THE NEW BRUNSWICK BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

IN THE MATTER OF a Generic Hearing concerning
the Capacity Planning Process of
The New Brunswick Electric Power Commission

D E C I S I O N

November 12, 1991

THE NEW BRUNSWICK
BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

IN THE MATTER OF The Public Utilities Act, R.S.N.B. 1978, Ch. P-27 as amended

IN THE MATTER OF a Generic Hearing concerning the Capacity Planning Process of the New Brunswick Electric Power Commission

Board:	Mr. David C. Nicholson	- Chairman
	Mr. B. Fernand Nadeau	- Vice-Chairman
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NB Power:	Mr. Thomas B. Drummie, Q.C., Mr. L. Paul Zed, Solicitors	
The Large Power Users Group:	Mr. E. Neil McKelvey, Q.C., Solicitor	
The Power Commission of the City of Saint John:	Mr. Richard Burpee, General Manager	
Themselves:	Mr. Ken Sollows, Dr. J. Venart and Dr. Kuma Sumathipala	
Public Intervenors:	Mr. Robert L. Kenny, Q.C. and Mr. Ivan Robichaud	

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Introduction

By application dated April 20, 1990, The New Brunswick Electric Power Commission (NB Power) requested that the New Brunswick Board of Commissioners of Public Utilities (the Board) approve a specific change to its rates. In a Memorandum filed on the same date, NB Power indicated that the primary purpose of the application was to vest jurisdiction in the Board. This enabled the Board to hold hearings to review the basic background principles (generic issues) that impact on the level of rates for services performed by NB Power within the Province.

A pre-hearing conference was held on June 13 and 14, 1990, to consider which generic issues should be reviewed and in which order public hearings should be conducted. Proposals were received by the Board as to the issues that were relevant and opinions were expressed as to the order in which they should be examined. The Board concluded that the appropriate generic issues and the order in which they would be examined was as follows:

(1) Accounting and Financial Policies

(2) Depreciation Policies

(3) Capacity Planning

(4) Cost Allocation

(5) Rate Design

(6) Customer Service Policies.

The public hearing with respect to Accounting and Financial policies commenced on October 15, 1990, and concluded on October 24, 1990. The Board's decision with respect to Accounting and Financial policies has been issued separately.

The hearing on Depreciation policies and practices of NB Power was held at the offices of the Board commencing on November 13, 1990, and continuing through November 14 and 15. The Board's decision on NB Power's Depreciation policies and practices has also been released separately.

The public hearing to review the Capacity Planning process commenced on March 12, 1991, and concluded on March 19, 1991.

A number of intervenors took part in the public hearing. One intervenor was referred to as the Large Power Users Group (LPU) and consisted of the following companies:

Brunswick Mining and Smelting Corporation Limited
Denison-Potacan Potash Company
Fraser Inc.
Irving Oil Limited
Miramichi Pulp & Paper Inc.
NBIP Forest Products Inc.
Rothesay Paper Limited
St. Anne-Nackawic Pulp Company Ltd.
Stone Consolidated Inc.

Mr. Richard Burpee appeared on behalf of The Power Commission of the City of Saint John. Mr. Ken Sollows, Dr. James Venart and Dr. Kuma Sumathipala appeared as a group representing themselves. Robert Kenny, Esq., Q.C. and Ivan Robichaud, Esq. participated as the public intervenors appointed by the Attorney General of the Province of New Brunswick.

NB Power presented a panel of witnesses comprised of the following:

Mr. Douglas Bartlett, P. Eng. - Director, Strategic Planning, NB Power

Mr. William Marshall, P. Eng. - Senior Engineer Power Supply Planning, NB Power

Mr. Navin Bhutani - Manager Rates & Load Forecasting, NB Power

The following group appeared as a panel as well:

Mr. K. F. Sollows, P.Eng.

Dr. U.K. Sumathipala, P. Eng.

Dr. J.E.S. Venart, P. Eng.

The remainder of this document contains the Board's comments with respect to NB Power's Capacity Planning process.

Overview

The production of electricity is a capital intensive business. The original cost of NB Power's fixed assets exceeds three billion dollars and significant additions are planned over the next few years. The time required to plan for and install new assets ranges from a few months to ten years or more. The determination of which assets to add to the system and when to add them is of necessity a complex and difficult process. This process is further complicated by the recognition that, in today's environment, proper consideration must be given to demand side management and non-utility generation.

