Final Report of the State Planning Office on the Proposed Hydro-Québec Power Purchase

April 1988

Maine State Planning Office

Richard H. Silkman, Director

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STATE OF MAINE

EXECUTIVE DEPARTMENT

STATE PLANNING OFFICE

JOHN R. McKERNAN, JR.
GOVERNOR

RICHARD H. SILKMAN
DIRECTOR

April 4, 1988

Dear Governor McKernan,

I am pleased to submit to you the Final Report of the State Planning Office on the proposed purchase of power from Hydro-Québec.

This report builds on the results of the Preliminary Report on the Effects of the Proposed Purchase of Power From Hydro-Québec produced in May of 1987 by the Special Study Group on the Hydro-Québec Purchase. The purpose of this analysis is to assess whether the proposed power purchase is an appropriate means of meeting Maine's energy needs. It is reviewed here in the context of Maine's energy, economic and environmental policy to determine the degree to which a large Hydro-Québec purchase is consistent with the broader interests of Maine citizens.

The analysis, conclusions, and recommendations presented here cannot hope to substitute for the in-depth regulatory review necessary for a prudent decision on the many complex issues presented by this proposal. Rather, they are offered to help guide the debate on these important issues and to inform the reader as to their dimensions.

In this review, we have attempted to identify and assess the primary risks of the proposed purchase to Maine ratepayers and citizens. Our conclusion is as follows:

While CMP's proposal to purchase significant amounts of electricity from Hydro-Québec does present certain risks, it appears that the means exist to manage those risks. We have cited a number of specific actions which have been taken or could be taken to mitigate and/or compensate for the potential adverse impacts of the proposed purchase and transmission line. It is our considered assessment that the proposed Hydro-Québec purchase has the potential of meeting many of Maine's energy, economic development, and environmental goals.

Accordingly, we recommend that CMP be encouraged to continue to pursue direct negotiations with Hydro-Québec and to advance its proposals before the appropriate State and Federal regulatory bodies. However, we recommend withholding any endorsement of the proposal until those regulatory bodies have conducted their reviews and issued their findings.

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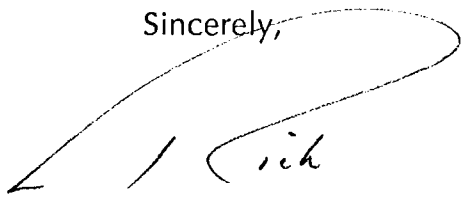
I note that this work relied on the assistance and advice of staff from several State agencies especially the Office of Energy Resources, the Office of the Public Advocate, the Public Utilities Commission, the Department of Environmental Protection, and the Department of Conservation. Nonetheless, the conclusions and recommendations are the sole responsibility of the State Planning Office.

Thank you for this opportunity to assist you and the people of Maine.

Sincerely,



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EXECUTIVE SUMMARY

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MANAGING THE PRICE RISK

Further assessment of the price risk of the Hydro-Québec contract will come through the PUC review process. In advance of regulatory review, this analysis reveals that the price of Hydro-Québec power:

> will not be subject to the volatility of past energy sources and will rise at a rate at or below inflation;
>
> offers more predictability than an equal amount of power from alternative sources; and
>
> has already significantly lowered the price of power in Maine.

MANAGING THE DEMAND RISK

As with the price risk, the risk of over-supply or inability to market the excess Hydro-Québec power will receive close scrutiny by the PUC. On its face, however, the demand risk appears to be reasonably managed. Current demand forecasts for Maine and New England indicate a growing need for electricity sources. Supply forecasts suggest that capacity will be in place to handle the increased demand. However, these forecasts ignore the possibility that planned expansions, such as Seabrook, may be further forestalled. Further, should planned supplies materialize, the available power will certainly be more expensive than

Hydro-Québec. In any case, the project will not be pursued if export markets cannot be found prior to contract execution.

MANAGING THE RELIABILITY RISKS

The issue of technical reliability will be assessed in some detail by State and federal agencies. It is clear at this point that Hydro-Québec has made a serious commitment to bring its system up to U.S. reliability standards. In addition, Maine electricity consumers stand to gain benefits beyond the power purchase from the presence of the tie to Hydro-Québec. Finally, arguments regarding the risk of an arbitrary cut-off of electricity are simply not convincing in light of the importance of energy exports to Québec's economy.

MANAGING THE RISK TO MAINE'S SMALL POWER PRODUCTION INDUSTRY

Approval of the Hydro-Québec proposal will not affect those small power production facilities now under construction in Maine or planned to meet contracted pur-chases. Moreover, CMP's latest preferred Hydro-Québec option includes an additional 100 MW of purchased power. Opportunities for still more small power expansion appear to exist within the context of CMP's load forecast and in export markets in southern New England.

Transmission capacity between Maine and southern New England, current forest resource management practices, and the cumulative environmental impacts of biomass power production appear to present more significant barriers to expanding the small power production industry in Maine than does the Hydro-Québec purchase.

MANAGING THE ENVIRONMENTAL AND HEALTH RISKS

It is difficult to evaluate the environmental risks specific to the Hydro-Québec transmission line in advance of a formal application with the Department of Environmental Protection and the Land Use Regulation Commission. When submitted, the application will reflect CMP's site selection and mitigation efforts and will receive an extensive environmental review by the Federal Economic Regulatory Administration, the Maine Department of Environmental Protection and the Land Use Regulation Commission.

It is clear, however, that in traversing western Maine, the transmission line will have some impact on the natural habitat and visual character of the region. This impact must be assessed in relation to the environmental impact of alternative electricity sources. In the absence of Hydro-Québec, Maine's natural environment, scenic resources and property values would be subject to the effects of power plant emissions, ash disposal, transmission lines, and biomass harvesting.

Very little definitive information is available at this writing regarding the health effects of high voltage transmission lines. No evidence has been found that DC (direct current) lines pose any risk to human health. However, a recent New York Public Service Commission study found an association between high-voltage

AC (alternating current) lines and childhood cancer. The absence of corroborative research led the authors to assert that the link remains no more than a hypothesis. Most of the proposed Hydro-Québec transmission line (3/5) will be DC transmission.

The presence of the AC line association lends credence to a call for caution in the siting of high-voltage power lines. While authority for mitigation lies with State regulatory agencies, it would be prudent to take special measures to avoid siting the lines near residences.

Summary of Conclusions and Recommendations

CONCLUSIONS

To summarize the findings of this analysis:

1. Barring unforeseen regulatory barriers, the Hydro-Québec purchase appears to be consistent with many of Maine's energy, economic development, and environmental protection goals. While the Hydro-Québec proposal presents certain risks to ratepayers and citizens, the means exist to manage those risks adequately .

2. The proposed Hydro-Québec purchase need not preclude prudent development of additional cogeneration and small power production in Maine.

3. Conservation and load management remain the favored means among energy options to address Maine's future energy needs. However, the level of uncertainty about how much of their potentials can be achieved makes decisions to defer capacity additions based on the hopes of high success rates imprudent.

4. Uncertainty remains regarding the environmental and health effects of the Hydro-Québec transmission line.

RECOMMENDATIONS

The recommendations from this assessment can be summarized as follows:

1. Small power producers in Maine should be assured competitive access to power markets in Maine and southern New England.

2. Continued aggressive development of conservation and load management programs should be pursued.

3. Siting the right-of-way corridor for the Hydro-Québec transmission line should include an added margin of safety.

CHAPTER 1

INTRODUCTION

OVERVIEW

In May of 1987, the State Planning Office released the report of an inter-agency study group entitled Preliminary Report on the Effects of the Proposed Purchase of Power from Hydro-Québec. The report presented a preliminary examination of the issues raised by the Central Maine Power Company (CMP) proposal to purchase 900 MW of power from Hydro-Québec. That analysis included a comparison of the economic and environmental benefits and risks of the proposed purchase compared with Maine-based energy alternatives.[1]

The principle benefits of the Hydro-Québec purchase include a known amount of power at a fixed real cost for nearly 30 years. It offers a large block of power at a comparatively low price, in a form that may be environmentally superior to viable alternatives.[2] Among the risks of this proposal are the chance that the fixed Hydro-Québec contract price may turn out to be higher than other alternatives, that demand for the full amount of purchased power may not materialize, resulting in penalty payments by CMP to Hydro-Québec, and that Maine may forfeit the benefits of further growth of its domestic small power production industry.

This final report assesses whether the proposed Hydro-Québec power purchase is an appropriate means of meeting Maine's energy needs within the context of broader State policy goals. Building on our preliminary findings, it examines the risks and uncertainties of the the Hydro-Québec purchase, the factors now in place that mitigate them, and proposals for additional Risk Management. This analysis is not a substitute for in-depth regulatory review, but rather, serves as an initial assessment of the degree to which a large Hydro-Québec purchase is consistent with the interests of Maine citizens.

The size, scope and complexity of the Hydro-Québec proposal presents Maine government and citizens with a difficult decision. If approved, the Hydro-Québec power purchase will likely be the single largest investment in the Maine electricity supply for the next two decades. The dimensions of this proposal in terms of capacity, 900 MW, duration, nearly 30 years, and financial investment, nearly $9 billion, will have serious implications for Maine's energy future.

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[1] The Executive Summary of the Preliminary Report is included in Appendix 1 of this report.

[2] For details see Letter of Intent between Central Maine Power Company and Hydro-Quebec, Appendix 2.

But the Hydro-Québec purchase also has important implications for Maine's future economic growth and environmental quality. It will affect the cost of electricity in Maine for the next 28 years, influence the future of the domestic small power production industry, and necessitate the construction and operation of a large transmission line through undeveloped western Maine.

The remainder of this chapter describes the elements of risk and uncertainty inherent in energy planning. Chapter II begins with a synopsis of Maine energy, economic development and environmental protection policy with respect to meeting Maine's future energy needs. This is followed by a discussion of the risks of the Hydro-Québec purchase and the measures designed to manage those risks. The final chapter presents the conclusions of the risk assessment, proposes additional Risk Management measures, and identifies issues to be resolved by the Maine Public Utilities Commission, the State Department of Environmental Protection and the Land Use Regulation Commission.

MANAGING RISKS OF POWER PURCHASES

To sort out the multifaceted character of the Hydro-Québec proposal, this report focuses on risk and uncertainty. "Risk" implies the possibility of an unintended adverse outcome of a decision. We all face risks several times a day. In deciding what we eat, where we go, and how we get there, we make implicit or explicit assessments of the benefits and dangers involved. In considering a course of action that entails risk, we weigh the magnitude of the danger and the chance that it will occur against the expected gains.

An alternative to abandoning a venture that involves risk is to take steps to "manage" that risk. Risk management can be accomplished in two ways—mitigation and compensation. First, risk can be mitigated either by reducing the likelihood of an unfavorable outcome, or lessening the undesired effect. Fire retardant material makes a fire less likely, while earthquake resistant construction lessens the damage caused by a tremor. Investment risks can be moderated by special contract conditions such as ceiling prices and escape clauses.

Even with mitigation measures in place, some risk may remain often leading to the the second means of risk management—compensation. In financial investments, for example, rates of return increase with the level of risk inherent in a venture. Investors can be further induced to take reasonable risks by the potential for higher rewards associated with the venture. The investor is offered compensation for excepting a higher level of risk.

Assessing the best means of mitigating a risk or determining appropriate compensation requires knowledge. "Uncertainty," then, is the lack of knowledge necessary to manage risk effectively. Information about current and anticipated conditions—economic, environmental, social, etc.—can reduce the uncertainties associated with an action, thus providing another risk management tool.

An investor can reduce the risk of an investment in a particular product by conducting marketing studies to assess consumer demand for that product. The same investor might further reduce the uncertainty of the investment by producing demographic forecasts or other indicators of future demand. Armed with such knowledge the investor can determine how much return to expect at what level of risk.

A long-term power purchase contract, as with all long-term investments, includes several risks to the public interest. It requires a utility, and ultimately ratepayers, to pay a predetermined price over a period of several years for a set amount of power. Calculation of this price is typically based on current and anticipated costs of energy from alternative sources—"avoided costs." One risk of such a purchase is that of being locked into too high a price, i.e., the contracted price may turn out to be higher than the actual cost of electricity from alternative sources. The initial small power production contracts entered into by Maine utilities are a case in point.

Pursuant to the federal Public Utility Regulatory Policies Act (PURPA) and corresponding State law, Maine utilities have entered into long-term power purchase contracts with cogenerators and small power producers (SPP) at what the utilities estimated to be their "avoided costs." These estimates of potential future energy costs set prices for power purchases that were thought to be somewhat below, but more stable than, the anticipated costs of oil and/or coal fired power plants. In the mid-1980's, shortly after Maine utilities entered into several power purchase contracts, world oil prices collapsed, as did oil-fired electricity prices. Because the long-term PURPA contracts set the price of purchased electricity, Maine electricity costs will increase just as oil and coal prices are declining.

A second risk is that of contracting for too much or not enough electricity. If capacity additions are made only in response to actual shortfalls, we run the risk of costly and disruptive electricity outages. On the other hand, if we build too much capacity, ratepayers are burdened with the cost of unnecessary power plants. Because of the time lag between planning and installing significant amounts of new large electric generating capacity, 10-13 years for new base load coal plants, for example, utilities are forced to base new capacity decisions on projected future demand. Unfortunately, economic forecasting remains more art than science. As a result there is always the risk that demand projections, especially long-range forecasts, will be too high or too low.

In addition to the price and demand risks of purchased power, there are uncertainties regarding potential harm to the natural environment. The Preliminary Report described the types of environmental impacts associated with various energy alternatives. The use of biomass fuel, especially municipal waste, wood and peat, presents the uncertainties of greatest concern. These include the availability and cost of safe ash disposal, impacts on wood and peat resources and safe levels of toxic emissions such as dioxin.

Assessing and managing the risks to ratepayers and to the public interest of securing long-term energy supplies is the role of the Public Utilities Commission

(PUC). This commission is empowered by the State Legislature to en-sure that Maine utilities provide adequate and reliable service at reasonable rates. By setting the rates charged to consumers for electricity, approving or denying large utility investments such as this purchase and the associated transmission line, and ruling on numerous related issues, the PUC seeks to guide utilities to make prudent investments for both shareholders and ratepayers.

Managing the environmental risks associated with energy supply is the task of the Department of Environmental Protection (DEP), and in some cases, the Land Use Regulation Commission (LURC). The DEP administers laws and regulations related to the protection and improvement of Maine's natural environment. LURC serves as the planning and zoning board for the unorganized territories of Maine. It is responsible for reviewing applications for utility lines and power plants within its jurisdiction to promote the health, safety and general welfare of the people of Maine.

All these regulatory bodies seek to manage the risks associated with securing an adequate power supply. Through extensive information gathering they reduce the uncertainties of proposed actions and then design risk management measures to protect the public interest.

