FINANCIAL PROJECTIONS OF THE IMPACT OF NEW ALUMINIUM SMELTERS ON THE NEW ZEALAND ELECTRICITY SYSTEM : AN ANALYSIS OF THE NZED STUDY

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Contents:

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Introduction

In a recent unpublished study[1], the New Zealand Electricity Division claim to have satisfied themselves that the proposed expansion of aluminium smelting in New Zealand will have no significant effect on the bulk electricity tariff. The NZED study was carried ou ostensibly to answer questions put by the Electrical Supply Authorities Association, and t allay fears that the cost of subsidising the electricity for the Aramoana smelter to be built by Fletcher-Alusuisse will be borne by other consumers of electricity.

On the basis of the NZED results, the Minister of Energy (Mr Birch) has tried to give the impression that, since expansion of the aluminium industry will not affect the bulk tariff, there is in fact no subsidy[2].

The Coalition for Open Government greeted the NZED results with scepticism[3]. NZED ha clearly produced the results which the Minister wanted to support his advocacy of the secon smelter project. We therefore challenged the Minister or the NZED to publish the actual study (rather than selected results from it) so that the public could judge for themselves the true strength of the Minister's case. The Minister, to his credit, responded that although the study did not exist in the form of a specific document, interested parties cou have "detailed discussions with the Electricity Division"[4].

We therefore wrote to NZED asking for specific answers to a number of questions, and followed this up with a visit to NZED. We were greeted with a clear and disappointing response to our request for detailed information on the bulk tariff study. Nothing was to be made available for our inspection except the final printouts from the two computer runs (numbers 52 and 53) which had yielded the results used by the Minister. We were not to be told which power stations appeared in the forecast capital works programme for the period 1995-2010 (on the grounds that the programme had no official status but might attract criticism from "environmentalists" who failed to appreciate this, if it were to be made public). We were not to be allowed to take photo-copies of the computer printouts of the NZED results (on the grounds that we might use them to "misrepresent" the

1. The results of this study were first made public by the Minister of Energy in a press statement dated February 2, 1981. They were subsequently made available in more detail with the release of a letter from NZED to the Electrical Supply Authorities Association, dated January 30 1981. Both documents are reproduced in Appendix B.
2. This certainly would be the impression gained from a careless reading of the opening sentence of his February 2 press statement: "'The aluminium smelters will definitely not be subsidised by the other electricity consumers', said the Minister of Energy, Mr Birch, today." The sentence is, of course, strictly correct - it needs to be read with the emphasis on the words "by other electricity consumers".
3. COG's open letter to Supply Authorities, dated February 16, 1981, is reproduced in Appendix B.
4. These words are from a similar response from Mr Birch to the Inner City Ministry, Wellington, in a letter dated February 13, 1981 (see Appendix B). The invitation to COG was made on Radio New Zealand's Checkpoint programme on February 18, 1981.

NZED's position). We were not offered access to the computer programme itself, nor to the results of the (51?) computer runs prior to those which had given the desired results. We received no clear answer to our request for information about the sensitivity of the NZED projections to altered assumptions. Some days later, a follow-up request for the NZED forecast of total annual electricity generation during the period 1995-2010 drew the response that these projections were secret.

NZED officials explained to us that their position was based on (1) the need to be consistent in what they disclosed (so that we could not see material which had not been shown to the Electrical Supply Authorities Association); and (2) the directions of their Minister (that is, Mr Birch). The officials were helpful and courteous during our two-hour meeting, and obviously cannot be held responsible for the veil of secrecy drawn over their study. They outlined to us the aims and scope of the study, and allowed us to copy down by hand the figures which appear in Table 1. The interpretation of those figures which we offer below is, of course, entirely our own, and should in no way be attributed to NZED.

NZED's Assumptions

The NZED study rests upon the following basic assumptions:

1) Inflation starts at 15% in 1981, declines to 5% by the mid-1980s, and remains at 5% per year thereafter.

2) The rate of interest at which NZED can borrow from the Government falls from 10% 1981-1987 to 5% from 1992 onwards.

3) NZED is not instructed to maximise the return on its assets in the manner of a private business. Instead, the management objectives specified for the study are (a) avoidance of short-run fluctuations of the bulk tariff, and (b) attainment over the long term of a value of 50% for the ratio

$$\frac{\text{Total loan liability}}{\text{Gross accumulated investment at historic cost}}$$

This ratio appears to be devoid of any clear economic or financial meaning, and should not be confused with the provision in the Electricity Act that NZED may set its bulk tariff to yield a 25-50% surplus over and above current operating costs.[5]

5. Section 34 of the Electricity Act 1968, as amended in 1977, reads: "The prices charged for all electricity supplied and sold to electrical Supply Authorities under this Act shall be so calculated as to produce, in respect of the period for which the prices are charged, an amount of revenue which, together with all other revenues which it is estimated by the Minister will be paid into the Energy Account pursuant to paragraphs (a) and (b) of Section 15B of the Ministry of Energy Act 1977 in respect of that period is twenty-five percent, or such other percentage, not exceeding fifty, as the Minister of Energy and the Minister of Finance, after consultation with the Electrical Supply Authorities Association, determine in respect of any such period, more than the total amount which it is estimated by the Minister of Energy will be required to make full provision in respect of that period for all charges and expenses in connection with the management, operation and maintenance of the supply of electricity."

TABLE I

Some NZED Projections, 1980-81 to 2009-10: $ million at current prices

1. Projected System without New Smelters

Year to March of:	(1) Working expenses (includes interest)	+ (2) Capital spending	= (3) "Total finance required"	= (4) Cash receipts	+ (5) Borrowing
1981	403	300	703	535	168
1982	455	320	775	591	184
1983	505	303	808	647	161
1984	554	302	856	705	151
1985	597	376	973	748	225
1986	647	376	1,023	784	238
1987	700	429	1,129	820	309
1988	719	483	1,202	849	353
1989	737	415	1,152	878	274
1990	695	321	1,016	901	115
1991	692	293	985	948	37
1992	690	334	1,024	1,009	15
1993	734	449	1,183	1,076	107
1994	801	750	1,551	1,145	406
1995	864	981	1,845	1,219	626
1996	928	747	1,675	1,305	370
1997	994	716	1,710	1,399	311
1998	1,063	795	1,858	1,498	360
1999	1,137	876	2,013	1,602	411
2000	1,235	1,076	2,311	1,713	598
2001	1,309	1,180	2,489	1,830	659
2002	1,378	1,269	2,647	1,954	693
2003	1,487	1,241	2,728	2,084	644
2004	1,572	1,099	2,671	2,222	449
2005	1,653	1,204	2,857	2,368	489
2006	1,740	1,225	2,965	2,522	443
2007	1,823	1,287	3,110	2,685	425
2008	1,923	1,351	3,274	2,835	439
2009	1,999	1,419	3,418	3,009	409
2010	2,145	1,489	3,634	3,200	434

TABLE I (cont.)

