

Aniwhenua and Matahina Generation Embedment Project (AMEP)

Feasibility Study for continuation of
Generation Embedment

Prepared for Horizon Energy,
Nova Energy and TrustPower

WP1115

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146 Tainui Street
Greymouth, New Zealand
Ph +64 3 768 9300
Fax +64 3 768 2766

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1 Introduction

The objective of this report is to:

"Confirm the feasibility of the continued bypassing of grid assets to embed Aniwhenua and Matahina Generating Stations at Edgecumbe GXP, considering the legal, commercial, environmental, operational and technical aspects of the proposed project as required under Part 12 of the Electricity Industry Participation Code."

This report draws on details from the existing embedded arrangements and associated studies, as well as further detailed investigation of subsequent refinements, to come up with an alternative bypass option that is technically, operationally and commercially viable.

2 Background

The Aniwhenua station is located on the Rangitaiki River and is owned and operated by Nova Energy Limited (formally Bay of Plenty Energy Limited). Based in the heart of the Bay of Plenty, the plant provides a significant amount of the region's electricity needs.

Water flows from the head pond through two 3.4m diameter steel penstocks, at a rate of 75 cubic metres per second, to the powerhouse 38 metres below. The flow drives two 12.5 MW generators before being discharged back to the river just below the Aniwhenua Falls.

The local Galatea demand is normally supplied (at 33kV) from the Aniwhenua power station to reduce distribution network losses. Excess generation is exported to the Transpower grid connection point at Matahina, via an 110kV connection line owned by Nova Energy.

The Matahina Power Station, also situated on the Rangitaiki River in the Bay of Plenty, was commissioned by NZED in 1967.

With a 76-metre gross head of water behind its 86-metre high dam (the largest earth dam in the North Island), Matahina Power Station has two generators producing 80 MW, to give an average annual output of 290 GWh.

The Matahina Power Station has a grid connection at Transpower's 110kV Matahina Substation, which resides on TrustPower land adjacent to the power station.

An existing agreement is already in place for embedding generation Aniwhenua and Matahina stations, for which the principles for embedment have been previously established and demonstrated. Analysis contained in this paper reconfirms the financial viability of the project.

The existing Notional Embedding Contract is due to expire at the end of its 15 year term on 31st March 2014. The Proponents seek a new Prudent Discount Agreement for a further 15 year period based on the fact that:

- the project is technical feasible;
- the project is operationally feasible and compliant with AOPO's stated in the code; and
- the economics of the project provide commercial benefit to the proponents over the current pricing methodology employed by Transpower for a similar level of service.

The Proponents are required to submit a new grid bypass project proposal for consideration in accordance with the Prudent Discount Policy prescribed under the Electricity Industry Participation Code. This report re-examines the embedding proposition as it stands today and reaffirms that the underlying benefits supporting the physical bypass of grid assets have not changed since the construction and notional embedding of the Aniwhenua Power Station in the 1970's.

3 Project Description

The Aniwhenua and Matahina Embedment Project (AMEP) would involve physically embedding both stations generation in the Horizon Energy network at Transpower's Edgecumbe substation.

Currently, the generation from both plants is fed into the 110kV bus at Transpower's Matahina substation. From Matahina two 110kV transmission lines transport generation to Kawerau and Edgecumbe. Horizon's main supply point is from the substation at Edgecumbe. There is also an existing 33kV feeder – the "Snake Hill" line, running from Edgecumbe back to Aniwhenua skirting Matahina.

The AMEP proposal is to upgrade the 33kV Snake Hill line to 110kV and connect it to the Edgecumbe 110kV bus to transport generation from Matahina and Aniwhenua. A new 110kV substation would be built at Matahina to connect the new 110kV line.

The existing generation 110kV connections at Transpower's Matahina Substation would then be relinquished.

Specifically, the following changes are considered for the Project:

- Upgrade Horizon's existing Matahina to Edgecumbe 33kV Snake Hill circuit to 110kV, using Nobelium AAAC/1120 conductor with a thermal rating of 120 MVA;
- Construct a new 110kV substation at Matahina to connect Aniwhenua and Matahina generation to the newly upgraded Horizon line;
- Establish a new 110kV connection at the Edgecumbe Substation 'connection location'; and
- Relinquish the Matahina grid connections.

This Project will need to be carried out in close cooperation with Horizon Energy, as much of the line work will involve changes to their assets. The line would likely be designed, constructed, operated and owned by Horizon or their agents. Drawings in Appendix A show the current and proposed configurations.

An alternative option to construction of a new substation would be, once agreement had been reached with Transpower regarding the embedment, for the proponents to purchase the existing Transpower assets at an appropriate depreciated value.

Both options have been costed and are detailed further throughout this report. However this report is based on construction of the new substation which is the higher cost option. If the project can be demonstrated viable with these higher costs then additional benefits would be available should an asset transfer take place.

4 Costs

The total expenditure for the project is estimated at \$7.8M for Option A. This would see a new switchyard built at Matahina alongside the existing Transpower switchyard. A new connection established at Edgumbe Substation utilising the existing overhead structure incorporating a new circuit breaker and associated equipment. The existing 33kV Snake Hill transmission line between Matahina and Edgumbe would be upgraded to 110kV.

A second option, Option B, would see the existing switchyard at Matahina purchased by the proponents, but include previously identified work at Edgumbe and line enhancement. This option is estimated at \$6M but could only be considered once the principle of embedment was established thereby leaving the existing substation stranded.

The total project costs are compared in Table 1.

Capital Costs (\$)		
Item	Option A	Option B
Substation Equipment/Work	\$3,535,000	\$1,952,000
110kV Line	\$3,811,789	\$3,811,789
Associated Works	\$151,000	\$58,000
Survey Fees	\$85,000	\$85,00
Scrap Recovery	\$(16,000)	\$(16,000)
Resource Consent	\$10,000	\$10,000
Easement & Investigation(s)	\$260,000	\$260,000
Total Capital Cost	\$7,836,789	\$6,075,789

4.1 Substation Equipment/Work

4.1.1 Matahina Substation Option A - \$2,227,000

A cost breakdown for Option A at Matahina is given below.

The proposal at Matahina is for TrustPower to construct a new 110kV substation on ground adjacent to the generation plant on land owned by TrustPower. This would involve relocating the existing two 40MVA transformers and circuit breakers, making provision for the incoming line from Nova's Aniwhenua generation and connecting to a new 110kV line to Edgumbe.

The costs provided in the table below include design and installation costs, are based on recent quotations from equipment suppliers and are rounded to the nearest thousand dollars.

	Qty	Cost (\$k)	Total (\$k)
110 kV Equipment Matahina Option A			\$2,227
Circuit Breakers	1	\$132	\$132
Disconnectors	2	\$39	\$77
VT's-3 phase single winding	1	\$70	\$70
CT's	1	\$81	\$81
Bus Extension	1	\$195	\$195
Foundation for 110 kV CBs including Stands	1	\$32	\$32
Foundation for 110 kV DIS including Stands	2	\$17	\$34
Foundation for 3 phase set CTs	1	\$10	\$10
Foundation for 3 phase set VTs	1	\$10	\$10
Protection Relays	1	\$167	\$167
Civil Works	1	\$1,419	\$1,419

4.1.2 Matahina Substation Option B - \$644,000

The project would result in Transpower's Matahina Substation assets becoming redundant as TrustPower and Nova are the only connected customers. Once this occurs, Transpower's right to occupy ceases and on this basis there would likely be an option for the proponents to purchase the Matahina Substation assets from Transpower at an appropriate depreciated value. For example, the figures below represent some 60% of replacement costs.

	Qty	Cost (\$k)	Total (\$k)
110 kV Equipment Matahina Option B			\$644
Circuit Breakers	2	\$79	\$158
Disconnectors	4	\$23	\$92
VT's-3 phase single winding	1	\$42	\$42
CT's	1	\$48	\$48
Bus Extension	1	\$116	\$116
Foundation for 110 kV CBs including Stands	2	\$19	\$38
Foundation for 110 kV DIS including Stands	4	\$10	\$40
Foundation for 3 phase set CTs	1	\$6	\$6
Foundation for 3 phase set VTs	1	\$6	\$6
Protection Relays	1	\$99	\$99

4.1.3 Edgumbe Substation - \$1,308,000

Either option A or B would require a 110kV single circuit connection at the Edgumbe GXP with the associated circuit breaker installed as per the current connections at Edgumbe. There is a connection point available to the Northern end of the structure.

	Qty	Cost (\$k)	Total (\$k)
110 kV Equipment Edgumbe			\$1,308
Circuit Breakers	1	\$132	\$132
Disconnectors	2	\$39	\$77
VT's-3 phase single winding	1	\$70	\$70
CT's	1	\$81	\$81
Bus Extension	1	\$195	\$195
Foundation for 110 kV CBs including Stands	1	\$32	\$32
Foundation for 110 kV DIS including Stands	2	\$17	\$34
Foundation for 3 phase set CTs	1	\$10	\$10
Foundation for 3 phase set VTs	1	\$10	\$10
Protection Relays	1	\$167	\$167
Civil Works	1	\$500	\$500

4.1.4 Associated Works - \$151,000

Associated works include SCADA, control and secondary equipment as detailed below. Option B only requires SCADA changes, as infrastructure remains substantially unchanged.

	Qty	Cost (\$k)	Total (\$k)
SCADA			\$58
Database/configuration changes to SCADA	1	\$58	\$58
Secondary Equipment			\$93
Multicore Control Cables from ODJB to relay room	4	\$20	\$82
Comms	1	\$11	\$11

4.2 New 110kV Line

The new Matahina substation will be connected to the Edgcumbe substation via a new 110kV line. The Project would require upgrading 15 kilometres of the Horizon Energy's Matahina to Edgcumbe 33kV Snake Hill circuit to 110kV. The upgrade would see a Nobelium AAAC/1120, 307mm² conductor with a continuous current rating between 373A to 961A. A detailed cost breakdown of the overhead line work is provided below.

4.2.1 Overhead 110kV Line Works - \$3,811,789

110kV Overhead Transmission Line	Estimate	Qty/km	Quantity	Prize NZ
Conductor Nobelium AAAC/1120	\$10.25	3000	15.00	\$461,250
Insulator Post NZI ALP33/920 with 20m stud	\$205.00	36	15.00	\$110,700
Insulator Terminating "Verilite SML 70kN 110kV composite	\$203.50	6	15.00	\$18,315
Poles Stresscrete 17M	\$1,908.55	10	15.00	\$286,283
Poles Hardwood 21M	\$5,453.00	2	15.00	\$163,590
Crossarms 2.7M Spotted Gum 100x100 treated	\$220.00	12	15.00	\$39,600
Site Works	\$512.50	12	15.00	\$92,250
Utilites	\$1.65	6000	1.00	\$9,900
Helicopter	\$1,537.50	80	1.00	\$123,000
Hiab Trucks	\$2.75	6000	1.00	\$16,500
Excavator 20T	\$275.00	40	1.00	\$11,000
Excavator 3T	\$165.00	40	1.00	\$6,600
Project Manager	\$179.38	320	1.00	\$57,402
Process Engineer	\$170.50	120	1.00	\$20,460
Mechanical Engineer	\$170.50	120	1.00	\$20,460
Electrical Engineer	\$170.50	120	1.00	\$20,460
Supervisor	\$110.00	200	1.00	\$22,000
Line Mechanic Wire Run	\$76.88	8000	1.00	\$615,040
Line Mechanic Poles	\$76.88	16000	1.00	\$1,230,080
Labour - Removal	\$60.00	1815	1.00	\$108,900
Labour - Erection	\$60.00	1815	1.00	\$108,900
Sub Total				\$3,542,689
Performance Bond	\$6,000.00	1	1.00	\$6,000
Insurance	\$2,400.00	1	1.00	\$2,400
Freight	\$6,000.00	1	1.00	\$6,000
Contract Design and Management	\$15,000.00	1	15.00	\$225,000
Allowance for inclement weather 10%	\$1,980.00	1	15.00	\$29,700
Total Overhead Works				\$3,811,789

The line costs equate to a rate per km of \$254,119. By including survey and easement costs the rate is comparable to other recently completed 110kV lines of similar construction. Transpower has previously been supplied with detailed cost breakdowns supporting this estimate.

