An Examination of Nova Scotia Power Incorporated's Green Power Rider

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This submission replaces the one of 17 July 2002.

1 Introduction

In December 2001, Nova Scotia Power Incorporated (NSPI) made application to the Nova Scotia Utility and Review Board for an Optional Green Power Rider to be added to their existing Domestic (that is, residential) Services Rates [1]. The proposed Green Power Rider is intended to offer NSPI's residential customers the opportunity to purchase 'green power'. (Subsequent references to NSPI's submission will be referred to as 'the document'.)

The Green Power Rider is a 'premium price option'. The proposed premium price is $5.00 for 125 kilowatt-hour per month 'block' of electrical energy. This is equivalent to a premium of 4 cents per kilowatt-hour; that is, the cost of a kilowatt-hour is the existing residential rate (at the time of writing, 8.35 cents per kilowatt-hour) plus 4 cents, for a total of 12.35 cents per kilowatt-hour. For example, if someone purchased a single block of 'green power' and used 200 kilowatt-hours of electricity, they would be charged 12.35 cents per kilowatt-hour for the first 125 kilowatt-hours and 8.35 cents per kilowatt-hour for the remaining 75 kilowatt-hours.

NSPI's Green Power Rider is essentially a public relations exercise; as NSPI's web site explains [2]:

> *With Green Power, Nova Scotia Power and Nova Scotians can feel good about making a contribution to a cleaner, greener, environment. It's an important first step in improving our environmental performance.*

This report examines NSPI's Green Power Rider submission to the UARB.

2 What will be the source of NSPI's 'green power'?

NSPI's web site would seem to suggest that 'green power' would be produced from the two wind turbines it purchased in 2001 (see next section). However, according to the document, NSPI has the option to purchase 'green credits' (equivalent to blocks of 'green' electricity) from generators outside the province. In these circumstances, residential customers will still be expected to pay the Green Power premium pricing although the power will not be produced locally.

3 How many turbines and how much do they cost?

NSPI has purchased two turbines for its Green Power programme. According to the Emera Annual Report for 2001, these turbines are rated at 1.3 megawatts [3]. However, the document refers to these turbines as having a combined rating of 1.2 megawatts.

According to the document, the two turbines were purchased in 2001. The total capital expenditure on these turbines was $2,954,240. However, because these turbines were intended for a renewable energy programme, the Federal government refunded NSPI the 44 percent Capital Cost Allowance (CCA), meaning that the true cost to NSPI was:

$2,954,240 - ($2,954,240 x 0.44) = $1,654,374

It should be noted that this is not the value used by NSPI in the document. In the document, NSPI includes the cost of marketing and promoting the turbines ($48,000) as part of the overall cost of the turbines:

$2,954,240 + $48,000 = $3,002,986

This amount is then subject to the 44 percent CCA refund:

$3,002,986 - ($3,002,986 x 0.44) = $1,681,254

3.1 Observations and comments:

- It is unclear whether the marketing and promotion of the turbines should have been included as part of the 44 percent CCA refund.
- The CCA refund is apparently intended for equipment that is installed in the year the refund is applied. The turbines were purchased and the refund applied in 2001 and at the time of writing this submission (July 2002), the turbines have yet to be installed.
- These are the only capital expenditures listed. Although not stated, they should include the cost of land, installation, and grid connection.

4 How many kilowatt-hours are to be generated by these turbines?

It is important to know the number of kilowatt-hours (kWh) that NSPI expects to generate from its turbines, since this can be used to determine the cost per kilowatt-hour.

