Wairoa Energy Supply

Scoping Study

Report to the Wairoa District Council

By East Harbour Management Services

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Wairoa Energy Supply

1. Introduction

Solid Timber Building Systems (STBS) are upgrading the Clapham sawmill at Wairoa. The expansion requires new investment in the electricity distribution network in order to match increased capacity demand. STBS are evaluating the use of process wood waste for on-site electricity cogeneration which could be economic if adequate processing wood waste is available from that and the adjacent East Coast Lumber sawmill. It would be uneconomic if additional fuel has to be sourced from off-site sources.

AFFCO and East Coast Lumber also have expansion plans which are constrained by the capacity and cost of energy supply. AFFCO are being significantly affected by high spot electricity prices. At the same time they are considering constructing a blast freezer plant that would require an additional 0.5 MW of electricity supply. AFFCO however have a number of energy investment initiatives that they could take but they need a framework for their decision making.

The Wairoa area is on a transmission spur from the Genesis owned Tuai power station and because of this location has high nodal electricity prices. Eastland Network is endeavouring to rationalise their electricity distribution assets to decrease transmission costs and off-set expensive new investment in sub-transmission assets. Notably Eastland Network is installing 1.0 MW diesel generators at Mahia and Frasertown in order to avoid Transpower transmission charges, provide network voltage support, and provide increased security of supply. The Mahia generator will also provide capacity support to meet high holiday demands. Alternative generation from local hydro is potentially available but has not been evaluated.

STBS energy supply costs have been the principal driver for this study however the energy issues are far greater than they can manage on their own. The electricity supply problems in the Wairoa area affect each of the area's stakeholders but the issues are multifaceted and don't fall into any one party's area of interest. An integrated energy solution that would assist STBS and other business in Wairoa has been suggested but this requires someone to take a lead and pull it together.

The energy supply related issues highlighted at Wairoa and being encountered by STBS are typically being encountered by regional wood processors elsewhere throughout the country. The resolution of these issues at Wairoa is a pilot for similar exercises elsewhere. Being on a spur line for electricity supply, and with only 3 major electricity loads, means that it is a more manageable situation than would normally occur.

East Harbour Management Services were engaged as an independent facilitator by Wairoa District Council to identify, evaluate, and provide a scoping study on the range of energy issues and opportunities that may assist;

- STBS achieve its development of the Clapham sawmill,
- Reduce energy supply capacity and cost to business in the Wairoa area,
- Improve electricity supply reliability in the Wairoa area at the least cost.

The scoping study provides recommendations and priorities for further more detailed investigations.

2. Drivers of Energy Demand

Demographic Overview

The regional economy[1] has been performing well over the past year. The key sectors in the East Coast region are agriculture, forestry, manufacturing (mainly primary processing), retail trade, health and education. The outlook for 2003 is for a slowing in growth as the region is likely to suffer from falling export returns over 2002.

The labour market improved in the year to September 2002 compared to the previous year, driven by robust economic growth in the region but employment growth was weak. Over the next year it is expected to weaken further as lower regional economic growth leads to static or even declining employment. The result is that Wairoa's broad permanent population is remaining static or may have even have dropped by 10%, as a result no change in energy demand is expected, except in the Mahia area and for the three main commercial enterprises in Wairoa township.

Mahia Peninsula

The growth of the Wairoa area is specifically driven by the visitors to the Mahia Peninsula during the summer months. It is assessed that the population can increase from around 800 to an estimated 3-5,000 for a two week period. The influx of visitors tend to overwhelm the local infrastructure and energy supply in particular is stretched. For the past several seasons a 0.5MW diesel generator has been installed at Opoutama for two to four weeks to support voltage and meet the increased capacity demands.

Commercial Enterprise

Solid Timber Building Systems

STBS processes at it's Tauranga site around 1000 m^3 per month of low grade pinus into high value products such as laminated beams and construction components almost all of which is exported. STBS has expanded its operations into Wairoa by purchasing and redeveloping the mill and processing plant (refer Annex A).

The cost of energy at the mill and processing plant has increased significantly since STBS made the decision to purchase the site at Wairoa (from 7/kWh to 16c/kWh). In addition line charges have increased and mill upgrading has necessitated upgrading of the capacity of electricity connection. Further timber drying plans are based on installation of dehumidifier kilns which will use additional electricity.

STBS have upgraded at their own cost the supply voltage to the site which includes a new 1000kVA transformer as part of building extensions/alterations which were taking over the existing transformer site. Current connected electrical load is around 900kW but actual load is much lower and highly variable. The variable load factor of the mill is a major issue for supply to the site Eastland Network has advised STBS that investment of approximately $154,000 is required to upgrade and extend existing distribution assets in order to meet the mills future capacity and security of supply requirements, and to avoid interference with other network consumers caused by the mills operation. STBS have been advised that a capital contribution of approximately $76,000 towards this new investment is required. Without an enhanced electricity network there will be inadequate capacity available to take up some of STBS's options for further processing of sawn

[1] REGIONAL LABOUR MARKET REPORT: EAST COAST prepared by the Department of Labour, in December 2002

timber. Even now, only part way through stage one of the mill development they are at the limit of the electricity supply capacity. Stage two of the development, construction of remanufacturing plant, is entirely dependent upon energy availability but they cannot make plans for this until they are sure that they have a reliable and effective supply of electrical energy. Stage two development would allow some of the current Tauranga operations to move to Wairoa.

The current development target for the sawmill is a production level of 250 m3/day. The sawmill cuts mainly douglas fir although it is planned that pinus radiata will be cut as further mill developments occur.