Demand-side management refers to any means which may be employed to reduce the consumption of or demand for electricity. Non-utility generation is the production of electricity by someone for the purpose of sale to an utility such as NB Power. The proper use of demand-side management and non-utility generation will minimize the need to add new capacity to NB Power's system and result in the provision of electricity at the lowest overall cost.

The capital planning process requires a careful analysis of numerous critical factors such as the rate of growth of the provincial economy, fuel prices and interest rates. Most of these factors are beyond the control of NB Power. Nevertheless, the

utility must develop forecasts for these factors and, on the basis of these forecasts, develop the best plan to ensure the continued provision of electricity for use by the people of New Brunswick. The plan must be flexible enough to permit revisions to it should this be required due to a significant change in any of the critical factors.

Many of NB Power's planning criteria are a result of its interconnection with other electric utilities. These interconnections play an important role in ensuring the uninterrupted provision of electricity and are made possible by the joint adoption and maintenance of reliability criteria. NB Power actively consults with other electric utilities and is part of the Northeastern Power Co-ordinating Council.

The evidence clearly indicates that NB Power employs a detailed and comprehensive process to determine when capacity additions are required and what type of plant will be added. This process has evolved over time and continues to be improved as new techniques are employed.

The starting point of the process is the development of a forecast which indicates the demands that will be placed upon NB Power's system. If the forecast indicates that there will be increased demands, these can be met by additions to NB Power's

system, by purchases from other utilities or from non-utility generators of electricity or by the introduction of projects which will reduce the demands that would otherwise be placed upon the system (Demand-Side Management).

Each of the various options available to NB Power is carefully analyzed. The objective is to select those options which best meet the needs of NB Power and its customers and which will ensure the continued provision of electricity on a reliable basis at the lowest possible cost.

Various aspects of the process are discussed in more detail below.

(1) Load Forecasts
(2) Planning Criteria
(3) Capacity Planning Options
(4) Economic Criterion
(5) Inter-utility Connections and Cooperation
(6) Demand-Side Management

Load Forecasts

The utility must forecast future demands and energy requirements of its system. The methodology used by NB Power to

produce its load forecasts is appropriate. The Board recognizes that forecasting is not an exact science. NB Power has made modifications to its methods as new techniques and better data become available. The Board considers this to be proper and encourages NB Power to continue to refine its forecasting methodology. One possibility for such refinement would be a review of the industrial forecast to ensure that naturally occurring conservation is fully reflected in the current approach. The Board believes that it is appropriate to continue direct consultation with major industrial customers and to make appropriate use of any information that they are able to provide.

Planning Criteria

NB Power filed an integrated resource plan which included consideration of both demand-side management and additional generation. Many utilities have prepared similar integrated resource plans for a number of years. However, this was NB Power's first such plan.

The integrated resource planning study represents the culmination of the capacity planning process as it presents the preferred approach of NB Power to meet its obligation with respect to the provision of electricity. The Board compliments NB Power on the production of this document and considers that such a

document is an essential planning tool for NB Power. As such, the Board must question how NB Power, in the past, could effectively plan in the absence of a similar document.

The criteria used by NB Power in planning the generation, transmission and distribution of electricity are consistent with industry standards and appropriate for use in New Brunswick.

The Canadian Electrical Association and its member utilities measure the reliability of electrical service to customers by four indices as follows:

(1) The System Average Interruption Frequency Index (SAIFI); defined as the total of customer interruptions divided by the total number of customers served.

(2) The System Average Interruption Duration Index (SAIDI); defined as the total customer hours of interruptions divided by the total number of customers served.

(3) The Customer Average Interruption Duration Index (CAIDI); defined as the total customer hours of interruptions divided by the total number of interruptions.

(4) The index of reliability; defined as the total hours during which service was available during a year divided by the total hours in the year.