4.3 Survey Fees

Provision of \$85k has been made for survey work for the overhead line. This provides 11 weeks, full time equivalent, (including LIDAR Survey and the like) for a surveyor and associated professional fees, which is considered adequate.

4.4 Cost Recoveries

Old conductor made redundant as part of the upgrade will be recoverable. The conductor, which is ACSR "DOG" - a steel core wrapped aluminium construction consisting of a 7/1.57 steel core and 6/4.72 aluminium outer. Based on an existing route length of 14.5 km, a total conductor length of some 43.5km is involved. Typical construction would consist of 288kg/km of Aluminium and 106kg/km of steel to deliver savings of around \$16k.

Prices based on recent MetalCorp NZ scrap prices 7th May 2013.

4.5 Resource Consents

No new Resource Consents are necessary in the proposed upgrade of the line and professional opinion has confirmed this – see Section 9 and Appendix H for further detail. However, council and adjacent neighbours will require to be notified of works, in addition traffic management plans will be necessary.

An allowance of \$10,000 has been made for this which is considered adequate.

4.6 Easement Costs

The total line length is ~15.0km of which 14.0km is the existing 33kV route while the remaining 1km would be 'new' land. The first 10.5km runs in either Road Reserve or across agricultural land used for mainly arable farming. The remaining 5km runs through forestry land. At this level of design, new easements for only 1km between Matahina Substation and the existing Snake Hill line would be necessary. In practise there may be cause to deviate the line from its current position, requiring new or adjusted easements and any injurious affects.

A general allowance of \$35,000 has been made for easement investigation. All the land on the plains is subject to the Public Works Act 1981 and as such provision of money for compensation purposes may be required. An allowance of \$8/m for existing and \$86/m for new easements has been made, totalling \$198k. For the purchase of a new strip of land into the station provision of \$26k has been made. More detail is provided in Appendix B.

In total \$260,000 has been made available for easement costs. The proponents consider this a generous allowance and sufficient to cover any unforeseen effects.

4.7 Operations and Maintenance Costs

The existing 33kV line is around 50 years olds and is of wooden pole/cross arm type construction. The proposal would see a complete new line installed. It is envisaged that there would be no increase over and above the current O&M costs. Indeed there may even be a reduction in costs.

During the course of the installation opportunity would be taken to manage any vegetation growth to ensure a fifteen year maintenance free period.

4.8 Business Interruption Costs

There is minimal business interruption cost for the generating companies as the existing transmission lines will remain available during construction phase. Several short duration unit outages will be required while generator transformers are relocated to the new Matahina Substation. These will be scheduled for summer/early autumn, during low inflow/generation periods. During these periods it is typical that only one unit is running at Matahina and even then this would likely be on part load. Financial impact is considered negligible.

While the upgrade work is in progress on the Snake Hill Line, Horizon's network in Galatea area will be reduced from n-1 to n security. However given proposed improvements in the distribution infrastructure, and the options of connecting into the 110kV network, the short term risk is outweighed with the longer term gains in network security.

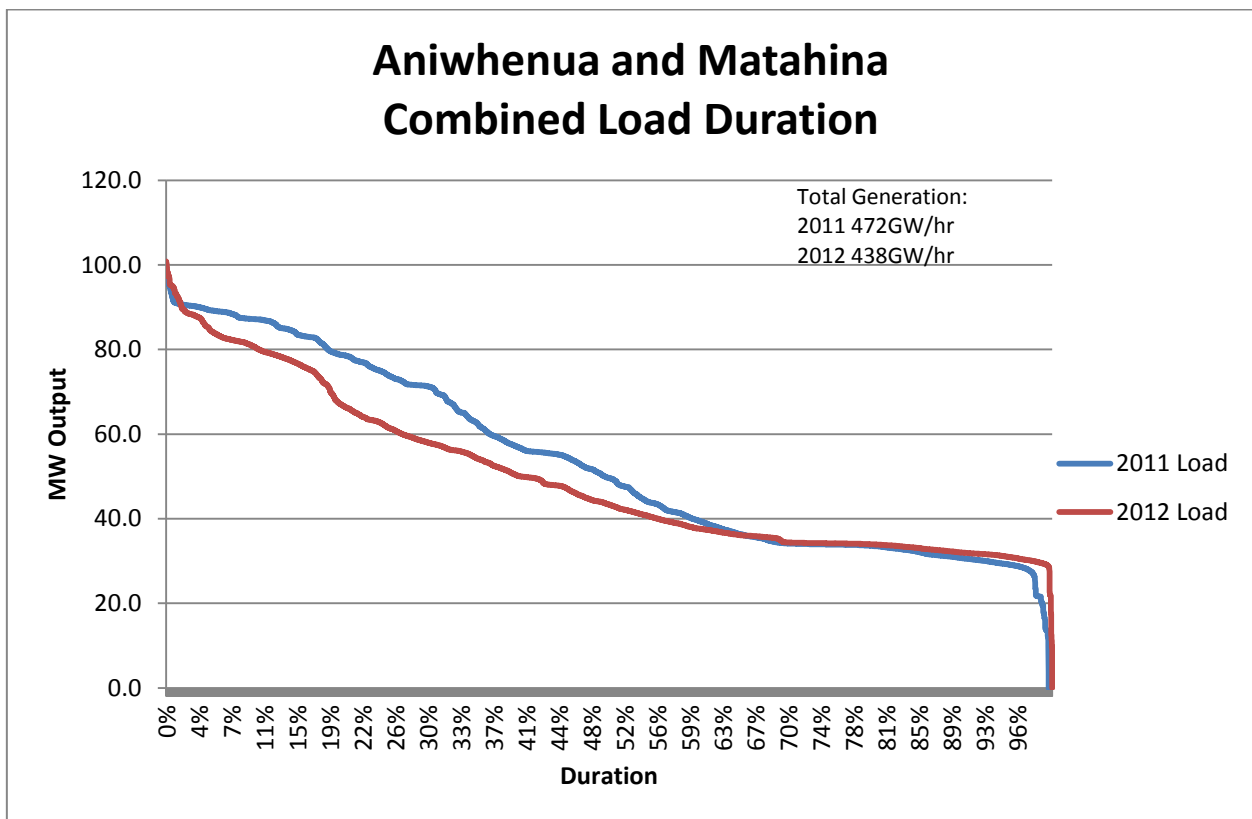
The cost estimates for the substation work and line construction are based on recently completed projects by a contracting firm. This same firm has been used by Transpower on a number of occasions previously for construction and maintenance of transmission assets. The proponents have received assurance that the estimates provided are true and fair, and the firm providing them is prepared to enter into negotiations to build the execute the project based on prices submitted.

5 Transmission Losses

The transmission losses for the proposed configuration have been calculated at 7,957GWh and, assuming \$80MWh, are valued at \$636.6k. This represents an additional 3,594GWh, \$287.5k, compared with current losses.

5.1 Loss Calculation Methodology

Generation data from 2011 and 2012 was used to produce a load duration curves for energy injected into the 110kV network, as shown below. (Figures for 2011 were used in calculation representing higher generation year.)



Load flow analysis was used to determine actual loss in transmission lines in incremental steps of generation. This was completed for existing and proposed configurations. The tables are shown in Appendix C.

In order to manage the loss calculation in ETAP model, actual loss figures were grouped into larger bands. This gave, for an injected quantity of energy, a loss in terms of megawatts. These results produced the load duration curves shown below. Some averaging was necessary but this is considered fair and reasonable. An extract from the table is shown below.

Costing the losses requires the MW to be converted to MWh. This is achieved by allocating actual generation to a band according to look up tables. Once all half hours of generation are allocated to a loss band, an overall loss figure can be established.

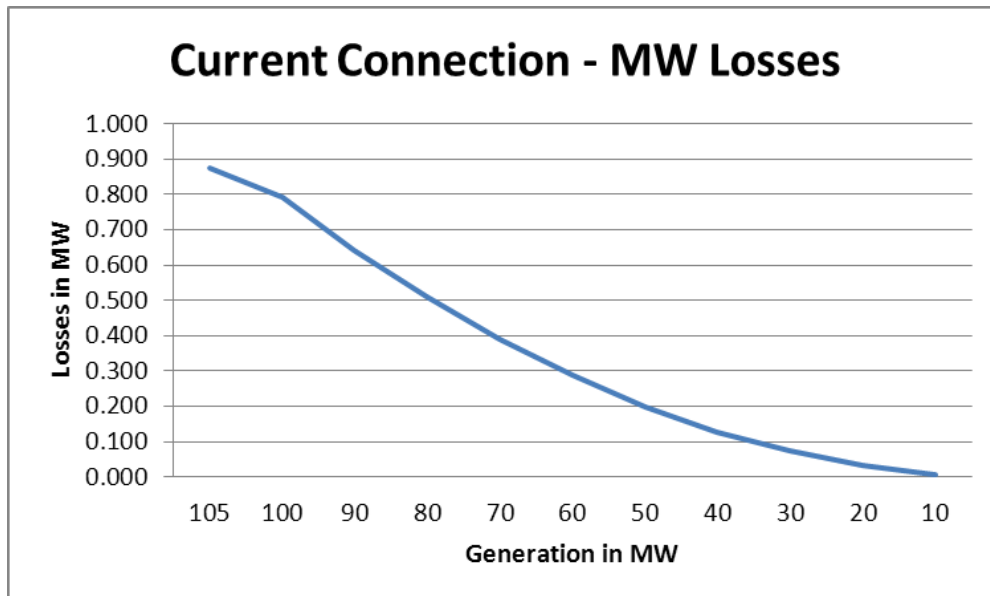
Examples of load duration curves and loss calculations are shown below for both the current and proposed system configurations.

Date	Halfhour	Generation Output						Losses in MW per Half Hour									
		MAT G1 export	MAT G1 import	MAT G2 export	MAT G2 import	Aniwhen ua export	Total	<10	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	
27/01/2011	16	35092	0	29412	0	21102	85606	0	0	0	0	0	0	0	0	0.996	
27/01/2011	17	27741	2	26240	0	20976	74957	0	0	0	0	0	0	0	0.765	0	
27/01/2011	18	35809	0	26059	0	20888	82757	0	0	0	0	0	0	0	0	0.961	
27/01/2011	19	35768	0	27467	0	20992	84227	0	0	0	0	0	0	0	0	0.979	
27/01/2011	20	35755	0	22623	0	21054	79432	0	0	0	0	0	0	0	0.814	0	
27/01/2011	21	35620	0	4122	0.25	21022	60763	0	0	0	0	0	0	0.530	0	0	
27/01/2011	22	35519	0	0	0.00	21134	56653	0	0	0	0	0	0.417	0	0	0	
27/01/2011	23	35471	0	0	0.00	20928	56399	0	0	0	0	0	0.415	0	0	0	
27/01/2011	24	35368	0	0	0.00	21254	56622	0	0	0	0	0	0.417	0	0	0	
27/01/2011	25	35211	0	0	0.00	21428	56639	0	0	0	0	0	0.417	0	0	0	
27/01/2011	26	34849	0	0	0.00	21452	56301	0	0	0	0	0	0.414	0	0	0	
27/01/2011	27	34599	0	26919	0.20	21588	83106	0	0	0	0	0	0	0	0	0.965	
27/01/2011	28	34405	0	29345	0.00	22350	86100	0	0	0	0	0	0	0	0	1.002	
27/01/2011	29	34207	0	27498	0.00	22048	83752	0	0	0	0	0	0	0	0	0.973	
27/01/2011	30	27314	0	3207	0.12	19218	49739	0	0	0	0	0.297	0	0	0	0	
27/01/2011	31	21533	0	0	0.00	17574	39107	0	0	0	0.18	0	0	0	0	0	
27/01/2011	32	1827	0	0	0.00	17518	19345	0	0.036	0	0	0	0	0	0	0	
27/01/2011	33	0	0	2563	0.80	17534	20097	0	0	0.059	0	0	0	0	0	0	
27/01/2011	34	0	0	31256	0	17614	48870	0	0	0	0	0.291	0	0	0	0	
27/01/2011	35	23455	1	34320	0	17700	75475	0	0	0	0	0	0	0	0.771	0	
27/01/2011	36	29696	0	34730	0	17692	82117	0	0	0	0	0	0	0	0	0.953	

5.2 Losses on the Current System

The losses on the current system were calculated in a series of loadflow studies. ETAP software was used to accomplish this based on 2011 data supplied by TrustPower and Nova Energy.