The disposal of sawmill by-product in the form of bark, sawdust, planer shavings and chip fines provides an opportunity for generation of their own electricity. The waste does have an opportunity value in that some of it could be chipped and sold. This is not however the stated intention so it could be available as boiler fuel.

STBS have held discussions with bioenergy plant suppliers but need assistance to sort out their options.

East Coast Lumber

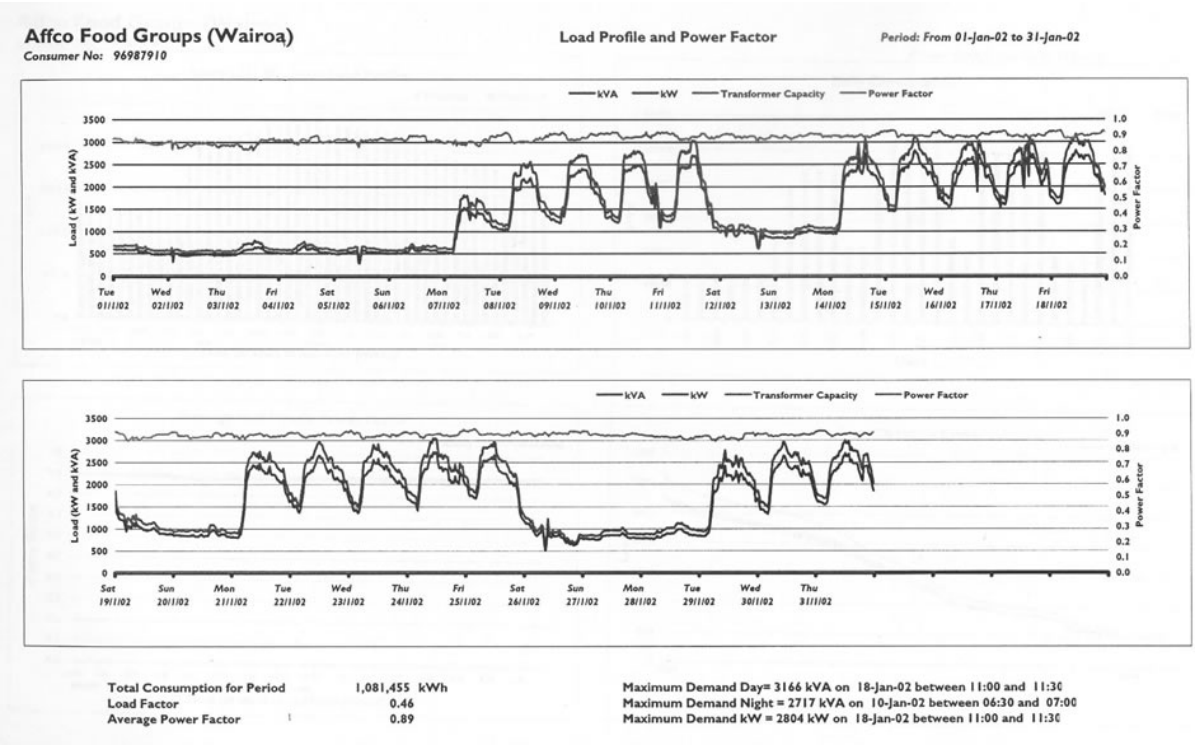
East Coast Lumber currently producing around 100 m^3 of sawn pinus radiata logs a day, 5 days a week and plan to increase this to 150 m^3/day. They process this into timber which is dried in dehumidifier kilns and exported. The waste is chipped and sold. Excluding the chip which is sold for export it is estimated that they have approximately 4 tonnes of process waste a day that could be available as an energy fuel.

Further development decisions are dependent on gaining additional electrical capacity.

AFFCO Wairoa

The current peak electricity load to the site is around 3.2 MW with average load of around 2.5MW. As is shown in figure 1 the load fluctuates significantly.

Figure 1



The AFFCO electricity demand is around 40% of the Wairoa area total load which results in AFFCO picking up a high percentage of the areas transmission costs. There is therefore a very strong incentive for AFFCO to consider load management so that they can reduce their connection costs.

AFFCO have a dedicated single 11kv electricity feeder which is often operated at full capacity, and often beyond normal acceptable limits. For 3.2 MW load this is very large for a single connection and leaves AFFCO very exposed to threat of interruption of supply. Relieving the end cables constraint would cost around $50,000 and allow feeder capacity to increase from 4MW to 6 MW. A second feeder would still be necessary for reliability and discussions have commenced with Eastland Network on a route and cost ($90,000).

AFFCO have an 18,000kg/hr steam boiler that is 50-60% utilised. It is fuelled on coal that is back loaded (80 tonne/week) from Wanganui or the Waikato on trucks taking offal (four trucks a day). Addition of a second hand steam turbine generator to utilise surplus steam is recommended. An initial assessment indicates that around 0.5 - 1.2 MW of electricity may be able to be generated at 10 – 12 c/kWh depending on surplus steam availability, outlet pressure requirements, and whether a condensing or back pressure turbogenerator is used. It is possible that a rendering plant may be reinstalled in which case this would take the current surplus steam and it would be unavailable for electricity generation.

AFFCO also have a heavy fuel oil steam boiler on site that is not utilised but could be used to produce steam for electricity generation. At present costs it is unlikely that this is suitable for electricity generation but it should be noted as an option for future use, particularly if the rendering plant was reinstalled.

AFFCO use steam for steam cleaning and air conditioning, about 10% of the steam is used for wool drying and the fellmongery, and the rest is used for washing at 82^{o}C and 43^{o}C. They have installed a significant amount of heat recovery equipment that provides them with a significant amount of their low temperature (43^{o}C) needs. The 82^{o}C hot water however needs to be made up from steam.