The document does not discuss or indicate how many kilowatt-hours the turbines are expected to generate; however, it is possible to estimate this from information in the document:

- NSPI states that residential revenue will be $152,000 per year. NSPI will be charging $5.00 per 125 kWh ‘block’ of electricity:

  $152,000 / $5.00 per block = 30,400 blocks

  The sale of 30,400 blocks at 125 kWh each suggests that NSPI expects to generate 3.8 million kWh per year:

30,400 blocks x 125 kWh per block = 3.8 million kWh

- The document refers to two 600 kW turbines. Assuming that the turbines operate at 100 percent capacity for the entire year (8760 hours per year), then the maximum theoretical output will be:

  8760 hours per year x 600kW x 2 turbines =10.512 million kWh per year

  Depending upon the sites selected, the turbines can be expected to generate upwards of 35 percent of their maximum output:

  10.512 million kWh per year x 0.35 = 3.68 million kWh per year

These two methods, based upon the data supplied by in the document, suggest that NSPI expects to produce about 3.7 million kWh each year from these two turbines.

According to a report in the Daily News [4], NSPI expects to generate 3.9 million kWh from these turbines. (This figure is used throughout the remainder of the report.)

4.1 Observations and comments:

- NSPI has stated that the Green Power Rider is to cost 4 cents per kilowatt-hour and that the expected revenue is $152,000 per year. If NSPI expects to generate 3.9 million kWh, then at 4 cents per kilowatt-hour, NSPI's revenue will be:

  3.9 million kWh x 4 cents / kWh = $156,000

  Or $4,000 per year (about 2.5 percent) more than their submission states.

5 What is the cost per kilowatt-hour?

The cost to generate a kilowatt-hour of electricity is important to know when determining the overall rate to charge a customer.

A common method of determining the cost per kilowatt-hour from a particular generating source is to use the 'levelized cost'. The levelized cost consists of two components:

- the capital cost of the project plus the fuel, operating, and maintenance cost over the lifetime of the plant (in the case of a wind turbine, there is no fuel cost), and
- the total number of kilowatt-hours produced by the plant over its life.

The levelized costs for NSPI's turbines are based upon the data shown in the following table:

Capital costs (turbine plus marketing)	$1,681,254
Operating and Maintenance (annual)	$51,000, escalating at 2% per year
Expected output (annual)	3.9 million kWh
Expected lifetime of the turbines	20 years

To determine the operating and maintenance costs for the lifetime of the project,

it is necessary to know the initial annual expenditure ($51,000), the annual cost increase (2%), and the lifetime of the project (20 years). The costs for the lifetime of the project are calculated as follows:

$$= \textit{Initial annual expenditure} \times ((1 + \textit{cost increase})^{\textit{lifetime}} - 1) / \textit{cost increase}$$

$$= \$51{,}000 \times (1.02^{20} - 1) / 0.02$$

The levelized cost, based upon this information, is therefore:

$$\textit{Total cost} = \$1{,}681{,}254 + \$51{,}000 \times (1.02^{20} - 1) / 0.02$$

$$= \$1{,}681{,}254 + \$51{,}000 \times 24.3$$

$$= \$1{,}681{,}254 + \$1{,}239{,}165$$

$$= \$2{,}920{,}419$$

Levelized cost over 20 years:

$$= \textit{Total cost / kilowatt-hours produced}$$

$$= \$2{,}920{,}419 / (3.9 \text{ million kWh per year} \times 20 \text{ year})$$

$$= \$0.0374 \text{ per kWh}$$

Or about 3.7 cents per kWh.

5.1 Observations and comments:

- The cost per kilowatt-hour shown here is the cost of generating the electricity; it has nothing to do with the Green Power Rider of 4 cents per kilowatt-hour that NSPI proposes.
- It is instructive to compare the levelized cost of the wind turbines with that of other electrical generation assets. The following table presents capital, operating and maintenance costs for U.S. Department of Energy 'best case' coal fired technology [5] (comparable data was not available from NSPI). The projected fuel costs are those supplied by NSPI for the 2002 rate case [6]:

Cost	Cost (per kWh)
Capital, operating and maintenance costs (U.S. dollars converted to Canadian, 1997 dollars)	$0.012 to $0.037
Projected fuel costs (from [6])	$0.031
Levelized cost	$0.043 to $0.068

The levelized cost of 3.7 cents per kilowatt-hour of wind generated electricity is better than the 'best case' coal fired technology. Since this technology is not available to NSPI, it is reasonable to assume that NSPI's levelized cost is in the range given ($0.043 to $0.068 per kWh).