The resultant graph is shown below:



The table shows the steps (bands) for which calculations were carried out and the average loss for each step

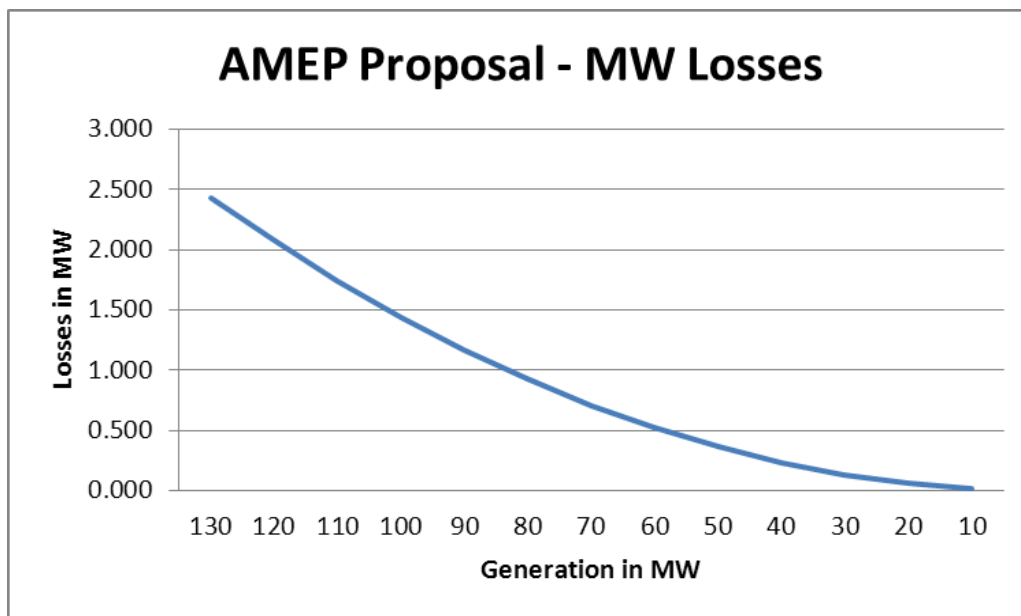
Step	Injection MW	Ave MW Loss in band	Duration in band hours	Generation in MW	Losses in MWh
1	130	0	0		
2	120	0	0		
3	105	0.874	0	100-109	0
4	100	0.793	332	90-99	433
5	90	0.643	1273	80-89	1401
6	80	0.509	1071	70-79	897
7	70	0.390	535	60-69	335
8	60	0.287	1139	50-59	506
9	50	0.199	870	40-49	252
10	40	0.128	2908	30-39	484
11	30	0.072	557	20-29	53.5
12	20	0.032	63	10-19	1.85
13	10	0.008	2	0-10	0.01
			(8760hrs)	Total	4363

The proponents value losses at \$80/MWh producing a loss value of \$349,040.

5.3 Losses on Proposed System

In order to assess the additional marginal losses that would be incurred as a direct result of AMEP, a series of loadflow studies were carried out. ETAP software was used to accomplish this based on 2011 data supplied by TrustPower and Nova Energy.

The resultant graph is shown below:



The table shows the steps (bands) for which calculations were carried out and the average loss for each step

Step	Injection MW	Ave MW Loss in band	Duration in band hours	Generation in MW	Losses in MWh
1	130	2.437			
2	120	2.077			
3	110	1.746	0	100-109	0
4	100	1.444	331	90-99	789
5	90	1.171	1273	80-89	2552
6	80	0.927	1070	70-79	1636
7	70	0.711	536	60-69	611
8	60	0.523	1139	50-59	924
9	50	0.364	870	40-49	458
10	40	0.233	2908	30-39	885
11	30	0.132	556	20-29	99
12	20	0.059	64	10-19	0.34
13	10	0.015	13	0-10	0.2
			(8760hrs)	Total	7955

The proponents value losses at \$80/MWh producing a loss value of \$636,363

5.4 Summary of Losses

Currently, losses accredited to the proponents are minimal due to the direct connection at Matahina GIP. In reality there is no off take at Matahina so all the electricity is transmitted to either Kawerau or Edgumbe where there is load demand. The losses to these GXP's combined are calculated to be 4,363GWh and valued at \$349k.

The project would see an overall increase in losses which is to be expected as all the electricity generated at Matahina and Aniwhenua would be transmitted along a single 110kV circuit rather than the two circuits at present. Given that the spot price at Matahina is generally depressed below that at Kawerau and Edgumbe, it is not unreasonable to suggest the proponents are paying for transmission losses between Matahina and these other GXP's. (The difference in prices achieved at MAT 1109kV and KAW 110kV for 2011 and 2012 are \$207k and \$187k respectively)

It would therefore be reasonable to assume that existing line losses are 4,36GWh and will increase to 7,96GWh, an increase of \$287.5k in dollars terms. While this is a significant increase in losses, it is more than offset by savings in fees payable to Transpower. The proponents believe this to be a reasonable trade-off delivering benefits to consumers.

6 Revenue

The revenue for the project is derived from the avoided transmission charges, less the transmission losses brought about by the project and adjustment of connection charges. These charges are summarised in the table below.

Charge	Value (\$'000)
Connection Charges (Section 6.1)	\$432
EDG Avoided Interconnection (Section 6.2)	\$4,198
Total Savings	\$4,630
Less Increased Losses (Section 5.4)	-\$287
Net Annual Benefit	\$4,343

6.1 Connection Charges

A summary table of current Connection Charges payable by the proponents is shown in Appendix D.

6.1.1 Matahina Substation

As from 1st April 2014, Transpower will require connection charge of \$577,120 at Matahina Substation. These charges will be payable if the project is not commissioned by 31st March 2014.

6.1.2 Edgecumbe Substation

Connection charges at Edgecumbe of \$846,694 will become payable once the project is commissioned, compared to connection charges of \$710,064 if the project did not proceed

6.1.3 Kawerau Substation

Connection charges at Kawerau of \$358,639 will become payable once the project is commissioned, compared to connection charges of \$349,682 if the project did not proceed

Assuming the project proceeds, the Proponents would forego the Matahina charges and pay only the Edgecumbe and Kawerau connection charges. Thus an incremental saving in the Connection Charge of \$433,532 would be realised by the Proponents as summarised in the table below.

Connection Asset	Charge
Matahina	-\$577,120
Edgecumbe	\$136,630
Kawerau	\$8,957
Total Savings	-\$431,533

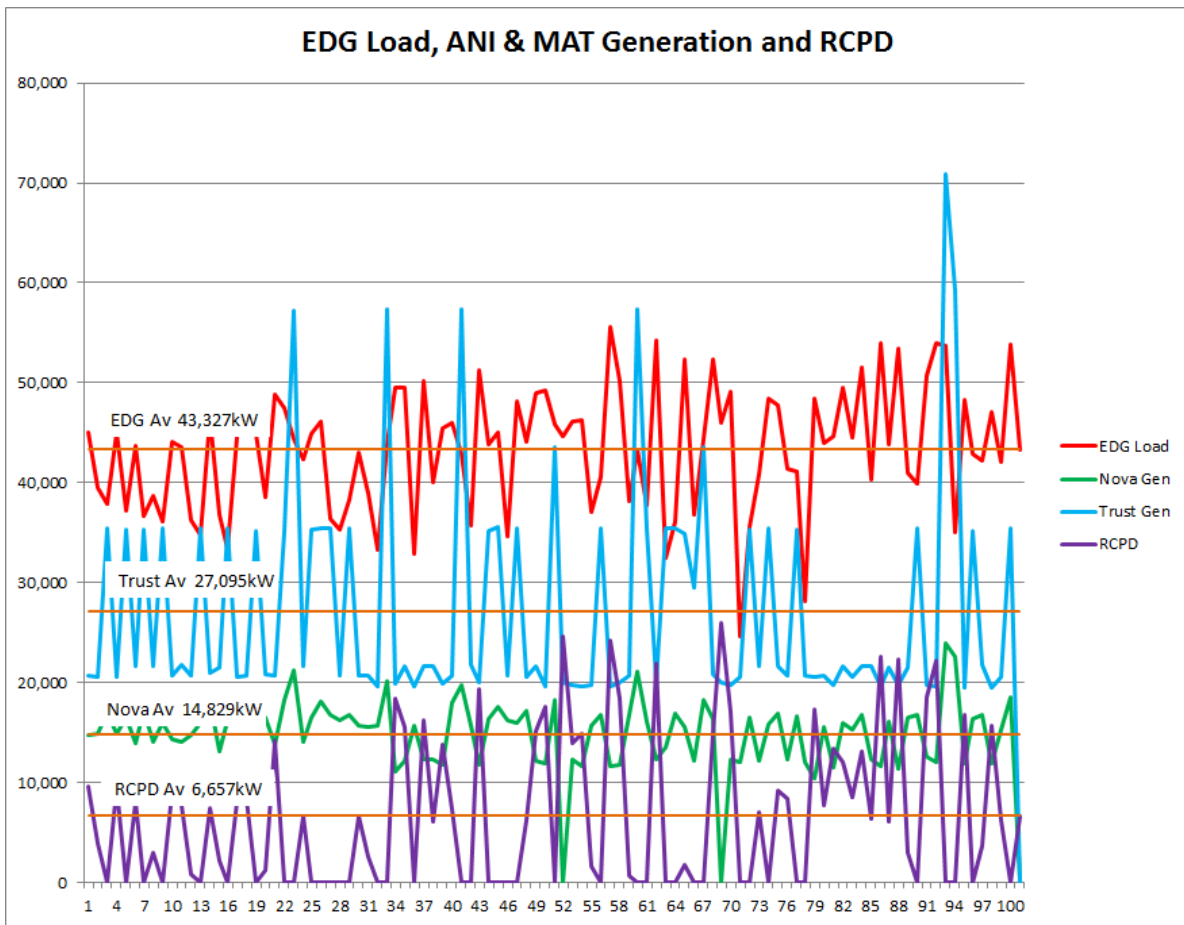
6.2 Edgecumbe Avoided Interconnection Charges

The Project will provide a significant benefit by the reduction of Horizon Energy's Interconnection Charges at Edgecumbe through the netting of generation and demand.

The combined Matahina and Aniwhenua generation schemes are capable of producing 105 MW and this combined maximum peak output has been achieved in recent times.

The 2012/13 Capacity Measurement Period determines the rate for April 2014 pricing year. If the project had been in place over this period Horizon Energy would have registered an RCPD value of 6,657kW. If the project had not been in place over the same period then horizon would have registered an RCPD value of 43,327kW

The graph below shows Edgecumbe load, Aniwhenua and Matahina generation and the coincident RCPD.



Therefore with a 2014 interconnection charge is \$114.47 per kilowatt and a difference of 36,670kW, the implied saving for the Proponents is of \$4,197,614 per annum.

It should be noted however that the implied saving is extremely conservative for several reasons:

- The summer/autumn/winter periods of 2013 were the driest on record for Matahina Hydro Scheme and being registered as a 1 in 50 year dry. Only during the winter period did inflows approach the average. This negatively impacted generation capacity at both stations during the RCPD periods.
- The proponents did not actively target the RCPD peaks, from data presented in the graph above the average generation from the stations was 41,725kW. Had all RCPD peaks been targeted then Horizon's RCPD would have been reduced by 5,055kW, providing the proponents an additional \$578,645.
- As a result of grid restraints at Kawerau, a bus split was imposed at Matahina and meant that when either unit was shutdown or operating in Tail Water Depressed mode, the station end up drawing energy from the grid. While this effect was minor in comparison to the first two, the effect still negatively impacted generation.

Given average hydrology the normal output of Aniwhenua and Matahina would be expected to balance all the load at Edgecumbe.

6.3 Increased Losses

Additional transmission losses for the project are estimated at \$287.5k as detailed in Section 5.4.

7 Economic Feasibility

7.1 Assumptions

A number of assumptions are required to provide the seed input data for the financial modelling process and these are detailed below.