AFFCO are currently considering installing a blast freezer ($2million) that would require an additional 0.5 MW of electricity to be delivered to the site. It has a flat load and would operate for 24 hours per day.

Currently waste (cattle gut, manure,) disposal costs around $400,000 pa with most of it going to composting. This is available for conversion to energy.

An initial evaluation of the value of installing an anaerobic digester to process the liquid waste to methane which could be used to generate electricity indicated that for a standalone operation that 0.6 MW of electricity could be produced at around 7 cents/kWh. The capital cost of the plant would be around $650,000. The cost of electricity could be reduced further if the methane was piped as fuel for the coal fired boiler or Clapham sawmill bioenergy facility.

A 70kVA diesel generator is currently installed but rarely used. Consideration is currently being given to installing a 1,400kVA diesel generator $540,000) which will be able to be used during periods of high electricity spot prices. It is assessed that electricity will be able to be generated from such a machine at around 18-21c/kWh.

Wairoa District Council
A key growth target of the Council is to extend the tourism to cover the whole year and to attract more people to Wairoa. The upgrading of the sawmills has reversed the trend for taking resources out of Wairoa.

The Wairoa District Council has been working extremely closely with STBS to assist it upgrade the sawmill and through funding this study is working to identify opportunities for reducing energy costs for the area.

The Council is currently addressing the problems of waste disposal at its landfill which currently cost $1million pa. Utilisation of the biomass waste for energy production is an option that can be considered. The volume may be too small to make it economic unless it can be associated with other waste streams.

Wairoa Community
The Wairoa community consists of around 1,500 business points of supply and 4,000 residential electricity customers.

The residential customers use on average 8000kWh of electricity per year. Approximately 30% of the energy is used for heating water. Research has also shown that most NZ homes are inefficient users of energy and that by simple investment and changes in use habits substantial energy savings are possible.

The recreation centre and swimming pool are large users of heat. It is understood that previous studies into the use of solar energy for heating water was not economic. It would appear that with the passage of time and increased energy costs that the use of solar energy should be re-evaluated. With the distance of the facilities from any possible heat plant it is unlikely to be economic to transfer heat from boilers at AFFCO or the Clapham sawmill.

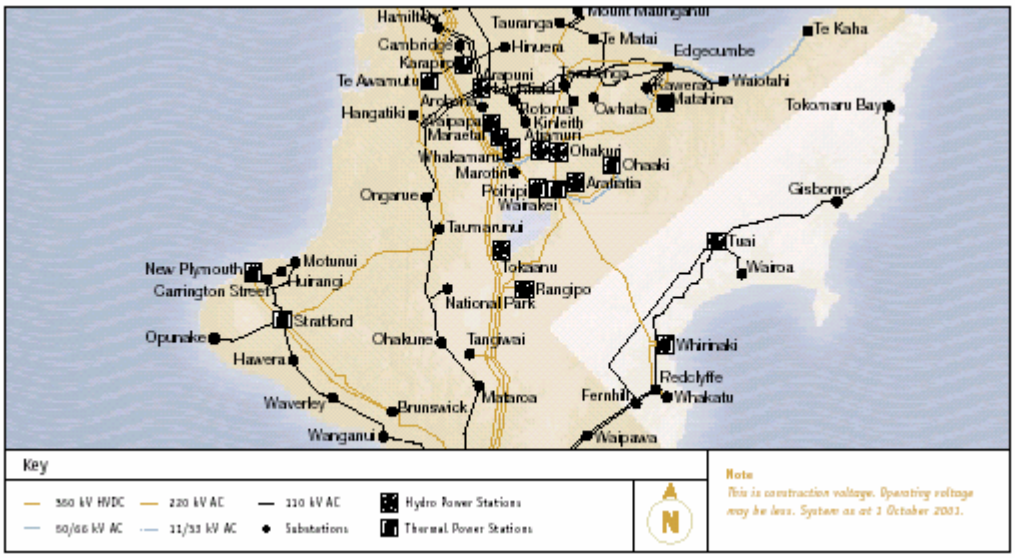
The business community uses energy in a wide range of ways. Experience elsewhere shows that the cost of this energy can be reduced through energy audits and establishment of energy management training programmes.

Wairoa District is in the area covered by the Hawkes Bay Regional Council but falls into the region covered by Eastland Network Ltd for its electricity supply. This position provides a separation that in energy terms can provide advantages for ring fencing the taking of initiatives to manage energy costs.

3. Energy Supply

Energy Supply to the Region
The Waikaremoana hydro power stations are connected to the national transmission system through Redclyffe substation near Napier and Fernhill substation south of Hastings. The Waikaremoana system is on a spur from the national grid and then Wairoa is on a further spur.

Figure 2



The present system has a single-circuit 110 kV line from Tuai to Fernhill and a double-circuit 110 kV line from Tuai to Redclyffe. Options to rationalise the present configuration are being investigated in preparation for life extension work that is scheduled to begin on the assets.

Eastland Network are negotiating with Transpower to reduce the level of security at the Wairoa substation so that it is at a similar level as that provided by Eastland Network throughout the distribution system.

Wairoa Energy Supply

While electricity is generated on the Wairoa boundary from the Waikaremoana lakes, prices are influenced by national supply / demand considerations and the location of Wairoa on a spur of the transmission grid.

There is also already existing locally controlled generation from the Eastland Network diesel at Mahia peninsular and the small 5MW Waihi Power station which has 3 days electricity supply capability and is used by Eastland Network to reduce peak prices.