2. Projected System with New Smelters

Year to March of:	(1) Working expenses	+ (2) Capital spending	= (3) "Total finance required"	= (4) Cash receipts	+ (5) Borrowing
1981	403	300	703	535	168
1982	458	423	881	591	290
1983	520	418	938	647	291
1984	590	411	1,001	739	262
1985	667	444	1,111	844	267
1986	729	489	1,218	902	316
1987	850	613	1,463	983	480
1988	916	681	1,597	1,024	573
1989	895	766	1,661	1,056	605
1990	907	687	1,594	1,088	506
1991	925	679	1,604	1,143	461
1992	945	695	1,640	1,206	434
1993	983	572	1,555	1,271	284
1994	1,045	778	1,823	1,340	483
1995	1,127	839	1,966	1,420	546
1996	1,201	742	1,943	1,516	427
1997	1,268	695	1,963	1,620	343
1998	1,347	612	1,959	1,730	229
1999	1,425	573	1,998	1,846	152
2000	1,509	728	2,237	1,967	270
2001	1,600	912	2,512	2,098	414
2002	1,712	965	2,677	2,235	442
2003	1,823	1,114	2,937	2,380	557
2004	1,945	999	2,944	2,531	413
2005	2,009	849	2,858	2,692	166
2006	2,122	1,225	3,347	2,862	485
2007	2,238	1,287	3,525	3,042	483
2008	2,373	1,351	3,724	3,231	493
2009	2,506	1,419	3,925	3,431	494
2010	2,663	1,489	4,152	3,642	510

4) There is no constraint on NZED's ability to borrow at the assumed rate of interest. For each year of the NZED financial projections, both capital and current expenditures are aggregated to give a single "finance required" figure, with this finance being obtained from cash receipts and borrowing. NZED management has considerable discretion to vary the ratio of borrowing to cash receipts. Since cash receipts are the yield from the bulk tariff (plus revenues from a small number of special bulk sales to industrial users), it is clear that for the purposes of this study, the bulk tariff is determined as a residual once NZED has decided on
(a) the amount of capital expenditure for the year, and
(b) the proportion of "finance required" which is to be obtained by borrowing from Government.

5) Apart from the aluminium smelters, power demand from the rest of the economy is projected to grow at the rate shown by the central forecast in the 1980 Energy Plan. (It should be noted that this forecast is now considered too conservative, and is likely to be amended upwards in the 1981 Plan).

6) The real world price of aluminium is assumed to remain constant (i.e. to move exactly in line with the rate-of-inflation assumption made for the New Zealand economy in (1) above). The amount paid for electricity by the Aramoana smelter therefore remains constant in real terms throughout the thirty years. The price of power to the Bluff smelter is believed to be fully indexed to the New Zealand inflation rate; it also, therefore, remains constant in real terms.

Some Problems with the Design of the NZED Study

Before going on to discuss the results of the NZED study, it is important to establish precisely what the study did and did not attempt to achieve. The most important point is that this was not a study of the impact of the Aramoana smelter, nor is it even an accurate study of the impact of the two major projects - the Bluff third potline plus the Aramoana smelter. Other more detailed problems arise with the capital works programme, and with the degree of flexibility allowed in the study for borrowing.

1) Contrary to the impression which many members of the public may have received, the NZED study is not designed to reveal the impact of the Aramoana smelter on the bulk tariff. It is designed to show the impact of adding two separate aluminium smelting projects, using a total of 5,000 GwH annually (the Aramoana smelter alone will use only 3,000 GwH). Implicitly, but not explicitly, these two projects are to be understood as comprising Comalco's third potline at Bluff and the Fletcher-Alusuisse

smelter at Aramoana. The NZED study compares the situation in which both of these projects proceed (labelled the "+5,000GWh option") with the situation if neither of them proceeds (labelled the "+0 option"). The problem here is that the two projects have radically different implications for our electricity supply system. The Bluff potline will utilise power from already-installed excess generating capacity[6], and hence may actually reduce pressure on the bulk tariff during the 1980s (although this is not certain). The Aramoana smelter, on the contrary, will require a crash construction programme to install new power stations. Power from these stations is likely to be relatively costly, and the construction programme faces the usual risks of cost over-runs and commissioning delays (with consequent risks of power shortages for other consumers). By lumping the two projects together, the NZED study conceals the true impact of the Aramoana project - the one which is likely to put upward pressure on the bulk tariff if its power is heavily subsidised.

NZED claims to have done no work on forecasting the financial impact of the second smelter on its own. This is a serious omission, given the political and economic importance of the second smelter issue. It must be recognised, however, that the NZED study was designed not to address that issue, but rather to respond to a loosely-framed question from the Supply Authorities about the impact of smelters rather than the Aramoana smelter. It will be noted that neither NZED nor the Minister of Energy talk about the second smelter - their published statements of refer to "smelters".[7]

2) The NZED study shows the effect of adding 5,000 GWh annually of industrial load to the existing system. However, the combined impact of the actual smelter proposals (Bluff and Aramoana) is likely to be 4,500 GWh rather than 5,000. This was recognised in the 1980 Energy Plan [8] but has not been taken into account in designing the NZED study. The question of what happens to the "missing" 500 GWh poses a serious problem for the interpretation of the NZED results. In the data reproduced in our Table 1, NZED provide projections of the costs associated with supplying an extra 5,000 GWh, and the revenues likely to accrue from the two smelter projects. If the revenues have been projected on the basis of the actual projects as proposed, then they are revenues from the sale of 4,500 rather than 5,000 GWh per year. Alternatively,

6. See G. Bertram and K. Johnston, Electricity in New Zealand: Is there a Surplus to Sell? (Wellington, 1980) p.8.
7. See, for example, the opening sentence of Mr Birch's press statement of February 2, 1981, in Appendix B.
8. 1980 Energy Plan, p. 41, states: "5,000 GWh/y of electricity intensive load has been allowed for ... It is noted that electricity projects currently approved by the Government total in the range 4,200 to 4,700 GWh/y."

if NZED have projected the revenues from sales of 5,000 GWh at the prices likely to be charged the smelters, then the revenue stream in Table 1 is unduly inflated, with consequent effects upon the study's conclusions.

3) An important set of basic data for a study such as this one is the planned capital works programme - that is, the list of power stations to be constructed and the timetable for doing so. Up to 1995 the NZED study uses the construction programme set out in the 1980 Energy Plan for the +5,000 scenario; and simply defers some of this construction for the +0 case. From 1995 on, however, the construction programme for the +5,000 case is "hypothetical" as well as secret. The costings of this programme, consequently, are "hypothetical" as well. Since we were denied access to the works programme, we are unable to say how the capital expenditure projections for the NZED study were derived, and we are therefore unable to interpret some peculiar features of the time-profile of capital expenditures for the +5,000 case (on which, see below).

We put to the NZED officials a direct question as to whether the +0 construction programme had been inflated by early construction of excess capacity (specifically, the commissioning of redundant capacity on the Clutha before the mid-1990s) and were assured that this had not been done in the financial study.[9]

4) The computer programme used by NZED was not shown to us, and we can therefore only conjecture as to the series of steps by which the computer reached its results. Our impression is that the computer was given the projected working expenses and capital expenditure programmes for the "+0" and "+5,000" cases, and instructed to try out various ways of financing these from a combination of cash receipts and borrowing, subject only to the general constraint that at the end of the thirty-year period the loan liability: gross accumulated capital ratio should be roughly 50%. (Since both numerator and denominator of this ratio differ between the two cases, it is possible that some flexibility in the nature and timing of the capital expenditure programme may have been allowed.) The bulk tariff for each of the +0 and +5,000 cases could then be obtained by dividing the required cash receipts by the number of kilowatt-hours of power sold to Supply Authorities for distribution (after making some adjustment for the impact of the other bulk users who buy directly from NZED, such as Tasman

9. This question related to criticisms made last year of the design of an earlier NZED study, in which +2000 and +5000 scenarios were compared. See M.J. Ellis, "The Economic Value of Electricity: Aluminium and Alternative Uses", in N.J. Erickson (ed) The Aluminium Debate: Moulding New Zealand's Future (University of Waikato Environmental Studies Unit, 1981).

and New Zealand Steel).