NB Power's performance in 1989 is compared with Canadian utilities of more or less similar type in the following table:

	Region 2 Utilities	**NB Power**
SAIFI	3.93	3.03
SAIDI	4.78	5.25
CAIDI	1.22	1.73
Reliability Index	0.999455	0.999401

The figures indicate that for NB Power customers, service was interrupted just over three times; that each interruption lasted for 1.73 hours; and that the total time without service during the year was 5.25 hours. The reliability index shows that service was available 99.94% of the time, or 8754.75 hours out of the 8760 hours in the year.

The Board notes that the Canadian averages and figures for individual utilities vary from year to year depending chiefly on climatic variations and the extent of planned interruptions for maintenance purposes. For this reason, firm conclusions should not be drawn from comparisons with other utilities.

The Board notes that some information exists on the trade-off between the cost of increased reliability and the cost to the customers of power outages. The Board encourages NB Power to continue to develop such information so that these costs may be properly balanced.

Capacity Planning Options

NB Power's evidence relating to the evaluation of planning options may be summarized as follows.

Options evaluated are those which satisfy planning and environmental criteria. They include both plant additions and demand-side management. Short-, medium- and long-term purchases from or sales to other utilities are also evaluated.

Economic analysis is the basic step in this evaluation process. It is accomplished through the use of sophisticated mathematical models which simulate system operations and costs. One such model determines the best option or combination of options among all those available. A second model is then used to verify the cost of the most favourable options through more detailed simulation.

The normal planning horizon is 20 years and corrections

are made to reflect cost differences for any options which exceed 20 years.

Before DSM options were considered in the planning process, NB Power ensured least cost to consumers by choosing those options resulting in lowest future revenue requirements. However, the inclusion of DSM options tends to reduce the quantity of power and energy sold with the result that the lowest future revenue requirement does not necessarily result in lowest rates or least cost to all consumers. For this reason, NB Power now uses the criterion of lowest future rates in the economic evaluation of options.

Economic evaluation requires estimates of system loads, project costs, fuel costs, interest and inflation rates. Error in such input data may lead to error in evaluation results. NB Power, therefore, performs sensitivity analyses using a range of values for key variables.

Using the results of economic analysis, a financial analysis is then performed. The results are used to assess financial feasibility, including debt requirements, and the extent and abruptness of rate changes.

Final choice is then based on economic analysis, tempered

by a judgmental assessment of financial and other risks, rate stability and strategic objectives (reduction of dependence on oil, for example).

Intervenors offered no criticism of NB Power's evaluation methods of planning options either in testimony or argument.

NB Power's economic evaluation technique, as outlined in its testimony and detailed in Exhibit NBP-23 is, in the opinion of the Board, adequate to ensure the inclusion of all potentially beneficial courses of action and, subject to the accuracy of planning assumptions, capable of providing accurate comparisons of economic benefit.

The Board recognizes that load growth is affected by economic and demographic factors; that interest and inflation rates are influenced by policies which may change over time; that oil prices are subject to geo-political influence; and that, as a result, error in planning assumptions is inevitable.

The Board further notes that NB Power uses sensitivity analysis to deal with the uncertainties thus created and that this is the generally-used technique. Mr. Bartlett testified that, in developing the integrated resource plan, a scenario approach had been used. Realistic scenarios were used to develop nine plausible

cases and the effect of export conditions was also examined (Transcript page 2261). The Board considers that a scenario approach is proper and is of the opinion that NB Power has performed adequate sensitivity tests in the case under reference.

NB Power's testimony dealt with risk in the context of planning assumptions but did not specifically address the question of project risk. There is always some risk of error in the estimates of project cost relating to construction delays, accidents, cost over-runs, breach of contract, regulatory action or acts of God. The Board is therefore of the opinion that, in the case of very large projects, NB Power should include a specific analysis of project risks in its evaluation technique to determine whether the potential benefits justify acceptance of the risks.

Economic Criterion

NB Power has recognized that the inclusion of DSM projects among planning options affects the appropriateness of criteria used for economic evaluation. For the inclusion of DSM, the Board is aware that four criteria, sometimes referred to as the California tests, are widely used. They require that the adoption of a DSM project shall result in no disbenefit to:

(1) society

(2) the utility

(3) participating customers, and

(4) non-participating customers.

It is the Board's understanding that the first three of these criteria are generally accepted but some differences of opinion exist as to the need of applying the fourth criterion. The Board believes that the fourth criteria should be used as a standard against which NB Power's approach may be compared to ensure that no customer is worse off as a result of the adoption of a DSM project.