Risks and uncertainties are inherent in all important public policy decisions: the risk of failure to achieve desired ends, of causing unintended harm to the public interest; uncertainties regarding new technologies and future socio-economic conditions. And policy makers seldom face the simplicity of deciding between taking an action or not taking it. They are more often confronted with choosing between competing alternatives and the conflicting public interests inevitably connected with them. When a decision has long-term ramifications, as in providing for electricity needs for the next 30 years, balancing competing public interests becomes especially difficult. The Hydro-Québec power purchase proposal is such a decision.

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CHAPTER 2
HYDRO-QUEBEC AND PUBLIC POLICY IN MAINE

ENERGY POLICY

Maine's energy policy has been shaped largely by the desire to escape this State's historic dependence on oil and the associated price and supply vagaries. The petroleum price and supply shocks of the 1970's and the potential for continued volatility have compelled Maine to pursue policies aimed at developing more desirable alternative sources of electricity.[3]

Today the goal of Maine's energy policy is to "promote the present and future economic well-being of Maine residents and businesses by ensuring the availability of reliable energy at the lowest possible cost."[4] Achieving this goal as it relates to electricity supply has revolved around developing a diversity of electricity sources at low and predictable prices and encouraging cost-effective energy conservation. Maine's energy goals include promoting the use of Maine's renewable forest resources in domestic power production and the purchase of cost-effective power from Canadian provinces.[5]

ECONOMIC DEVELOPMENT POLICY

Maine's energy goals are rooted in the State's economic develop-ment policy to enhance and protect the economic well-being of Maine's citizens. As articulated by Governor John R. McKernan, that policy can be achieved by encouraging the development of quality job opportunities for citizens around the State and by improving the business environment in Maine. It is here that Maine energy policy goals and the Hydro-Québec proposal present a potential paradox.

To the extent that it offers low-cost power, the Hydro-Québec purchase will allow Maine citizens and businesses to spend less of their incomes on their energy needs. In addition to lowering costs, its long-term price stability provides for more predictable energy costs, thereby enhancing the investment climate in

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[3] While world oil prices tumbled in 1986, the Office of Energy Resources projects that the price of crude oil will increase to the $40-$50 per barrel range before dropping back to $30 per barrel in 1995, and then rise again to above $50 per barrel by 2005.

[4] State of Maine Energy Resources Plan. Office of Energy Resources. October 1987. Page 7.

[5] Ibid. Page 15.

Maine. As these benefits accrue to Maine businesses, their competitive positions are improved, and Maine becomes a better place to start or expand business.

On the other hand, if Maine can supply its own electricity from cost-effective domestic production, the State can gain the price benefits cited above and, at the same time, increase employment opportunities and Maine's energy independence. This raises the question whether the Hydro-Québec purchase will jeopardize the fledgling domestic small power production industry in Maine and the economic benefits associated with its expansion.

ENVIRONMENTAL POLICY

Public policy in Maine has long recognized that economic growth must be balanced with the desire of most Maine citizens to preserve the qualities that make Maine special. This State's wealth of natural resources, unparalleled beauty and high degree of environmental quality are not only crucial to sustained economic prosperity but are indispensable elements of the quality of life enjoyed by Maine's citizens. Consequently, a system of State environmental regulation, resource protection, and land use laws seek to ensure that development and other actions do not unreasonably degrade the quality of Maine's natural environment.

The growing energy demands of a prosperous economy are increasingly colliding with the desire to preserve Maine's unspoiled character. Today, as energy demand threatens to outstrip the capacity to produce it, decision makers are faced with selecting the least harmful of undesirable effects.

MANAGING THE RISKS OF HYDRO-QUEBEC

All methods of securing long-term power, whether purchased or utility-owned, entail risks. The Hydro-Québec proposal is no exception. And like all long-term investments, the terms of the Hydro-Québec proposal provide conditions designed to mitigate some risks and to compensate for others. The Hydro-Québec power purchase presents two types of risks: 1) direct risks, those immediately related to the conditions of the purchase contract; and 2) the ancillary, or indirect, risks of implementing the purchase.

For the most part, the contract conditions providing for management of Hydro-Québec-related risks are aimed at addressing the direct risks. They include cost escalators, price ceilings and floors, preconditions to contract signing, and other factors, as described below. The indirect risks to the interests of Maine citizens raise issues well beyond the purchase itself. In this category belong impacts on the small power production industry, the health and environmental effects of transmission lines, transmission bottlenecks, and forest resource management. Managing these indirect risks will require actions beyond the conditions of the Hydro-Québec purchase agreement by numerous groups including the State of Maine.

The remainder of this chapter will describe the direct and indirect risks to State policy goals presented by the Hydro-Québec proposal. Each risk identification is followed by a description of current or proposed risk management measures. Implicit in this assessment of the risks of Hydro-Québec is the knowledge that approval of the Hydro-Québec proposal will only come after extensive review by the Maine Public Utilities Commission, the Department of Environmental Protection and the Land Use Regulation Commission.

DIRECT RISKS

Risk 1 Hydro-Québec May Be Priced Higher Than Alternatives.

Like other options, the Hydro-Québec proposal runs the risk of costing CMP ratepayers more than electricity from alternative sources. When first proposed, the principle benefits of the Hydro-Québec proposal were the level and predictability of the price of power. Hydro-Québec power is priced at about 75% of CMP's "avoided costs," based, untill recently, largely on the cost of power from a new coal-fired plant.[6] The levelized cost of Hydro-Québec power beginning in 1993 and extending through 2020 is estimated at close to 9.7 cents per Kwh compared to the approximately 13 cents per Kwh cost of power from a new coal plant over roughly the same time period.

CMP is now in the process of establishing new avoided costs which are closer to the cost of Hydro-Québec power. These new cost estimates are based on the assumption that Hydro-Québec is an available power source and on the apparent availability of large quantities of electricity from small power producers at a price competitive with Hydro-Québec. Nonetheless, CMP still expects the Hydro-Québec purchase to save ratepayers $158 million (present value) compared to an alternative that excludes Hydro-Québec.[7]

While the price of Hydro-Québec power is structured to be below anticipated future avoided costs, the contract price will not fall in response to lower-than-expected prices of alternatives. Thus, the Hydro-Québec purchase will limit CMP's ability to take advantage of lower than expected prices of oil, coal or other energy options. In this case, CMP ratepayers will likely be paying more for their electricity than if Hydro-Québec is not in the electricity mix.

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[6] Utilities in Maine base the price they pay for purchased electricity on "avoided costs", or the amount the utility would have to pay to purchase or produce needed power through the next most expensive means. Before the Hydro-Quebec proposal, CMP's avoided costs had been tied to the price of new coal-fired power, which is relatively expensive and subject to significant price volatility over the next 30 years.

[7] CMP Case 2, "short-term alternative plan" includes an additional 200 MW of purchases from small power producers, life extension of existing oil units, and new purchases from New Brunswick. PUC Docket #87-268, Testimony of Daniel Peaco, Pages peaco-5 to 7.

Risk Management

The Price of Hydro-Québec Power Will Rise at a Rate at or Below that of General Inflation and is Moderated by a Ceiling Price.

The sensitivity of the Hydro-Québec purchase to lower than anticipated costs of alternative power is compensated somewhat by provisions that insulate Hydro-Québec power from rising fuel prices. The prices for each block of capacity and energy are made up of 1) a fixed capacity price inflated only at the start of each block by the Handy-Whitman index of fossil-fuel power plants; and 2) a fixed price for energy escalated each year at the rate of general U.S. inflation as measured by the U.S. GNP Implicit Price Deflator.

These provisions tie cost increases to indices that have been historically less volatile than fuel prices, especially fossil fuel prices. As a result, the price of Hydro-Québec is expected to rise at a rate no faster than that of general inflation.

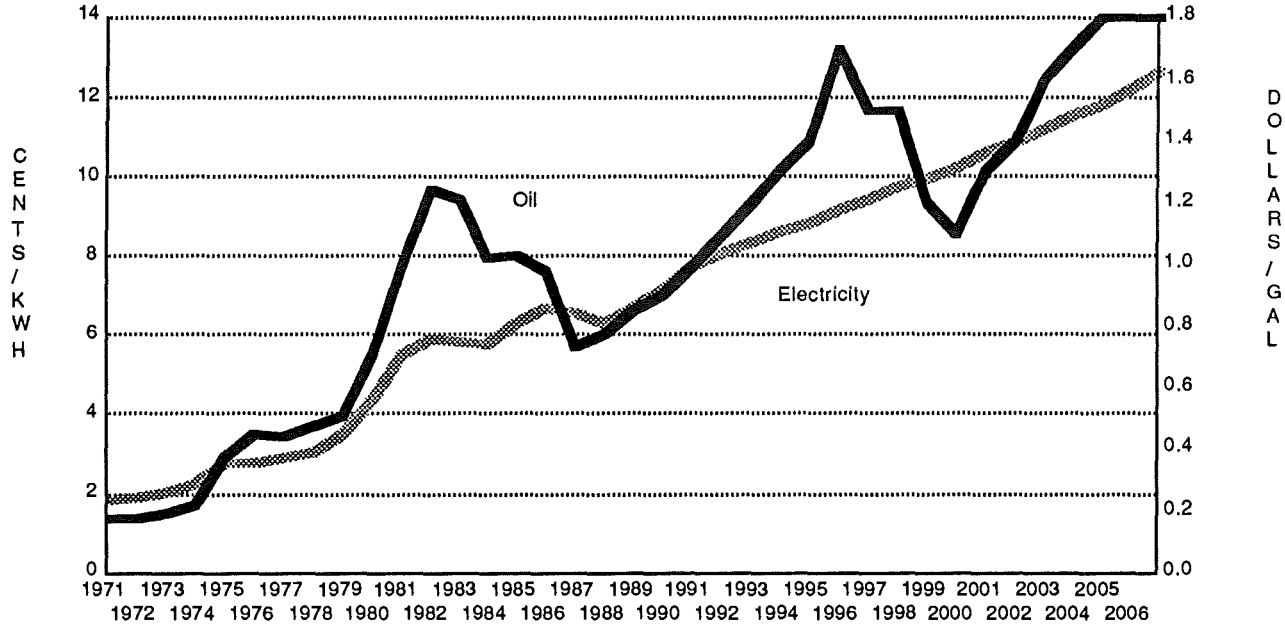
In any case, contract price escalation of Hydro-Québec power will be confined by a ceiling price based on the average retail rates of CMP and New England's three largest utilities. This provision provides a guarantee that Hydro-Québec will not increase CMP rates in excess of average rates within the New England region.

"Most Favored Nation" Status Will Allow Near-term Price Improvements.

The Letter of Intent provides for further mitigation of the price risk: a temporary "most favored nation" status. This refers to a concept in international trade whereby one party agrees to confer on a second party the most favorable terms of trade offered to any third party. In this case, Hydro-Québec agrees to grant CMP the same price terms accorded any other U.S. utility should Hydro-Québec enter into a contract, within three years, on terms more favorable than those with CMP.

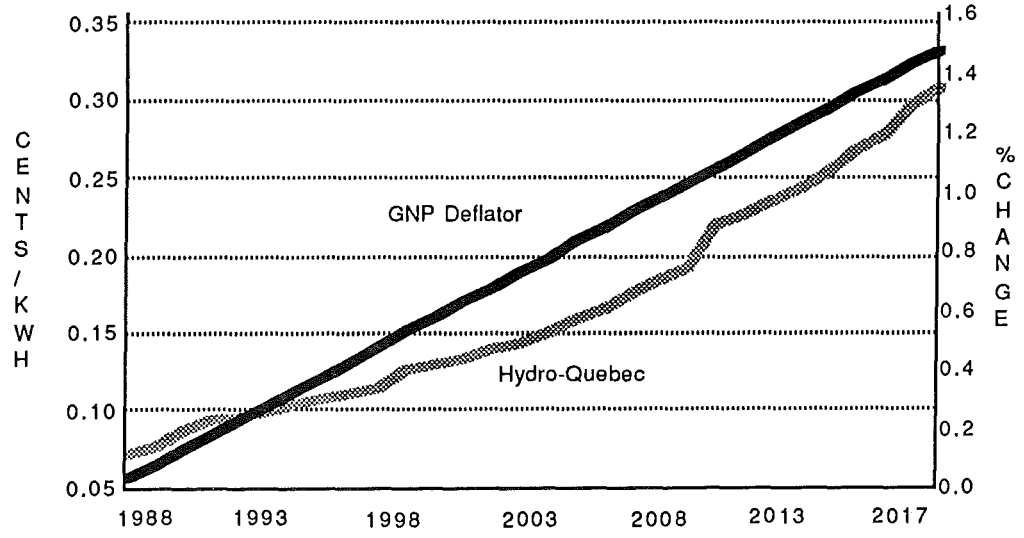
Presumably, Hydro-Québec will seek export contracts with other utilities during the next three years. If competitive conditions arise that force Hydro-Québec to offer power at a lower price, the CMP purchase will be adjusted to reflect the reduced price. Similar contracts between Hydro-Québec and the States of New York and Vermont are set at comparable price levels.

FIGURE 1
Oil & Electricity Prices in Maine 1971-2006



Source: Office of Energy Resources. 1987.

FIGURE 2
Projected Change in the Price of Hydro-Québec Power and Inflation in the United States



Source: Power Supply Issues and Options. CMP. 1987.

Price Risks Associated with Potential Alternatives Make Them Less Attractive Than Hydro-Québec.

The Hydro-Québec proposal offers the ability to contract now for large blocks of future power at predictable prices. Alternative energy sources are unlikely to be able to offer a similar amount of power over the same time period at a similarly predictable price.

Small Power Producers

While there seems to be many small power producers willing to sell at Hydro-Québec prices, it remains unclear how much of this power will be available at competitive prices over the long term.

The Hydro-Québec proposal establishes the price of each of three block purchases over the life of the contract—400 MW in 1993, 200 MW additional in 1995, and 300 MW more in 2000. Contracts with small power producers for the full 400 MW needed to meet domestic demand would presumably be similarly staggered. However, only a portion of the full 400 MW would be contracted for now. While small power producers can offer competitive terms today, there remains substantial risk that future small power production will be priced above the Hydro-Québec alternative.

For example, the outlook for future biomass fuel costs remains uncertain. The economics of wood harvesting in Maine today make it unlikely that biomass fuel prices will be pushed up substantially by increased fuel-wood demand. Biomass harvesting tends to be a bi-product of saw-log and pulp-wood harvesting. In such an integrated process, stumpage prices and the marginal cost of removing wood unsuitable for other uses are very low. In addition, the amount of "unmerchantable" wood is thought to be very large. As a result, the current price of biomass fuel is unlikely to be greatly affected by an increase in biomass demand.[8]

However, demand pressures on forest resources in general will require more intensive wood lot management.[9] It is likely that biomass fuel harvesting will share in the burden of financing this intensified management.[10] This would be especially likely in the event that wood lots begin to be directly managed for sustained biomass wood supply. In this case biomass fuel prices will certainly rise to levels higher than today's "by-product" would.

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[8] The prognosis regarding the price effect of increased biomass demand would be reversed if the paper industry turns to extensive use of junk wood in the pulping process.