The point here is that "required cash receipts" (which determine the bulk tariff for each year in the study) can be reduced simply by borrowing more, and increased by borrowing less. In other words, the cost differences between the +0 and the +5,000 cases can be absorbed by changes in NZED borrowing, and of course in the rate of return on NZED assets. We discuss below the extent to which each of these various options is followed in the final NZED projections

The NZED Results

In Table 1 we set out the key financial series from the NZED computer printouts which we saw. These provide the computer's answers, for +0 and +5,000 cases respectively, to the questions

- what will it cost to operate the electricity supply system?
- what will it cost to construct new capital works as per the specified capital works programme?
- what cash revenues will NZED receive, given certain specified prices for electricity sold to the smelters, other direct buyers, and the Supply Authorities?
- how much borrowing will be undertaken to make up any shortfall of revenues relative to total finance required?

As we pointed out in a previous study[10], the two key questions to ask in assessing the impact of aluminium smelters are

(1) What is the difference between the cost of supplying power for the New Zealand economy without the smelters and the cost of supplying the economy with the smelters?

(2) How much will the smelters pay for their power? Specifically, will they pay enough to meet the increased costs which they impose upon the electricity system?

On the basis of the NZED financial projections (based on the assumptions listed earlier), we have calculated NZED's implicit estimate of the expected subsidies to the smelter projects. The results appear in Column (5) of Table 2. We define the subsidy to the smelters as the difference between the cost of supplying them with power (Column (4) of Table 2) and the amount of revenue which they are expected to pay to NZED (Column (3) of Table 2). All extra costs which are not paid for by the smelters themselves have to be met by other groups - basically other consumers and/or taxpayers.

10. Bertram and Johnston (1980), op. cit.

TABLE II

Financial Impact on NZED of Providing 5,000GWH of Additional Power for Proposed Aluminium Projects

$ million

Year to March of:	(1) Additional revenues	= (2) Estimated extra revenue from non-smelter consumers	+ (3) Estimated extra revenue from smelters	(4) Additional costs of the expanded system	(5) Subsidy to smelters (4) - (3)
1981	0	0	0	0	0
1982	0	0	0	106	106
1983	0	0	0	130	130
1984	34	7	27	145	118
1985	96	17	79	138	59
1986	118	18	100	195	95
1987	163	18	145	334	189
1988	175	18	157	395	238
1989	178	21	157	509	352
1990	187	22	165	578	413
1991	195	11	184	619	435
1992	197	0	197	616	419
1993	195	-11	206	372	166
1994	195	-12	207	272	65
1995	201	-15	216	121	-95
1996	211	-15	226	268	42
1997	221	-15	236	253	17
1998	232	-18	250	101	-149
1999	244	-19	263	-15	-278
2000	254	-16	270	-74	-344
2001	268	-19	287	23	-264
2002	281	-19	300	30	-270
2003	296	-22	318	209	-109
2004	309	-23	332	273	-59
2005	324	-23	347	1	-346
2006	340	-23	363	382	19
2007	357	-27	384	415	28
2008	396	0	396	450	54
2009	422	3	419	507	88
2010	442	3	439	518	79

Sources: Column (1) is the difference between Table I.1 Col.(4) and Table I.2 Col.(4).
Column (2) is derived in Appendix A.
Column (3) is Col.(1) minus Col.(2).
Column (4) is the difference between Table I.1 Col.(3) and Table I.2 Col.(3).

Because the figures in Table 2 are at expected current prices, they are not comparable from year to year until they have been corrected for inflation. We therefore deflate the series for annual subsidy to the smelters, and also the capital expenditure data, back to 1980/81 dollars in Table 3. The results can be summarised as follows:

(1) Between 1981 and 1995, NZED expects to subsidise the smelter projects to the tune of nearly $1,500 million.

(2) From 1996 to 2010 the projects are expected to pay nearly $500 million more than the cost of their power.

(3) Consequently, over the entire thirty-year period, the total net subsidy amounts to at least $1,000 million, in 1980/81 dollars.

As various observers have suggested, the subsidy is concentrated in the first fifteen years, during which expensive new construction of power stations is required to service the additional load. In the second half of the period covered, the pace of construction activity is lower for the system with smelters than for the system without smelters. (The reasons for this are not clear at first sight; see below). The cost burden of the smelters is correspondingly reduced, and the economics of supplying them with power looks more attractive as a result[11].

From the viewpoint of 1981, it is natural enough to give most weight to the results for the first period, up to 1995. This is the period closest to the present, and the one for which the projections are most likely to be accurate. It is also the period for which we have the most information, since it is covered in the 1980 Energy Plan documents. For the period 1995-2010, all figures are necessarily more 'hypothetical", and correspondingly less reliable.

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11. It will be noted that the full capital cost of power stations appears in Tables 1 and 2 as the stations are built; there is no item for depreciation in the cost figures. This accounts for the discrepancy between the time-streams of costs and revenues shown here, and the cost series in Bertram and Johnston (1980), where capital depreciation and loan amortisation were spread over the accounting life of the various power stations.

TABLE III

Smelter Subsidy and Capital Programme Deflated to 1980 Dollars

$ million

Year to March of:	(1) Inflation rate assumed by NZED: %	(2) Deflator for year	(3) Subsidy to smelters in 1980 dollars	(4) Capital expenditure for +0 GWH case	(5) Capital expenditure for +5,000GWH case
1981	-	1.0000	0	300	300
1982	15	0.8696	92	278	368
1983	12.5	0.7729	100	234	323
1984	10	0.7027	83	212	289
1985	7.5	0.6537	39	246	290
1986	5	0.6225	59	234	304
1987	5	0.5929	112	254	363
1988	5	0.5647	134	273	385
1989	5	0.5378	189	223	412
1990	5	0.5122	212	164	352
1991	5	0.4878	212	143	331
1992	5	0.4645	195	155	323
1993	5	0.4424	73	199	253
1994	5	0.4214	27	316	328
1995	5	0.4013	-38	394	337
1996	5	0.3822	16	286	284
1997	5	0.3640	6	261	253
1998	5	0.3466	-47	276	212
1999	5	0.3301	-92	289	189
2000	5	0.3144	-108	338	229
2001	5	0.2994	-79	353	273
2002	5	0.2852	-77	362	275
2003	5	0.2716	-30	337	303
2004	5	0.2587	-15	284	258
2005	5	0.2464	-85	297	209
2006	5	0.2346	4	287	287
2007	5	0.2235	6	288	288
2008	5	0.2128	11	287	287
2009	5	0.2027	18	288	288
2010	5	0.1930	15	287	287
Totals:					
1981-1995			1,489	3,625	4,958
1996-2010			-457	4,520	3,922
1981-2010			1,032	8,145	8,880