- Project Life 50 years
- Project Cost (Section 4.1) \$7.8 million (\$6.0M Option B)
- Base Revenue (Section 6) \$4.6 million
- Discount Rate 7.0%
- Annual Cost Adjustment 2% per annum
- Annual Revenue Adjustment 2% per annum
- Projected Asset Life cycle
 - Lines 45 years
 - Switchgear 40 years
 - SCADA, Comms 25 years
- Perpetuity Flat
- O&M Cost Variance No additional O&M costs projected.
- Taxation Rate 28%

7.2 Economic Assessment Results

A summary of the economic assessment for Option A and B is presented below and provides a sound basis for the Proponents to proceed with the project. A full analysis of cashflow for both options is available in Appendix E.

Option A

ECONOMIC AND FINANCIAL ASSESSMENT:

UNDISCOUNTED PAYBACK	2.42 YEARS		
DISCOUNTED PAYBACK PERIOD	2.65 YEARS	ACCOUNTING RATE OF RETURN	86.6%
NET PRESENT VALUE (\$000)	32,886	BENEFITS COST RATIO (BCR)	5.06
INTERNAL RATE OF RETURN	51.7%	EQUIVALENT ANNUAL VALUE (\$000)	0

Option B

ECONOMIC AND FINANCIAL ASSESSMENT:

UNDISCOUNTED PAYBACK	1.94 YEARS		
DISCOUNTED PAYBACK PERIOD	2.08 YEARS	ACCOUNTING RATE OF RETURN	110.6%
NET PRESENT VALUE (\$000)	34,363	BENEFITS COST RATIO (BCR)	6.40
INTERNAL RATE OF RETURN	51.7%	EQUIVALENT ANNUAL VALUE (\$000)	0

8 Technical Feasibility

There are no significant technical issues associated with project implementation. The technical considerations are summarised below. Proposed system diagrams have been produced to enable appropriate cost estimates to be prepared.

8.1 Matahina Substation

The project proposes a new 110kV Substation will be built at Matahina. There is sufficient land available to construct the substation while the existing substation remains in service with minimal operational impact. Only when generator transformers are relocated will there be operational restrictions/generator unavailability. This will be scheduled for times of low generation minimising lost generation opportunity, most likely over the summer period.

Once the new substation is constructed the existing Transpower substation would be disestablished and site cleared.

No technical issues are foreseen with the proposed construction, all services being readily available on site and construction relatively simple and straight forward.

Assuming Transpower and the Proponents were to agree in principle to the embedment project, Transpower's existing switchyard would become a stranded asset. An opportunity for the Proponents to purchase the existing switchyard thereby saving significantly on capital costs. There would remain the requirement to connect the transmission line as in Option A. There are no technical difficulties or limitations with this option with only a very short duration outage on the local network for the final connection.

8.2 Edgecumbe Substation

Edgecumbe is the Transpower owned GXP and consists of 220kV, 110kV and 33kV assets. Horizon has a number of 33kV connections at the North East end of the substation.

The project would utilise an existing spare bay at the South Eastern end of the 110kV overhead structure but would require switchgear and associated equipment to be installed.

Figure one below provides an indicative route for the 110kV connection into Edgecumbe.



8.3 New 110kV Transmission Line to Edgecumbe

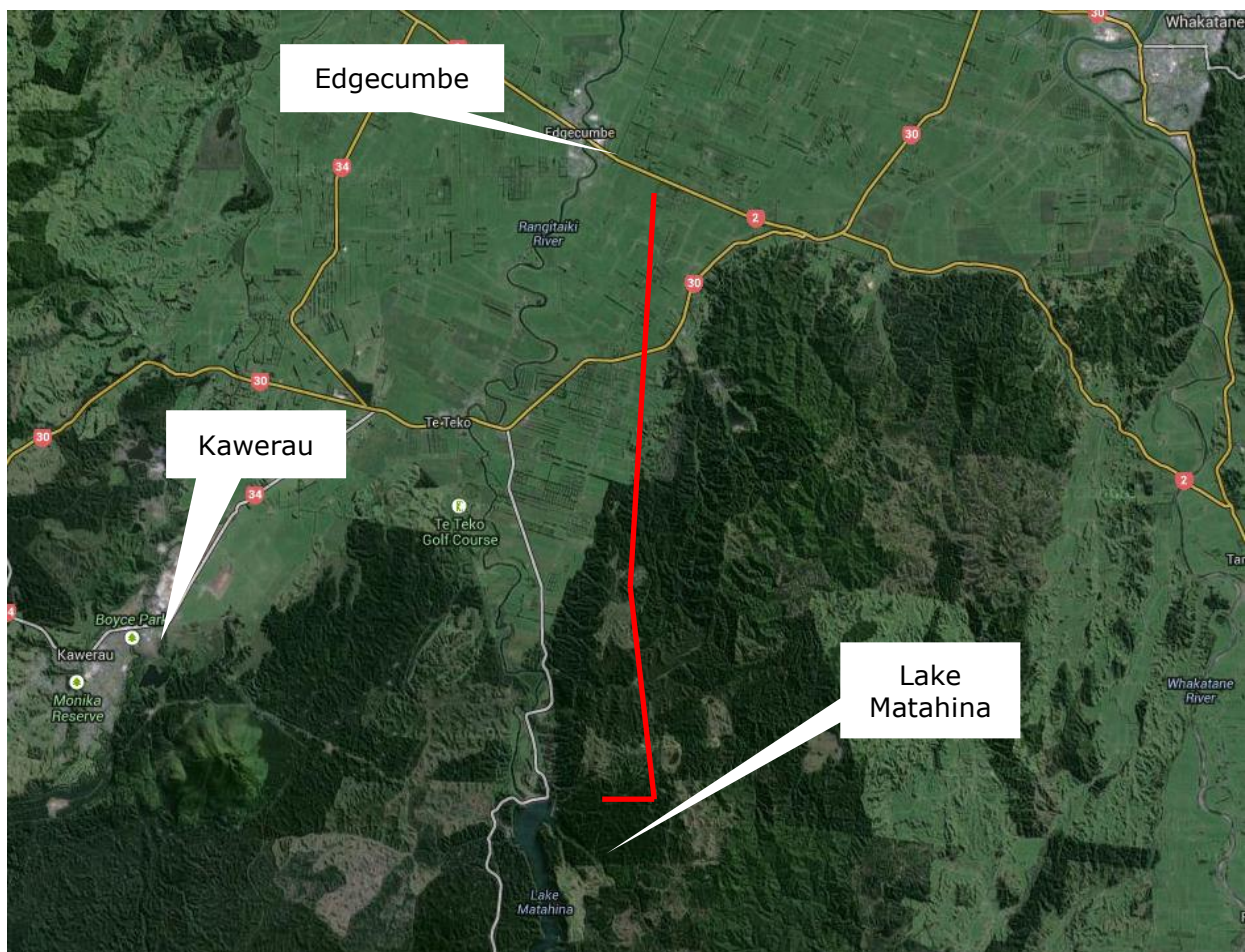
Horizon Energy owns the 33kV Snake Hill transmission line currently running between Edgecumbe and Galatea. The proposal would see around 15km of the transmission line upgraded to 110kV single circuit with new concrete poles and AAAC Nobelium conductor.

From Edgecumbe the transmission line would leave the switchyard to the south east running for approximately 500 meters across farmland requiring new easements, until picking up the existing 33kV transmission line route. The farmland is already an existing transmission corridor for one of the 110kV Edgecumbe/Kawerau circuits, which is a steel lattice tower design.

Once on the existing transmission route the line runs for about 10km across flat land over both road reserve and agricultural land. There are four road crossings that need to be made. While physical access is relatively easy with road or track access, local land owner permissions will be necessary. The land is mainly arable usage with some dairy farming as well.

Just south of the Galatea and MacDonald Road junction, the existing route heads off due south into forestry land towards Omataroa. The existing line route is followed for around 4.5km rising through hilly forest land to around 100m. Although track access is available the land is steep and rugged. When the line is due east of Te Mahoe Village, the line would deviate west down to Matahina site. This is a distance of ~1km falling 100m through bush/forest skirting the village into the switchyard.

Figure two below provides an indication of the proposed line route.



8.4 Loadflow Analysis

The Proponents are aware the project connection may increase the power flow on certain existing Transpower lines and Transpower is currently planning to upgrade the interconnecting transformers at Kawerau, due to capacity issues following recent new generator connections. A load flow study has been completed to determine the effects of the project and no detrimental impacts to the transmission system have been identified.

A copy of the Load Flow Study is available in Appendix F.

9 Legal and Environmental Issues

There is no law, regulation or other impediment that would prevent the Proponents achieving the physical embedment of Matahina and Aniwhenua generation output at the Edgecumbe GXP.

The nature of the Project dictates that legal and contractual matters will necessarily involve Transpower as the owners of the existing transmission infrastructure assets and Horizon Energy as the final transmission customer contracted with Transpower at Edgecumbe.

The following documents are salient when considering Transpower's legal position with respect to the Project:

- Transpower's Statement of Corporate Intent;
- The Electricity Act;
- The Commerce Act;
- Electricity Governance Regulations;
- Electricity Industry Participation Code 2010; and
- Distributed Generation Regulations 2007.

Transpower is a State Owned Enterprise (SOE) and therefore its owner and shareholder is the Government of New Zealand. There is a considerable body of other legislation that impacts on Transpower, including the Health and Safety in Employment Act; however, this has little relevance to the project under consideration.

Transpower's Statement of Corporate Intent lays down the self-imposed framework under which Transpower operates. This includes the intended levels of return it aims to provide to its shareholder.

The Commerce Act is concerned with the abuse of monopoly market positions, particularly when this involves anti-competitive behaviour.

The Electricity Governance Regulations provide the framework by which the industry is regulated, including Transpower, distributors, purchasers and generators. Superseded by EIPC, the Code, in 2010

The Electricity Industry Participation Code (the Code), Part 12, Transport, Schedule 12.4, provides the framework for the Transmission Pricing Methodology.

The Distributed Generation Regulations 2007 provide the framework by which the industry is regulated when generation is connected directly to the local lines network.

The pricing methodology for the development of a case for a prudent discount agreement is contained in the Electricity Industry Participation Code 2010, Schedule 12.4, Prudent Discount Policy clauses 36 to 42 and has been taken into account in preparing this report.

Work at Matahina Substation would be within existing site boundaries but would require development of the existing site. Once the project was implemented and existing Transpower assets disestablished site utilisation would be as it is currently. All of the sites are appropriately zoned for their existing uses. Under the Whakatane District Plan, the upgrade of the 33kV Horizon line to 110kV would be considered a new construction and a Permitted Activity in the rural foothills. See Appendix G for excerpts from the Whakatane District Plan and Appendix H for an independent opinion of likely consenting issues involved with the Project.

Landowners alongside the route of the Project power lines will need to be consulted prior to work beginning, especially if land access for construction purposes is required and these will need to be identified at an early stage if the project proceeds.

10 Project Risk

A number of project risks have been identified and are summarised below. Having identified these risks however, the proponents believe that given the current market conditions, economic climate and regulatory framework, none present a significant threat to the project especially considering the highly positive NPV and short payback period. As such, should Transpower decline the embedment proposal the proponents will progress with the design, construction and commissioning of the alternative transmission route forthwith.

There is nothing in the design and construction of the project that present significant risk to the proponents. All the elements of the line are 'bread and butter' to a suitably experienced and qualified line construction company. The line requires no specialised equipment or plant for construction. No special land issues either geographical or topographical exist along the proposed route. Crossing mainly flat farm land with only a short length passing through a hilly, managed forest before entering the substation, presents no specific risk.

The costs for the project have been provided by ElectronNet who are an approved contractor for Transpower and have completed a number of line builds in the recent past. All costs are based on recently completed projects and supported by current estimates (at the time of writing). Appropriate margins have been built into all the costs. A potential risk is movement of raw material costs. The biggest single cost item being the AAAC conductor at just under \$500k. Over the past 18 months aluminium has fallen by about 10%. Even if the price were to recover by this much the resultant increase would add ~\$50k to cable cost. This is less than 1% of the overall project and is seen as low risk and insignificant.

Transmission Losses do not present additional risk to the project. All loss analysis has been carried out by subject matter experts and is in line with expectations.

