consumed)</i>											
	1996 (GWhr)	(GWhrs.)	(GWhrs.)	(GWhrs.)	(GWhrs.)	(GWhrs.)	(GWhrs.)	(GWhrs.)	(GWhrs.)	(GWhrs.)	(GWhrs.)
Residential	13,603	14,079	14,572	14,980	15,399	15,831	16,274	16,729	17,198	17,679	18,174
General	14,929	15,287	15,654	15,983	16,318	16,661	17,011	17,368	17,733	18,105	18,486
Transmission	14,568	14,976	15,395	15,718	16,048	16,385	16,729	17,081	17,440	17,806	18,180
Other	1,330	1,360	1,392	1,424	1,457	1,490	1,524	1,559	1,595	1,632	1,669
Total Demand	44,430	45,702	47,013	48,105	49,223	50,367	51,539	52,738	53,966	55,222	56,509
<i>Domestic Supply Sources (Annual GWhrs. supplied)</i>											
Firm Hydro	42,938	43,964	45,379	46,370	46,370	46,370	46,370	46,370	46,370	46,370	46,370
Burrard Thermal	3,145	3,145	3,145	3,145	3,145	3,145	3,145	3,145	3,145	3,145	3,145
Gas Turbines	201	550	550	550	550	550	550	550	550	550	550
Existing Independent Power Producer Contracts	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700
New Independent Power Producer Contracts and Purchases	0	0	0	188	1,396	2,631	3,897	5,192	6,518	7,875	9,265
Less Line Losses	-3,554	-3,656	-3,761	-3,848	-3,938	-4,029	-4,123	-4,219	-4,317	-4,418	-4,521
Total Supply	44,430	45,702	47,013	48,105	49,223	50,367	51,539	52,738	53,966	55,222	56,509

EXHIBIT 4: (Continued)

	Base Assump- tions	NEWCO OPERATIONS (Years 1 to 5)					NEWCO OPERATIONS (Years 6 to 10)				
		1997 Nor- malized* Project- ions (\$ mil- lions)	1998 Nor- malized* Project- ions (\$ mil- lions)	1999 Nor- malized* Project- ions (\$ mil- lions)	2000 Nor- malized* Project- ions (\$ mil- lions)	2001 Nor- malized* Project- ions (\$ mil- lions)	2002 Nor- malized* Project- ions (\$ mil- lions)	2003 Nor- malized* Project- ions (\$ mil- lions)	2004 Nor- malized* Project- ions (\$ mil- lions)	2005 Nor- malized* Project- ions (\$ mil- lions)	2006 Nor- malized* Project- ions (\$ mil- lions)
<i>Supply Cost Assumptions (Annual cost per GWhr.)</i>											
	1996 (\$000)	(\$000s)	(\$000s)	(\$000s)	(\$000s)	(\$000s)	(\$000s)	(\$000s)	(\$000s)	(\$000s)	(\$000s)
Firm Hydro (Water Rentals)	5,930	6,078	6,230	6,386	6,545	6,709	6,877	7,048	7,225	7,405	7,590
Burrard Thermal	24,118	24,721	25,339	25,973	26,622	27,288	27,970	28,669	29,386	30,120	30,873
Gas Turbines	61,193	62,722	64,290	65,898	67,545	69,234	70,965	72,739	74,557	76,421	78,332
Existing Independent Power Producer Contracts	56,503	57,916	59,364	60,848	62,369	63,928	65,526	67,164	68,844	70,565	72,329
New Independent Power Producer Contracts and Purchases	32,800	33,620	34,461	35,322	36,205	37,110	38,038	38,989	39,964	40,963	41,987
<i>Calculation of Cost of Energy (Supply source multiplied by supply cost)</i>											
	1996 (\$mil.)	(\$ mil- lions)	(\$ mil- lions)	(\$ mil- lions)	(\$ mil- lions)	(\$ mil- lions)	(\$ mil- lions)	(\$ mil- lions)	(\$ mil- lions)	(\$ mil- lions)	(\$ mil- lions)
Firm Hydro (Water Rentals)	255	267	283	296	304	311	319	327	335	343	352
Burrard Thermal	76	78	80	82	84	86	88	90	92	95	97
Gas Turbines	12	34	35	36	37	38	39	40	41	42	43
Existing Independent Power Producer Contracts	96	98	101	103	106	109	111	114	117	120	123
New Independent Power Producer Contracts and Purchases	0	0	0	7	51	98	148	202	260	323	389
Cost of Export Sales	73	75	76	78	79	81	83	84	86	88	90
Total Annual Cost of Energy	512	553	575	602	660	722	788	858	932	1,010	1,094

Note: *Assumes Normal Weather and Water Levels for the Year. Fiscal Years Ending March 31. Totals May Not Add Due To Rounding.