In evaluating DSM options, NB Power first applies a preliminary screening based on the total social benefit and cost of each program (total resource evaluation). Programs having a ratio of benefit to cost significantly less than 1.0 are rejected. This ensures that no disbenefit to society will result from DSM programs.

DSM programs which survive the preliminary screening are grouped and the groups are included in the system cost modelling and selection process. This process selects the most advantageous combination of options to meet future system requirements. Supply and DSM options compete on equal terms.

The Board's understanding of the process, confirmed by Mr. Marshall's testimony, is that NB Power's technique does ensure that no group of programs will be selected unless it leads to rates equal to or lower than those which would be experienced if supply options only were selected. (Transcript page 2289)

The Board notes that the fourth criterion, no disbenefit to non-participating customers, is satisfied so long as the inclusion of DSM programs does not raise rates. The Board is therefore of the opinion that NB Power's evaluation techniques do in fact satisfy the non-participating customer criterion.

Finally, the Board notes that the effect of the techniques actually employed by NB Power is that a large fraction of all the DSM programs capable of passing the total resource test and an even larger fraction of the potential demand and energy savings of such programs. These techniques are included in the integrated resource plan.

The Board therefore concludes that NB Power's evaluation techniques are reasonable and tend to maximize the use of DSM programs while avoiding inequitable treatment of non-participating customers.

Inter-Utility Connections and Cooperation

NB Power's testimony showed that some of its transmission facilities are planned and built to provide interconnections with other utilities rather than for the direct purpose of serving in-province loads; that the total capacity of connections with Quebec, New England, Nova Scotia and Prince Edward Island is 2400 MW; and that this capacity is larger in proportion to system size than that of any other utility in North America.

Mr. Bartlett testified that interconnections are in each case built and sized to maximize the net benefits; that such benefits consist of savings in system capital and operating costs and that they occur because interconnections between utilities permit:

(1) A lower total system installed capacity for a given level of reliability;

(2) Joint participation in generating plant, enabling larger units to be built with economies of scale;

(3) Sharing of spinning reserves (which consist of unloaded generators kept on line in case emergencies arise) with reduction of reserve capacity and fuel costs;

(4) Purchase and sale of economy energy, enabling operating costs of the interconnected utilities to be reduced; and

(5) Purchase and sale of capacity and firm energy, where this can result in mutual benefit. (Transcript pages 1855 to 1858)

The evidence before the Board confirms that such benefits are in fact realized by NB Power. Without capacity support from interconnected utilities, NB Power's reserves would have to be increased substantially in order to achieve the required loss of load expectancy of one day in ten years. Utilities in New England and PEI have participated in the costs and output of NB Power generating units. Spinning reserves are shared with Nova Scotia, reducing the total required and the operating cost of both utilities.

The Board concludes that NB Power's interconnections are indeed beneficial and that the importance of such interconnections in capital planning have been clearly established.

A related matter which, in the Board's opinion, warrants consideration is whether the potential benefits of interconnections are being fully exploited. On this point, the testimony is less conclusive.

Mr. Marshall stated that, when the line to Nova Scotia was built, it had been the intent that the three connected utilities (NB Power, NS Power and the then-existing Nova Scotia Light and Power) would co-ordinate their system planning to the extent that when the combined system required more generation, each utility in turn would have the right to construct a new unit, and that load growth of all three utilities would be met from the new unit until it became fully utilized. He did not know whether this intended practice has ever been followed, but confirmed that it is not now in effect. (Transcript pages 2329-2331).

Mr. Bartlett suggested that some or all of the benefits of such a co-ordinated planning approach are available through the activities of the Co-ordinating Committee for Maritime Electric Utilities (CCMEU) formed under direction of the Council of Maritime Premiers. Mr. Bartlett stated that, through the CCMEU, each utility knows what the other is planning and can assess whether an opportunity exists to buy or sell capacity. (Transcript pages 2040-2041).

The Board recognizes that, where a complete commitment to economic efficiency exists on all sides, the informational approach afforded by the CCMEU may be sufficient to ensure that potential benefits are realized. However, the Board is of the opinion that other considerations may exist; that they may thwart

co-operation; for example, the lack of joint economic dispatch.