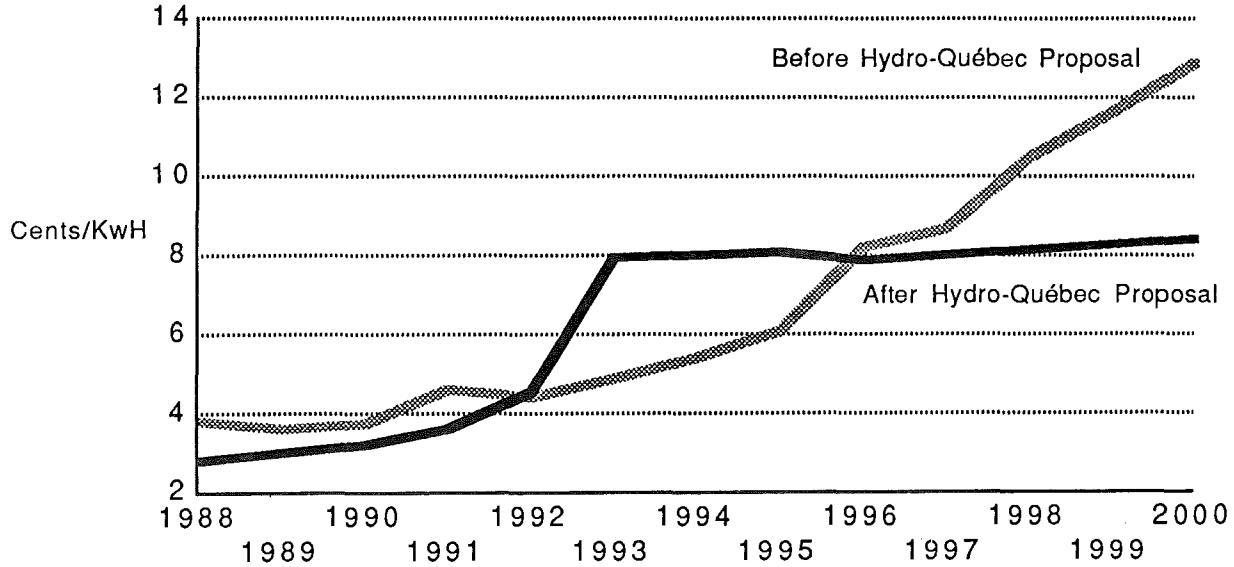
[9] See discussion of Forest for the Future project on pages 17-18.

[10] See discussion of Indirect Risks, page 19.

Other factor costs leave biomass power prices vulnerable to substantial increases over the next 10-30 years. Transportation costs are likely to increase the delivered price of biomass fuel as gasoline prices rise and hauling distances between available biomass and small power producer facilities increase. Ash disposal may also cause an increase in future biomass costs. Tests are underway to determine if wood ash can be safely spread as a fertilizer. If not, finding adequate disposal sites will likely be expensive. New waste-burning energy plants in Maine are already finding it difficult to locate adequate ash-disposal sites due to the toxics known to exist in waste ash.

Finally, there is the real possibility that the costs of purchased power in Maine will rise in the absence of Hydro-Québec. The Hydro-Québec proposal has had a significant impact on the cost of purchased power. Figure 3 shows the price of purchased power from small power producers based on avoided costs prior to, and after, submission of the Hydro-Québec proposal. In one case, Boise Cascade was negotiating with CMP the price of power from a new cogeneration facility. When the Hydro-Québec purchase was proposed in the midst of these negotiations, Boise reduced its selling price to a level comparable to the Hydro-Québec price. Subsequently, other small power producers responded by offering long-term power contracts at and below the Hydro-Québec price. Without Hydro-Québec in the avoided costs calculation, it is uncertain what future power producer purchase prices will be based on, except that avoided costs will certainly be higher.

FIGURE 3
Price of Purchased Power Before and After Hydro-Québec Proposal



Conservation

Maine utilities are among the leaders in New England and the United States in pursuing innovative conservation and load management initiatives. Due to the relatively low cost of reducing electrical demand compared to building or purchasing new supplies, CMP, with the assistance and support of various State agencies, has vigorously promoted several programs aimed at reducing industrial, commercial, and household consumption of electricity. Most recently, CMP has requested competitive bids for electricity savings, much like the purchased power RFP program. At this writing, this inititative has generated 13 proposals for 36 MW of electricity conservation.

Experts inside and outside the utility industry agree that electricity efficiency technologies can reduce growth in demand at competitive prices. But while the technical potential exists to achieve significant reductions in electricity demand, uncertainties remain about how much can be achieved in practice. The degree of success enjoyed by conservation initiatives depends on factors beyond technical potential, including utility and government policy, program design and promotion, and customer acceptance. While proven technologies exist, few mechanisms are yet in place to overcome the many obstacles to the adoption of these technologies.[11]

While it is in Maine's interest to pursue conservation and load management agressively, abandoning new energy supply resources in the hope of substantial future success in conservation presents considerable risk of future shortfalls in needed electricity capacity. Alternatively, using conservation to replace oil and other less desirable energy sources allows for capacity in place if excess demand requires it.

Summary—Managing The Price Risk

Further assessment of the price risk of the Hydro-Québec contract will come through the PUC review process. But in advance of regulatory review, this analysis reveals that the price of Hydro-Québec power:

> will not be subject to the volatility of past energy sources and will rise at a rate at or below inflation;
>
> offers more predictability than an equal amount of power from alternative sources; and
>
> has already significantly lowered the price of power in Maine.

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[11] Henderson, Y.K., R. W. Kopcke, G.J. Houlihan, N.J. Inman, "Planning for New England's Electricity Requirements" New England Economic Review. Jan/Feb 1988. Federal Reserve Bank of Boston. Pages 14-17.

The terms of the Hydro-Québec contract provide some insurance to CMP ratepayers that the price of Hydro-Québec power will remain within certain reasonable bounds -- tracking the general inflation rate on the up side and average New England utility rates on the down side. Of significant additional insurance to CMP ratepayers would be the extension of the "most favored nation" provision beyond the currrent three-years to the entire duration of the contract.

Risk 2 Lower Than Anticipated Long-term Demand.

A second risk is the chance that the demand for electricity in Maine and southern New England will be significantly lower than the contracted amount. This risk is unique to a very large, long-term purchase such as Hydro-Québec. The size of the purchase, 900 MW, is predicated on the cost of the necessary transmission tie. A smaller purchase could not produce the revenue needed to justify the financial investment in constructing and operating the line. Because 900 MW (+/– 100 MW) is beyond the needs of CMP customers, the purchase is designed to help meet anticipated electricity demand in the CMP service area (400 MW), and take advantage of anticipated demand elsewhere in Maine and in southern New England (500 MW).

However, if electricity demand in Maine is less than anticipated and/or southern New England export markets do not materialize, CMP may not require the full amount of power to meet contractual requirements of the Hydro-Québec purchase. In that case, CMP will have to pay actual damages to Hydro-Québec or 75% of all remaining contract payments, whichever is greater.

Energy demand in Maine is projected to increase by 2-3% per year over the next 30 years, and in New England as a whole by at least 1.5% per year. However, as of this writing, CMP has no firm commitments for the resale of Hydro-Québec power to southern New England. While some utilities have expressed interest in specific amounts (totalling about 217 MW), none has been willing to make a firm commitment without further study.

Risk Management

Projected Electricity Demand in Maine. Resale Arrangements Must be in Place before the Hydro-Québec Contract can be Executed. +/- 100 MW Leeway in Last Block.

The Office of Energy Resources projects that electricity needs in Maine will increase at an average of 3% per year during the next twenty years. This is expected to create a demand for 1800 MW of additional capacity over these twenty years. The OER forecast notes that conservation investments, not included

in their 1987 forecast, could cut demand from 3% to 2% per year.[12] It is important to note, however, that Maine Yankee, which supplies about 22% of the electricity consumed in Maine annually, is scheduled to be retired in 2008. This will require Maine utilities and other New England owners of Maine Yankee to find new sources for the over 800 MW supplied by this nuclear plant by the year 2008.

Current New England Power Pool (NEPOOL) projections indicate that New England as a whole has adequate capacity until 1994 or 1995. Even if anticipated surpluses prevail, the energy associated with this surplus capacity, especially Seabrook power, is likely to be quite expensive compared to Hydro-Québec power. Thus, it may be possible to sell the excess from the Hydro-Québec contract in spite of the apparent short-term New England capacity surplus.

On the other hand, there is evidence that the NEPOOL forecast of energy demand is conservative. NEPOOL has admitted that its short-term demand forecast (to 1990) is too low, and critics have added that the NEPOOL forecast is especially conservative in comparison with recent trends in demand growth of 4%-5%.[13]

In any case, the Hydro-Québec contract provides for a +/– 100 MW flexibility in the last block, reducing, though not eliminating, the plan's sensitivity to low demand growth.

Nonetheless, CMP has stated that it will not execute the Hydro-Québec contract without resale arrangements in place. Without these firm purchase commitments for 500 MW, CMP is authorized under its agreement with Hydro-Québec to cancel the proposed purchase. If the utility cannot resolve the resale issue this year, presumably through firm commitments to purchase the power, CMP will shift to a plan that relies more heavily on independently produced power, according to the PUC testimony of CMP President John Rowe.[14]

Summary--Managing The Demand Risk

As with the price risk, the risk of over-supply or inability to market the excess Hydro-Québec power will receive close scrutiny by the PUC. On its face, however, the demand risk appears to be reasonably managed. Current demand forecasts for Maine and New England indicate a growing need for electricity sources. Supply forecasts suggest that capacity will be in place to handle the increased demand. However, these forecasts ignore the possibility that planned expansions, such as Seabrook, may be forestalled. Should planned southern New

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12 State of Maine Energy Resources Plan. Pages 95-100.

13 Henderson et al. Pages 12-13.

14 PUC Docket #87-268, Petition for Certificate of Public Convenience and Necessity for Purchase of Generating Capacity and Energy From Hydro-Quebec. Volume I. January 8, 1988. Page Rowe-7.

England capacity materialize, the available power will certainly be more expensive than Hydro-Québec. Finally, the project will not be pursued if export markets cannot be found prior to contract execution.

Risk 3 System Reliability and Security of Supply

Concerns have been raised about the reliability of power supplies from Hydro-Québec. These concerns are twofold: technical reliability and the potential for arbitrary cutoff of power.

At present, Hydro-Québec does not conform to the North American Electric Reliability Council (NERC) reliability criteria, due to the unusual configuration of its system: most of the generation capacity is located at James Bay, a considerable distance from load centers in southern Québec, and the northeastern United States. As a result of this geography, the Hydro-Québec system is somewhat more susceptible to large-scale power interruptions than systems with more diversified generation/load arrangements.

Concern has also been raised in some quarters regarding the wisdom of relying on a foreign source of electricity for such a large share of our power supply. This sentiment is based on the fear that Hydro-Québec may be willing to sell power to the U.S. only until domestic demand in Québec requires use of the facilities, at which time exports to the U.S. will be cut off.

Risk Management

Regulatory Review

The technical reliability of the Hydro-Québec electric distribution system will be the subject of intense review by both State and Federal authorities prior to project approval. The construction of a transmission tie to a Canadian province requires a Presidential Permit. As a result, the Economic Regulatory Administration (ERA) of the U.S. Department of Energy will assess the reliability and environmental impact of the Hydro-Québec line. Before approving the purchase the State PUC will also have to be satisfied of the system's reliability.

System Upgrades

While Hydro-Québec experienced several power outages between the late 1960s and 1979, substantial investments in upgrading system reliability have greatly reduced power interruptions. Hydro-Québec has recently submitted a proposal to the Northeast Power Coordinating Council (NPCC) to upgrade its system with the goal of receiving certification under NPCC reliability criteria. Construction of major DC lines to James Bay facilities are among these measures.

Energy Exports and Québec's Development Strategy

An arbitrary cutoff of power from Québec is very unlikely. Hydro-Québec and the Québec government have made power exports to the U.S. a major part of their corporate and provincial development strategies, and have little incentive to break contracts.[15] These sales are expected to help finance the massive investments in hydro power capacity planned and already incurred. Second, recent forecasts of electricity demand in Québec show the rate of growth in demand dropping substantially between now and 2006 as the home space heating market becomes saturated and population growth slows.[16] Third, the conditions of the Hydro-Québec power purchase contract provide significant financial penalties for curtailing power deliveries. Finally, the U.S./Canada Free Trade Agreement commits the Government of Canada to a fair administration of energy cutbacks in case of short supply.[17]

Dispatchability, Economy Purchases and Other Benefits of Transmission Line Provide Some Compensation for Risks.

The availability of electricity from the Hydro-Québec contract has few limitations. The contract allows CMP a relatively wide variance in annual and monthly amounts of power it receives (65% to 85% annually, and 25% to 95% monthly), and provides CMP the option of +/– 100 MW in the last block of power. Hydro-Québec retains the right to reduce the load factor to as low as 65% in certain cases of low-water in Québec. Thus, beyond these limits, power from Hydro-Québec is available when needed. This flexibility, unavailable from even some of CMP's own facilities, is seldom available from small power producers. Most co-generation and small power producer contracts require CMP to take power when it is available.

The transmission line offers benefits beyond the initial contract. Returns from exporting excess power to southern New England will help defray the costs of the transmission facilities. In addition, the tie line is proposed to have a 1000 MW capacity while firm contract amounts range from 400 MW in 1992 to 900 MW in 2000. The excess transmission capacity offers the potential of providing some additional benefits to CMP customers in the form of economy purchases. Such purchases of electricity in excess of contracted amounts are made in cases of power unit outages or when the marginal cost of buying electricity on the spot market is less than the marginal cost of generating it using CMP's facilities.

Economy purchases made by CMP from New Brunswick resulted in an estimated fuel savings of $3.5 million in 1987. The potential gains of similar pur-

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15 Power From the North, Robert Bourassa. Prentiss-Hall. Canada. 1985.

16 Conversation with staff of Office of Energy Resorces.

17 Canada-U.S. Free Trade Agreement. Chapter 9.

chases over the Hydro-Québec line are estimated by CMP to total between $30 and $40 million (present value) over the 28 years of the contract and would moderate electricity rates by reducing variable costs.[18]

The transmission line also offers the potential to use the tie to the Hydro-Québec system to meet reserve requirements.

Summary—Managing The Reliabilty RIisks

As noted, the issue of technical reliability will be assessed in some detail by State and federal agencies. It is clear at this point that Hydro-Québec has made a serious commitment to bring its system up to U.S. reliability standards. In addition, Maine electricity consumers stand to gain from the presence of the tie to Hydro-Québec. Finally, arguments regarding the risk of an arbitrary cut-off of electricity are simply not convincing in light of the importance of energy exports to Québec's economy.

INDIRECT RISKS

The Hydro-Québec purchase presents risks beyond the terms of the contract. While providing certain energy and economic development benefits, the Hydro-Québec purchase could impede achievement of other Maine economic and environmental goals.

Risk 1 Foregone Economic Development Opportunities from Purchase of Power from Maine-based Facilities.