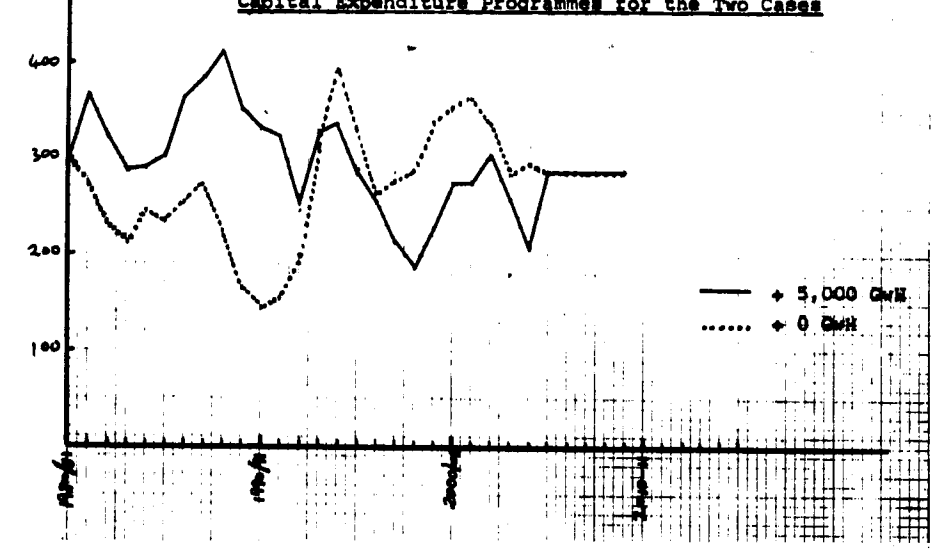
The Capital Expenditures Problem

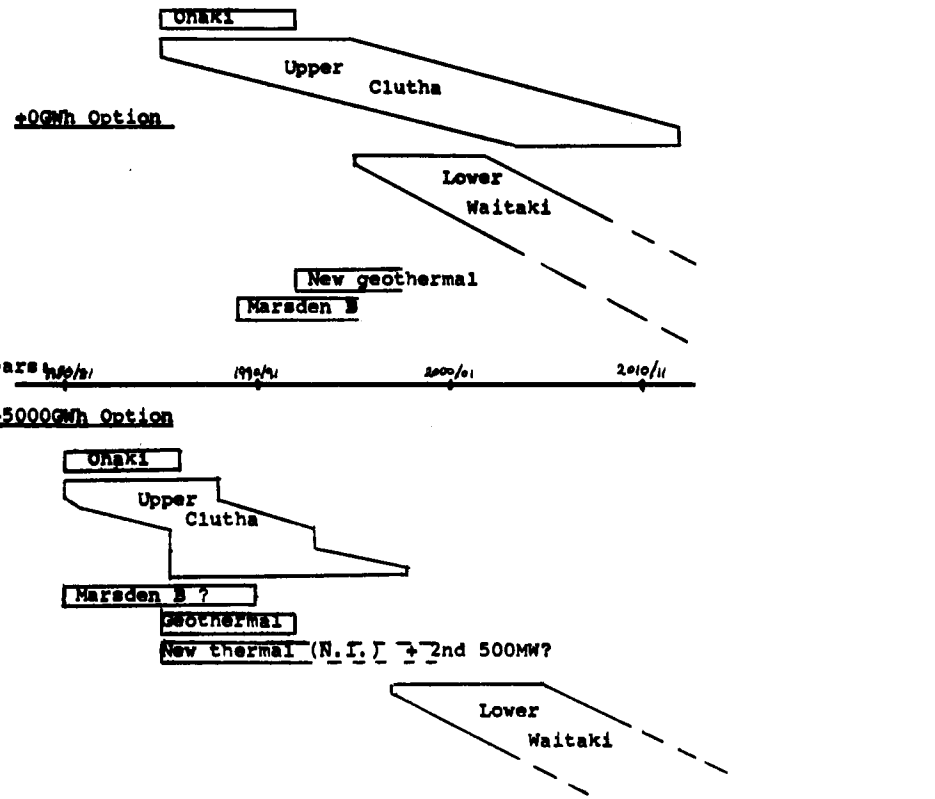
As we mentioned earlier, the capital expenditure series used in the NZED study, and reproduced in constant 1980 dollars in Table 3, are difficult to interpret without more information than NZED were prepared to release to us. Up to 1995 there is no great problem as one would expect, the +5,000 case requires considerably more capital expenditure than the +0 case, because of the need to install additional capacity to service the extra 5,000 GWh of annual load. From 1996 to 2010, however, the figures are puzzling. In both cases, additional capital expenditures are required to service the growth of the New Zealand economy at large apart from the smelter projects (once the "lump" of demand represented by these has been coped with, the projects themselves impose a constant, not a growing, demand on the system).

Even taking account of the possibility that the NZED study may incorporate some assumed "spread effects" of the smelter projects on growth elsewhere in the economy, it is unlikely that there is a significant difference in the extra demand to be serviced between 1996 and 2010 in the +5,000 case and the +0 case. Although NZED's thirty-year generation forecast remains secret, we believe that roughly 4,500 GWh of extra demand is expected to develop during those fifteen years 1996-2010. The construction of extra generating capacity to service this demand in the +0 case costs a total of $4,520 million, whereas in the +5,000 case the same amount of extra generating capacity costs only $3,922 million. There is no clear reason why it should cost $598 million less to build additional capacity in the scenario in which the most attractive power-station investments have already been undertaken before 1996.

This is very important in interpreting our estimates of the subsidy to the smelters over the period 1996-2010. Table 3 indicates that the NZED estimate of the subsidy is -$457 million for that period, and this result appears to rest entirely on the fact that the same amount of new capacity can be installed for $598 million less in the with-smelters world from 1996 to 2010. If the two capital expenditure programmes had been equal for this period, then the subsidy to the smelters would work out positive rather than negative for the second half of the period.

We are, of course, looking here only at capital costs and not taking account of operating costs. It might be supposed that the lower construction costs projected by NZED for the +5,000 scenario reflect a decision to build a greater number of thermal stations after completion of the next group of hydro stations. Thermal stations have lower capital costs and higher operating costs than hydro stations; we would therefore expect that, if the explanation for the discrepancy in capital costs is to be found here, then the +5,000 scenario should display a rise in operating costs per unit of power produced between 1996 and 2010, whereas the +0 scenario should display no rise, or a





smaller rise. In fact, the opposite is the case. Table 4 shows that the system's working expenses for the +0 case rise from 1.18 to 1.22 cents/kilowatt-hour 1996-2010, while working expenses for the +5,000 case remain absolutely static at 1.32 cents/kilowatt-hour. We therefore rule out the possibility that the capital-cost discrepancy results from some difference in the "mix" of stations in each of the two cases studied by NZED.

In Figure 1 we graph the two series for capital expenditures, and underneath we show hypothetical capital-works programmes for the two cases. If these capital-works programmes were in fact to be adopted, we can see no reason why capital expenditures should be higher for the +0 case than for the +5,000 case over the period 1996-2010. This being the case, we cannot at this stage accept NZED's claim of a negative smelter subsidy for that period.[12]

TABLE IV

WORKING EXPENSES PER KILOWATT-HOUR OF ELECTRICITY GENERATED

cents/KWh, deflated to 1980/81 prices

Year to March of:	+0 Case	+5,000 case
1995	1.18	1.32
2010	1.22	1.32

Source: Appendix A.

12. We remind the reader that NZED denies any intention to build excess capacity during the 1981-1995 period; the lower capital expenditures for the +5,000 case 1996-2010, given that assurance, cannot be accounted for by the availability of excess capacity as at 1995.