6 What are the cash flows and Net Present Value of the turbines?[1]

The cash flows are a necessary feature of any business plan, since they allow the proponent to decide whether the project will lose money, break even, or make money.

NSPI determines the annual cash flow as follows:

Annual cash flow = cash inflow - cash outflow - tax

where:

Cash inflow: revenue from residential customers.

Cash outflow: expenses from the project. These are positive if money is spent and negative if money is saved. NSPI lists four cash outflows:

- Avoided variable generation costs - by operating the two wind turbines, NSPI will avoid generating (notably, purchasing fuel) or purchasing electricity from other sources. This represents a saving to NSPI.
- Avoided capital generation costs - by operating the two wind turbines, NSPI also avoids or postpones the construction of new generating assets. This represents a saving to NSPI.
- Generation operating costs - the annual costs of running the wind turbines. As stated earlier, this starts at $51,000 in 2002 with an annual 2 percent escalator.

Tax: the tax rate is 44 percent of the net cash flow (cash inflow - cash outflow).

The viability of a project can be determined using the 'Net Present Value' (NPV), a calculation of the present value of an investment's future net cash flows minus the initial investment. The value of the future cash flows is discounted to a predetermined interest rate. The Net Present Value can be defined as:

Net Present Value = Sum of discounted annual cash flows - initial investment

If the Net Present Value is positive (that is, the sum of the discounted annual cash flows are greater than the initial investment), the investment should be made (unless a better investment exists), otherwise it should not [7].

NSPI's initial investment consists of the following, both of which occur in the first year only (2001):

- Marketing and promotion - the Green Power programme budgets $48,000 for marketing and promotion. Although the programme runs for 20 years, marketing and promotion occurs in the first year only.
- Capital expenditures - the costs of establishing the project; in this case NSPI lists only one, the cost of the turbines ($2,954,240).

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[1] The author would like to thank Mr. Luke Miller, a graduate student in the Department of Mechanical Engineering at Dalhousie University, for several conversations regarding this section.

The document determines the Net Present Value of the turbines using two different cash inflows, both of which are now discussed.

6.1 No change in residential revenues

In the first table (reproduced at the end of this report), NSPI assumes that the power generated by the turbines replaces that of existing generating assets, consequently, the cash inflow remains unchanged (i.e., it is zero). What does change is the avoided variable generating costs and avoided capital costs (they become negative, that is, a savings to NSPI, since NSPI is not required to produce electricity from these generating assets). There is, not surprisingly, an additional expense, the operating costs of the turbines (starting at $51,000 per year with a 2 percent escalator).

According to data presented in the first table, the Net Present Value of the turbines if there is no change in the residential revenues is about -$838,000. Due to rounding errors, the Net Present Value in the document differs by about $1,000 from the Net Present Value in this report.

The Net Present Value is negative because the sum of the discounted annual cash flows (i.e., the savings made in the avoided variable generation costs and the avoided variable capital costs, plus the turbine operating costs) is less than the initial expenditures.

There are a number of omissions in the document regarding this table and the way the Net Present Value is obtained, notably:

- The discount rate used for the cash flow after tax. This is estimated to be 6.1 percent.
- There is no indication of how the avoided variable generation costs were estimated. It is unclear whether NSPI has included its projected rising fuel costs in this (and subsequent) tables.
- There is no indication of how the avoided capital generation costs were estimated.
- There is no indication of how the turbine operating costs were estimated.