Two potential risks have been identified under the Revenue heading. The first and lesser of the two risks being data handling and/or manipulation, which could lead to over or under estimation of benefits available. This risk is primarily mitigated through multiple checks and independent verification of benefits by Transpower. The most significant risk to the project is a change of regulatory regime by the Electricity Authority. The current regime permits prudent discount arrangements but it has been signalled that a complete overhaul is under consideration. This may result in the reduction or the removal of ACOT benefits. A working paper was released in November 2013 seeking feedback on the benefits to consumers that distributed generation actually brings, as the Authority contends that benefits to consumers are extremely limited. The Authority currently envisages revising Part 6.4 of the Code as a separate workstream to the rest of the Transmission Pricing Methodology, and therefore may not be bound to the same timeframes as the rest of the TPM review (which, currently, may not see a new TPM in place prior to 1 April 2017)

While it is possible that benefit in some form may still be available for new ACOT enhancements committed after the release of the working paper, it would probably be of a much lower quantum than at present. Any possible change would presumably be well signalled and may not be implemented before 1st April 2015 at the earliest. It would be reasonable to assume, given the negative financial impact on a number of lines companies and generators, there would be strong challenge to any proposal by the Authority, potentially delaying implementation dates well beyond 2015.

Should a pricing regime change occur and assuming a 50% reduction in benefits available to the proponents, then net benefit would reduce from ~\$4.2M to ~\$2.1M. Given that the project is very NPV positive the payback period would increase from ~2years to ~4years. In all likelihood the project would have covered the capital cost prior to any regulatory change being implemented and therefore the proponents maintain the project is viable and would proceed with construction.

Apart from the specific issues around the regulatory regime the other legislation to present risk to the project would be environmental and/or land ownership issues. As there is an existing

transmission line and the proposed route would either follow or replace this, these risks are minimal. Professional opinion has been sought which has confirmed the land use falls within permitted activity of the local and district plans. Dealing with local land owners for access and possibly additional land, if required, may prove time consuming and impact financially but overall present little in the way of real risk to the project.

11 Conclusion

This study demonstrates that it is practicable to bypass the existing Transpower owned grid assets by building a totally separate substation on the Matahina site, upgrading the Snake Hill line and connecting into Edgecumbe substation.

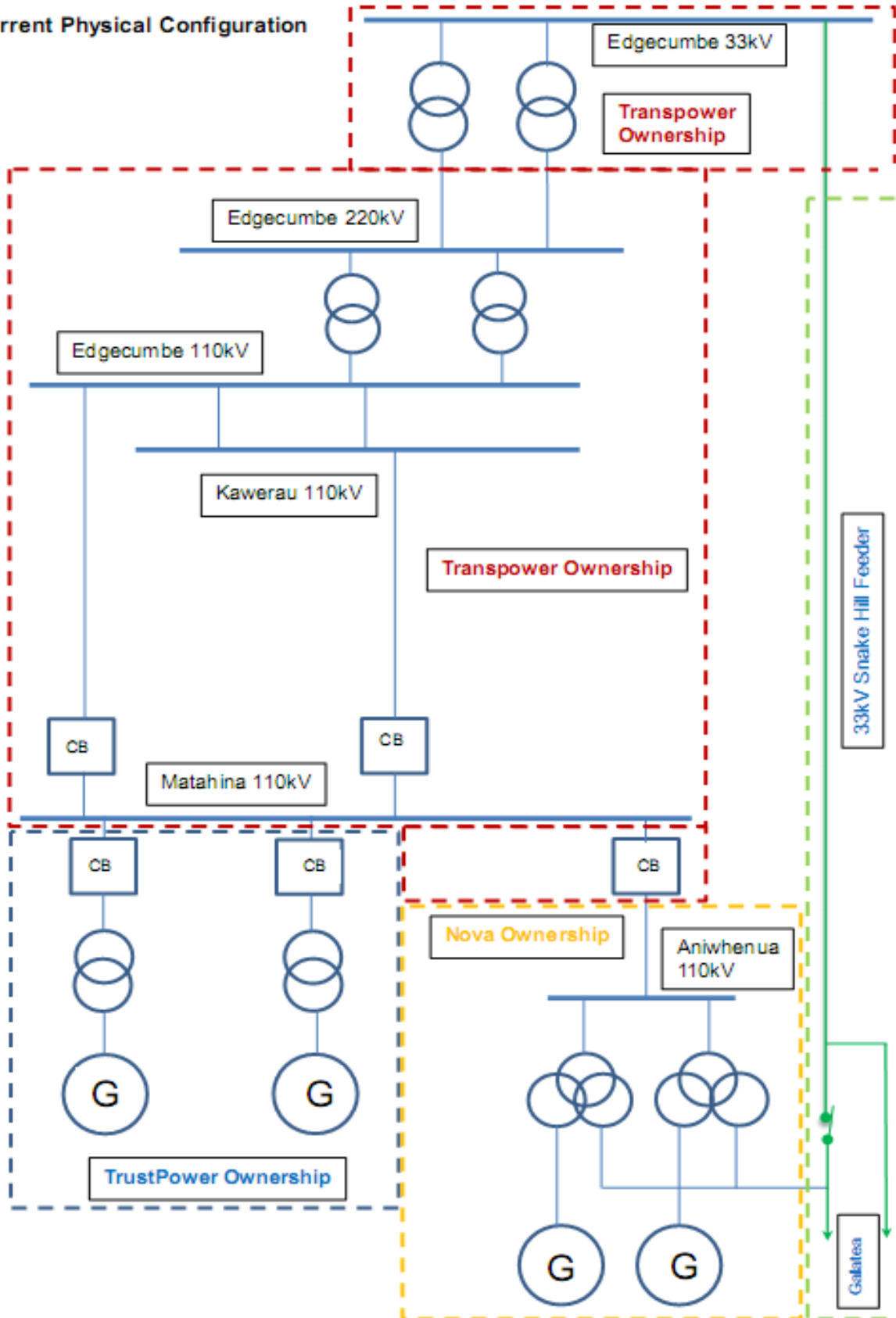
Solid cost estimates are provided and revenues streams demonstrate that the Project is economically viable – given that data used in analysis was from a particularly dry year. There is no significant material or technical issues to be overcome and the new line can be established without significant resource consent issues.

An alternative option is provided for consideration by Transpower whereby, once the principle of grid bypass is established, transfer of ownership of the existing assets should be given due consideration. This process will see significant cost benefit for the proponents.

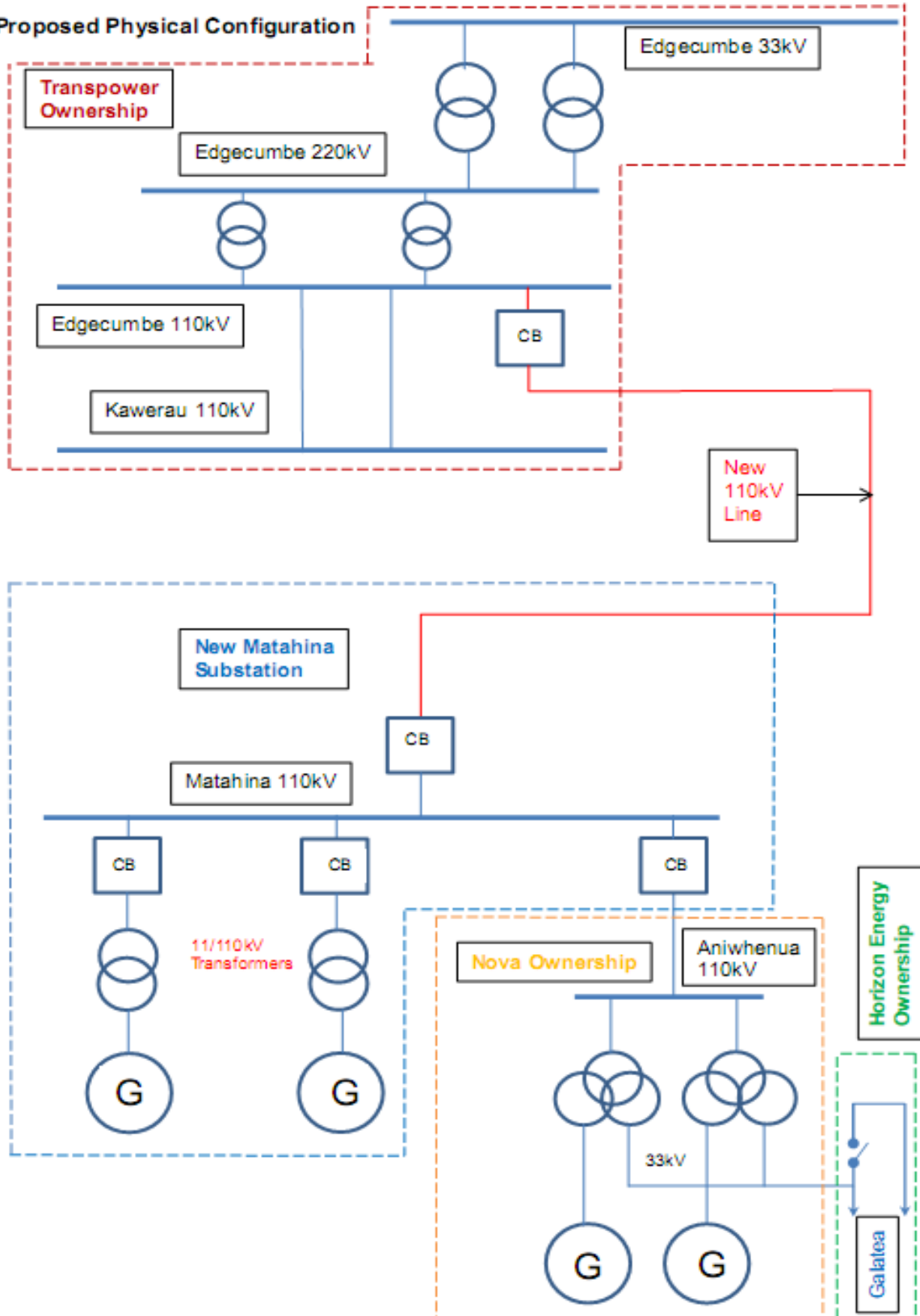
It is therefore concluded that the Proponents will proceed with the Project unless an economically equivalent commercial arrangement can be negotiated with Transpower in accordance with the Prudent Discount Arrangements.

Appendix A – Conceptual Drawings

Current Physical Configuration



Proposed Physical Configuration



Appendix B – Easement Costs Breakdown

Land between Matahina Substation and Existing Snake Hill Line								
Land Purchase								
Length	1000	Width	20	Area (Ha)	2	at	\$13,246	\$26,492
Easement								
Length	1000				Rate/m		\$86	\$86,000
Snake Hill across Plains and into Edgecumbe Substation								
Length	14000				Rate/m		\$8	\$112,000
General Allowance								
								\$35,000
					Total			\$259,492
*All land prices based on REINZ Rural Market Report to June 2013 for Bay of Plenty.								

The allowance is represents a nominal sum per meter of land for either new land or existing land along transmission routes. The only land purchase is likely the last 1000 meter section into Matahina where current market value has been provided for. The current use of this land is predominately forestry. In reality the majority of land is subject to Public Work Act and no easements are likely to be paid. The allowance may be used for injurious affects and/or access.