Economic dispatch consists of deciding which of the available generating units will be put on line to supply the system load at any given time and apportioning the load between the selected units in a way which minimizes system operating costs. Mr. Marshall confirmed that joint dispatch on a regional basis would lead to lower total costs than dispatch by each utility independently, as is now the case in the Maritime Provinces.

However, he pointed out that as long as economy trading can occur on an hour-by-hour basis and trading between utilities is done freely, the same economies can be achieved through economy sales as through joint dispatch. (Transcript pages 2333-2334).

While the Board accepts the validity of Mr. Marshall's statement, it notes that the trade in energy with Nova Scotia is minor compared to the trade over NB Power's other interconnections. The Board recognizes that this may indicate merely the lack of significant cost differences between the two systems and thus the sparsity of opportunity for mutual benefits. On the other hand, it could reflect circumstances which frustrate the free trading which Mr. Marshall considers essential if the benefits of regional dispatch are to be realized through economy sales.

Mr. Bartlett indicated NB Power is prepared to co-operate with other utilities to improve the efficiency of regional planning and operation. (Transcript page 2334).

The Board considers that Mr. Bartlett's testimony on this point is consistent with the breadth of NB Power's dealings with other utilities, as disclosed by the evidence. Nevertheless, the Board is not convinced that the opportunities for benefits through regional co-operation are now fully exploited and is of the opinion that this is an area which deserves continued attention by the Council of Maritime Premiers.

Demand-Side Management

The reduction of system demand and energy requirements is a recognized alternative to increasing system capacity. Customer demands can be influenced by several means including direct control of customer loads; rate or other incentives to influence habits of use or to encourage increased efficiency; and customer education on energy conservation. The term "demand-side management" (DSM) is now applied to initiatives of all these types although it is often restricted to measures aimed at improving efficiency and encouraging conservation.

DSM initiatives considered by NB Power for inclusion in

its resource plan are discussed in this section. Dual fuel heating, which was not included in the resource plan but was the subject of a specific intervention, is dealt with in a subsequent section.

NB Power's exhibits and testimony show that, although it had previously considered demand-side measures in relation to system planning, it undertook in 1990 for the first time the production of an integrated resource plan based on an optimum mix of supply and demand-side options (Exhibit NBP-23).

For this purpose a list of all known programs was compiled. Of these, 25 were eliminated as being unsuitable for a winter peaking system such as NB Power's. The maximum technical potential of the remaining 42 programs was then estimated. Customer penetration levels and social costs were estimated by NB Power and its consultant. Detailed screening from a total resource perspective (page 14 supra) was then conducted. Programs with a benefit/cost ratio of about 1.0 or greater (as listed in Exhibit NBP-23) were then selected for economic evaluation in competition with supply-side options.

The DSM programs selected as a result of economic evaluation are included in the integrated resource plan (for e.g. efficient light bulbs, low-flow shower heads). The plan does not

contain a timetable for implementation. This must be done soon if the anticipated load reduction is to be realized in time to defer the next combustion turbine. Work is proceeding on detailed implementation plans and programs will be recommended for approval as detailed planning is completed.

On cross-examination, NB Power witnesses confirmed that the costs associated with DSM programs include societal and administrative costs but exclude the cost of any incentives which might be needed to secure customer acceptance; that NB power would, if necessary, spend an amount not exceeding the difference between the cost of the DSM option and the best supply option in order to secure the planned level of participation. The maximum amount that can be spent on incentives is known for each group of programs but NB Power does not have an estimate of how much will actually need to be spent and that this will not be known until definitive program design has been completed (Transcript pages 2289-2297).

The Public Intervenor characterized NB Power's list of DSM alternatives as reasonable and the process of evaluation as appropriate. He expressed concern that there is no timetable for implementation and suggested that it would not be unreasonable to require NB Power to identify the order of implementation, the timing for each program and an explanation of both timing and approach.

In argument for the LPU, Mr. McKelvey commended the integrated resource planning study and NB Power's intended implementation of DSM projects.

The Board considers NB Power's approach to the identification and development of DSM programs to be generally sound and likely to result in reasonable rapid progress. Nevertheless, some potential weaknesses are evident.