Small power producers, both cogenerators and stand-alone plants, have been one of Maine's largest sources of new employment and investment in the last five years. Investment in small power plants already built, planned or under construction will generate up to 1500 jobs in biomass harvesting, transport, and plant operations. Because of the distribution of the biomass fuel (largely wood), the economic benefits associated with small power producers are concentrated in northern, eastern, and western Maine. Further expansion has the potential to create several thousand more jobs in biomass fuel supply, construction, and plant operation.

Power plants owned and operated by Maine's industrial firms and stand-alone producers supplied 28% of the electricity consumed in Maine in 1986. This could be increased to more than 40% by 1990 by plants now under construction or planned. The rapid growth of cogeneration and small power produc-

[18] PUC Docket #87-268. Page Kelly-10. Also Data Request Item 19 (OPA-01-19).

ers in the past four years demonstrates that large quantities of small power producer electricity can be competitive with other supply options.

The ability of these small power producers to compete with the Hydro-Québec proposal was cited in the Preliminary Report as a crucial factor in the future development of Maine's indigenous energy industry. Since the release of that report, Central Maine Power has received proposals for cogeneration and small power production of more than 1400 MW, considerably more than expected. As information regarding the feasibility of these proposals is not available at this writing, it is impossible to determine how much of that power is actually deliverable on competitive terms. However, CMP has amended its long-range energy plans and the proposed Hydro-Québec purchase to include additional purchases (100 MW) from small power producers, reflecting their preliminary assessment of those proposals.

CMP's preliminary review of the unexpected profusion of responses to the RFP indicates that small power producers can be competitive with Hydro-Québec. Yet the Hydro-Québec purchase could threaten new small power producer markets both in Maine and in southern New England in two ways.

First, the Hydro-Québec purchase could meet the entire future domestic electric power demand for the next 28 years negating the need for additional small power producers. In addition, once the transmission tie to Hydro-Québec is established, Maine utilities could fill additional needs, such as unspecified base load or unanticipated demand, by purchasing more Hydro-Québec power.

Second, as noted above, the Hydro-Québec purchase depends upon the resale of excess power to southern New England. However, transmission capacity between Maine and southern New England is limited restricting the flow of electricity between them at certain times. Exports of large amounts of excess Hydro-Québec power will aggravate this situation and possibly prevent other Maine power producers from reaching export markets in southern New England.

Risk Management

Opportunities Remain for the Prudent Development of Additional Maine-Based Small Power Production

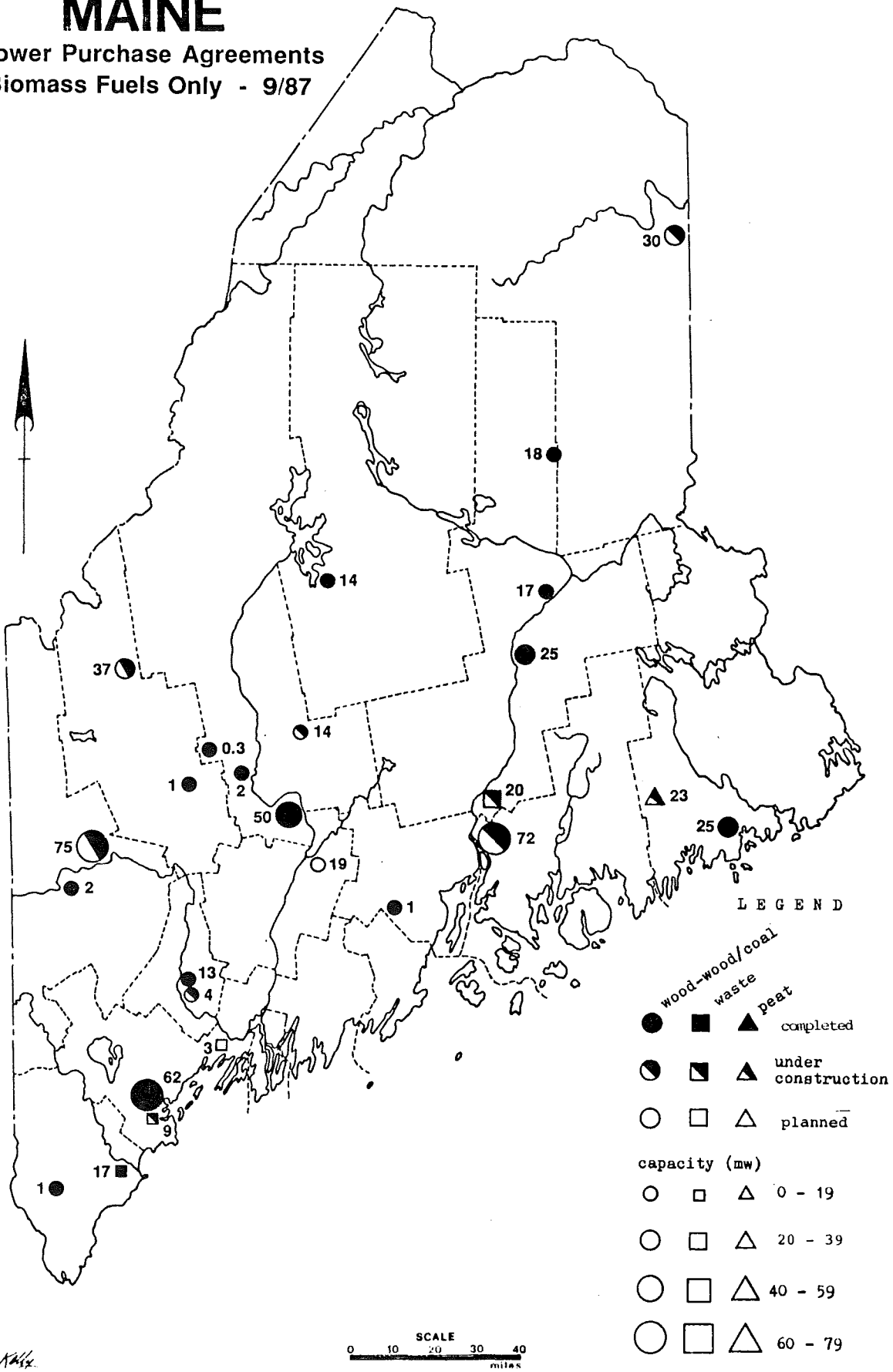
The Hydro-Québec purchase, if approved, will not impede the development of small power production plants now under construction or planned. Small power producers are expected to make up 40% of Maine's electricity mix by 1990 when plants now under construction or planned come on line (See Figure 4).[19] This is up from 28% in 1986. Opportunities for further expansion of

19 State of Maine Energy Resources Plan. Page 62.

FIGURE 4

MAINE

Power Purchase Agreements
Biomass Fuels Only - 9/87



the domestic small power production industry exist even within the context of the Hydro-Québec purchase.

Additional Small Power Producer Purchases in Hydro-Québec Plan and CMP Base Load

CMP has adjusted its original Hydro-Québec-based energy plan (submitted in February 1987) in response to the large number of small power producers interested in selling power to CMP at Hydro-Québec prices. Their new plan calls for targeting an additional two decrements (100 MW) for independent producers. This is achieved by maintaining the structure of the original Hydro-Québec purchase, but reselling an additional 100 MW of the first block. The new plan calls for selling 100 MW of the second block as originally planned, and selling 100 MW from the last block.[20]

Energy resource plans submitted by CMP in 1988 indicate a need for future base load power beyond Hydro-Québec. These plans now call for the purchase of new coal-fired power from New Brunswick. However, the cost and environmental constraints to coal power leave open the possibility that future base load capacity could be filled by additional small power producer purchases. In fact, the "preferred plan" filed by CMP with the PUC assumes that 324 MW of small power currently under contract will be renewed or replaced over the next thirty years beginning in 1992, and that up to an additional 304 MW of congeneration will be available from paper companies by 2021.

The price of small power producer power may be more competitive than future Hydro-Québec purchases. Interviews with Hydro-Québec personnel suggest that future Hydro-Québec export contract terms will be less attractive than the current offer as the need to finance continued capacity expansion at James Bay will force its costs of exported power to increase. If so, the competitive position of Maine small power producers, vis-à-vis future Hydro-Québec purchases, will be enhanced.

Exporting Maine Small Power Producer Power

Small power producers can sell power to southern New England if the political and technical means of alleviating or circumventing the transmission bottleneck between Maine and southern New England can be found. While a

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[20] The intent of this restructuring is to increase the opportunities for small power producers to sell power to CMP. What is less clear is whether or not this is in the best interest of all concerned. The restructuring amounts to a 100 MW swap with southern New England utilities of Hydro-Québec power for Maine-generated small power production. Under this new proposal, CMP would meet 100 MW of its load requirements with small power production rather than with Hydro-Québec power, at roughly similar costs. The southern New England utilities, who, presumably, would be willing to pay more for this 100 MW of small power production since their avoided costs are higher than those of CMP, are able to meet load requirements with Hydro-Québec power at lower prices than they otherwise could achieve. Of course, their gain would come at the direct expense of Maine's small power producers.

bottleneck problem already exists, the Hydro-Québec purchase will clearly aggravate the problem. CMP is in the process of offering a portion of the Hydro-Québec contract to NEPOOL rather than to individual utilities. If the contract is designated a "Pool Purchase", members would be required to allow transmission access for contract delivery.

A potential response to the bottleneck problem involves capacity sales and energy banking arrangements between CMP and southern New England utilities, and/or CMP and Hydro-Québec. Maine utilities own about 300 MW of capacity located south of the bottleneck, primarily nuclear plants. This capacity could be sold in a package which combines Maine energy (Canadian, small power producers or combination) with Maine-owned southern nuclear capacity and an energy banking arrangement to handle the economics associated with the bottleneck. Access to the Hydro-Québec system afforded by the new transmission line may further facilitate such arrangements.

Formal energy banking and capacity sales entail complex legal and financial arrangements, as yet untried. However, one such arrangement has been successfully struck. Peat Products of America, a Maine small power producer, has recently entered into an energy banking agreement with Bangor Hydro Electric and Boston Edison. Other possible remedies to the bottleneck problem could be achieved by the Federal Energy Regulatory Commission, Maine PUC, State Legislature or through private contracts between utilities.

Resource Constraints to Biomass Power Development

With or without Hydro-Québec, there are limits to the prudent expansion of the biomass power industry in Maine. According to research conducted for the Maine Forest for the Future Program, "the forests of Maine, *as they are now being managed,* cannot sustain harvests at the average 1980-1986 levels, nor will they be able to meet fully projected demand levels."[21] (emphasis added) Thus, in the context of what now seems a conservative fuelwood demand forecast, Maine forests already face significant pressures from current use.[22] An expanded wood-fueled electric generating capacity will increase considerably the overall drain on Maine's wood resource.[23]

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[21] Forest For the Future: A Report on Maine Forest to the Legislature, the Governor, and the People of Maine. Maine Department of Conservation. January 31, 1988. Page 11.

[22] Forest For the Future projections of fuelwood availability are based on a demand forecast for forest products from the Report on the Demand for Forest Products in Maine by Keith Balter and Johan Veltkamp of Resource Information, Inc. It is based, in part, on the belief that wood-fueled electricity could not be profitably produced at a price as low as that offered by other sources. Since the time of that forecast, June 1987, CMP has received proposals for over 1400 MW of power from small power producers at prices competitive with Hydro-Quebec. Of this amount, 400 MW, or 29%, represents wood-fueled generation projects.

[23] *Ibid.* Page 3.

The air emissions and waste ash generated by biomass power plants may also constrain the desirable level of expansion of the small power production industry in Maine. The environmental effects of domestic power production are discussed below.

Summary—Managing The Risk To Maine's Small Power Production Industry

Approval of the Hydro-Québec proposal will not affect Maine small power production facilities now under construction or planned to meet contracted purchases. Moreover, CMP's latest preferred Hydro-Québec option includes an additional 100 MW of purchased power. Opportunities for still more small power expansion appear to exist within the context of CMP's load forecast and in export markets in southern New England.

Transmission capacity between Maine and southern New England, current forest resource management practices, and cumulative environmental impacts of biomass power production appear to present more significant barriers to expanding the small power production industry in Maine than does the Hydro-Québec purchase.

Risk 2 **Environmental and Economic Impact of Transmission Line Construction and Maintenance.**

CMP proposes to construct and operate a high voltage transmission facility to deliver Hydro-Québec power from the Canadian border to the CMP distribution system. It would consist of a +/– 450-kV DC transmission line extending approximately 92 miles from the U.S./Canada border in Bowmantown, Maine to the Town of Jay, and a 345-kV AC line extending 42 miles from Jay to Pownal (See FIGURE 5).

The construction and operation of a 134-mile transmission line through western Maine presents the risk of adverse effects on the natural environment and human health in the vicinity of the line. Environmental consequences of the proposed line and access roads include risks to:

wildlife habitat, especially deer wintering yards and endangered or threatened species;

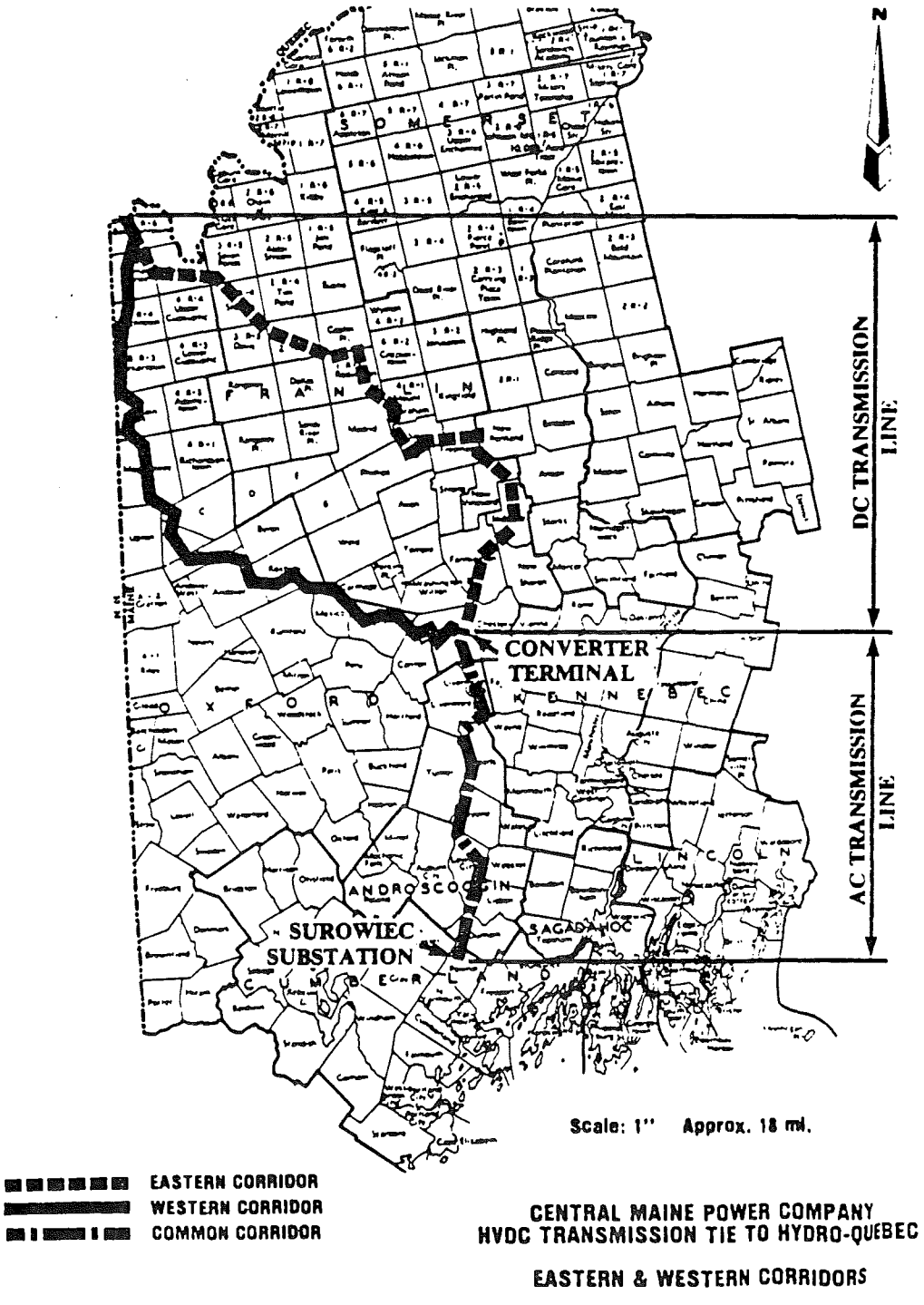
visual and recreational resource quality;

water quality and fish habitat from sedimentation and herbicides; and

current land use.