Appendix C – Loss Tables

Current Losses

Matahina 1 & Aniwhenua to Kawerau line losses

MW Losses		MVar																						
		-105	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	105
	0	1.049	0.943	0.749	0.58	0.436	0.314	0.214	0.134	0.074	0.032	0.008	0	0.009	0.032	0.071	0.124	0.19	0.27	0.362	0.466	0.582	0.71	0.778
	10	1.057	0.95	0.757	0.588	0.444	0.323	0.222	0.143	0.082	0.04	0.016	0.008	0.016	0.04	0.079	0.131	0.198	0.277	0.369	0.473	0.589	0.716	0.783
	20	1.083	0.976	0.783	0.615	0.47	0.348	0.248	0.168	0.107	0.065	0.04	0.032	0.04	0.063	0.102	0.154	0.22	0.299	0.39	0.494	0.609	0.736	0.803
	30	1.129	1.022	0.828	0.659	0.514	0.392	0.291	0.21	0.149	0.106	0.081	0.072	0.079	0.102	0.14	0.191	0.257	0.335	0.426	0.529	0.644	0.77	0.837
	40	1.194	1.086	0.891	0.721	0.576	0.452	0.351	0.269	0.207	0.163	0.137	0.128	0.134	0.156	0.193	0.244	0.308	0.386	0.476	0.578	0.692	0.818	0.885
	50	1.277	1.169	0.973	0.802	0.655	0.531	0.428	0.345	0.282	0.237	0.21	0.199	0.205	0.226	0.262	0.312	0.375	0.452	0.541	0.642	0.755	0.88	0.946
	60	1.38	1.271	1.073	0.9	0.752	0.626	0.522	0.438	0.373	0.327	0.298	0.287	0.291	0.311	0.345	0.394	0.456	0.532	0.62	0.72	0.832	0.955	1.021
	70	1.501	1.391	1.191	1.017	0.867	0.739	0.633	0.547	0.481	0.433	0.403	0.39	0.393	0.411	0.444	0.491	0.552	0.627	0.713	0.812	0.923	1.045	1.11
	80	1.641	1.53	1.328	1.151	0.999	0.869	0.761	0.673	0.605	0.555	0.524	0.509	0.51	0.526	0.558	0.604	0.663	0.736	0.821	0.919	1.028	1.149	1.213
MW	90	1.8	1.688	1.483	1.304	1.148	1.016	0.906	0.816	0.746	0.694	0.66	0.643	0.642	0.657	0.687	0.731	0.788	0.859	0.943	1.039	1.147	1.266	1.33
	100	1.978	1.864	1.656	1.474	1.316	1.181	1.068	0.976	0.903	0.849	0.812	0.793	0.79	0.803	0.831	0.873	0.929	0.998	1.079	1.174	1.28	1.397	1.46
	105	2.074	1.959	1.749	1.566	1.406	1.27	1.155	1.062	0.987	0.932	0.895	0.874	0.87	0.882	0.908	0.949	1.004	1.072	1.153	1.246	1.351	1.468	1.53

Matahina 2 to Edgumbe line losses

MW Losses		MVar																
		-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80
	0	3.471	2.555	1.806	1.206	0.742	0.4	0.168	0.038	0	0.049	0.179	0.383	0.657	0.997	1.398	1.857	2.371
	10	3.487	2.579	1.838	1.243	0.783	0.443	0.211	0.081	0.043	0.091	0.218	0.42	0.692	1.027	1.425	1.88	2.39
	20	3.611	2.708	1.97	1.377	0.917	0.575	0.343	0.211	0.17	0.214	0.338	0.535	0.802	1.133	1.525	1.975	2.481
	30	3.842	2.941	2.201	1.607	1.143	0.799	0.562	0.425	0.379	0.418	0.536	0.728	0.963	1.314	1.7	2.144	2.641
MW	40	4.178	3.271	2.528	1.929	1.46	1.109	0.866	0.721	0.668	0.701	0.811	0.995	1.248	1.566	1.944	2.381	2.87
	50	4.614	3.7	2.948	2.34	1.863	1.503	1.251	1.098	1.037	1.061	1.162	1.338	1.581	1.89	2.259	2.687	3.167
	60	5.148	4.225	3.461	2.842	2.353	1.982	1.72	1.555	1.483	1.496	1.587	1.752	1.985	2.283	2.643	3.06	3.531
	70	5.782	4.842	4.064	3.43	2.928	2.544	2.268	2.091	2.006	2.006	2.084	2.237	2.46	2.746	3.094	3.5	3.96
	80	6.511	5.553	4.757	4.106	3.587	3.186	2.895	2.704	2.604	2.59	2.656	2.795	3.003	3.277	3.613	4.006	4.455

Proposed System losses

Matahina & Aniwhenua to Edgumbe 'new' line losses

MW Losses		MVar														
		-110	-100	-80	-60	-40	-20	-10	0	10	20	40	60	80	100	110
	0	2.37	1.895	1.14	0.606	0.255	0.06	0.014	0	0.015	0.058	0.221	0.478	0.818	1.236	1.471
	10	2.379	1.906	1.154	0.621	0.27	0.075	0.029	0.015	0.03	0.072	0.234	0.489	0.829	1.245	1.479
	20	2.429	1.956	1.203	0.669	0.317	0.121	0.074	0.059	0.073	0.114	0.274	0.527	0.865	1.278	1.512
	30	2.518	2.044	1.289	0.751	0.396	0.197	0.149	0.132	0.144	0.184	0.341	0.591	0.926	1.336	1.568
	40	2.647	2.17	1.409	0.867	0.507	0.303	0.252	0.233	0.244	0.282	0.435	0.681	1.012	1.419	1.649
	50	2.814	2.333	1.564	1.015	0.649	0.439	0.386	0.364	0.372	0.407	0.555	0.797	1.123	1.525	1.753
	60	3.021	2.534	1.755	1.197	0.822	0.605	0.548	0.523	0.527	0.56	0.702	0.938	1.258	1.656	1.881
	70	3.266	2.772	1.98	1.411	1.027	0.801	0.74	0.711	0.711	0.74	0.875	1.104	1.419	1.81	2.033
	80	3.55	3.048	2.241	1.659	1.263	1.026	0.96	0.927	0.923	0.947	1.074	1.296	1.604	1.989	2.208
MW	90	3.874	3.361	2.537	1.939	1.53	1.282	1.21	1.171	1.162	1.182	1.3	1.514	1.813	2.191	2.407
	100	4.237	3.713	2.868	2.253	1.829	1.567	1.489	1.444	1.43	1.444	1.552	1.757	2.048	2.417	2.63
	110	4.64	4.102	3.235	2.6	2.159	1.882	1.798	1.746	1.726	1.734	1.831	2.025	2.307	2.668	2.876
	120	5.083	4.531	3.637	2.981	2.521	2.227	2.136	2.077	2.05	2.051	2.136	2.319	2.591	2.942	3.145
	130	5.568	4.998	4.076	3.396	2.915	2.603	2.503	2.437	2.402	2.397	2.468	2.639	2.899	3.24	3.439
	140	6.094	5.506	4.552	3.845	3.341	3.01	2.9	2.825	2.782	2.769	2.827	2.984	3.233	3.563	3.756

Appendix D - Connection Charges

Matahina

							Rate				
							0.0755	0.0221	\$1,134		
							Recovery				
Asset	Asset Id	Physical Location	A	M	O	Asset Value	Asset Component	Maintenance Component	Operating Component	Customer Allocation	Connection Charge
Substation	Kawerau	KAW	TPM	TPM		1,896,404.86	143,178.57	41,910.55		0.00%	0.00
Substation	Matahina	MAT	NEA	NEA		1,162,868.76	87,796.59	25,699.40		100.00%	113,495.99
Switchgear	132	KAW	NEA	NEA	NEA	509,625.72	38,476.74	11,262.73	1,134.00	100.00%	50,873.47
Switchgear	142	KAW	NEA	NEA	NEA	509,625.72	38,476.74	11,262.73	1,134.00	100.00%	50,873.47
Switchgear	42	MAT	NEA	NEA	NEA	132,564.41	10,008.61	2,929.67	1,134.00	0.00%	0.00
Switchgear	52	MAT	NEA	NEA	NEA	132,564.41	10,008.61	2,929.67	1,134.00	0.00%	0.00
Switchgear	62	MAT	NEA	NEA	NEA	509,625.72	38,476.74	11,262.73	1,134.00	100.00%	50,873.47
Switchgear	72	MAT	NEA	NEA	NEA	509,625.72	38,476.74	11,262.73	1,134.00	100.00%	50,873.47
Switchgear	47-57	MAT	NEA	NEA	NEA	108,121.03	8,163.14	2,389.47	1,134.00	100.00%	11,686.61
Switchgear	VT1	MAT	NEA	NEA	NEA	49,288.68	3,721.30	1,089.28		100.00%	4,810.58
Switchgear	VT2	MAT	NEA	NEA	NEA	49,288.68	3,721.30	1,089.28		100.00%	4,810.58
Switchgear	VT3	MAT	NEA	NEA	NEA	49,288.68	3,721.30	1,089.28		100.00%	4,810.58
Line	KAW_MAT		NEA	NEA		1,049,891.79	79,266.83	114,216.00		100.00%	193,482.83
Total Connection Charge											536,591.04

Edgecumbe

							Rate				
							0.0755	0.0221	\$1,134		
							Recovery				
Asset	Asset Id	Physical Location	A	M	O	Asset Value	Asset Component	Maintenance Component	Operating Component	Customer Allocation	Connection Charge
Substation	Edgecumbe	EDG	TPM	TPM		1,896,404.86	143,178.57	41,910.55		10.00%	18,508.91
Switchgear	132	EDG	NEA	NEA	NEA	509,625.72		11,262.73	1,134.00	100.00%	12,396.73
Switchgear	42	EDG	NEA	NEA	NEA	132,564.41		2,929.67	1,134.00	100.00%	4,063.67
Switchgear	47-48	EDG	NEA	NEA	NEA	21,624.21		477.89	1,134.00	100.00%	1,611.89
Switchgear	VT1	EDG	NEA	NEA	NEA	49,288.68		1,089.28		100.00%	1,089.28
Total Connection Charge											37,670.49

Appendix E – Discounted Cashflow Analysis

Option A

Inputs Page																								
PROJECT DESCRIPTION: Matahina Generation Embedment Project																								
CAPITAL INVESTMENT WORKSHEET																								
Project	03/2014	\$000																		\$000				
Start Date	(Enter as mm/yyyy)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL	
(Enter Year-End Capital Investment values.)		03/2014	03/2015	03/2016	03/2017	03/2018	03/2019	03/2020	03/2021	03/2022	03/2023	03/2024	03/2025	03/2026	03/2027	03/2028	03/2029	03/2030	03/2031	03/2032	03/2033	03/2034		
Existing Assets:																								
New Assets:																								
Matahina	2,227																							2,227
Edgecumbe	1,308																							1,308
Buildings	0																							0
Lines	3,812																							3,812
Associated Works	151																							151
Include these costs in above amounts where applicable:																								
Capitalised Interest	255																							255
Non-depr. costs (fees, consents, ea)	355																							355
In-house labour costs																								
Less Disposals at start	(16)																							(16)
= TOTAL CAPITAL COST	8,092																							8,092
Working capital increases																								
Deduct Residual values																								
Total Cash Outflow	8,092																							8,092
ENTER PROJECT LIFE, COST OF CAPITAL AND TAX RATE																								
PROJECT LIFE	50 YEARS	COST OF CAPITAL	7.0%	TAXATION RATE	28.0%																			
FINANCIAL COSTS AND BENEFITS WORKSHEET																								
First Fiscal Year	2014/2015	\$000																		\$000				
(Enter as YYYY/YYYY)		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL	
(Enter as YYYY/YYYY)		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034			
Revenues/Savings																								
HVDC Injection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Connection Charge (MAT)	577	589	600	612	625	637	650	663	676	690	704	718	732	747	761	777	792	808	824	841				14,022
Connection Charge (EDG)	(137)	(139)	(142)	(145)	(148)	(151)	(154)	(157)	(160)	(163)	(167)	(170)	(173)	(177)	(180)	(184)	(188)	(191)	(195)	(199)				(3,320)
Connection Charge (KAW)	(9)	(9)	(9)	(10)	(10)	(10)	(10)	(10)	(10)	(11)	(11)	(11)	(11)	(11)	(12)	(12)	(12)	(13)	(13)	(13)				(218)
Additional Losses	(288)	(293)	(299)	(305)	(311)	(317)	(324)	(330)	(337)	(344)	(350)	(357)	(365)	(372)	(379)	(387)	(395)	(403)	(411)	(419)				(6,986)
Avoided transmission	4,198	4,282	4,368	4,455	4,544	4,635	4,728	4,822	4,919	5,017	5,117	5,220	5,324	5,431	5,539	5,650	5,763	5,878	5,996	6,116				102,000
Base Data	0	4,342	4,429	4,517	4,608	4,700	4,794	4,890	4,988	5,087	5,189	5,293	5,399	5,507	5,617	5,729	5,844	5,961	6,080	6,201	6,325			105,499
(Costs)																								
Losses																								
Injection Charge																								
Base Data																								
Total Costs excl Depr																								
E.B.I.T.DA		4,342	4,429	4,517	4,608	4,700	4,794	4,890	4,988	5,087	5,189	5,293	5,399	5,507	5,617	5,729	5,844	5,961	6,080	6,201	6,325			105,499
Other non-cash adjustments																								
-(Accounting Depr)		(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)			(3,184)
Accounting Profit/Loss on Disposal																								
E.B.I.T.		4,183	4,270	4,358	4,449	4,541	4,635	4,731	4,828	4,928	5,030	5,134	5,240	5,348	5,458	5,570	5,685	5,801	5,921	6,042	6,166			102,315
Accounting Depreciation	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159				3,184
Accounting Profit/Loss on Disposal																								
Tax Depreciation	(626)	(569)	(519)	(474)	(433)	(396)	(363)	(333)	(305)	(280)	(257)	(236)	(217)	(200)	(184)	(169)	(155)	(143)	(131)	(121)				(6,111)
Taxable Profit		3,717	3,860	3,999	4,134	4,267	4,398	4,527	4,655	4,782	4,909	5,035	5,162	5,289	5,417	5,546	5,675	5,805	5,937	6,070	6,205			99,388
Tax	(1,041)	(1,081)	(1,120)	(1,158)	(1,195)	(1,231)	(1,267)	(1,303)	(1,339)	(1,374)	(1,410)	(1,445)	(1,481)	(1,517)	(1,553)	(1,589)	(1,626)	(1,662)	(1,700)	(1,737)				(27,829)
Tax on Depr. Recovered on sale																								
Add back Tax Depreciation	626	569	519	474	433	396	363	333	305	280	257	236	217	200	184	169	155	143	131	121				6,111
Deduct Accounting Depreciation	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)	(159)				(3,184)
NOPAT (before interest)		3,142	3,189	3,239	3,291	3,346	3,403	3,463	3,525	3,589	3,655	3,724	3,794	3,866	3,941	4,017	4,096	4,176	4,258	4,343	4,429			74,486
Accounting Depreciation	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159				3,184
Cash Inflow		3,301	3,348	3,398	3,450	3,505	3,563	3,622	3,684	3,748	3,815	3,883	3,953	4,026	4,100	4,176	4,255	4,335	4,417	4,502	4,588			77,671
Net Cashflow		(8,092)	3,301	3,348	3,398	3,450	3,505	3,563	3,622	3,684	3,748	3,815	3,883	3,953	4,026	4,100	4,176	4,255	4,335	4,417	4,502	4,588		69,579
Cumulative	(8,092)	(4,790)	(1,442)	1,956	5,406	8,911	12,474	16,096	19,780	23,529	27,343	31,226	35,180	39,205	43,305	47,482	51,737	56,072	60,489	64,991	69,579			139,158
Funds Employed	7,498	7,418	7,259	7,100	6,941	6,782	6,622	6,463	6,304	6,145	5,985	5,826	5,667	5,508	5,349	5,190	5,030	4,871	4,712	4,552	4,393			
EBIT / Total Funds %age		56.4%	58.8%	61.4%	64.1%	67.0%	70.0%	73.2%	76.6%	80.2%	84.0%	88.1%	92.5%	97.1%	102.0%	107.3%	113.0%	119.1%	125.7%	132.7%	140.4%			