On cross-examination, Mr. Marshall agreed that both the cost and capability of DSM programs are subject to more uncertainty than the cost and capability of supply options. It appears to the Board that the actual cost, power and energy savings of each DSM program will depend to a significant extent on the final program design and in particular on the method of program delivery, the level of incentives offered and the promotional effort allocated to it. By contrast, the procedure followed by NB Power applies both the total resource test and the final economic evaluation on the basis of estimates made before such important details are settled.

As a result, the Board considers it possible, or even likely, that some of the programs contained in the integrated resource plan may not live up to expectations.

An alternative approach, followed in some other jurisdictions, involves completion of program design before projects are submitted to economic evaluation. This approach introduces some inefficiency in that design costs are likely to be incurred for programs which do not find a place in the integrated resource plan. On the other hand, it results in a plan with fewer inherent uncertainties.

A second aspect of concern to the Board relates to program delivery costs. NB Power's testimony seems to imply an intention to complete the designs of individual programs, secure corporate approval and launch each program as soon as possible. In the Board's opinion, delivery costs would be lower, marketing would be more effective and more programs would be economic if programs were grouped for delivery, particularly for programs where a customer-by-customer sales effort is intended.

Both of the foregoing concerns suggest to the Board that it would be prudent to adopt a co-ordinated approach in completing the design and implementation of DSM programs.

Dual Fuel Heating

Dual Fuel heating was proposed for use as a demand management technique in the intervention by Mr. K.F. Sollows, Dr.

U.K. Sumathipala and Dr. J.S. Venart, professional engineers. For the sake of brevity, this intervention is designated as Sollows et al.

The intervention was of significant value to the Board, providing a practical test of several aspects of NB Power's capital planning approach. The effort devoted to analysis, documentation, presentation and response to interrogatories was impressive. The Board records its appreciation.

The purpose of dual fuel heating is to displace electric heating power and energy at times of system peak through the substitution of oil heat thereby reducing NB Power's peak load and its requirement for peaking capacity.

A dual fuel installation as proposed by Sollows et al includes a furnace capable of either oil firing or production of heat from electric heating coils installed in the furnace hot air passage. The proposed installation also includes duct-work and registers for warm air heating, oil storage, chimney, and a control system, remotely operable by NB Power, to switch operation from electricity to oil during peak load periods. The installation was estimated to cost $3,500 per household on average which would be paid by NB Power.

Prefiled testimony also included an approximate but detailed analysis purporting to show that dual fuel heating, at a cost of $3,500 per household, to save 7.7 KW which would be significantly less costly than new gas turbine capacity.

Sollows et al further showed that dual fuel heating programs had been adopted with success by other utilities including Quebec Hydro which in 1990 was reported to have 90,000 dual fuel customers with a program target of 160,000 customers by 1994.

In direct testimony, Dr. Venart described dual fuel interruptible as the most significant cost-effective approach to controlling the growth of peak demand and thereby reducing the growth of generating capacity. He cited two unique advantages of the dual fuel proposal:

(1) Unlike all the other DSM techniques considered by consultants, it would retain control of the load by NB Power; and

(2) It constitutes peak management, with very little effect on energy use, and would therefore not have a significant effect in reducing NB Power's revenue. (Transcript pages 2385-2386)

Dr. Venart further stated that the dual fuel proposal would reduce oil consumption and atmospheric emissions and would be of more benefit to the provincial economy than the imported technology of gas turbines (Transcript page 2390).

NB Power testified that it had considered dual fuel heating among other DSM initiatives but had eliminated it in favour of bivalent heat pumps. This was due to a consideration of marketing factors as well as the fact that NB Power does not have a regular supply of low cost energy to encourage off-peak use of electricity. (Transcript pages 1880-81).

NB Power further testified that it had reviewed dual fuel furnaces after receiving the intervenors' evidence and had still found the program unattractive. The different results of Sollows et al and NB Power were ascribed mainly to differences in the input data: peak saving per installation of 5.2 KW (NBP) vs. 7.7 KW (SOL); cost of gas turbine capacity $525/KW (NBP) vs. $620 (SOL) and oil heating time required 440 hours per year (NBP) vs negligible time (SOL). A benefit/cost calculation using the SOL method together with NBP input data was presented in Exhibit NBP-25. It showed cost in excess of benefit for both society and the participating customer.