Investigations have previously been undertaken into construction of other small hydro schemes and harnessing wind energy.

Generation and Reactive Power Opportunities

Moderate generation (tens of MW range) is of particular benefit at Gisborne, as it improves both the load and voltage limits on the whole regional network. In about seven to ten years' time, any generation up to about 100 MW on the 110 kV system would be useful as it offsets the possible need to increase the Redclyffe 220/110 kV transformer capacity. However, any generation in the Hawke's Bay region is on the constrained side of the Wairakei ring transmission constraint for northward power transmission. A similar situation applies to the Wairoa spur but its influence is less

Electricity Retailing
Trustpower is the local incumbent electricity retailer in the area. Meridian Energy is the only other company offering to sell to residential customers.

Within the current electricity market Trustpower is the most financially exposed of the retailers. It is long on customers and short on generation. With the lack of a fluid electricity price hedge market Trustpower is not able cover its exposure to high whiolesale electricity spot prices. Trustpower is therefore shedding around 32,000 customers in the Christchurch and Wellington regions.

It is understood that Trustpower hoped to purchase the Taranaki Combined cycle power station which would have put a better balance between its retail and generation operations. Business customers were advised to have spot price contracts for the interim before Trustpower was in a position to enter into firm fixed price contracts. Trustpower customers have been very exposed during the current electricity shortage because of their spot price contracts.

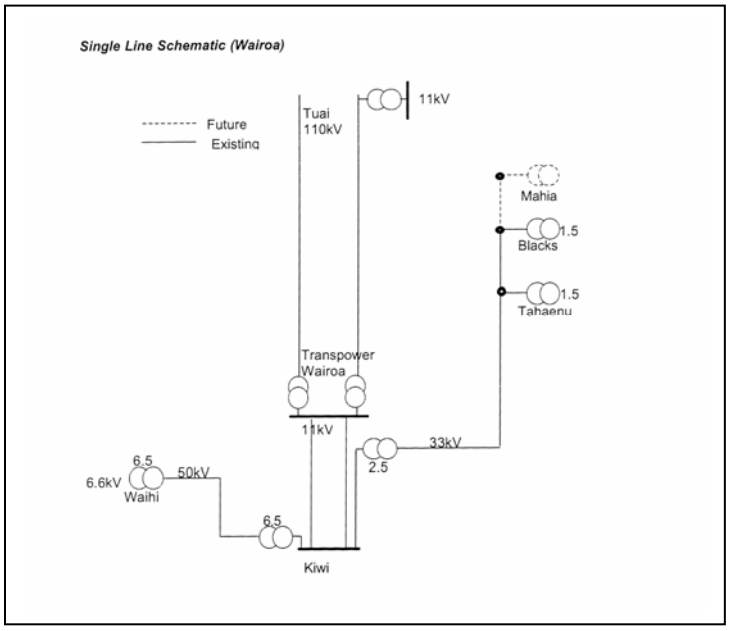
The electricity retailers are all part of generating companies. These companies tend to match their generation activities to their contracted retail position. This results in extensive inflexibilities that inhibit operation of a more open and competitive electricity market.

Electricity Distribution
The electricity distribution system is owned and operated by Eastland Network. Their network connects to the national Transmission system at the Wairoa substation. Eastland Network are discussing with Genesis direct connection to the Tuai and Piripaua power stations.

Electricity is supplied from Tuai to the Wairoa substation by a Transpower 110 kV line operating at 50 kV.

The main parts of the distribution network are shown in figure 3.

Figure 3



Eastland Network is upgrading some of its 11kv lines from Tuai to 33kv so that it can source electricity directly from Tuai and provide supply security via a ring arrangement. They will also be support voltage around the ring by taking 2-3 MW directly from Piripaua power station. With this arrangement Eastland may be able to bypass the Transpower transmission line and have zero off-take load at Wairoa substation. All electricity would then be supplied to Wairoa through the Eastland network directly. Avoiding use of the Transpower assets reduces connection costs to Eastland Network by approximately 50%. This will have an additional benefit in that it will provide higher utilisation of Eastland Network assets.

Electricity is also provided into the area from the 5MW Waihi power station. Eastland Network use the Waihi power station for peak load reduction at $50/kW pa. The power station only has about three days storage so by using it for peak load reduction Eastland is able to limit the peak electricity they have to bring in from outside the region. This reduces Eastlands network connection costs.

Eastland Network advise that there is no capacity constraint at the Wairoa network grid exit point, the issues relate to the security and quality of supply. Throughout the area Eastland network seek to work with electricity users to confirm the level of security customers want and are prepared to pay for.

During the summer peak loading occurs at Mahia which is beyond the capacity of the electricity network to supply. A small diesel generator has been available to meet peak load and this is just being upgraded to a 1250kVA machine.

Electricity Network have developed a Strategic Plan which has a strong emphasis on the use of distributed generation as a means of meeting peak electricity load requirements, deferring upgrades that would otherwise be required, reducing peak transmission capacity costs, and generally reducing electricity costs overall. The Eastland Network Asset Management Plan identifies a number of planned improvements to the Wairoa network. These are separate to lines upgrades that would be necessary to meet specific customer requirements. Where a specific change to the distribution network is required to meet customer capacity or security requirements these are a direct cost to that customer regardless of whether the customer arranges for their implementation or that it is undertaken by Eastland Network.

Eastland Network advise that they have found it difficult to plan appropriate upgrading of the distribution system as they have not had good communication with the Wairoa area over new or potential developments affecting electricity supply. This is partly because they don't interface directly with electricity customers as this is now through the electricity retailer.