Borrowing

In constant 1980/81 dollars, NZED expects the two smelter projects to require $1,489 million in subsidy between now and the mid-1990s. (Table 3). This is the extra cost of supplying power over and above what the smelters are expected to pay. To finance this subsidy, NZED proposes to borrow from the Government as an alternative to raising the bulk tariff. In Appendix C we undertake the detailed calculations required to show how this is to be done; the results appear below as Table 5.

TABLE V

Expected Sources of Finance for Smelter Power Costs

Millions of 1980/81 dollars

Period (March years)	(1) Extra finance required to service smelters	=	(2) Revenue from smelters	+	(3) Extra revenue from other consumers	+	(4) Additional borrowing	(5) Subsidy to smelters
1981-1995	2,412		924		59		1,429	1,489
1995-2010	828		1,286		-66		- 391	- 457
1981-2010	3,240		2,210		-7		1,038	1,032

Sources: Columns (1) - (4) from Appendix C.
Column (1) from Table 3 Column (3).
Minor discrepancies in the addition are due to rounding of decimals.

It can be seen that planned NZED borrowing closely matches the expected subsidy to be provided for the smelters. For the first fifteen years the subsidy totals $1,489 million (Table 3) and additional borrowing comes to $1,429 million. For the second fifteen years the expected subsidy is -$457 million, and additional borrowing is -$391 million. It is this willingness to use borrowing to finance the subsidy, and not any actual lack of subsidy, that accounts for the loudly proclaimed constancy of the bulk tariff in real terms.

Conclusions

1) The NZED study does not tackle the major issue of current concern, namely the implications of the second aluminium smelter at Aramoana. Instead, the study is conducted for a group of energy-intensive projects using 5,000 GWh/year of electricity. This is not accurate even as a study of the combined impact of Aramoana plus the third potline at Bluff.

2) NZED expects to subsidise the power to those two projects by $1,500 million (1980-81 dollars) between 1981 and 1995. This subsidy will be financed almost entirely by borrowing from Government.

3) Between 1996 and 2010, NZED claims that the smelters will pay $500 million more than the financial cost of their electricity - in effect a negative subsidy, reducing the total subsidy for the thirty-year period to $1,000 million. However, this result rests upon capital expenditure estimates which at this stage must be treated as unsubstantiated. Consequently, relatively little weight should be accorded to the 1996-2010 results.

4) Because the subsidy is to be financed by borrowing rather than by raising the bulk tariff, the burden of financing it will be borne by future generations of taxpayers rather than by electricity consumers.

5) It is quite misleading to claim, as the Minister of Energy has done, that the NZED study "proves" or "confirms" that the bulk tariff will not be increased to finance the smelter projects. What the study actually does is to show the implications of a decision not to raise the bulk tariff. The main implication is straightforward enough: if the subsidy is not financed directly by electricity consumers, then it will have to be financed in some other way. The figures released by NZED provide an exploration of the option of financing the subsidy by borrowing from the Government. It is unfortunate that the study has not been presented to the public in its correct light: as a description of one of several possible ways of meeting the cost of developing aluminium smelting in this country on a heavily subsidised basis.

6) It is of some interest to ask what the effect on the bulk tariff might have been, had the smelter subsidies been fully loaded onto other consumers. From 1981 to 1995, subsidies are projected as $1,500 million and revenues (excluding those paid by the smelters) as $7,400 million. In order to finance the subsidies, thus, roughly a 20% increase in the average bulk tariff would be required for that period. NZED and/or the Minister of Energy have evidently concluded that further increases of this magnitude would be politically unacceptable.

Appendix A

NZED's letter to Supply Authorities (see Appendix B) provides a table showing the annual percentage change in the bulk tariff which would be NZED policy under the +0 and the +5000 scenarios. Using these percentage increments, we have estimated the actual expected bulk tariff for each year of the thirty-year period, in Table A.1. The difference between the two projected tariffs in each year, multiplied by the amount of electricity used by non-smelter consumers, gives the change in NZED revenues attributable to bulk tariff adjustments; this is the series which is used as Column (2) of Table 2 in the main text.

Since NZED has refused to release a series showing their projected total electricity generation for either the +0 or the +5000 case beyond the year 1994-95, we have resorted to educated guesswork. Taking an estimated series for the +0 option on the basis of the 1980 Report of the Electricity Sector Forecasting Committee, P. 31, we have extended it by adding on 350 GWh annually for the five years 1995/96 - 1999/2000; 300 GWh annually for 2000/01 - 2004/05; and 250 annually for 2005/06 - 2009/10. The result is Column (4) of Table A.1., which provides us with the multiplicand necessary to estimate the impact of the smelters on other consumers' power bills, assuming the bulk tariff moves as specified in the NZED report.

Table 4 of the main text is also based on these generation figures. In order to calculate the working expenses per KwH for the +0 case we took working expenses from Table I.1. Column (2) and divided them by the total electricity generation for the year, from Table A.1 Column (4). For the +5000 case we simply added 5000 GWh to the +0 case; This is admittedly crude and overstates the actual difference between the two, but it does not affect the trend in Table 4, which is the important thing.

TABLE A.1

Derivation of some Basic Data for Text Tables

Year to March of:	(1) Projected bulk tariff for +0 case, cents/KWh	(2) Projected bulk tariff for +5000 case, cents/KWh	(3) Difference between bulk tariff projections, cents/KWh	(4) Projected electricity generation for + 0 case, GWh	(5) Effect on NZED revenue of difference in bulk tariff, i.e. (3) x (4) $ million
1981	3.02	3.02	-	22,000	-
1982	3.23	3.23	-	22,300	-
1983	3.36	3.36	-	22,900	-
1984	3.43	3.46	0.03	23,700	7.1
1985	3.50	3.57	0.07	24,600	17.2
1986	3.57	3.64	0.07	25,200	17.6
1987	3.60	3.67	0.07	25,800	18.1
1988	3.64	3.71	0.07	26,300	18.4
1989	3.67	3.75	0.08	26,800	21.4
1990	3.82	3.90	0.08	27,200	21.8
1991	4.01	4.05	0.04	27,700	11.1
1992	4.21	4.21	-	28,100	-
1993	4.42	4.38	-0.04	28,600	-11.4
1994	4.64	4.60	-0.04	29,000	-11.6
1995	4.88	4.83	-0.05	29,400	-14.7
1996	5.12	5.07	-0.05	29,750	-14.9
1997	5.38	5.33	-0.05	30,100	-15.1
1998	5.65	5.59	-0.06	30,450	-18.3
1999	5.93	5.87	-0.06	30,800	-18.5
2000	6.22	6.17	-0.05	31,150	-15.6
2001	6.54	6.48	-0.06	31,450	-18.9
2002	6.86	6.80	-0.06	31,750	-19.1
2003	7.21	7.14	-0.07	32,050	-22.4
2004	7.57	7.50	-0.07	32,350	-22.6
2005	7.94	7.87	-0.07	32,650	-22.9
2006	8.34	8.27	-0.07	32,900	-23.0
2007	8.76	8.68	-0.08	33,150	-26.5
2008	9.11	9.11	-	33,400	-
2009	9.56	9.57	0.01	33,650	3.4
2010	10.04	10.05	0.01	33,900	3.4

Sources: Columns (1) and (2) obtained by taking the 1980/81 bulk tariff of 3.02, and marking it up by the annual rates shown in the NZED letter to supply authorities of January 30, 1981. (See Appendix B). Column (4) 1981-1995 is based on the +2000 projections in Report of the Electricity Sector Forecasting Committee 1980 p.31, with 2,000 GWh subtracted off. The series is extended to 2010 by adding 350 per year 1996-2000; 300 per year 2001-2005; and 250 per year 2006-2010.