FIGURE 5

Proposed Route of CMP HVDC Transmission Tie to Hydro-Québec



Identification of specific resources and/or species at risk must await formal application to the Department of Environmental Protection for approval of CMP's preferred route. However, two issues of particular concern are evident from knowledge of the general vicinity of the proposed line.

The first is the necessity of crossing the Appalachian Trail. Whatever the route of the line, it will not be able to avoid traversing this famous hiking trail, thereby affecting the aesthetic quality of a portion of the trail. The second issue relates to the mountainous terrain of the region. The presence of the transmission line across or between mountains will have an intrusive effect on vistas and other visual resources.

The economic impact of the transmission facility derives from the potential environmental effects. There is the potential that the line will harm the scenic quality of the area and reduce the level of tourism spending that fuels a portion of the region's economic base. In addition, the line may reduce the value of property near or in view of it.

Risk Management

CMP Site Selection and Mitigation

Efforts to identify and minimize adverse impacts of the transmission line are now being undertaken by Central Maine Power. According to testimony before the PUC, Central Maine Power has employed several measures to reduce the risk of unreasonable environmental degradation from constructing the transmission facilities. Siting criteria included avoidance of unreasonable adverse impacts to recreational areas, fishing resources, unique natural or historic areas, threatened or endangered plant or animal species, wetlands, deer wintering areas, and major existing development.

In conjunction with the production of a mandated Environmental Impact Statement, CMP has contracted with The Nature Conservancy to determine whether any threatened, endangered or rare species are known to exist in the proposed project area. Moreover, the 42 miles of the proposed route from Jay to Pownal are in an existing power line right-of-way.

These efforts have already resulted in a variety of measures designed to mitigate environmental impacts. The proposed route has been altered to avoid historic nesting and foraging areas of rare golden eagles in remote northern Maine. Special construction techniques will be employed to cross deer wintering areas when such areas cannot be reasonably avoided. In more populated areas of the State, the preferred route takes advantage of existing topography to minimize the visual impact of the new transmission line and to avoid existing residential and commercial development.

Public Regulatory Environmental Review

As noted above, construction of a transmission tie to a Canadian province requires a Presidential Permit. The U.S. Department of Energy has determined that issuance of a permit in this case would be a major federal action significantly affecting the quality of the human environment. As such, no permit may be granted without federal review of environmental consequences of granting such a permit. Accordingly, an Environmental Impact Statement (EIS) is being prepared pursuant to the National Environmental Policy Act of 1969 (NEPA).

The EIS will include a thorough description of the existing environment in the vicinity of the proposed transmission facility, including an inventory of the existing natural, socio- economic, cultural, and infrastructural environment. Following this description will be an analysis of the effects of the proposed facility on each element and measures taken or proposed to minimize them.

The proposed transmission project will undergo review by the State Department of Environmental Protection and, for part of the route, the Land Use Regulation Commission, to ensure that it meets all State environmental and land use laws and regulations. This review may result in recommending additional mitigation steps such as alternative methods of siting and constructing the line.

Hydro-Québec is Environmentally Superior to Domestic Alternative Generation Options

The domestic alternative to Hydro-Québec would most likely include a mix of biomass-fueled small power producers, upgraded utility-owned oil-fired power plants, and small hydropower. By most measures of environmental impact, Hydro-Québec competes far more favorably than a comparably-sized mix of these domestic alternatives.

Constructing and operating several small power plants, cogeneration facilities, and hydro dams will have significant environmental consequences of their own. Among these are the impacts of transmission lines, air emissions, biomass harvesting (wood and peat), ash disposal, and damming rivers. Scenic resources and property values would be additionally affected by power plant location, with attendant smokestacks and cooling towers, and the noise associated with their construction and operation.[24]

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[24] More detail of the environmental impacts of these energy options is provided in the State Planning Office Preliminary Report.

Risk 3 Health Effects of Electric and Magnetic Fields Created by High-current Transmission Facilities.

The proposed transmission line will include a DC portion and an AC portion. Research on the health effects of DC transmission lines conducted for the Minnesota Envrionmental Quality Board in1986 has found no scientific evidence that high-voltage DC lines pose a hazard to human or animal health. The general consensus in the scientific community is that the electrical environment of a high-voltage DC transmission line does not present a hazard to public health.[25]

A study conducted for The New York State Public Service Commission (PSC) and the New York Power Authority examined the health hazards associated with electric and magnetic fields produced by AC electric power transmission lines. [26] This research explored potential biologic effects over a wide range of human systems including studies of genetic and reproductive systems, cell biology, neurobiology, behavior, and cancer incidence. Of particular concern was the findings of an association between residential exposure to magnetic fields produced by AC power lines and the incidence of cancer in children and adults in Denver.

While these analyses found that electric and magnetic fields produced by AC lines did have a variety of behavioral and nervous system effects, they were not considered to present a significant risk of adverse health effects. However, the study did indicate an excess risk of childhood cancer, especially leukemias, associated with high current AC wiring configurations (high-voltage transmission lines) near homes.

The authors of the New York State PSC report found that although their study confirms an association reported in previous studies, the causal relationship between high-voltage AC transmission lines and childhood cancer is still no more than an hypothesis. It would require several independent studies providing similar findings to infer a cause-effect relationship. However, the basis for the hypothesis is now stronger.

> Although much more research is needed before the question whether the magnetic fields actually cause or promote cancer can be resolved, the basis of such an hypothesis is now established. At this time no risk assessment can be made because only four studies of this question have been made and the two which report an association are from the same region.[27]

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[25] Minnesota Environmental Quality Board. Memorandum to Members of Board from George Durfee, Supervisor, Power Plant Siting Program. January 16, 1987.

[26] Biological Effects of Power Line Fields, New York State Powerlines Project, Scientific Advisory Panel Final Report. July 1, 1987.

[27] IBID. Page 132.

It is noted by the authors, however, that the findings of this report deserve special consideration because their analysis was designed to avoid the weaknesses identified in previous epidemiologic studies of this effect.

Risk Management

Regulatory Review

Many of the measures adopted for mitigating environmental impacts of transmission line construction and operation, particularly efforts to avoid population centers, will offer some mitigation of potential health impacts. In reviewing an application for a site location permit, the Department of Environmental Protection, the Land Use Regulation Commission, and the Federal Economic Regulatory Administration will specifically consider the health effects of the proposed transmission line.

Widen Right-of-Way corridor/Continued Study of Health Effects

As noted, the New York PSC study strengthens the hypothesis that AC power lines are associated with potential health risks. However, nothing approaching conclusive results are yet available. Additional analysis of this issue will be undertaken in association with the regulatory review of the Hydro-Québec proposal. This review will allow some assessment of the potential health risks of the transmission line and perhaps suggest measures to reduce those risks.

In response to similar concerns in 1978, the New York Public Service Commission approved the construction of proposed power lines but required 1) conduct of the study discussed above, and 2) a 350-foot right-of-way corridor surrounding each power line within which residences were not allowed.

Summary—Managing The Environmental And Health Risks

It is difficult to evaluate the environmental risks specific to the Hydro-Québec transmission line in advance of formal application with the Department of Environmental Protection and the Land Use Regulation Commission. When submitted, the application will reflect CMP's site selection and mitigation efforts and will be part of an extensive environmental review by the Federal Economic Regulatory Administration, the Maine Department of Environmental Protection and the Land Use Regulation Commission.

It is clear, however, that in traversing western Maine, the transmission line will have some impact on the natural habitat and visual character of the route. This impact must be assessed in relation to the environmental impact of

alternative electricity sources. In the absence of Hydro-Québec, Maine's natural environment, scenic resources and property values would be subject to the effects of power plant emissions, ash disposal, transmission lines, and biomass harvesting.

While no significant health risks have been associated with fields emanating from DC lines, very little definitive information is available at this writing regarding the health effects of high voltage AC transmission lines. Research to date is inconclusive. While a recent New York PSC study found an association between high-voltage AC lines and childhood cancer, the absence of corroborative research led the authors to assert that the link remains no more than a hypothesis.

The presence of this association lends credence to a call for caution in the siting of high-voltage power lines. While authority for mitigation lies with State regulatory agencies, it would be prudent to take special measures to avoid siting the lines near residences.

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CHAPTER 3
CONCLUSIONS/RECOMMENDATIONS

PRICE, DEMAND AND RELIABILITY OF THE HYDRO-QUEBEC PURCHASE

The severity and probability of price and over-supply risks associated with the Hydro-Québec proposal will be determined through the PUC review process. However, some determinations can be made in advance of formal regulatory review. For instance, it is clear that the price of Hydro-Québec power:

> has already significantly lowered the price of cogeneration and small power production in Maine;
>
> will not be subject to the volatility of past energy sources and will rise at a rate at or below the general level of inflation;
>
> offers more predictability than an equal amount of power from alternative sources over a similar time period; and
>
> will be competitive with other sources of electric power available to future southern New England electricity markets in the future.

The technical reliability of Hydro-Québec power will receive thorough evaluation from State and federal agencies. It is clear at this juncture, however, that Hydro-Québec has made a serious commitment to bring its system up to U.S. reliability standards. In addition, Maine electric consumers stand to gain from the presence of the tie to Hydro-Québec through economy power transactions and through the potential ability to utilize the Hydro-Québec system to meet reserve requirements. Finally, arguments regarding the risk of an arbitrary cut-off of electricity are not convincing in light of the importance of energy exports to Québec's economy and Hydro-Québec's development strategy.

HYDRO-QUEBEC AND MAINE'S SMALL POWER PRODUCTION INDUSTRY

Expansion of Maine's small power production industry should only occur within the limits of prudent resource management. As noted in Chapter II, expanding biomass power production in Maine will have broad implications for Maine's forest resource.[28] It is now clear that expansion of the domestic small power production, and almost any other long-term uses of Maine's forest

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[28] See page 20 of this report.

resource, will require more intensive forest management practices.[29] In the absence of more aggressive stewarding of our forests, expansion of the biomass-fueled small power producer industry will add significantly to the pressure on Maine's forest resource.

Still, this industry presents an important economic development opportunity for Maine. It appears to be able to provide electricity that is cost-competitive with Hydro-Québec and promises significant economic benefits for Maine, especially in slow-growth regions of northern, eastern and western Maine.[30] Thus, it remains in Maine's interest to encourage and support the responsible expansion of the domestic small power production industry.

At the same time, it would be unwise to make important decisions regarding Maine's energy future solely on the basis of maximizing a single economic development initiative. The Hydro-Québec proposal offers important economic benefits itself, some of which go beyond the initial proposal. The predictable and stable price, security of supply, and potential for additional low-cost electricity offered by the Hydro-Québec proposal are also critical to the State's long-term economic health.

But most importantly, importing power from Hydro-Québec and expanding the domestic small power production industry need not be mutually exclusive. CMP's latest Hydro-Québec purchase "preferred option" includes two added decrements (100 MW) of purchased power. As noted in Chapter 2, there remains room within CMP's load forecast for still more small power purchases. (See page 20). In addition, the markets in southern New England offer great opportunity for Maine small power producers. CMP ownership of capacity south of the transmission bottleneck and the new Hydro-Québec tie line could facilitate power banking and capacity sales between Maine small power producers and export markets.

There are currently no explicit provisions in the Hydro-Québec proposal to safeguard future development of Maine's small power production industry . As noted, additional demand is evident in CMP's energy plans. However, if the Hydro-Québec tie-line is built, future load could be filled with additional purchases of Hydro-Québec rather than small power producers. If the Hydro-Québec proposal is not to foreclose future small power purchases, it may be necessary to assure Maine small power producers either an opportunity to meet electricity needs in Maine, or transmission access to southern New England markets.

Given the limits to prudent development of a domestic biomass energy industry and the potential for further biomass development within the Hydro-Québec proposal, Hydro-Québec and the domestic small power producer

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[29] Forest for the Future. Page 11.

[30] Detailed review of small purchase power proposals from CMP's RFP process will help determine how much cost-effective small power is available.

industry can be integral components of a balanced program of long-term economic growth for all regions of Maine.

HYDRO-QUEBEC AND ENERGY CONSERVATION AND LOAD MANAGEMENT

Electricity from Hydro-Québec and continued conservation efforts need not be mutually exclusive either. Claims of technical potential notwithstanding, given the uncertainties regarding the level of attainable conservation and load management, it would be similarly unwise to reject other supply options in the hope that adequate conservation will be achieved. The Natural Resources Council of Maine (NRCM), with the Conservation Law Foundation, has recently explored a package of conservation proposals with CMP. These discussions and PUC review of the Hydro-Québec proposal may provide more insight into the potential for additional conservation and its effect on the desirability of the proposed Hydro-Québec purchase.

ENVIRONMENTAL AND HEALTH EFFECTS OF THE HYDRO-QUEBEC TRANSMISSION LINE

Much more information is needed to make a meaningful assessment of the health risks of an AC transmission line. While the New York PSC study found an association between high-voltage AC power lines and childhood cancer, in the absence of corroborative research, according to the authors, the link remains no more than a hypothesis. Such information will not be forthcoming in time to inform a decision on the Hydro-Québec proposal.

Accordingly, a wider right-of-way buffer should be established based on current information regarding health effects and distance from the line.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Conclusions

To summarize the findings of this analysis:

1. Barring unforseen regulatory barriers, the Hydro-Québec purchase appears to be consistent with many of Maine's energy, economic development, and environmental protection goals. While the Hydro-Québec proposal presents certain risks to ratepayers and citizens, the means exist to manage those risks adequately.