6.2 Application of the Green Power Premium

In the second table (reproduced at the end of this report), NSPI introduces the Green Power Premium of 4 cents per kilowatt-hour. As stated earlier, this means that NSPI is charging the residential rate (currently 8.35 cents per kilowatt-hour) plus the premium. This table is based upon revenues of $152,000 per year (that is, the sale of 3.8 million kilowatt-hours). As with the previous table, it is assumed that the turbines simply displace existing generation assets.

In the second table, the Net Present Value is positive, suggesting that NSPI should go ahead with the project. In the document, the Net Present Value is slightly lower than those shown in this report ($963 rather than $1031); this difference appears to be attributable to rounding errors.

As with the first table, there are a number of omissions in the document regarding this table, notably:

- The discount rate used for the cash flow after tax. This is estimated to be 7.05 percent. It is unclear why NSPI appears to use two different discount rates for the two tables. Had the document used 6.1 percent (as in the first table), the Net Present Value would have been over $130,000.
- There is no indication of how the avoided variable generation costs were estimated.
- There is no indication of how the avoided capital generation costs were estimated.
- There is no indication of how the turbine operating costs were estimated.

A third table (reproduced at the end of the report) shows the Net Present Value if the turbines produce 3.9 million kilowatt-hours of electricity (that is, the annual residential revenue is $156,000 rather than $152,000). In this case, the Net Present Value increases to over $24,000 (using the same discount rate found in the second table).

6.3 Treating the turbines as 'new' power

Another way to consider these turbines is to assume that they are producing 'new' power that does not displace any existing generation assets. If this approach is taken, the residential revenues can be considered 'new' as well (given the growth in the residential home market, this is a reasonable assumption). In this case, the Net Present Value is positive, over $41,000.

The value of the residential rate is not fixed at 8.35 cents per kilowatt-hour (as it appears to be in the document); instead, the rate increases at one percent a year. By 2021, the rate is 10.09 cents per kilowatt-hour. The Net Present Value is calculated using the same discount rate presented in the second table.

6.4 Observations and comments:

In addition to the above discussions regarding the tables supplied in the document, the following should be noted:

- The document does not state which existing generation assets will not be used when the wind turbines are running. If these burn fossil fuels (coal, oil, or natural gas), the reduction in carbon dioxide emissions will allow NSPI to sell production credits to other utilities. This inflow is not included, but should be.
- The revenue from the sale of green power remains at 4 cents per kilowatt-hour for the lifetime of the programme. There should be an escalator included in this price, since no one can expect the price of electricity to remain unchanged for such a length of time. By keeping the price per kilowatt-hour fixed, the value of the Net Present Value is reduced.
- Recently announced Federal Production Incentive for Renewable Energy [8]

subsidies on renewable energy may be applicable to these turbines. This is another cash inflow that should be included.

7 What if green power was included directly in NSPI's energy mix?

According to the Emera 2001 Annual Report, NSPI had the following electricity sales [3]:

Sector	Total (GWh)
Residential	3,756.7
Commercial	2,724.9
Industrial	3,831.6
Other	592.6
Total	10,905.8

The proposed green power programme, if included as part of NSPI's generating capacity would amount to:

= 3.9 million kWh (3.8 GWh) / 10,905.8 GWh

= 0.035%

The additional capacity of these two turbines is negligible.

8 Conclusions

NSPI is proposing a Green Power Rider for its residential customers that is 4 cents per kilowatt-hour over and above the existing residential rate.

As this report has shown, the Green Power Rider cannot be justified for a number of reasons, notably:

- The Federal tax rebate on the wind turbines means that the levelized costs of the power from the turbines is as good as or better than the levelized costs for NSPI's existing generation assets.
- As shown in this report, there are a number of ways in which the Net Present Value can be used to determine whether the turbines will be profitable. When treating the turbines as 'new' power and increasing the residential rate, the best Net Present Value is obtained.
- How much of the data supplied in the report is obtained is not made clear. For example, assumptions about fuel prices are not presented.
- Other incentives and credits that could be used as cash inflows are ignored.