Appendix B

Some Documents in the Debate

Contents:

NEWS RELEASE

FEBRUARY 2, 1981

FROM THE OFFICE OF THE MINISTER OF ENERGY

PRICING ELECTRICITY FOR ALUMINIUM PRODUCTION

"The aluminium smelters will definitely not be subsidised by the other electricity consumers," said the Minister of Energy, Mr Birch, today.

"A study by the Electricity Division shows it will receive sufficient revenue from the new special smelter loads to achieve a rate of return on its increased expenses which will be comparable with the return it has historically received on its normal expenditure.

"If the production of aluminium and the corresponding generation of extra electricity is regarded as one project, the return on the country's funds allocated to this overall project will be in the order of 10%, made up of the selling price of electricity to the new smelters and non-electricity benefits to the nation's economy, including foreign exchange earnings.

"Several individuals and groups, including the Campaign Power Poll group, have claimed that the electricity tariffs will have to be raised considerably because the price the smelters will pay for electricity is too low.

"I asked the Electricity Division to carry out a very careful study of likely future tariffs, and their investigations have confirmed that the introduction of the new aluminium smelters will have no overall effect on future bulk electricity tariffs," he said.

"For this study the Electricity Division developed two feasible long-term development power plans covering a 30-year period with similar levels of supply security. One plan included the extra smelters, while the other represented a possible future power system which could have been developed if the new smelters had not been approved.

"A full financial statement for each succeeding year was worked up for each alternative development, based on the estimated capital and operating costs and a financial policy which aimed at stable tariffs and a sound borrowing strategy.

"It was found that minor differences which occurred in the late 1980s were reversed in the early 1990s and the final outcome was that, over the whole period up to the year 2010, the average bulk tariff was the same for the two alternatives of supplying or not supplying the new smelter.

"In any case the difference at no time exceeded 2% which is less than the likely movements in bulk tariffs resulting from factors other than smelter considerations.

"For the financial analysis it was necessary to make assumptions including estimates of possible future inflation and rates of interest which the Electricity Division may have to pay on its borrowed funds. Because of the uncertainty in these, a number of studies were carried out covering several patterns of inflation and interest rates. All these confirmed that the addition of the third potline at Tiwai and the new smelter at Aramoana would have no overall effect on the electricity tariff regardless of the levels of future inflation assumed."

New Zealand Electricity
A Division of the Ministry of Energy

Rutherford House, 23 Lambton Quay, Wellington N.Z.
Telegraphic address: Waterpower Private Bag, Wellington. Telephone 723 550 Telex WATPWR WN/NZ 3592

Inquiries to:

Our Ref: 44/1/2; 10/0/2
Your Ref:

30 January 1981

The Manager
Electrical Supply Authorities
Association of NZ
P O Box 1017
WELLINGTON

Dear Mr Heir,

At our meeting on 17 December 1980 you sought clarification on several matters related to the proposed supply of electricity to the second smelter and the third potline for the existing smelter. The questions were:

a Will the selling price to the smelters, (quoted as being of the order of 1.7 cents to 1.8 cents per unit at 97% load factor for the second smelter with approximately the same price for the third potline) have any effect on the bulk tariff?

b How is this selling price related to the 2.5 cents to 3.0 cents per unit which has been quoted as the price required to provide the country with a 10 percent rate of return on the second smelter?

c What effect will this supply of additional power to the smelters have on the ability of the Electricity Division to maintain supply to supply authorities?

I will deal with these three points in turn.

EFFECT ON THE BULK TARIFF

1 Using the normal method of forecasting Electricity Division finances a series of forecasts have been made up to the year 2010 comparing the Electricity Division's total annual revenue and costs of two alternatives, i.e. not having to provide power to the third potline and the second smelter and having to provide that power. To make such forecasts comparable it

was necessary to assume a common objective and to make assumptions common to both alternatives.

2 The common objective assumed was that of achieving stability in the future bulk tariff by two means:

- assuming bulk tariff changes which do not vary widely from year to year.
- gradually reducing the total loan liability of the Electricity Division from the 31 March 1980 figure of 80% of total capital outlay down to about 50% by maintaining a reasonable contribution to capital works from revenue. (This 50% is not the same as the requirement in Section 34 of the Electricity Act which limits the estimated revenue surplus for a tariff period to 50% of the estimated charges and expenses. It is an assumed figure to help maintain stability of tariff and also enable the two alternatives to be compared on similar terms.)

3 The assumptions made were:

- generation figures for each alternative were based on the middle estimates in the 1980 Electricity Sector Forecast up to 1994/95 and projected to the year 2010.
- the capital programme and the working expenses for each alternative were based on requirements to meet the generation forecasts.
- cost estimates of new capital works and working expenses for each alternative were made in 1980 dollars for each year to 2010.
- provision was then made for annual inflation of Electricity Division costs and for changes in the interest rate.
- assumed annual increases in the bulk tariff to cover assumed inflation were made for each alternative bearing in mind the objective of making changes which did not vary widely from year to year and of reducing the total loan liability to about 50% of the total capital outlay.
- revenue from the new smelters would vary with the change in the price of aluminium and this was assumed to be at the same rate as that assumed for inflation of Electricity Division costs.

4 The results showed:

- Over the period up to the year 2010 the bulk tariff could remain quite stable in real terms under each alternative.
- Over the whole period up to the year 2010 the average bulk tariff under each alternative was the same. For a short period in the late 1980's the bulk tariff under the alternative of not having to supply power to the smelters

showed up as about 2% lower than the tariff for providing power to the smelters but this imbalance was reversed in the early 1990's and then after a period the bulk tariff for each alternative became the same.

- These minor differences in the bulk tariff patterns which showed up for a time could be further reduced or eliminated by fractional adjustments to annual bulk tariff increases. However the differences are so small as to be overshadowed by the other matters which are considered when a tariff change is made such as loan requirements, interest rates, consumer price index effect and the policy of the Government at the time.
- Summing up it can be stated that there would be no discernible difference in the bulk tariff charges whether power has to be provided to the smelters or not. In other words the selling price to the third potline and the second smelter will cover the increase in Electricity Division costs. This is made possible by the nature of the supply (in bulk at 97% load factor compared with the widespread supply at 55% load factor to the national grid) and by the availability for a period of a current surplus generating capacity at little extra cost.
- Appendix 1 attached provides information on each alternative in respect of assumed interest rates, inflation rates and bulk tariff percentage increases which would meet the assumed objective.

  Naturally with different interest and inflation rates, different bulk tariff changes would be required. Therefore it is emphasised that the changes in Appendix 1 should not be regarded as a forecast of actual bulk tariff changes but rather as a comparative exercise for the two alternatives of with and without new smelters. However test runs with different rates of interest and inflation showed the same close relationship between the two series of bulk tariff changes would be retained.

ECONOMIC ANALYSIS METHOD

5 When the proposal to sell power to smelters was being evaluated the normal cost/benefit analysis was carried out by officials of several departments and the results were submitted to the Government. These studies evaluated the proposal from a national viewpoint as distinct from that of a region, a department or a company. Current public sector rules require that a project should show a positive net present discounted value at a test discount rate of 10% per annum. In other words an annual rate of return of 10% for the nation is sought for a project.