2. The proposed Hydro-Québec purchase need not preclude prudent development of additional cogeneration and small power production in Maine at favorable costs to consumers.

3. Conservation and load management remain the favored means among energy options to address Maine's future energy needs. However, the level of uncertainty about how much of the potential can be achieved makes

decisions to defer capacity additions based on the hopes of high success rates imprudent.

4. Uncertainty remains regarding the environmental and health effects of the Hydro-Québec transmission line.

Recommendations

The recommendations from this assessment can be summarized as follows:

1. Small power producers in Maine should be assured competitive access to power markets in Maine and southern New England.

2. Continued aggressive development of conservation and load management programs should be pursued.

3. Siting the right-of-way corridor for the Hydro-Québec AC transmission line should include an added margin of safety.

• • • • • • •

Planning for Maine's energy future is a perilous task. It necessitates making difficult decisions that will affect us for many years to come. There are always trade-offs in energy planning. Short-term security is gained often at the risk of long-term vulnerability. Pursuit of one economic or environmental goal often comes at the expense of others. In avoiding one series of environmental impacts, we must often accept others.

The proposed Hydro-Québec purchase is no exception. In this review, we have attempted to identify and assess the primary risks of the proposed purchase to Maine ratepayers and citizens. Our conclusion is as follows:

> **While CMP's proposal to purchase significant amounts of electricity from Hydro-Québec does present certain risks, it appears that the means exist to manage those risks. We have cited a number of specific actions which have been taken or could be taken to mitigate and/or compensate for the potential adverse impacts of the proposed purchase and transmission line. It is our considered assessment that the proposed Hydro-Québec purchase has the potential of meeting many of Maine's energy, economic development, and environmental goals.**
>
> **Accordingly, we recommend that CMP be encouraged to continue to pursue direct negotiations with Hydro-Québec and to advance its proposals before the appropriate State and Federal regulatory bodies. However, we recommend withholding any endorsement of the proposal until those regulatory bodies have conducted their reviews and issued their findings.**

APPENDIX

1. Executive Summary, Preliminary Report on the Effects of the Proposed Power Purchase from Hydro Quebec. May 1987.

2. Letter of Intent. Hydro-Québec/Central Maine Power Company. February 10, 1987.

Appendix 1

PRELIMINARY REPORT ON

THE EFFECTS OF THE PROPOSED PURCHASE OF POWER FROM HYDRO QUÉBEC

Maine State Planning Office

May 19, 1987

Special Study Group on the Hydro Québec Purchase

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Dean C. Marriott, Commissioner
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EXECUTIVE SUMMARY

The proposed purchase of up to 900 megawatts of power from Hydro Québec over the period 1992-2020 presents the State of Maine with a number of important questions. It is not an understatement to say that the decision about this purchase of power from Hydro Québec will be a major determinant of the future sources and prices of electricity in the state. In fact the signing of the letter of intent has already had a major impact on one potential cogenerator and on power planning in New England.

Four major options for meeting Maine's future electricity needs have been identified:

- A Maine utility built and operated coal-fired generating station
- Purchases from Canada
- A mixture of oil, biomass, hydro, and conservation
- Conservation

Of these four, there is a general consensus that the first is likely to be the most expensive. The fourth option has recently been proposed by the Natural Resources Council of Maine, but there has not been sufficient time to evaluate this alternative.

The State Planning Office, in cooperation with the Office of Energy Resources, Public Advocate, the Advocacy staff of the Public Utilities Commission, and the Departments of Conservation and Environmental Protection, has conducted a preliminary examination of the issues raised by Central Maine Power's proposed purchase. It should be emphasized that these issues are enormously complex, and cannot be fully addressed until the proposal has been examined by the appropriate regulatory agencies. Much of the information to conduct even a preliminary analysis of the issues is as yet unavailable, and thus the process of evaluation must continue in the months ahead.

Major conclusions that can be drawn at this time are as follows:

1. Hydro Québec Purchase

Benefits

• The Hydro Québec purchase provides reasonable security of supply and price for nearly 30 years. No other alternative that has been evaluated is likely to provide the same predictability of price for the same amount of power as the Hydro Québec purchase. There are indications that individual components of an alternative to Hydro Québec may offer similar or greater price security. However, purchasing several increments of power over time, as hypothesized here, opens the total cost of an alternative to the price impacts of inflation, increases in fuel costs, increases in the cost of capital, and other energy production cost changes.

• Construction of the transmission line necessary to import the power from Hydro Québec will result in an average 114 direct and indirect jobs, and an annual average of $21 million in personal income in Maine between 1989 and 1992.

• If Hydro Québec is the lowest cost alternative to provide 600 MW of electricity, it will offer competitive advantages to Maine industries and increased disposable income for consumers. Some projections have placed the cost of Hydro Québec power below that of alternatives. If the Hydro Québec purchase is 10% cheaper than the next best alternative (taken to be the "domestic alternative" described below), there would be an estimated 135 additional jobs in Maine annually between 1992 and 2020.

• Over and above the benefits of this specific proposed purchase, this transmission line will offer the opportunity for purchasing additional power from Québec on a short term basis to reduce electricity costs, and will be a permanent link to the vast hydroelectric resources of Québec.

• Total increases in employment, income, and taxes from construction and power purchases from the proposed Hydro Québec deal are thus:

Hydro Québec Purchase** (Annual Average Figures)			
Years	Employment	Income	State Taxes
1989-1992	114	$21 million	$ 1.19 million
1992-2015*	360	$66 million	$ 3.77 million
*Assuming an electricity price 10% below the domestic alternative.			

Risks

• There are two major economic risks associated with the Hydro Québec purchase. The first is the opportunity costs that may be incurred if some other form of electricity supply (including conservation) is found to be cheaper than the power purchased from Hydro Québec. Technological advances in generation and conservation could prove to be cheaper than Hydro Québec at some point in the future, and the long term commitment to Hydro Québec may foreclose the use of such advances. The result would be lost opportunities to save on electricity costs. To the extent that such advances also produced employment and income in Maine, economic development benefits could be lost as well.

• An additional economic risk associated with the Hydro Québec purchase is that demand in New England will be significantly below projected levels, forcing CMP to pay the substantial penalties contained in the agreement. Since CMP has proposed reselling one third of the power it proposes to buy to other utilities outside of Maine, this risk is a function of both demand within Maine and in southern New England. Whether ratepayers or shareholders would have to bear this risk is a matter of uncertainty to be addressed in the legislative and regulatory arenas.

** REVISED FROM FIRST ADDITION. CORRECTION FOR OVERESTIMATE OF CONSTRUCTION JOBS.

• Concerns have been raised about the reliability of supplies from Hydro Québec. The best evidence currently available is that there are technical reliability risks because of the configuration of the Hydro Québec system, but these may be resolved or reduced in the future. Risks of arbitrary cutoffs of power appear small and are likely to be reduced further in the future as demand growth for electricity in Québec slows.

• Environmental impacts in Maine from the proposed transmission line are dependent upon a number of specific siting variables that cannot be judged until a final route is selected. While many impacts can be avoided or mitigated, there may be an unavoidable adverse impact on the Appalachian Trail and its users. Concerns about the health effects from large scale transmission lines have been raised in similar proposals elsewhere, but remain largely unresolved.

2. The "Domestic Alternative"

This alternative is a hypothetical mixture of biomass (both stand-alone and cogeneration), hydroelectric dams, conservation, and reactivation of the oil-fired Mason Station. The scenario was chosen by the study group as a reasonable alternative, is designed to produce the same power for Maine as the Hydro Québec purchase, and to come on line in approximately the same time frame.

Benefits

• The principal advantage of this alternative, assuming it can supply electricity at a price that is competitie with Hydro Québec, is the additional employment and income that would be created as a result of indigenous generation. Construction employment is estimated at 684, while operating employment is estimated at 295. In addition, 630 jobs would be required to harvest and transport the needed biomass. Total direct jobs are thus 1609, and estimated indirect jobs are 1000, annual average.

• Total employment, income, and tax effects of this alternative thus are:

Domestic Alternative

(Annual Average Figures)

Years	Employment	Income	StateTaxes
1992-2015	1,609 direct 1,000 indirect 2,609 total	$202 million	$11.5 million

• This alternative would provide a more flexible means of meeting demand, using several different sources of supply, plus conservation. No upfront commitment is required for the full 600 MW, and so the risks of excess capacity, and overcommitment to a single technology are reduced.

• The price of electricity from this alternative is less certain. It depends on a wide number of factors, the most important of which appear to be whether a sufficient number of small power producers can afford to match Hydro Québec's price and thus become the more attractive pricing alternatives, whether inflation will drive up the costs of various sources under this alternative, and, whether fuel prices for biomass will substantially escalate over time. Inadequate information exists to answer the first question. Preliminary estimates of supply and demand for biomass suggest that prices for biomass fuel may, in fact, rise somewhat more rapidly than the rate of inflation over the time period in question.

• The environmental effects of this alternative are impossible to accurately assess at this time, since much will depend on the actual sites chosen and the types of facilities constructed. In general, additional biomass or other thermal generation can be expected to result in increased air and water emissions, and present problems of ash disposal. Hydroelectric dams may have a number of adverse effects on water quality, fisheries and wildlife, and other resources depending upon the site chosen.

• Biomass harvesting itself may have adverse effects if done improperly, including soil nutrient depletion and effects on regeneration and growth. However, properly done biomass harvesting is generally considered an important aid to sound forest management.

Principal unresolved issues that await additional information:

• Will the Hydro Québec purchase foreclose the opportunity for additional development of small power generation in Maine?

The most important issue here is whether small power producers can provide electricity at a cost lower than Hydro Québec. Boise Cascade has recently signed a contract with CMP to provide power at a comparable cost, suggesting that at least some cogeneration projects may be competitive. CMP is expected to ask for bids this summer from small power producers. CMP will also request bids from major industries in its service area for conservation investment proposals. The results of these bidding processes are expected to shed light on the price of electricity under the domestic alternative.

There is also a question of whether, even with the purchase from Hydro Québec, there may still be opportunities for small power generation in Maine to sell to southern New England. Again, the levels of price and demand for this power are unknown at this time. In addition, adequate transmission capacity to the south may be an issue here, although the expiration of current power contracts with New Brunswick in the early 1990's may make additional capacity available if these contracts are not renewed at that time.

• Will the price of alternatives rise over time?

The electricity price of the domestic alternatives would be made up of many components, with many uncertainties. Because these options are brought on line over a long period of time, they would be subject to some escalation in their construction and operating costs because of general inflation; they may be thus more expensive than current projects. Fuel prices for wood-fired plants may rise over time as well.

• Opportunities for sale of power from the Hydro Québec purchase or other Maine generators to southern New England.

The CMP-Hydro Québec purchase hinges on CMP's ability to market 300MW of power to southern New England. While the demand for such power can be reasonably expected, no firm arrangements have yet been made to sell this power. It is not clear what the attitude of other New England states will be towards this power, and whether they will be helpful or obstructionist.

• Is an all-conservation alternative realistic?

The Natural Resources Council of Maine has proposed that almost all of Maine's foreseeable electricity needs could be met through increased investments in conservation at a lower price than purchasing additional generating capacity, either domestically or from Canada. Adequate time has not been available to examine this proposal. It should be thoroughly reviewed and analyzed to determine what impact such a course would have.

• Are there other Canadian alternatives that would provide the same benefits as Hydro Québec?

Both New Brunswick and Nova Scotia have announced a desire to build coal plants to serve the New England market, and both are actively pursuing plans for such facilities. Neither province can currently offer the firm commitment that Hydro Québec has. However, both provinces may choose to provide more firm commitments now that a preliminary deal with Hydro Québec has been signed. There remain some questions regarding New Brunswicks stated desire to condition future power contracts on access to CMP transmission capacity. Such a condition could exaserbate potential transmission bottlenecks.

• Are there impacts on utilities outside of Maine that may have adverse consequences for Maine in the future?

The New York Power Pool, the Pennsylvania-New Jersey-Maryland Power Pool and some New England officials have voiced concern over the

purchase of such a large block of power from Hydro Québec However, the exact problems that are feared remain unclear at this time. Because both the Hydro Québec purchase and potential expansion of the small power industry in Maine rely to a great degree on markets elsewhere in New England, the regional implications of this purchase should be more fully understood.

• What will the final route of the transmission line be, and what implications will this choice have for cost and environmental effects?

CMP is currently undertaking detailed studies of alternative transmission routes. Until a preferred alternative is identified, it will be impossible to know precisely what impacts may be expected, and what mitigation efforts may be successful.

• Who will bear the risks of the Hydro Québec purchase: CMP ratepayers or shareholders?

There are a number of large and small risks associated with CMP's proposed purchase of power from Hydro Québec. The question of who will bear these risks is a matter that is raised by L.D. 729 (An Act Establishing the Maine-Canada Energy Cooperation Act) and in the regulatory proceedings before the P.U.C. The decisions made by these two bodies will have important implications for regional access to Hydro Québec power within Maine and the price of that power.

Appendix 2

HYDRO-QUÉBEC

CENTRAL MAINE POWER COMPANY

LETTRE D'ENTENTE

LETTER OF INTENT

FÉVRIER 1987

FEBRUARY 1987

LETTRE D'ENTENTE

Faite et signée ce 10e jour de février 1987.

ATTENDU QU'HYDRO-QUÉBEC et CENTRAL MAINE POWER COMPANY (CENTRAL MAINE) poursuivent depuis un certain temps des négociations en vue de signer un contrat pour la vente à long terme de puissance et d'énergie garanties par HYDRO-QUÉBEC à CENTRAL MAINE; et

ATTENDU QUE les principes de base d'un contrat d'électricité garantie ont fait l'objet d'un accord préliminaire; et

ATTENDU QU'HYDRO-QUÉBEC et CENTRAL MAINE reconnaissent que la construction d'une interconnexion à courant continu entre leurs réseaux, d'une capacité minimale de 1 000 MW, leur serait mutuellement avantageuse; et

ATTENDU QU'HYDRO-QUÉBEC et CENTRAL MAINE conviennent que le tronçon situé aux États-Unis (É.-U.) de l'interconnexion mentionnée ci-dessus sera la propriété d'une nouvelle société ou association appartenant conjointement à CENTRAL MAINE ou à sa filiale, ainsi qu'à une filiale d'HYDRO-QUÉBEC; et

ATTENDU QUE les parties estiment qu'il est opportun de signer la présente lettre d'entente pour consigner ce dont elles ont convenu;

EN CONSÉQUENCE, elles formulent leurs intentions comme suit:

1.0 PRINCIPES DU CONTRAT D'ÉLECTRICITÉ GARANTIE

Les principes de base du projet de contrat d'électricité garantie sont décrits à l'annexe "A"

LETTER OF INTENT

Letter of Intent made and entered into this 10th day of February, 1987.