Option B

Inputs Page

PROJECT DESCRIPTION: Matahina Generation Embedment Project

CAPITAL INVESTMENT WORKSHEET

Project	\$000																				\$000	
Start Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
(Enter as mm/yyyy)	03/2014	03/2015	03/2016	03/2017	03/2018	03/2019	03/2020	03/2021	03/2022	03/2023	03/2024	03/2025	03/2026	03/2027	03/2028	03/2029	03/2030	03/2031	03/2032	03/2033	03/2034	
Existing Assets:																						
New Assets:																						
Matahina	644																					644
Edgecumbe	1,308																					1,308
Buildings	0																					0
Lines	3,812																					3,812
Associated Works	58																					58
Include these costs in above amounts where applicable:																						
Capitalised Interest	200																					200
Non-depr. costs (fees, consents, etc)	355																					355
In-house labour costs																						
Less Disposals at start	(16)																					(16)
= TOTAL CAPITAL COST	6,361																					6,361
Working capital increases																						
Deduct Residual values																						
Total Cash Outflow	6,361																					6,361

ENTER PROJECT LIFE, COST OF CAPITAL AND TAX RATE

PROJECT LIFE: 50 YEARS COST OF CAPITAL: 7.0% TAXATION RATE: 28.0%

FINANCIAL COSTS AND BENEFITS WORKSHEET

First Fiscal Year	\$000																				\$000	
(Enter as YYYY/YYYY)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
2014/2015	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034		
Revenues/Savings																						
HVDC Injection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Connection Charge (MAT)	577	589	600	612	625	637	650	663	676	690	704	718	732	747	761	777	792	808	824	841	14,022	
Connection Charge (EDC)	(137)	(139)	(142)	(145)	(148)	(151)	(154)	(157)	(160)	(163)	(167)	(170)	(173)	(177)	(180)	(184)	(188)	(191)	(195)	(199)	-3,320	
Connection Charge (KAW)	(9)	(9)	(9)	(10)	(10)	(10)	(10)	(10)	(10)	(11)	(11)	(11)	(11)	(12)	(12)	(12)	(13)	(13)	(13)	(13)	-218	
Additional Losses	(288)	(293)	(299)	(305)	(311)	(317)	(324)	(330)	(337)	(344)	(350)	(357)	(365)	(372)	(379)	(387)	(395)	(403)	(411)	(419)	-6,986	
Avoided transmission	4,198	4,282	4,368	4,455	4,544	4,635	4,728	4,822	4,919	5,017	5,117	5,220	5,324	5,431	5,539	5,650	5,763	5,878	5,996	6,116	102,000	
Base Data	0																					0
Total Revenues/Savings	4,342	4,429	4,517	4,608	4,700	4,794	4,890	4,988	5,087	5,189	5,293	5,399	5,507	5,617	5,729	5,844	5,961	6,080	6,201	6,325	105,499	
(Costs)																						
Losses																						
Injection Charge																						
Base Data																						
Total Costs excl Depr																						
E.B.I.T.DA	4,342	4,429	4,517	4,608	4,700	4,794	4,890	4,988	5,087	5,189	5,293	5,399	5,507	5,617	5,729	5,844	5,961	6,080	6,201	6,325	105,499	
Other non-cash adjustments																						
-(Accounting Depr)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(2,318)	
Accounting Profit/Loss on Disposal																						
E.B.I.T.	4,226	4,313	4,402	4,492	4,584	4,678	4,774	4,872	4,971	5,073	5,177	5,283	5,391	5,501	5,613	5,728	5,845	5,964	6,086	6,210	103,181	
Accounting Depreciation	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	2,318	
Accounting Profit/Loss on Disposal																						
Tax Depreciation	(476)	(435)	(398)	(365)	(335)	(307)	(282)	(259)	(238)	(219)	(201)	(185)	(170)	(156)	(144)	(132)	(122)	(112)	(103)	(95)	(4,734)	
Taxable Profit	3,866	3,994	4,119	4,243	4,365	4,487	4,608	4,728	4,849	4,970	5,092	5,214	5,337	5,461	5,585	5,712	5,839	5,968	6,099	6,231	100,765	
Tax	(1,083)	(1,118)	(1,153)	(1,188)	(1,222)	(1,256)	(1,290)	(1,324)	(1,358)	(1,392)	(1,426)	(1,460)	(1,494)	(1,529)	(1,564)	(1,599)	(1,635)	(1,671)	(1,708)	(1,745)	(8,214)	
Tax on Depr. Recovered on sale	476	435	398	365	335	307	282	259	238	219	201	185	170	156	144	132	122	112	103	95	4,734	
Add back Tax Depreciation	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(116)	(2,318)	
Deduct Accounting Depreciation																						
NOPAT (before interest)	3,143	3,195	3,248	3,304	3,362	3,422	3,484	3,548	3,614	3,682	3,751	3,823	3,897	3,972	4,049	4,129	4,210	4,293	4,378	4,465	77,285	
Accounting Depreciation	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	2,318	
Cash Inflow	3,259	3,311	3,364	3,420	3,478	3,538	3,600	3,664	3,730	3,797	3,867	3,939	4,012	4,088	4,165	4,245	4,326	4,409	4,494	4,581	79,603	
Net Cashflow	(6,361)	3,259	3,311	3,364	3,420	3,478	3,538	3,600	3,664	3,730	3,797	3,867	3,939	4,012	4,088	4,165	4,245	4,326	4,409	4,494	70,924	
Cumulative	(6,361)	(3,102)	209	3,573	6,993	10,470	14,008	17,608	21,272	25,001	28,799	32,666	36,605	40,617	44,705	48,870	53,115	57,440	61,849	66,343	141,848	
Funds Employed	5,822	5,764	5,648	5,532	5,416	5,300	5,184	5,068	4,953	4,837	4,721	4,605	4,489	4,373	4,257	4,141	4,025	3,909	3,793	3,677	3,561	
EBIT / Total Funds %age	73.3%	76.4%	79.6%	82.9%	86.5%	90.2%	94.2%	98.4%	102.8%	107.5%	112.4%	117.7%	123.3%	129.2%	135.6%	142.3%	149.5%	157.2%	165.5%	174.4%		

Appendix F – Loadflow Study

Matahina Embedment Project Load Flow Study

Prepared for Trustpower

Document: MEL-R1364 Rev 00

Project: ENS1310

August 2012



PO Box 6318
Christchurch 8442
New Zealand

Ph: +64 3 336 1100
Fax: +64 3 336 7386

Quality Assurance Record

Project Description: Matahina Embedment Project Load Flow Study
Document Number: MEL-R1364 Rev 00
Project Reference: ENS1310
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Revision Log

Rev	Date	Description		Signed	Name
00	31 August 2012	First issue to Client	Prepared	<i>BM West</i>	Bruce West
			Reviewed	<i>PBoys</i>	Philip Boys
			Approved		

Contents

1	Introduction	4
2	Conclusions.....	5
Appendix A	Network Diagrams	7
Appendix B	Current Load Flow.....	12
Appendix C	Future Load Flow.....	50

Abbreviations

AAAC	All Aluminium Alloy Conductor
ANI	Aniwhenua Power Station
BoPE	Bay of Plenty Electricity
EDG	Edgecumbe Substation
KAG	Kawerau Generation
KAW	Kawerau Substation
KIN	Kinleith Substation
KMO	Kaitmako Substation
LFD	Lichfield Substation
MAT	Matahina Power Station
MTM	Mount Maunganui Substation
OKE	Okere Tee
OWH	Owhata Substation
PDA	Prudent Discount Agreement
ROT	Rotorua Substation
TGA	Tauranga Substation
TKH	Te Kaha Substation
TMI	Te Matai Substation
TPW	TrustPower
TRK	Tarukenga Substation
WAI	Waiohahi Substation
WHE	Wheao Power Station

1 Introduction

TrustPower (TPW), as owners of Matahina Power Station (MAT) and their partner Bay of Plenty Energy (BoPE), as owners of Aniwhenua Power Station (ANI) wish to enter into an arrangement with Transpower for a Prudent Discount Agreement (PDA) to bypass the present 110 kV connection at Kawerau Substation (KAW) with a new 110 kV line direct to Edgecumbe Substation (EDG).

There is a current Notional Embedment Agreement in place with Transpower for this arrangement which expires on 31st March 2014.

As part of this negotiation the possibility of connecting MAT directly to EDG is being investigated. This involves upgrading an existing BoPE 33 kV Line to 110 kV and using it to connect MAT to EDG. The existing 110 kV MAT-KAW Lines would be decommissioned.

ANI is connected to the MAT bus via a Todd Energy owned 110 kV ANI-MAT Line. The total load on the proposed 110 kV MAT-EDG Line is 110 MW.

TPW is aware this new connection may cause overloads on existing lines and there is planned work by Transpower to upgrade the interconnecting transformers at KAW due to overloads. Therefore TPW require a load flow study to determine the effects of the proposal.

In Appendix A, Figure 1 shows the network as it is today. Figure 2 shows the network configuration for which this study is done.

The changes are as follows:

- The 110 kV MAT-KAW Lines are decommissioned (TPW Work).
- The 110 kV MAT-EDG Line is commissioned (TPW Work).
- The 220 kV/110 kV Interconnecting Transformers EDG T4 and EDG T5 are decommissioned (Transpower Work).
- The 220 kV/110 kV Interconnecting Transformer KAW T12 is replaced and uprated (Transpower Work).
- Norske Skog 25 MW geothermal generator will be commissioned and connected to the KAW 110 kV Bus.