The UARB should reject NSPI's Green Power Rider and require NSPI to include these turbines as part of their existing generation assets. The cost per kilowatt-hour of these turbines compares favourably with NSPI's existing generating assets.

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Table 1: No change in residential revenue (from Table 1 of document)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Residential revenue										
Total cash inflow	0	0	0	0	0	0	0	0	0	0
Incremental cash outflows:										
Avoided variable generation costs		(268,014)	(165,680)	(180,614)	(126,426)	(177,498)	(172,520)	(176,130)	(141,436)	(159,562)
Avoided capital generation costs		0	0	0	(16,530)	(16,872)	(17,214)	(17,556)	(17,936)	(18,278)
Generation operating costs		51,000	52,020	53,060	54,122	55,204	56,308	57,434	58,583	59,755
Marketing and promotion	48,000									
Total cash outflows	48,000	(217,014)	(113,660)	(127,554)	(88,834)	(139,166)	(133,426)	(136,252)	(100,789)	(118,085)
Net cash flow	(48,000)	217,014	113,660	127,554	88,834	139,166	133,426	136,252	100,789	118,085
Capital expenditures	(2,954,240)									
Total net cash flow	(3,002,240)	217,014	113,660	127,554	88,834	139,166	133,426	136,252	100,789	118,085
Tax	1,320,986	(95,486)	(50,010)	(56,124)	(39,087)	(61,233)	(58,707)	(59,951)	(44,347)	(51,958)
Cash flow after tax	(1,681,254)	121,528	63,650	71,430	49,747	77,933	74,718	76,301	56,442	66,128
NPV	(837,104)									

Table 1 (continued)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential revenue											
Total cash inflow	0	0	0	0	0	0	0	0	0	0	0
Incremental cash outflows:											
Avoided variable generation costs	(163,628)	(133,418)	(157,320)	(154,888)	(239,514)	(132,772)	(264,784)	(188,594)	(201,020)	(158,042)	(161,196)
Avoided capital generation costs	(18,658)	(19,038)	(19,418)	(19,798)	(20,216)	(25,422)	(25,954)	(26,448)	(25,232)	(25,764)	(26,258)
Generation operating costs	60,950	62,169	63,412	64,680	65,974	67,293	68,639	70,012	71,412	72,841	74,297
Marketing and promotion											
Total cash outflows	(121,336)	(90,287)	(113,326)	(110,006)	(193,756)	(90,901)	(222,099)	(145,030)	(154,840)	(110,965)	(113,157)
Net cash flow	121,336	90,287	113,326	110,006	193,756	90,901	222,099	145,030	154,840	110,965	113,157
Capital expenditures											
Total net cash flow	121,336	90,287	113,326	110,006	193,756	90,901	222,099	145,030	154,840	110,965	113,157
Tax	(53,388)	(39,726)	(49,863)	(48,402)	(85,253)	(39,996)	(97,723)	(63,813)	(68,129)	(48,825)	(49,789)
Cash flow after tax	67,948	50,561	63,463	61,603	108,503	50,904	124,375	81,217	86,710	62,141	63,368

Table 2: Application of the Green Power Premium (from Table 2 of document)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Residential revenue		152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000
Total cash inflow	0	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000
Incremental cash outflows:										
Avoided variable generation costs		(268,014)	(165,680)	(180,614)	(126,426)	(177,498)	(172,520)	(176,130)	(141,436)	(159,562)
Avoided capital generation costs		0	0	0	(16,530)	(16,872)	(17,214)	(17,556)	(17,936)	(18,278)
Generation operating costs		51,000	52,020	53,060	54,122	55,204	56,308	57,434	58,583	59,755
Marketing and promotion	48,000									
Total cash outflows	48,000	(217,014)	(113,660)	(127,554)	(88,834)	(139,166)	(133,426)	(136,252)	(100,789)	(118,085)
Net cash flow	(48,000)	369,014	265,660	279,554	240,834	291,166	285,426	288,252	252,789	270,085
Capital expenditures	(2,954,240)									
Total net cash flow	(3,002,240)	369,014	265,660	279,554	240,834	291,166	285,426	288,252	252,789	270,085
Tax	1,320,986	(162,366)	(116,890)	(123,004)	(105,967)	(128,113)	(125,587)	(126,831)	(111,227)	(118,838)
Cash flow after tax	(1,681,254)	206,648	148,770	156,550	134,867	163,053	159,838	161,421	141,562	151,248
NPV	1,031									