Gas Supply

Westech Energy have been actively drilling for oil and gas in the Wairoa area and have identified opportunities near Wairoa and Frasertown. They are currently seeking exploration partners and can be expected to continue exploration within the near future. While driven by the national energy market there could be associated benefits for the supply of energy to Wairoa if extraction of the gas and fluids occurred.

4. Electricity costs

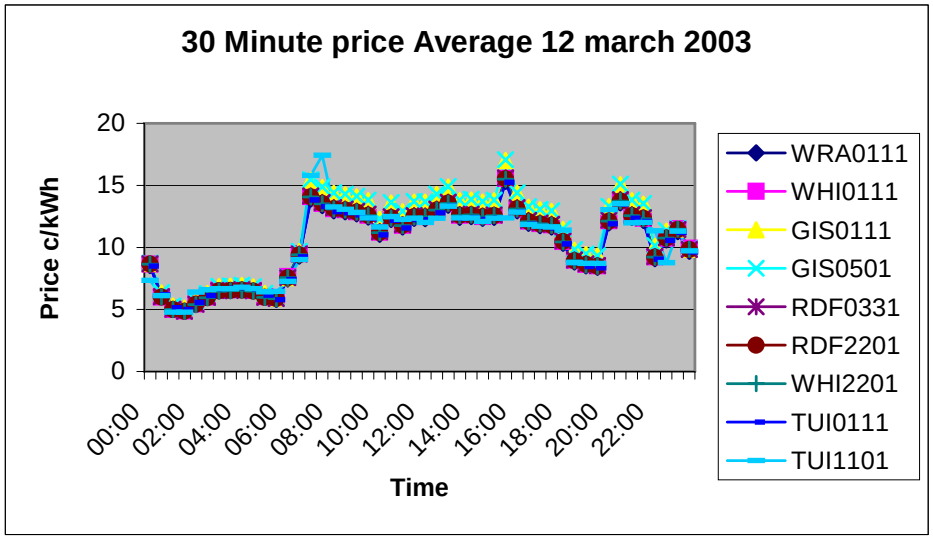
Nodal pricing

The national transmission system is based on electricity prices being set at each node or grid exit point. The grid exit point for Wairoa is the Transpower Wairoa substation.

Nodal prices in the region all follow the same daily pattern with some minor variations. There are small price differentials across the region with prices at Wairoa higher than their southern neighbours. The price differential for Gisborne however is significantly higher (by about 10%) than those in Hawkes Bay. This differential is particularly noticeable from about 7.30 am to about 10.30 pm. Prices at Wairoa are significantly influenced by those at Tuai and follow these closely.

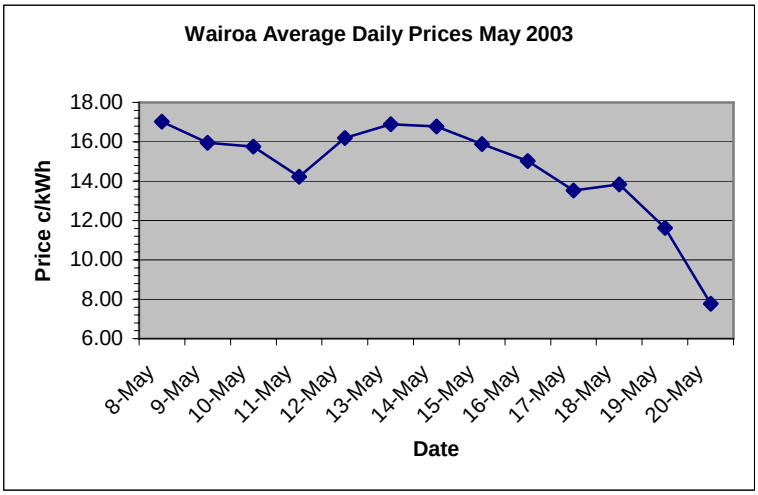
Spot prices at the various regional substations during May 2003 are shown in figure 4.

Figure 4



The nodal prices change on a half hourly basis so it is always difficult to say what is the Wairoa electricity price. Figure 5 demonstrates how significantly prices can change day to day. This demonstrates the importance of industry having good energy management techniques and actively managing peak loads in particular.