Transpower's Annual Planning Report 2012 shows some significant maintenance work in the Bay of Plenty network. This includes some temporary work to transmit MAT generation to EDG while KAW T12 is being replaced. The temporary work includes recommissioning EDG T4 and EDG T5.

By the time of this study KAW T12 will be uprated and the temporary works returned to the current state with EDG T4 and EDG T5 decommissioned.

This report is of load flows of the proposed configuration to determine if there are any voltage or overloading conditions. The load flows are with high generation and high loads.

2 Conclusions

The results of the load flows are documented in Appendix B for the current situation and Appendix C for the proposed situation. Summaries of these load flows are shown in Appendix A, Figure 3 and Figure 4 which show the percentage loading on lines and major plant.

The following changes are noted:

- The proposed 110 kV EDG-MAT Line loading is 95.13 MW and 28.29 MVar. This is shown as 100% loading but the line can be designed to suit the required power flow.
- The KAW T12 loading drops from 66% to 36% due to its increased rating.
- KAW T5's loading increases from 0% to 84% due to the Norske Skog 25 MW geothermal generator.
- The 220 kV KAW-OHK Line loading decreases from 21% to 19%.
- The 220 kV KAW-EDG Line loading increases from 23% to 26%.
- The 220 kV EDG-TRK Lines loading increases from 2% to 4%.
- The 110 kV EDG-OWH Line loading increases from 56% to 60%.
- The 110 kV OWH-OKE Line loading increases from 39% to 42%.
- The 110 kV OKE-TMI Line loading increases from 59% to 60%.
- The 110 kV OKE-TRK Line loading decreases from 35% to 32%.

There are other minor changes to the rest of the Bay of Plenty network. None of the noted changes are significant or would cause difficulties for the operation of Transpower's Bay of Plenty network.

The proposed decommissioning of the existing 110 kV MAT-KAW Lines and the commissioning of a new 110 kV MAT-EDG Line will avoid the transmission constraints associated with connection to Kawerau Substation due to the addition of new generation to this site and it will not result in any new transmission constraints or operational difficulties.

Appendix B Current Load Flow

DigSILENT PowerFactory 14.1.3		Date: 8/8/2012								
Load Flow Calculation				Complete System Report: Substations, Voltage Profiles, Grid Interchange						
AC Load Flow, unbalanced, 3-phase (ABC)				Automatic Model Adaptation for Convergence No						
Automatic Tap Adjust of Transformers Yes				Max. Acceptable Load Flow Error for Nodes 1.00 kVA						
Consider Reactive Power Limits Yes				Model Equations 0.10 %						
Grid: NIPS				Study Case: Dynamics No Wind - Peak Is						
Rated Voltage	Bus-voltage		Active Power		Reactive Power		Power Factor	Current	Loading	Additional Data
	[kV]	[p.u.]	[kV]	[deg]	[MW]	[Mvar]	[-]	[kA]	[%]	
Aniwhenua										
ANI33	33.00	1.02	19.46	-72.62						
		1.02	19.45	167.38						
		1.02	19.45	47.38						
Qub_0.2/Lod	ANI				A 0.00	-0.00	1.00	0.00		PI0: 0.00 MW QI0: 0.00 Mvar
					B 0.00	0.00	1.00	0.00		PI0: 0.00 MW QI0: 0.00 Mvar
					C 0.00	0.00	1.00	0.00		PI0: 0.00 MW QI0: 0.00 Mvar
Qub_0.0/Tr3	ANI-TF1				A -0.00	-0.00	-1.00	0.00	87.41	Tap: 1.00 Min: 1 Max: 1
					B -0.00	0.00	-1.00	0.00	87.41	
					C -0.00	-0.00	-1.00	0.00	87.41	
Qub_0.1/Tr3	ANI-TF2				A -0.00	-0.00	-1.00	0.00	87.41	Tap: 1.00 Min: 1 Max: 1
					B -0.00	0.00	-1.00	0.00	87.41	
					C -0.00	-0.00	-1.00	0.00	87.41	
ANI_G1	11.00	1.02	6.46	-68.64						
		1.02	6.46	171.35						
		1.02	6.46	51.36						
Qub_2 /Sym	ANI-G1				A 4.14	-0.28	1.00	0.64	88.92	Typ: PV
					B 4.14	-0.28	1.00	0.64	88.92	
					C 4.14	-0.28	1.00	0.64	88.92	
Qub_3 /Tr3	ANI-TF1				A 4.14	-0.28	1.00	0.64	87.41	Tap: 1.00 Min: 1 Max: 1
					B 4.14	-0.28	1.00	0.64	87.41	
					C 4.14	-0.28	1.00	0.64	87.41	
ANI_G2	11.00	1.02	6.46	-68.64						
		1.02	6.46	171.35						
		1.02	6.46	51.36						
Qub_2 /Sym	ANI-G2				A 4.14	-0.28	1.00	0.64	88.92	Typ: PQ
					B 4.14	-0.28	1.00	0.64	88.92	
					C 4.14	-0.28	1.00	0.64	88.92	

Note: The data referred to in the Appendix B above extends to 85 pages and is available on request

Appendix G – Extracts from the Whakatane District Plan

18.3.1 Activity Status for Works and Network Utilities

Key: P = Permitted
 C = Controlled
 RD = Restricted Discretionary
 D = Discretionary
 NC = Non-Complying
 Pr = Prohibited
 NA = Not applicable

Key:		Rural Plains	Rural Foothills	Rural Coastal	Rural Ohiwa	Residential, Urban Living, and Mixed Use	Retail and Commercial	Airport, Light Industrial and Industrial	Scheduled Features* Coastal Protection Zone	Reserve Zone Other Public Reserves	Formed Roads **
Energy											
1.	Electrical lines for conveying electricity, including their support poles at a voltage up to and including 110kV with a design capacity up to and including 100MVA per circuit and associated telecommunications lines and aerials up to one metre high: a. New lines, extension in length of lines overhead. b. New or extension of underground lines.	P P	P P	D P	D P	D P	P P	P P	D D	D P	P P
2.	Overhead electrical lines including support pylons and structures (new lines; extension in length of lines) for conveying electricity at voltage in excess of 110kV and telecommunication lines forming part of the same facility.	D	D	D	D	D	D	P	D	D	D
3.	Upgrading (see Chapter 19 Definitions) of existing overhead electrical lines with a voltage less than or equal to 110kV for conveying electricity.	P	P	P	P	P	P	P	P	P	P
4.	Temporary overhead electrical and telecommunication lines, subject to the Council being formally notified of the route, voltage/type of telecommunications link and date by which it will be removed.	P	P	P	P	P	P	P	D	P	P
5.	Removal of above-ground electrical lines and underground lines.	P	P	P	P	P	P	P	P	P	P
6.	Single transformers and associated switching gear conveying electricity at a voltage up to and including 11kV not exceeding a gross floor area of 4m ² and a height of two metres.	P	P	P	P	P	P	P	D	P	P
7.	Transformers, sub-stations and switching stations (new, upgrading and additions thereof) conveying electricity and ancillary buildings not exceeding 30m ² in gross floor area.	D	D	D	D	D	D	P	D	D	D

19 Definitions

Upgrading, for the purpose of Rule 18.3.1.3 shall mean an increase in the carrying capacity, efficiency or security of electricity and telecommunication lines, utilising the existing support structures or structures of a similar scale or character, and includes:

1. the addition of circuits and/or conductors
2. the re-conductoring of the line with higher capacity conductors
3. the re-sagging of conductors
4. the addition of longer or more efficient insulators
5. the addition of earth-wires (which may contain the telecommunication lines, earth-peaks and lightning rods).

Upgrading shall not include an increase in the voltage of the line unless the line was originally constructed to operate at the higher voltage but has been operating at a reduced voltage.

Appendix H – Independent Opinion of the Whakatane District Plan



MATAHINA AND ANIWHENUA GENERATION EMBEDMENT PROJECT ENVIRONMENTAL PLANNING ASSESSMENT

1. INTRODUCTION

Nova Energy, Horizon Energy Distribution Limited (Horizon) and TrustPower are developing an application for the embedment of Matahina and Aniwhenua electricity generation stations within the Horizon electricity network.

The proposal is to bypass existing 110kV generation output from the Matahina Generation Station and utilise the existing Horizon 33kV transmission system to provide a new 110kV generation connection direct to the Edgcumbe Substation.

This report examines the environmental planning rules and performances standards described in the Whakatane District Councils operative District plan and relevant sections of the Resource Management Act 1991 in order to assess the likelihood of the proposed works being consented by the Whakatane District Council.

2. EXECUTIVE SUMMARY

I find no environmental planning impediment to the proposed work. The installation of a new 110kV capacity line from the Matahina Generation Station to Edgcumbe replacing an existing 33kV transmission is a "new line" which is a permitted activity in both the Rural Plains and Rural Foothill planning zones. There is no requirement to seek a resource consent for this work. It may be prudent however, to secure a Certificate of Compliance from the consenting authority as confirmation security.

The linkages to the new system are encompassed with the Matahina and Edgcumbe designated sites and are consistent with the purpose of those designations. "Outline Plan" approval may be required for connections and switch points at the designated sites, which is merely a process, to ensure the consenting authority is satisfied the work is compatible with the purpose of the designation.

I found no relevant Resource Management Act 1991 issue that would jeopardise project.

HIPKISS CONSULTANTS (WHAKATANE) LTD

12 Domain Road, Whakatane 3120 ■ Ph 07 308 0632 ■ Mob 021 556 540 ■ Fax 07 308 0631 ■ Email: hipprop@xtra.co.nz
■ www.hipkissconsultants.co.nz

3. RELEVANT PLANNING RULES AND LEGISLATION:

3.1 WHAKATANE DISTRICT PLAN:

3.1.1 LAND ZONING:

All work lies within the Rural 1 (Plains) or the Rural 2 (Foothills) zones, this applies to the underlying zone of the designated sites at the Edgumbe Substation and the Switchyard at Matahina.

3.1.2 ACTIVITY STATUS FOR WORKS AND NETWORK UTILITIES:

Section 4.8.1 of the Whakatane District Plan describes the land use activity status of works associated with network utilities. The question is whether the proposed line work is a "new line" or an "upgrade". "Upgrading" is described in section 4.11 (Definitions) of the Whakatane District Plan. The proposed line work does not satisfy the meaning of upgrading and this case the proposal is classified a "new line". I have discussed this determination with a senior Council planner who agrees with this reasoning.

In this case the proposed line work is a permitted activity as the construction lies within the Rural 1 and Rural 2 planning zones. There is no requirement for a resource consent and no public notifications are necessary.

It would be prudent, but not essential, to seek a Certificate of Compliance as formal notification that the proposed line work is compliant.

3.1.3 DESIGNATED SITES:

The Transpower Edgumbe Substation (D.25) and The Transpower Switching Station (D.24) are designated sites owned by requiring network authorities. The purpose of these designations are described in the Whakatane District Plan schedules:

- The purpose of D.25 is "Electricity Substation"
- The purpose of D.24 is "Outdoor Switchguard"

These purpose descriptions are sufficiently broad to conclude that any linkage or connection requirement at Edgumbe and Matahina is compatible with the purpose of the designation. An "Outline Plan (s176A Resource Management Act) application may be required for submission to the Whakatane District Council for confirmation of compliance. This is not a consent process, the Council can only request changes.

3.2 THE RESOURCE MANAGEMENT ACT 1991:

3.2.1 PART 5: NATIONAL ENVIRONMENTAL STANDARDS (s43 & s44)

The Resource Management Act 1991 provides a hierarchy of instruments regulating technical standards for environmental matters. National Environmental Standards are dominant to a District Plan.

There is a National Environmental Standard for Electricity Transmission Activities. This standard, however, does not apply to the construction of new transmission lines or to substations. Nor does the standard apply to electricity distribution lines. The Standard only applies to activities that do not meet the terms and conditions for permitted activities.

E. HIPKISS

REGISTERED INDEPENDENT COMMISSIONER (MINISTRY FOR THE ENVIRONMENT)