Table 2 - continued.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential revenue	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000
Total cash inflow	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000	152,000
Incremental cash outflows:											
Avoided variable generation costs	(163,628)	(133,418)	(157,320)	(154,888)	(239,514)	(132,772)	(264,784)	(188,594)	(201,020)	(158,042)	(161,196)
Avoided capital generation costs	(18,658)	(19,038)	(19,418)	(19,798)	(20,216)	(25,422)	(25,954)	(26,448)	(25,232)	(25,764)	(26,258)
Generation operating costs	60,950	62,169	63,412	64,680	65,974	67,293	68,639	70,012	71,412	72,841	74,297
Marketing and promotion											
Total cash outflows	(121,336)	(90,287)	(113,326)	(110,006)	(193,756)	(90,901)	(222,099)	(145,030)	(154,840)	(110,965)	(113,157)
Net cash flow	273,336	242,287	265,326	262,006	345,756	242,901	374,099	297,030	306,840	262,965	265,157
Capital expenditures											
Total net cash flow	273,336	242,287	265,326	262,006	345,756	242,901	374,099	297,030	306,840	262,965	265,157
Tax	(120,268)	(106,606)	(116,743)	(115,282)	(152,133)	(106,876)	(164,603)	(130,693)	(135,009)	(115,705)	(116,669)
Cash flow after tax	153,068	135,681	148,583	146,723	193,623	136,024	209,495	166,337	171,830	147,261	148,488

Table 3: Residential revenues of $156,000 per year

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Residential revenue		156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000
Total cash inflow	0	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000
Incremental cash outflows:										
Avoided variable generation costs		(268,014)	(165,680)	(180,614)	(126,426)	(177,498)	(172,520)	(176,130)	(141,436)	(159,562)
Avoided capital generation costs		0	0	0	(16,530)	(16,872)	(17,214)	(17,556)	(17,936)	(18,278)
Generation operating costs		51,000	52,020	53,060	54,122	55,204	56,308	57,434	58,583	59,755
Marketing and promotion	48,000									
Total cash outflows	48,000	(217,014)	(113,660)	(127,554)	(88,834)	(139,166)	(133,426)	(136,252)	(100,789)	(118,085)
Net cash flow	(48,000)	373,014	269,660	283,554	244,834	295,166	289,426	292,252	256,789	274,085
Capital expenditures	(2,954,240)									
Total net cash flow	(3,002,240)	373,014	269,660	283,554	244,834	295,166	289,426	292,252	256,789	274,085
Tax	1,320,986	(164,126)	(118,650)	(124,764)	(107,727)	(129,873)	(127,347)	(128,591)	(112,987)	(120,598)
Cash flow after tax	(1,681,254)	208,888	151,010	158,790	137,107	165,293	162,078	163,661	143,802	153,488
NPV	24,669									