6 As part of this smelter project study, the electricity resource cost was calculated by the Electricity Division using investment criteria consistent with that of the main project analysis. This meant that a 10% rate of return was required

for the nation on all new electricity developments to be undertaken as a result of the proposed supply to the smelters.

7 The method used was to estimate on an annual basis the operating and capital costs that would be incurred in generating electricity to meet the expected demand without the additional smelters and then to undertake a similar exercise but with the additional load of the smelters included.

The difference between the two estimates represented the cost the country would incur in supplying the new smelters with electricity while obtaining a 10% annual rate of return on the cost of supplying that electricity.

The operating and capital costs and the total Electricity Division generation requirements for the two alternatives of supplying or not supplying the smelters which were used in this economic analysis were the same as those used in the bulk tariff exercise described above.

8 The average price per unit for the third potline and the second smelter in 1980 prices up to the year 2010 at 97% load factor under the economic analysis was 2.5 cents if a 10% rate of return was required for the nation.

THE RETURN ON THE BULK TARIFF AND A COMPARISON OF THE SELLING PRICE TO THE SMELTERS AND THE COST UNDER THE ECONOMIC ANALYSIS METHOD

9 The fixing of the bulk tariff requires an entirely different method of approach from the more severe cost/benefit method used in the economic analysis approach.

The bulk tariff can be subject to widely different views on the proportions of new capital works which should be financed from revenue and from loans. It has never been set to provide a fixed rate of return such as is done in an economic analysis.

The actual rate that has been earned in the past from the bulk tariff has varied from about 5% in the 1960s to zero in the mid 1970s and then back up to about 5% for the year ended 31 March 1980. The estimated rate of return which the Electricity Division will earn in the year ending 31 March 1981 is just under 5%.

10 Assuming the Electricity Division could be expected to earn a 5% rate of return and applying this to the cost of providing power to the third potline and second smelter produces a figure of the order of 1.8 cents per unit which approximates the selling price to the smelters.

11 As stated in paragraph 8 above the nation requires 2.5 cents per unit for additional power supplied to the smelters if a 10% rate of return is to be obtained.

This return is made up as follows:

Selling price	1.7 to 1.8 cents per unit
Return to the nation from foreign exchange earnings and allowing for the export incentive normally available to export industries but not being granted to the smelters - of the order of -	0.8 cents per unit

ABILITY OF THE POWER SYSTEM TO SUPPLY THE INCREASED LOAD

The Government realised that an accelerated power development programme would be required to accommodate the introduction of the third potline at the Tiwai smelter and the second smelter. The 1980 Electricity Sector Planning Report also indicated that "should the load forecasts (for the 5000 kWh case) prove to be accurate then to meet the load in full there will be a period of about six years when significant amounts of oil could need to be burnt in 'dry' years, if they occur".

In recognition of these indications, the Government has authorised the refurbishing of Meremere Power Station and has initiated a further review of natural gas availability to power stations. These actions, together with others such as commissioning Marsden B which are also being actively studied, should reduce the likelihood of supply problems which were the cause of the concern expressed in the 1980 report.

Of course, at any point in time it is not possible to say with absolute certainty that power restrictions will or will not occur in the future. A recent reappraisal of the situation based on the 1980 load forecasts and the actions taken and approvals given to date, indicated that there is a 1 in 10 chance that a restriction in supply of no more than 3% could occur in 1986 and 1987, if the load factor of gas turbine plant fired on distillate oil is restricted to 5% and the load factor of residual oil fired plant is restricted to 15%.

Experience in the past has indicated that reductions in load of this magnitude can be achieved without difficulty or inconvenience and hardship and without recourse to rationing. If necessary the restraint on oil burning could be eased to maintain supply.

The possibility of restrictions will be considerably reduced from 1988 onward with the introduction of Clyde and Luggate power stations.

In conclusion I trust that the foregoing information will answer the questions you raised.

Yours faithfully
K D McCool
GENERAL MANAGER

per: B Kennedy

COMPARATIVE PATTERNS FOR BULK TARIFF WITH OR WITHOUT NEW SMELTERS

Year ended 31 March	(1) Assumed interest rate	(2) Assumed inflation rate	(3) Assumed Bulk tariff increase without supply to new smelters	(4) Assumed Bulk tariff increase with supply to new smelters
	%	%	%	%
1981	10	1980 costs	9	9
1982	10	15	7	7
1983	10	12.5	4	4
1984	10	10	2	3
1985	10	7.5	2	3
1986	10	5	2	2
1987	10	5	1	1
1988	9	5	1	1
1989	8	5	1	1
1990	7	5	4	4
1991	6	5	5	4
1992	5	5	5	4
1993	5	5	5	4
1994	5	5	5	5
1995	5	5	5	5
1996	5	5	5	5
1997	5	5	5	5
1998	5	5	5	5
1999	5	5	5	5
2000	5	5	5	5
2001	5	5	5	5
2002	5	5	5	5
2003	5	5	5	5
2004	5	5	5	5
2005	5	5	5	5
2006	5	5	5	5
2007	5	5	5	5
2008	5	5	4	5
2009	5	5	5	5
2010	5	5	5	5

NOTE:

The main purpose of this table is to show that the bulk tariff under both alternatives would be virtually the same and with fractional adjustments to the annual increases the minor differences could be further reduced or eliminated.

Referring to columns 3 and 4 it should be understood that with different interest and inflation rates, different bulk tariff changes would be required. Therefore it is emphasised that the changes shown should not be regarded as a forecast of actual bulk tariff changes but as a comparative exercise for the two alternatives of with and without the new smelters.

However, test runs with different rates of interest and inflation showed the same close relationship between the two series of bulk tariff changes would be retained.

Coalition for Open Government

P.O. Box 6133 Te Aro, Wellington
Telephone 847-699 / 856-106

16 February 1981

The Manager
Electrical Supply Authorities Association of New Zealand
PO Box 1017
WELLINGTON

Dear Mr Heir

AN OPEN LETTER ON THE IMPACT OF ALUMINIUM SMELTERS ON THE BULK ELECTRICITY TARIFF AND ELECTRICITY SUPPLY.

Last December, your Association asked the New Zealand Electricity Division to clarify the probable impact of the second aluminium smelter on the bulk tariff. The reply, a letter to you from their General Manager, Mr K D McCool, dated 30 January 1981, was released to the public earlier this month. Mr McCool claims that the smelter will have no significant impact on the bulk tariff and that no problems are foreseen in maintaining the supply of power to supply authorities.

We have read Mr McCool's letter with grave concern. We believe his claims to be misleading and unsubstantiated. Our main specific criticisms are set out below:

1. The NZED "study" deals not with the second smelter on its own, but with the entire package of proposed aluminium developments including the third potline at Bluff. This approach clearly inflates the level of the expected bulk tariff in the "no smelters" case, since exclusion of the Bluff expansion leaves a surplus of South Island hydro capacity unutilised, with capital charges loaded onto existing consumers. Expansion of the Bluff smelter will more than absorb the South Island surplus over the planning period. The 3,000 GWh needed for the second smelter, in contrast, must be generated by new stations. Because the Electricity Division study fails to isolate the new construction needed, the question of whether the second smelter will pay the full cost of its electricity supply is avoided.