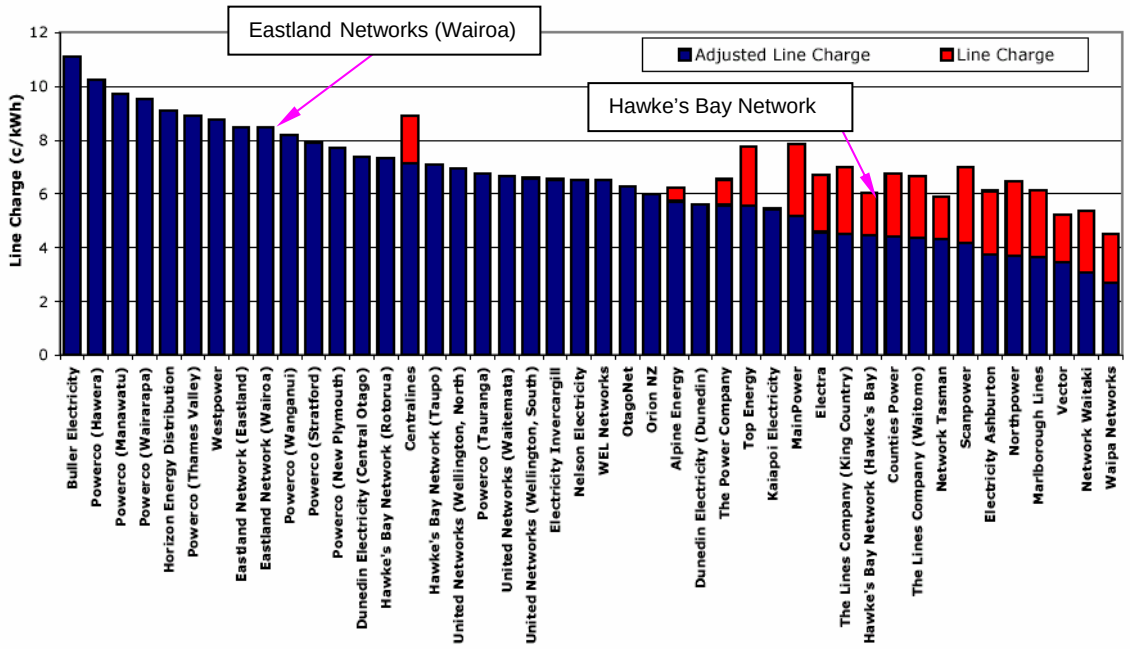
Figure 5



Lines Charges

Domestic lines charges are significantly higher for Eastland Network customers (8.48 c/kWh) than those for Hawkes Bay Networks (6.06 c/kWh). The charges for the two companies are indicated by arrows in Figure 6.

Figure 6 **: Approximate Ranking of Lines Company Charges after Deduction of Rebates, Discounts and Distributions**



Source Ministry of Economic Development

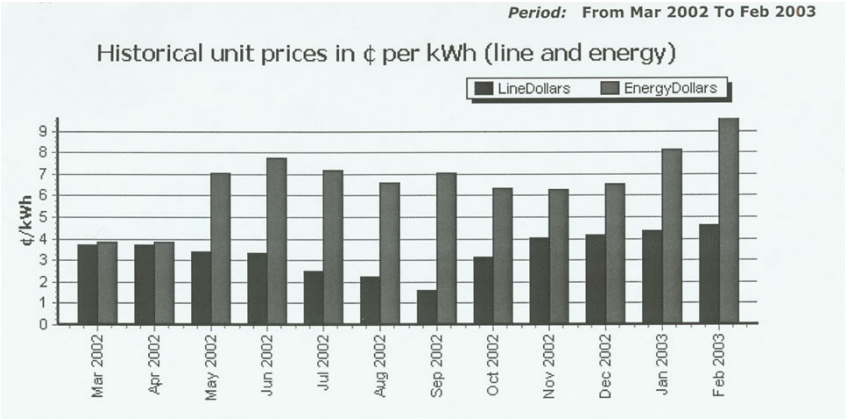
Wairoa residential customers pay approximately 12-15% higher energy charges over those in Hawkes Bay because of the lower population density in the Eastland Network area and the "spur" Transmission prices which are approx 60% of ENLs cost

Commercial and Industrial Prices

Currently STBS has a fixed price contract with TrustPower of 15.33 c/kWh plus fixed charge of 133.33 c/day. This is equivalent to about 16c/kWh.

Wairoa District Council has its electricity cost based on a hedge contract for energy (two weekday and two weekend categories), plus line charges based on four time of day categories. In February these average 9.5 c/kWh for energy and 4.2c/kWh for line charges. Figure 7 shows how these have changed during 2002. In 2003 the prices will have increased considerably depending on whether the hedge contract is exposed to movements in spot prices.

Figure 7



AFFCO have had total electricity costs of 23.17c/kWh during April 2003. The energy component during that month was 19.4 c/kWh (compared to 8.55c/kWh for April 2002). These high prices were because at that time AFFCO was 100% exposed to the electricity spot market. Since then they have been able to obtain hedge cover for approximately 28% of their demand.

The variations in commercial electricity prices highlight the necessity for all commercial electricity customers to gain a good understanding of electricity contracts and how energy management can reduce costs. Experience elsewhere has shown that there is significant lack of knowledge of commercial electricity contracts and often misunderstandings of how billing is calculated. It is suggested that significant cost savings can be made for all business in Wairoa if a series of seminars was held to assist understanding. This may need to be backed by on-going support from an independent Wairoa based advisor.

Residential Electricity Prices

Trustpower sells electricity under three alternative plans,

- Unrestricted 24 hour supply
- Controlled supply – suitable for fixed supply such as hot water heating and night store space heaters. A number of options are available from 4 hours each day to 22 hours each day.

Day and night. Different tariffs apply for day and night. This is suitable for appliances that can be used at the cheaper night rate.

Figure 8 summarises the residential electricity costs that have applied over the last few years.

Figure 8

East Coast

Line Business *Retailer*	Approx. No. of Residential Consumers by Line Business	15 Nov 1999 Line	15 Nov 1999 Retail	15 Nov 2002 Line	15 Nov 2002 Retail	15 Feb 2003 Line	15 Feb 2003 Retail	% Change 15 Nov 2002 to 15 Feb 2003 Line	% Change 15 Nov 2002 to 15 Feb 2003 Retail	% Change 15 Nov 1999 to 15 Feb 2003 Line	% Change 15 Nov 1999 to 15 Feb 2003 Retail	Total Increased Cost (+) or Annual Saving (-) 15 Nov 1999 to 15 Feb 2003 Line	Total Increased Cost (+) or Annual Saving (-) 15 Nov 1999 to 15 Feb 2003 Retail
Eastland Network (Eastland)	15,836	**8.04**		**8.48**		**8.48**		**0%**		**5%**		**$35**	
Contact Energy			15.45		17.42		18.18		4%		18%		$218
Meridian Energy			15.16		15.44		15.44		0%		2%		$22
Eastland Network (Wairoa)	4,031	**8.44**		**8.48**		**8.48**		**0%**		**0%**		**$3**	
TrustPower			15.57		17.81		17.81		0%		14%		$179
Meridian Energy			19.20		18.65		18.65		0%		-3%		-$44

5. Energy Resources

Hydro electricty

There have been a number of studies undertaken over the years into the hydro potential of the Wairoa area. There is major potential for hydro electricity generation from the Mohaka and smaller opportunities in the Wairoa river catchment.