Table 3: continued.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential revenue	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000
Total cash inflow	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000	156,000
Incremental cash outflows:											
Avoided variable generation costs	(163,628)	(133,418)	(157,320)	(154,888)	(239,514)	(132,772)	(264,784)	(188,594)	(201,020)	(158,042)	(161,196)
Avoided capital generation costs	(18,658)	(19,038)	(19,418)	(19,798)	(20,216)	(25,422)	(25,954)	(26,448)	(25,232)	(25,764)	(26,258)
Generation operating costs	60,950	62,169	63,412	64,680	65,974	67,293	68,639	70,012	71,412	72,841	74,297
Marketing and promotion											
Total cash outflows	(121,336)	(90,287)	(113,326)	(110,006)	(193,756)	(90,901)	(222,099)	(145,030)	(154,840)	(110,965)	(113,157)
Net cash flow	277,336	246,287	269,326	266,006	349,756	246,901	378,099	301,030	310,840	266,965	269,157
Capital expenditures											
Total net cash flow	277,336	246,287	269,326	266,006	349,756	246,901	378,099	301,030	310,840	266,965	269,157
Tax	(122,028)	(108,366)	(118,503)	(117,042)	(153,893)	(108,636)	(166,363)	(132,453)	(136,769)	(117,465)	(118,429)
Cash flow after tax	155,308	137,921	150,823	148,963	195,863	138,264	211,735	168,577	174,070	149,501	150,728

Table 4: Treating the turbines as 'new' power

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Residential rate cents/kWh		8.35	8.43	8.52	8.60	8.69	8.78	8.86	8.95	9.04
Residential revenue		325,650	328,907	332,196	335,518	338,873	342,261	345,684	349,141	352,632
Total cash inflow	0	325,650	328,907	332,196	335,518	338,873	342,261	345,684	349,141	352,632
Incremental cash outflows:										
Avoided variable generation costs		0	0	0	0	0	0	0	0	0
Avoided capital generation costs		0	0	0	0	0	0	0	0	0
Generation operating costs		51,000	52,020	53,060	54,122	55,204	56,308	57,434	58,583	59,755
Marketing and promotion	48,000									
Total cash outflows	48,000	51,000	52,020	53,060	54,122	55,204	56,308	57,434	58,583	59,755
Net cash flow	(48,000)	274,650	276,887	279,135	281,396	283,669	285,953	288,250	290,558	292,878
Capital expenditures	(2,954,240)									
Total net cash flow	(3,002,240)	274,650	276,887	279,135	281,396	283,669	285,953	288,250	290,558	292,878
Tax	1,320,986	(120,846)	(121,830)	(122,819)	(123,814)	(124,814)	(125,819)	(126,830)	(127,845)	(128,866)
Cash flow after tax	(1,681,254)	153,804	155,056	156,316	157,582	158,854	160,134	161,420	162,712	164,011
NPV	41,005									

Table 4: continued.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential rate cents/kWh	9.13	9.22	9.32	9.41	9.50	9.60	9.69	9.79	9.89	9.99	10.09
Residential revenue	356,159	359,720	363,317	366,951	370,620	374,326	378,070	381,850	385,669	389,525	393,421
Total cash inflow	356,159	359,720	363,317	366,951	370,620	374,326	378,070	381,850	385,669	389,525	393,421
Incremental cash Outflows:											
Avoided variable Generation costs	0	0	0	0	0	0	0	0	0	0	0
Avoided capital Generation costs	0	0	0	0	0	0	0	0	0	0	0
Generation Operating costs	60,950	62,169	63,412	64,680	65,974	67,293	68,639	70,012	71,412	72,841	74,297
Marketing and Promotion											
Total cash outflows	60,950	62,169	63,412	64,680	65,974	67,293	68,639	70,012	71,412	72,841	74,297
Net cash flow	295,209	297,551	299,905	302,270	304,646	307,033	309,430	311,838	314,256	316,685	319,123
Capital expenditures											
Total net cash flow	295,209	297,551	299,905	302,270	304,646	307,033	309,430	311,838	314,256	316,685	319,123
Tax	(129,892)	(130,923)	(131,958)	(132,999)	(134,044)	(135,094)	(136,149)	(137,209)	(138,273)	(139,341)	(140,414)
Cash flow after tax	165,317	166,629	167,947	169,271	170,602	171,938	173,281	174,629	175,984	177,344	178,709