In response to questions by Sollows et al, NB Power

agreed that commercial installations would probably be attractive and further agreed that the 15-year installation life, used in estimates by both parties, made insufficient allowance for the longer service lives of some components.

The Public Intervenor advocated pursuit of the dual fuel program for commercial customers and that NB Power and Sollows et al should attempt to reconcile differences in the estimates they had presented.

In final argument for the LPU, Mr. McKelvey recommended a cautious approach to dual fuel heating and suggested that NB Power should not embark on costly DSM programs unless there was a strong likelihood that they would succeed.

Because of the generic nature of the hearing, the Board's primary concern is with the planning process as such rather than with the merits of any specific development option. In broad terms, the question before the Board is whether the planning methods and procedures used by NB Power permit the selection of the best options.

The benefit/cost estimates presented in both Exhibits SOL-1 and NBP-25 were acknowledged by both parties to contain data error and methodological deficiencies. The information before the

Board is neither sufficiently accurate nor sufficiently complete to support any conclusion regarding the benefits of dual fuel heating. The Board's comments on the methodological aspects of project evaluation, using dual fuel heating as an example, are presented below.

It is clear from the filings and testimony that the cost of facilities necessary for dual fuel heating would vary with circumstances, being largest for existing housing equipped with baseboard heating and least for existing housing converted to electric heat in which a formerly used oil heating installation is still functioning. Other cases which may be distinguished involve existing housing with hot water heating and new housing. Commercial heating, acknowledged by Mr. Bartlett to have benefit potential, was not analyzed. The estimates before the Board considered residential housing as a whole and therefore, in the Board's opinion, were not sufficiently detailed to identify all opportunities which might exist.

The Board notes from daily load curves and other data presented by NB Power that heating loads have a significant effect on system peak demands and that the demand management potential of dual fuel heating at 5.2 KW per residential customer is far larger than the total demand savings of the programs now incorporated in NB Power's integrated resource plan.

The Board concludes:

(1) That it is difficult but nonetheless extremely important that NB Power's preliminary estimates of project potential be as accurate as possible;

(2) That where a large potential for demand reductions exists, a thorough analysis of program feasibility is warranted; and

(3) That thorough analysis entails separate consideration of individual sectors of the potential market.

Annual Capacity Factor

Sollows et al recommended that the Board should adopt a target value in the range of 70% to 80% for the annual capacity factor of NB Power's non-hydro generating plant and should not allow NB Power to include in its cost of service any expense for that portion of new generating plant having the effect of reducing the said factor below the 70% level. (Exceptions were to be made in the case of demonstrated lower cost or legislative decisions.)

The recommendation of Sollows et al that the load factor of thermal generating plan be adopted as a criterion of allowable

cost recovery is based on the assumption that load factor is an accurate criterion of the economic efficiency of an electric utility system.

The argument in favour of this assumption, presented in Exhibit SOL-1, is plausible and may be correct. On the other hand, the Board is not aware that such a criterion has been used by any utility as the basis for system planning.

The Board is, however, of the opinion that the methods and criteria used by NB Power for economic evaluation of planning options will be conducive to optimum development. Therefore, if the conjecture of Sollows et al is correct, NB Power's system will evolve toward the capacity factor they advocate. The Board accordingly finds it unnecessary to consider cost of service penalties as a means of forcing development toward an arbitrary condition.

Electric Heat

The Board considers the suggestion by the LPU, that NB Power discourage the use of electricity for space heating, to be inappropriate at this time. There was no information presented at the hearing with respect to either the costs or the revenues associated with the use of electricity for space heating.

Information Requirements

The Board believes that it would be useful to continue to be informed on NB Power's capacity planning process. The Board therefore requests that NB Power file with it copies of the annual load forecast, load and resources review and the integrated resource planning study as they become available. It would also be of assistance to have an explanation of the differences between the actual and forecast, where applicable.

Dated at the City of Saint John, N.B. this 12th day of November, 1991.

David C. Nicholson
Chairman

B. Fernand Nadeau
Vice-Chairman

Claudette Stymiest
Commissioner

Ivan McLean
Commissioner

Thomas McBrearty
Commissioner