Because of their size the Mohaka opportunities will not be discussed here. The opportunities on the Wairoa catchment are however within the capability of the local electricity supply network at around 10 – 15 MW of generation at 10 - 15c/kWh. These projects have not been investigated in recent years because they have previously been considered too expensive relative to gas generation elsewhere. As embedded generation under current Wairoa electricity prices they would appear to warrant further investigation.

Eastland Network has investigated extending the height of the Waihi power station weir in order to gain additional peaking capacity. With the value of peak electricity reduction this should be able to be fully justifiable. A suggestion has been made that desilting the lake should also be considered but no information is available on this option.

Gas

Two onshore wells were drilled during 2002, while offshore exploration was stalled awaiting new investment.

Westech Energy completed its Tuhara-1B appraisal well near Wairoa in mid-2002 but failed to establish a commercial flow of gas. Following the withdrawal of New Zealand partner Orion Exploration during 2002, Westech is seeking partners for its three offshore permits, two off Hawke's Bay and one off the Wairarapa coast.

The principal Westech field is at Frasertown approximately 11km from Wairoa. The field approximately 2-3 km from Wairoa is smaller.

The use of gas for electricity generation requires an electricity load significantly greater than 10-13 MW to provide economies of scale to support well development, pipeline construction and installation of generating plant. While Wairoa is close to the gas fields the electricity demand is just too small unless development were to proceed for export of electricity from the area. Westech have the option of piping the gas from the area to probably Whirinaki for electricity generation, or installing a gas fired power station near Wairoa and exporting the electricity via the Transpower transmission lines. With rising gas prices the option of installing a well head generator to prove the field may become an attractive proposition for staged field development. Such a decision will be driven by national gas and electricity prices rather than by anything to do with local energy requirements. If it were to proceed then Wairoa nodal electricity prices would certainly reduce.

Woody biomass

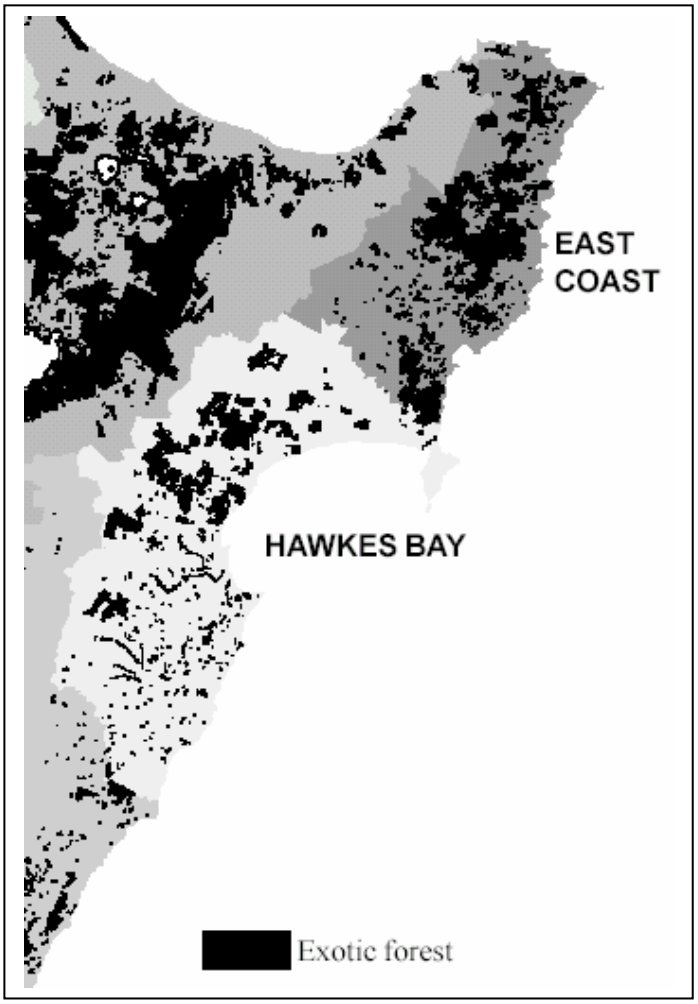
Resource

There are large quantities of forest derived biomass available in the Wairoa area. The size of the resource is shown in figure 9 and the the location of forests surrounding Wairoa are shown in figure 10. However while the forest are close many of the trees are cut and transported to either Napier or Gisborne. Anecdotal evidence is that some forest owners prefer to send the trees to processors who have long term security of activity, which they may not always see in local processors.

Figure 9

Territorial authority	Area (ha)	Standing volume (000 m3)	Area-weighted average age (years)
East Coast wood supply region			
Gisborne District	153 311	26 757	11.37
Total	**153 311**	**26 757**	**11.37**
Hawkes Bay wood supply region			
Wairoa District	**52 027**	**9 353**	**12.72**
Hastings District	63 782	13 834	13.05
Napier City	237	39	10.85
Central Hawkes Bay District	7 321	1 839	15.04
Total	**123 367**	**25 065**	**13.03**

Figure 10 Forest Distribution



Forest Residue

There is potentially hugh quantities of residue from nearby forests that could be processed into a homogenous fuel product. Current estimates are that this could cost up to 3-4 $/GJ ($40-60/tonne) delivered to a bioenergy facility.