2. The results of the NZED study strongly suggest that they have understated the true cost of incremental supply by repeating their tendency to overbuild power stations for the "no-smelter" option. The 1980 Report of the Electricity Sector Planning Committee contained details of a previous costing exercise for the second smelter's electricity, under the guise of a comparison between "+2,000 GWh" and "+5,000 GWh" scenarios. That study was strongly criticised by scientist Murray Ellis on the grounds that the capital works programme attributed to the "no-smelter" scenario

.. 2

was excessive, including as it did the early construction of redundant capacity on the Clutha River. These criticisms were presented as evidence to the Planning Tribunal hearings on water rights for the Clyde dam, and were not contested by NZED in cross-examination. If the NZED's new study also assumes such heavy capital commitments in the "no-smelter" case, the extra costs involved would naturally inflate the expected bulk tariff for that case.

Whether this has occurred cannot be judged from Mr McCool's letter, because he fails to reveal the Electricity Division's assumptions about capital programmes and working expenses for the two options.

- The discussion of NZED's financial rate of return on supplying the smelter, on page 4 of Mr McCool's letter, is obscure and confusing. Mr McCool apparently assumes that future NZED management will pay for any subsidy on the smelter's power out of a reduction in overall NZED profitability, rather than by means of a surcharge on the bulk tariff. This would, of course, require a political decision which has not been taken as yet (to our knowledge at least). It is not clear from Mr McCool's letter whether the assumption of a 5% nominal rate of return on assets is embodied in the "no-smelter" bulk tariff calculation as well as in the "with smelter" case.

- We are told that the NZED result shows that, with or without new smelters, the average bulk tariff would be "virtually the same". Surprisingly no indication is given of the sensitivity of this result to errors, changes and delays in construction and changes to other factors. To compound this unusual omission, it is probable that the "with smelters" alternative is more sensitive to errors and cost overruns than the "no smelters" case because the second smelter requires a "crash" construction programme.

- Mr McCool concludes his letter with a series of reassurances about the ability of the electricity system to supply the increased smelter load without jeopardising supply to other electricity users. He fails, however, to address himself to the concerns expressed last year by the ESA representatives on the Electricity Sector Planning Committee (Committee Report, p.42), about the NZED's ability to supply increased electricity requirements above the 1980 "central forecast". Recent Government projections suggest that GDP growth during the 1980s will more closely represent the "high" projections used in the 1980 Report of the Electricity Sector Forecasting Committee (p.30).

.. 3

If increased economic growth is expected to be reflected in electricity consumption, NZED planners will now be obliged either to alter radically their constraints on the burning of oil and availability of gas, or to plan to reduce supplies to existing users. A third alternative, of course, would be to cancel or postpone the sale of power to the second smelter.

6. In asking the NZED to predict the impact of the second smelter on the bulk tariff, your Association inadvertantly laid itself open to an evasive response. Had you asked instead to what extent cancellation of the smelter project would make possible a reduction of the capital expenditure programme, and hence a reduction in the bulk tariff, we expect that you would have received a different answer. The Minister of Energy is on record as stating that if the smelter were not built, then the price of electricity to other users could drop in real terms over the next few years.

Your difficulty in getting a straight answer on the question of electricity supply to the smelter is not confined to the ESA. Public interest groups, such as our own, have attempted, without success, to extract from NZED the data and assumptions on which their costing exercises have been based. The Planning Tribunal considering the Clyde High Dam encountered a similar reticence. The Tribunal found as a fact that the need for the dam "with its 1988 commissioning date for the first machine, is solely caused by the requirement to supply power for the new smelter." The Tribunal commented, however, that "the Government has apparently made a decision to approve, in principle, a new aluminium smelter. We say apparently because the Crown, in presenting its case, gave the Tribunal no evidence in chief concerning the smelter and all information before us was elicited by way of cross-examination."

We hope that your Association will not be satisfied with unsubstantiated claims based on an unpublished study. Proper assessment of the Government case will be possible only when the study, and its associated documentation, are made available for public scrutiny. The claim by the Minister of Energy that this was "a very careful study" would seem to indicate that he should have nothing to lose by publishing it. Until he does so, we hope that your members will remain sceptical.

Yours faithfully

Dr I G Bertram

K N Johnston

Authors of ELECTRICITY IN NEW ZEALAND: IS THERE A SURPLUS TO SELL?

Copies to: Electricity Supply Authorities Association Members, the Minister of Energy, General Manager Electricity Division, Ministry of Energy and Campaign Power Poll.

OFFICE OF THE
Minister of Energy
WELLINGTON, NEW ZEALAND

13 February 1981

Mr M Smith
Director
The Inner City Ministry
P O Box 6133
Te Aro
WELLINGTON

Dear Mr Smith

Thank you for your letter of 5 February requesting a copy of a departmental report concerning consumer subsidies for power station construction with respect to the second aluminium smelter.

These studies were undertaken to clarify long term tariff trends and were summarised in a letter to the Electrical Supply Authorities Association. A copy of this letter is enclosed together with a copy of my subsequent press statement. I have also invited the Electrical Supply Authorities Association to have detailed discussions with the Electricity Division on the basis of these studies.

You may care to have discussions with either the Electrical Supply Authorities Association or my Electricity Division officials about these forecasts.

Yours sincerely

W F Birch
Minister of Energy

Appendix C

TABLE C.1

Finance Required, Borrowing by NZED, and Payments by Smelters

Deflated to $ million at 1980/81 Prices

Year to March of:	(1) Finance required, +5,000 Case	(2) Finance required, +0 Case	(3) Extra cost of supplying smelters	(4) Planned borrowing, +5,000 Case	(5) Planned borrowing, +0 Case	(6) Extra borrowing in +5,000 Case
1981	703	703	0	168	168	0
1982	766	674	92	252	160	92
1983	725	625	100	225	124	100
1984	703	602	101	184	106	78
1985	726	636	90	175	147	27
1986	758	637	121	197	148	49
1987	867	669	198	285	183	101
1988	902	679	223	324	199	124
1989	893	620	274	325	147	178
1990	816	520	296	259	59	200
1991	782	480	302	225	18	207
1992	762	476	286	202	7	195
1993	688	523	165	126	47	78
1994	768	654	115	204	171	32
1995	789	740	49	219	251	-32
1996	743	640	102	163	141	22
1997	715	622	92	125	113	12
1998	679	644	35	79	125	-45
1999	660	664	-4	50	136	-85
2000	703	727	-23	85	188	-103
2001	752	745	7	124	197	-73
2002	763	755	9	125	198	-72
2003	798	741	57	151	175	-24
2004	762	691	71	107	116	-9
2005	704	704	0	41	120	-80
2006	785	696	90	114	104	10
2007	788	695	93	108	95	13
2008	792	697	96	105	93	11
2009	796	693	103	100	83	17
2010	801	701	100	98	84	15
TOTALS:						
1981-95	11,648	9,238	2,412	3,370	1,935	1,429
1996-2010	11,241	10,415	828	1,575	1,968	- 391
1981-2010	22,889	19,653	3,240	4,945	3,903	1,038

Sources: Data from Table 1 and Table 2, deflated using the index in Table 3.

Minor discrepancies in addition are due to rounding of decimals.

continued.....

TABLE C 1 CONTINUED

Year to March of:	(7) Expected revenues from smelters
1981	0
1982	0
1983	0
1984	19
1985	52
1986	62
1987	86
1988	89
1989	84
1990	85
1991	90
1992	92
1993	91
1994	87
1995	87
1996	86
1997	86
1998	87
1999	87
2000	85
2001	86
2002	86
2003	86
2004	86
2005	86
2006	85
2007	86
2008	84
2009	85
2010	85
TOTALS:	
1981-95	924
1996-2010	1,286
1981-2010	2,210

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