WHEREAS HYDRO-QUÉBEC and CENTRAL MAINE POWER COMPANY "CENTRAL MAINE" have been negotiating a contract for the long term sale of firm capacity and energy by HYDRO-QUÉBEC to CENTRAL MAINE; and

WHEREAS preliminary understanding has been reached on the basic principles of a Firm Power Contract; and

WHEREAS HYDRO-QUÉBEC and CENTRAL MAINE recognize that the construction of a DC interconnection between their systems, capable of transmitting at least 1000 MW, will be mutually advantageous; and

WHEREAS HYDRO-QUÉBEC and CENTRAL MAINE believe that the United States "U.S." portion of the hereinabove mentioned interconnection will be owned by a newly created corporation or partnership entity jointly owned by CENTRAL MAINE or its subsidiary and a subsidiary of HYDRO-QUÉBEC; and

WHEREAS the parties believe that it is now appropriate to execute this Letter of Intent to reflect these understandings;

NOW, THEREFORE, they state their intentions as follows:

1.0 PRINCIPLES OF FIRM POWER CONTRACT

Exhibit "A" hereto expresses basic principles of the proposed Firm Power Contract. The undersigned

ci-jointe. Les soussignés poursuivront leurs efforts pour mettre au point un contrat définitif d'électricité garantie définissant l'application desdits principes et autres conditions nécessaires. Sous réserve que les parties s'entendent sur le texte, que les autres questions mentionnées ci-dessous soient réglées de façon satisfaisante et que les circonstances ne changent pas de façon importante, les soussignés ont également l'intention de recommander à leur conseil d'administration respectif l'approbation du projet de contrat d'électricité garantie énonçant ces principes et les autres conditions nécessaires.

will proceed to use their best efforts to complete the text of a definitive Firm Power Contract defining the application of such principles and other necessary terms. Assuming agreements on the text and satisfactory resolution of the other matters referred to below, and no material changes in circumstances, the undersigned further intend to recommend to their respective Boards of Directors for approval the proposed Firm Power Contract embodying these principles and other necessary terms.

2.0 MESURES PROVISOIRES

Les parties reconnaissent qu'aucun accord n'a encore été conclu relativement aux caractéristiques et à l'emplacement de l'interconnexion, ni aux installations connexes ou aux modalités d'exploitation qui peuvent être nécessaires pour satisfaire aux exigences de fiabilité. Les représentants des parties ou des organismes concernés, ou tous ces représentants, collaboreront à l'analyse et à la conception de l'interconnexion et des installations connexes, à l'étude de leurs effets sur la fiabilité ainsi qu'aux démarches préliminaires pour l'obtention des permis et autorisations aux É.-U. et au Canada, toujours en vue d'obtenir l'approbation rapide du contrat d'électricité garantie et d'effectuer la mise en service des installations d'ici le 1er mai 1992.

2.0 INTERIM ACTION

The parties recognize that no understanding has yet been reached on the design and location of the interconnection, or on the related facilities nor on the operating procedures that may be required to meet reliability requirements. The representatives of the parties or the representatives of the appropriate corporate entities, or both, will cooperate in the further analysis and design of the interconnection and related facilities, of their reliability effects and in preliminary license and regulatory applications in the U.S. and Canada, all with the objective of having the Firm Power Contract approved promptly and the facilities in service by May 1st, 1992.

3.0 ENTREPRISE DE TRANSPORT

Les parties sont d'avis qu'il leur serait mutuellement avantageux que CENTRAL MAINE ou sa filiale et une filiale d'HYDRO-QUÉBEC forment une société de transport d'électricité (Nouco) dans le but de mener à bien la conception et la construction d'une interconnexion et des installations connexes destinées au transport de l'électricité garantie conformément à l'article 1.0 dans l'État du Maine ainsi que de les financer, les posséder et les exploiter. Les principes de base régissant l'entreprise de transport proposée sont énoncés à l'annexe "B" ci-jointe.

3.0 TRANSMISSION VENTURE

The parties believe that it would be in their mutual interest that CENTRAL MAINE or its subsidiary and a subsidiary of HYDRO-QUÉBEC form a transmission company (Newco) to complete the design, and to finance, build, own and operate an interconnection and related facilities in the State of Maine for the purpose of transmitting the Firm Power described in Article 1.0. Exhibit "B" hereto expresses the basic principles of the proposed transmission venture.

4.0 CONTRATS DE REVENTE ET CESSIONS

HYDRO-QUÉBEC reconnaît d'une part que CENTRAL MAINE doit revendre de la puissance et de l'énergie pour être en mesure de conclure et d'exécuter le contrat d'électricité garantie, et d'autre part, que cette revente peut obliger les tiers qui achèteront la puissance et l'énergie en question à obtenir les droits et autorisations de transport nécessaires.

Si une telle revente prend la forme d'une cession des droits et obligations de CENTRAL MAINE aux termes du contrat d'électricité garantie, cette cession ne libère pas pour autant CENTRAL MAINE de ses obligations envers HYDRO-QUÉBEC aux termes de ce contrat. De plus, une telle cession doit comporter une disposition qui permette à HYDRO-QUÉBEC de faire valoir le

4.0 THIRD PARTY RESALE CONTRACTS AND ASSIGNMENTS

HYDRO-QUÉBEC recognizes that CENTRAL MAINE must resell capacity and energy in order to make it possible for CENTRAL MAINE to enter into and go forward with the Firm Power Contract, and that such resale may require third party purchasers of such capacity and energy to obtain transmission rights and approvals.

If such resale takes the form of an assignment of CENTRAL MAINE's rights and obligations under the Firm Power Contract, CENTRAL MAINE shall not be relieved of its obligations to HYDRO-QUÉBEC under the Firm Power Contract by virtue of that assignment. Moreover, any such assignment shall include a provision which entitles HYDRO-QUÉBEC to enforce CENTRAL MAINE's rights to payment from the assignee for the power resold under

droit de CENTRAL MAINE de se faire payer par le cessionnaire l'électricité visée par le contrat d'électricité garantie et revendue, au cas où CENTRAL MAINE négligerait de faire valoir ce droit et de payer à HYDRO-QUÉBEC, en temps voulu, la puissance revendue.

CENTRAL MAINE et HYDRO-QUÉBEC conviennent également de rediscuter de la pertinence de la cession à HYDRO-QUÉBEC de contrats de revente à des tiers, à défaut de paiement par CENTRAL MAINE.

5.0 *CONDITIONS PRÉALABLES*

Les parties reconnaissent qu'elles ne peuvent aller de l'avant que si les conditions suivantes sont remplies:

a) approbation, par le conseil d'administration des sociétés intéressées, du contrat d'électricité garantie, de l'entreprise de transport et des contrats qui en découlent;

b) signature d'un contrat d'électricité garantie;

c) constitution et structuration d'une entreprise de transport selon les principes exposés à l'annexe "B" et la signature des contrats nécessaires à une telle entreprise;

d) signature d'une entente préliminaire d'exploitation et de soutien stipulant les droits et les obligations de chacun relativement à l'entreprise de transport,

the Firm Power Contract in the event CENTRAL MAINE shall fail to enforce these rights and to make timely payment to HYDRO-QUÉBEC for the resold power.

CENTRAL MAINE and HYDRO-QUÉBEC also agree to discuss further the advisability to have assignments in favour of HYDRO-QUÉBEC of third party resale contracts in cases of nonpayment by CENTRAL MAINE.

5.0 *CONDITIONS OF GOING FORWARD*

The parties recognize that their going forward is subject to all of the following conditions:

a) approval of the Firm Power Contract and of the Transmission Venture and ensuing contracts by their Boards of Directors;

b) the execution of a Firm Power Contract;

c) the constitution and organization of a transmission company in accordance with the principles of Exhibit "B" and execution of contracts for such venture;

d) the execution of a preliminary operating and support agreement delineating each party's rights and obligations with respect to the transmission venture up through the time Newco is final-

jusqu'à ce que Nouco soit entièrement mise sur pied;

ly organized;

e) *signature des contrats de revente et des actes de cession mentionnés à l'article 4.0;*

e) *the execution of resale contracts and assignments referred to in Article 4.0;*

f) *obtention, par HYDRO-QUÉBEC, CENTRAL MAINE et les tiers acheteurs mentionnés à l'article 4.0 de tous les droits et autorisations nécessaires auprès des autorités fédérales, provinciales, de l'État et locales, tant aux É.-U. qu'au Canada, y compris tous les droits et autorisations de transport nécessaires pour que les tiers acheteurs puissent prendre des engagements relativement à la puissance et à l'énergie revendues par CENTRAL MAINE, ainsi qu'acheter et recevoir cette puissance et cette énergie;*

f) *obtainment by HYDRO-QUÉBEC, CENTRAL MAINE and third party purchasers referred to in Article 4.0 of all necessary rights and regulatory approvals of U.S. and Canadian federal, state, provincial or local authorities including all transmission rights and approvals necessary for third party purchasers to commit, purchase and receive capacity and energy resold by CENTRAL MAINE;*

g) *établissement, de façon acceptable pour HYDRO-QUÉBEC, du fait qu'elle n'est pas tenue de s'inscrire auprès de la "Securities and Exchange Commission" (SEC) en vertu de la "Public Utility Holding Company Act of 1935" (Loi de 1935 sur les sociétés de gestion d'entreprises de service public - États-Unis) par suite de la présente transaction, et que cette transaction n'aura pas d'incidence négative sur la situation fiscale d'HYDRO QUÉBEC relativement à ses ventes d'électricité aux É.-U;*

g) *determination in a form satisfactory to HYDRO-QUÉBEC that it does not have to register with the Securities and Exchange Commission "SEC" under the Public Utility Holding Company Act of 1935 as a result of this transaction and that such transaction does not negatively impact the fiscal status relative to its sales of electricity in the U.S.;*

h) approbation du contrat d'électricité garantie et des modalités de transport par le corps législatif du Maine.

Il est entendu que ni l'une ni l'autre des parties ne sera tenue de donner suite au projet de contrat de vente d'électricité garantie ou d'entreprise de transport à moins que les conditions ci-dessus n'aient été remplies d'une façon qu'elle, et elle seule, jugera satisfaisante.

Nonobstant ce qui précède, si l'une ou l'ensemble des conditions ci-dessus n'ont pas été respectées, les parties conviennent de négocier de bonne foi une autre forme d'entente, dans la mesure du possible, afin d'atteindre l'objectif de la présente lettre d'entente. Les deux parties devront s'efforcer de conserver une situation économique et commerciale aussi avantageuse que celle qu'elles avaient envisagée à l'origine.

6.0 DÉCLARATION OFFICIELLE

Les parties conviennent de s'efforcer de s'aviser l'une l'autre et de se consulter mutuellement avant de faire toute déclaration officielle relativement à la teneur de la présente lettre d'entente et aux questions connexes.

7.0 DÉCLARATION DE BONNE VOLONTÉ

Chacune des parties s'engage à s'efforcer de mettre à exécution les accords mentionnés aux présentes, selon les principes énoncés dans la présente lettre

h) the endorsement of the Firm Power Contract and transmission arrangements by the Maine State Legislature.

It is understood that neither party will be bound to proceed with the Firm Power Contract or the Transmission Venture unless the foregoing conditions have been complied with to its satisfaction, as determined by it in its sole discretion.

Notwithstanding the foregoing, if any or all of the conditions have not been complied with, the parties agree to negotiate in good faith an alternative form of agreement, to the extent that this is possible, with a view to obtaining the object of the present Letter of Intent. Both parties shall strive to maintain an economic and commercial status as advantageous as the one originally contemplated by them.

6.0 PUBLIC STATEMENT

The parties agree to use their best efforts to inform and consult with each other prior to any formal or official public statement made in relation to the content of the present Letter of Intent and matters pertaining to it.

7.0 BEST EFFORTS

The parties intend by this Letter of Intent that each will use its best efforts to achieve the agreements referred to herein based on the principles expressed herein and in

d'entente et ses annexes.

8.0 *EFFET JURIDIQUE*

Aucune disposition de la présente lettre d'entente ne se veut une obligation de par la loi pour les parties aux présentes, ni ne saurait être interprétée comme telle.

Pour HYDRO-QUÉBEC

Originaux signés par:

Guy Coulombe

Président-directeur général

1987-02-10
Date

the exhibits hereto.

8.0 *LEGAL EFFECT*

Nothing in this Letter of Intent is intended, nor should it be construed, to be legally binding on the parties hereto.

For CENTRAL MAINE POWER COMPANY

Originals signed by:

John W. Rowe

President and Chief
Executive Officer

ANNEXE "A"

PRINCIPALES CONDITIONS DU PROJET DE CONTRAT D'ÉLECTRICITÉ GARANTIE

1. **Durée du contrat**

Le contrat prévoit la livraison de puissance et d'énergie pendant environ 29 ans, soit à partir de la date de mise en service de l'interconnexion (cette date est présumée être le 1er mai 1992 aux fins des présentes) jusqu'au 31 octobre 2020.

2. **Quantités contractuelles**

Sous réserve des autres conditions énoncées aux présentes, HYDRO-QUÉBEC est tenue de livrer et CENTRAL MAINE est tenue de payer les tranches de puissance cumulatives suivantes, selon un facteur d'utilisation moyen de 75 % pour toute la durée du contrat:

De la date de mise en service au 31 octobre 2013:	400 MW
Du 1er novembre 1995 au 31 octobre 2015:	200 MW
Du 1er novembre 2000 au 31 octobre 2020:	300 MW

CENTRAL MAINE peut reporter ou avancer d'un an la date de mise à sa disposition de la dernière tranche de 300 MW, à condition d'en aviser HYDRO-QUÉBEC avant novembre 1992; CENTRAL MAINE peut aussi réduire ou accroître de 100 MW la puissance de cette dernière tranche, à condition d'en aviser HYDRO-QUÉBEC au plus tard quatre ans avant la mise à sa disposition de la tranche en question.

EXHIBIT "A"

PRINCIPAL TERMS OF PROPOSED FIRM POWER CONTRACT

1. **Contract Period**

The contract will provide for power and energy deliveries over approximately 29 years commencing on the in-service date of the interconnection (which is assumed for this purpose to be May 1st, 1992), and ending on October 31st, 2020.

2. **Quantities**

HYDRO-QUÉBEC will be obligated to deliver and CENTRAL MAINE will be obligated to pay for the following additive blocks of power at an average load factor of 75% over the contract period, subject to other conditions outlined herein:

From the in-service date to October 31, 2013,	400 MW, and
From November 1, 1995 to October 31, 2015,	200 MW, and
From November 1, 2000 to October 31, 2020,	300 MW

CENTRAL MAINE will have the option of delaying or advancing the start of the last block of 300 MW by one year by giving notice before November 1992 and will also have the option of increasing or decreasing this last block by 100 MW upon notice to HYDRO-QUÉBEC at least four years before the start of such block.

3. ***Programmes de livraison***

CENTRAL MAINE peut fixer le facteur d'utilisation applicable à toute année entre 65 % et 85 % à condition que l'écart cumulatif par rapport à un facteur d'utilisation moyen de 75 % ne dépasse pas certaines limites. HYDRO-QUÉBEC peut abaisser le facteur d'utilisation jusqu'à 65 %, quand certaines conditions d'hydraulicité existent au Québec. La quantité d'énergie ainsi non livrée peut être reprogrammée par CENTRAL MAINE, à certaines conditions précises.

CENTRAL MAINE répartit d'avance sur douze mois la quantité d'énergie qui doit lui être livrée au cours d'une année quelconque. Chaque mois, cette quantité est confirmée ou modifiée puis répartie sur quatre semaines, mais le facteur d'utilisation mensuel doit être d'au moins 25 % et d'au plus 95 %.

Enfin, la quantité est confirmée ou modifiée chaque semaine, et un programme de livraison horaire est fourni pour chaque jour. Ces programmes horaires sont assujettis à certaines limitations de taux de variations et constituent un engagement définitif pour les parties.

4. ***Prix***

Le prix à payer pour chaque tranche de puissance et d'énergie comprend deux éléments.

Le premier élément, qui détermine le prix annuel de la puissance, est fondé sur un prix de référence par kilowatt de puissance contractuelle de 1985 et est payable tous les ans en douze

3. ***Scheduling***

CENTRAL MAINE will be able to choose the load factor applicable for any given year between 65% and 85% provided the cumulative deviation relative to the 75% average load factor does not exceed certain limits. HYDRO-QUÉBEC will have the option of reducing the load factor to a value of not less than 65% when certain defined hydraulic conditions prevail in Québec. The energy thus curtailed may be rescheduled by CENTRAL MAINE under specified conditions.

The quantity of energy to be delivered during any year will be allocated in advance among the 12 months of the year by CENTRAL MAINE. Then each month, the quantity will be confirmed or changed and will be allocated among the weeks in the month, but the monthly load factor will have to be no less than 25% nor more than 95%.

Finally, each week, the quantity will be confirmed or changed and hourly schedules for each day will be supplied. These hourly schedules will be subject to certain ramping limits, and will constitute the final commitments of the parties.

4. ***Pricing***

The price to be paid for each block of capacity and energy will be made up of two components.

The first component will determine the yearly capacity price which will be based on a 1985 reference price per kilowatt of contracted power and will be payable each year in twelve equal monthly payments. The refer-

versements mensuels égaux. Le prix de référence pour cet élément correspond aux montants indiqués dans le tableau ci-dessous:

Tranche de puissance	*Période*	*Prix en $ US/kW*
1	*De la date de mise en service au 31 octobre 1997*	*1 190,00*
1	*Du 1er novembre 1997 à la fin de la tranche 1*	*1 225,00*
2	*Toute la durée de la tranche 2*	*1 225,00*
3	*Toute la durée de la tranche 3*	*1 225,00*

Ces prix seront indexés selon l'indice d'inflation Handy-Whitman approprié jusqu'à la date où commence chaque tranche, et resteront inchangés jusqu'à la fin du contrat, sauf pour les rajustements éventuels imputables à la fluctuation des taux d'intérêt.

Le second élément, qui détermine le prix de l'énergie, est composé de deux parties. Cet élément est aussi fondé sur un prix de référence par mégawattheure de 1985, et il sera indexé en fonction du "United States Gross National Product Implicit Price Deflator (GNPIPD)" jusqu'à la fin du contrat. Ce prix est applicable à l'énergie réellement livrée et facturé chaque mois à CENTRAL MAINE. Les prix de référence pour cet élément sont 2,74 $ US/MWh et 15 $ US/MWh.

Le contrat comprend une disposition qui sera en vigueur pendant trois ans à compter de la date de signature du contrat d'électricité garantie, et qui garan-

ence price for this component will be equal to the values given in the table below:

Block of Capacity	*Period*	*Price $US/KW*
1	*In service date to October 31, 1997*	*1190.00*
1	*November 1, 1997 to end of block 1*	*1225.00*
2	*Duration of block 2*	*1225.00*
3	*Duration of block 3*	*1225.00*

These prices will be indexed according to the appropriate Handy-Whitman inflation index up to the beginning of each block and will remain constant thereafter up to the end of the contract period except for possible adjustments with variations in interest rates.

The second component will be made up of two parts and will determine the energy price. This component is also based on a 1985 reference price per megawatthour and indexed according to the United States Gross National Product Implicit Price Deflator (GNPIPD) up to the end of the contract period. This price will be applied to the energy actually delivered and will be billed to CENTRAL MAINE each month. The reference prices for this component are equal to $2.74 US/MWh and $15.00 US/MWh.

The contract will include a provision effective for three years beginning with the date of execution of the Firm Power Contract, assuring CENTRAL MAINE that if HYDRO-QUÉBEC enters in-

tit à CENTRAL MAINE que si HYDRO-QUÉBEC conclut avec des parties autres que CENTRAL MAINE n'importe quels contrats d'exportation aux États-Unis ayant la même nature et le même objet, à des prix plus avantageux pour les acheteurs que ceux du contrat d'électricité garantie, HYDRO-QUÉBEC doit alors appliquer dans le cadre du contrat d'électricité garantie des prix aussi avantageux, et ce pour la période d'effet de ces autres contrats postérieure au 1er mai 1992. Cette disposition ne s'applique que ci ces autres contrats portent sur 400 MW ou plus et durent plus de cinq ans.

to any contracts equivalent in nature and of equivalent object for export to the U.S. with parties other than CENTRAL MAINE, on price terms more favorable to the purchaser than the price terms in the Firm Power Contract, then HYDRO-QUÉBEC shall have equally favorable price terms reflected in the Firm Power Contract for the period of time that such other contract is in effect beyond May 1st, 1992. This principle shall apply only to such other contracts that provide for 400 MW or more and for periods of more than five years.

5. *Prix plafond et prix plancher*

Le prix combiné de la puissance et de l'énergie calculé selon les dispositions de l'article 4 ci-dessus est limité par un plafond et un plancher. Le plafond équivaut à 100 % des tarifs moyens de détail de trois des plus importantes entreprises d'électricité de la Nouvelle-Angleterre et de CENTRAL MAINE, pondérés selon une formule donnée. Le plancher équivaut à 100 % des tarifs moyens de détail d'HYDRO-QUÉBEC. Une partie peut rejeter une demande d'application du prix plafond ou du prix plancher faite par l'autre partie; dans ce cas, la partie requérante peut résilier le contrat sept (7) ans plus tard mais dans l'intervalle, ni le prix plafond ni le prix plancher ne s'appliquent.

5. *Ceiling price and floor price*

The combined price of capacity and energy calculated as described in Article 4 above will be subject to a ceiling and a floor. The ceiling will be equal to 100% of the average retail rates of three of the largest utilities in New England and of CENTRAL MAINE weighted according to a given formula. The floor will be equal to 100% of HYDRO-QUÉBEC's average retail rates. If a party requests the application of the ceiling price or of the floor price, the other party may refuse, in which case the requesting party may terminate the contract seven (7) years later, during which time the ceiling price or the floor price will not be applicable.

6. *Défaillances*

Le contrat comprend une série détaillée de dispositions ayant pour but d'assurer que les li-

6. *Deficiencies*

The contract will contain a detailed set of provisions which are intended to assure that deliveries not made by

vraisons non effectuées par HYDRO-QUÉBEC, ou non reçues ou non programmées par CENTRAL MAINE, donnent lieu à un rajustement de prix l'année contractuelle suivante. Par exemple, si HYDRO-QUÉBEC est incapable d'effectuer les livraisons programmées par CENTRAL MAINE, et si les parties ne s'entendent pas pour reprogrammer ces défaillances, le prix à payer pour l'énergie l'année contractuelle suivante sera réduit d'un montant correspondant à une (1,0) fois le prix de l'énergie non livrée en raison de difficultés sur le réseau, plus 1,25 fois le prix de l'énergie non livrée pour d'autres raisons. Si les défaillances sont attribuables à CENTRAL MAINE et si les parties ne s'entendent pas pour les reprogrammer, le prix à payer pour l'énergie l'année suivante sera majoré d'un quart (0,25) du prix de l'énergie non livrée par suite de difficultés sur le réseau, plus la moitié (0,50) du prix de l'énergie non livrée pour d'autres raisons. Les défaillances imputables à la non-disponibilité de l'interconnexion seront traitées séparément.

HYDRO-QUÉBEC or not taken or scheduled by CENTRAL MAINE will be reflected in a price adjustment in the subsequent contract year. For example, if HYDRO-QUÉBEC is unable to make deliveries as scheduled by CENTRAL MAINE, and the parties do not agree to reschedule these deficiencies, the price paid for the energy in the subsequent contract year will be decreased by an amount representing one (1.0) times the value of the energy curtailed for reasons of system problems plus 1.25 times the value of the energy curtailed for other reasons. In the case deficiencies are incurred by CENTRAL MAINE, and the parties do not agree to reschedule them, then the price paid for the energy in the subsequent contract year will be increased by one quarter (0.25) of the value of the energy curtailed for reasons of system problems plus one half (0.50) the value of the energy curtailed for other reasons. Deficiencies caused by the unavailability of the Interconnection will be treated separately.

7. ***Clause pénale***

Si pendant trois années contractuelles consécutives, les quantités d'énergie non livrées par HYDRO-QUÉBEC dépassent 33 % des livraisons prévues pour ces années, ou si les quantités d'énergie non livrées pendant une année contractuelle pour des raisons autres que des difficultés sur le réseau dépassent 5 % des livraisons prévues, CENTRAL MAINE peut résilier le contrat dans un délai donné et HYDRO-QUÉBEC doit lui verser la plus

7. ***Special penalties***

If during any three successive contract years the energy deliveries curtailed by HYDRO-QUÉBEC exceed 33% of the energy to be delivered in those years, or if in any given contract year the energy curtailed for reasons other than system problems exceeds 5% of the energy to be delivered in that year, then CENTRAL MAINE may terminate the contract within a specified time period and HYDRO-QUÉBEC will pay to CENTRAL MAINE the greater of 75% of the amount that would have been payable by CENTRAL

élevée des sommes suivantes: 75 % du montant que CENTRAL MAINE aurait dû payer à HYDRO-QUÉBEC entre la date de résiliation et la fin du contrat, actualisé à l'année de la résiliation; ou le montant des dommages réellement subis. Si CENTRAL MAINE refuse des livraisons programmées ou omet d'en programmer, les limites ci-dessus sont fixés à 25 % et 5 % respectivement. Dans ce cas, HYDRO-QUÉBEC a aussi le droit de résilier le contrat, et CENTRAL MAINE doit alors lui verser un dédommagement calculé selon les modalités ci-dessus.

MAINE to HYDRO-QUÉBEC from the date of termination up to the end of the contract period, discounted to the year of termination, or the actual damages incurred. In the case of curtailments of energy receipts or failure to schedule deliveries by CENTRAL MAINE, the above limits are fixed at 25% and 5% respectively. Then in this event, HYDRO-QUÉBEC has the same right to terminate the contract and CENTRAL MAINE will pay to HYDRO-QUÉBEC a penalty calculated as stated above.

8. *Installations d'interconnexion*

Le contrat oblige les parties à faire le nécessaire pour obtenir les permis relatifs aux installations d'interconnexion et, une fois les permis obtenus à construire ou à faire construire celles-ci.

8. *Interconnection facilities*

The contract will obligate the parties to strive to license the facilities and, in the event the necessary licenses are obtained, to construct these facilities or cause them to be constructed.

ANNEXE "B"

PRINCIPES DE BASE QUI RÉGIRONT L'ENTREPRISE DE TRANSPORT

A. *Une nouvelle compagnie de transport (Nouco) sera constituée, et elle sera chargée de terminer la conception de l'interconnexion et des installations connexes nécessaires pour faire transiter dans l'État du Maine l'énergie visée par le contrat d'électricité garantie, ainsi que de financer, de construire, de posséder et d'exploiter cette interconnexion et ces installations.*

B. *CENTRAL MAINE ou sa filiale et une filiale d'HYDRO-QUÉBEC détiendront respectivement soixante-dix pour cent (70 %) et trente pour cent (30 %) des actions de Nouco.*

C. *Les parties chercheront à obtenir un financement de projet pour le financement à court terme de Nouco. Nonobstant ce qui précède, et si nécessaire, CENTRAL MAINE ou sa filiale et une filiale d'HYDRO-QUÉBEC assumeront chacune cinquante pour cent (50 %) du financement à court terme pour l'obtention de permis et pour la construction, y compris les études d'avant-projet.*

D. *Nouco cherchera à atteindre la structure financière permanente suivante: capital emprunté: environ quatre-vingts pour cent (80 %); capitaux propres: environ vingt pour cent (20 %).*

E. *Les actionnaires de Nouco concluront une entente qui, notamment:*

   1.- *établira les responsabilités respectives en matière*

EXHIBIT "B"

BASIC PRINCIPLES OF TRANSMISSION VENTURE

A. *A new transmission company (Newco) shall be constituted to complete the design, and to finance, build, own and operate an interconnection and related facilities required to transit the energy mentioned in the Firm Power Contract in the State of Maine.*

B. *CENTRAL MAINE or its subsidiary and a subsidiary of HYDRO-QUÉBEC shall own respectively seventy percent (70%) and thirty percent (30%) of Newco's shares.*

C. *It is the intention of the parties to seek project financing for the short term financing of Newco. Notwithstanding the foregoing, and if necessary, CENTRAL MAINE or its subsidiary and a subsidiary of HYDRO-QUÉBEC shall each assume fifty percent (50%) of the short term financing of licensing and construction costs including preliminary engineering costs.*

D. *The permanent financial structure goal of Newco shall be approximately eighty percent (80%) debt and twenty percent (20%) equity.*

E. *The shareholders of Newco shall enter into an agreement which will among other things:*

   1.- *establish the management responsibilities for construction and*

de gestion pour les phases de construction et d'exploitation;

operation phases;

2.- *précisera, en cas d'excédents de capacité de la ligne de transport, les droits de chaque partie d'effectuer ses propres ventes, d'effectuer des reventes ou de faire une mise en marché conjointe d'électricité à même ces excédents;*

2.- *in the event of excess capacity on the transmission line, delineate rights of each party to use that capacity for its own sales, for resale and/or to market power jointly;*

3.- *précisera les correctifs en cas de non paiement en vertu du contrat d'électricité garantie;*

3.- *establish remedies in the event of a default on the Firm Power Contract;*

4.- *déterminera les conséquences qu'entraîneraient des retards dans la construction ou le financement, des problèmes liés au contrat et d'autres problèmes comme le dépassement des coûts prévus;*

4.- *specify consequences in the event of delays in construction or financing, contract problems, and other problems such as cost overruns;*

5.- *fournira des déclarations et des garanties relativement aux actifs, aux contrats avec des tiers, et à d'autres questions;*

5.- *provide representations and warranties with regard to assets, third party contracts, and other matters;*

6.- *établira les conditions d'émission, d'achat, de vente et de transfert d'actions de Nouco;*

6.- *establish conditions of issuance, purchase, sale and transferring of Newco shares;*

et qui portera également sur les questions généralement traitées dans une entente entre actionnaires.

and which shall also contain matters generally dealt with in a shareholder agreement.

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MAINE