It is expected that forest residue is not likely to be suitable as a source of energy for heat production until around 2005, and electricity generation until at least the end of this decade. The cost of collecting, processing and transferring forest residue to a bioenergy facility adds an additional 5c/kWh to the cost of producing electricity.

A cogeneration arrangement would bring the timing of electricity production forward.

Process Waste

Wood processing waste is the ideal fuel for a bioenergy facility as its use as an energy source usually avoids disposal costs that would otherwise be incurred. The ideal biomass fuel is when the process waste is hogged to a homogenous chip size and its moisture content is regular. This comes at a cost but reduces storage costs and allows steady operation of the heat plant.

Affco Waste

AFFCO produce approximately 22,000 tonnes per annum of paunchings, dung, and other annimal waste that it is currently costing close to $40 / tonne to dispose of. This material could be dewatered on site and used in a bioenergy facility. While achievable, the amount of energy used to dry and process the wet material can often out way the value of it as a fuel source. The most suitable and most economic use of this material as an energy source can be to put it into a digestor to produce methane gas which can be used as a fuel. Modern digestors are very efficient and cost effective. This is worthy of further investigation.

Council Municipal Waste

Wairoa District Council could produce up to 20 tonnes of burnable material a day but experience elsewhere indicates that such waste can often be difficult and costly to handle. As the cost of disposal of burnable material increases over time it may become cost effective for the Council to install a tub grinder to process burnable material, particularly if a bioenergy facility was nearby. There will however still remain the cost of supervision and separation to ensure that non-burnable or non-processable waste is not mixed with burnable waste. A decision on installation of a tub grinder will depend on the quantities being received at the landfill suitable for commutation into fuel. A visiting tub grinder which is also processing residue from nearby forests may reduce waste processing costs.

Current disposal cost is $30/tonne.

Processing landfill waste is commencing at some NZ landfills but it is usually undertaken by independent parties who negotiate contracts with the Council and possible fuel purchasers. These parties utilise specialist equipment and are often able to spread costs over several activities. It can also be expected that they will only enter the market when they are able to sell the processed waste as fuel.

Imported woody biomass

STBS have previously assumed that woody biomass could be trucked in from Napier or Gisborne, particularly as a backload on the chip liners taking chip from EastCoast Lumber. While these sources of woody biomass are available there is no guarantee that they would continue as a source of waste for fuel. Experience elsewhere has shown that such sources of biomass may not last long as other parties also see their value and they are used either in new on-site energy facilities or are taken to closer users.

The increase in interest in bioenergy is such that a lot of new plant is being installed and a number of facilities are now becoming fuel constrained. The value of waste woody biomass is increasing and it can no longer be always assumed to be a free fuel. There is also a further security of supply problem in that what is one persons waste today is another persons raw material for processing tomorrow.

Agriculture Waste

With the large quantities of corn and other agricultural crops grown in the area there is an opportunity for the waste from the crops to be a source of energy. Currently such waste is probably either burned or disposed of by dumping. If there were a bioenergy facility nearby then there could be an opportunity value in selling it to the facility operator as a fuel.

Wind

The Mahia area has many characteristics that indicate that it could be a reasonable area for installation of wind farms. While there are several areas that have reasonable topography, previous investigations undertaken by Wairoa Power have indicated that wind speeds are not consistently very high. The consequence of low wind speeds is that the cost of electricity generated by the wind farms is around the 15 - 17 cents/kWh range. This is only the cost of electricity generation. An assessed cost of $570,000 of distribution line upgrading would have to be undertaken for the Table Cape option and this would add an additional 1.2 cents/kWh to the energy cost. Because of the benefits that the Mahia area would receive it may be that there is no connection cost to obtain a delivered cost of electricity to say Wairoa.

Eastland Network indicated that a 2-3MW wind farm could be installed in the Mahia area without providing the need for Mahia – Wairoa distribution line upgrading. In fact that level of generation would be very beneficial to Eastland Network.

Wairoa Power investigated a number of possible wind farm sites in the Mahia area and it is assessed that up to 3MW could be generated on the Table Cape site alone.

The earlier Wairoa Power data has been reanalysed using current costs. Two sites were analysed, one that has extremely good topography and thus low capital costs, and a second better wind speed site. The better wind speed site has poor topography and only 1.5 MW of generation could be produced there. A second similar site would have to be found to obtain the target 3 MW sought. Figures 11 and 12 show the analysis results for the two representative sites.

Figure 11

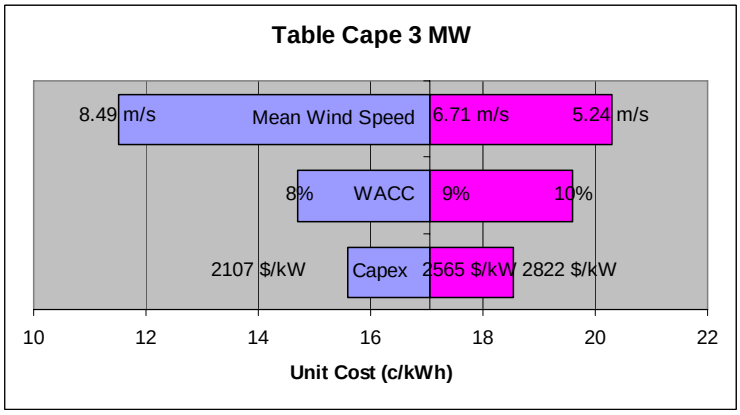
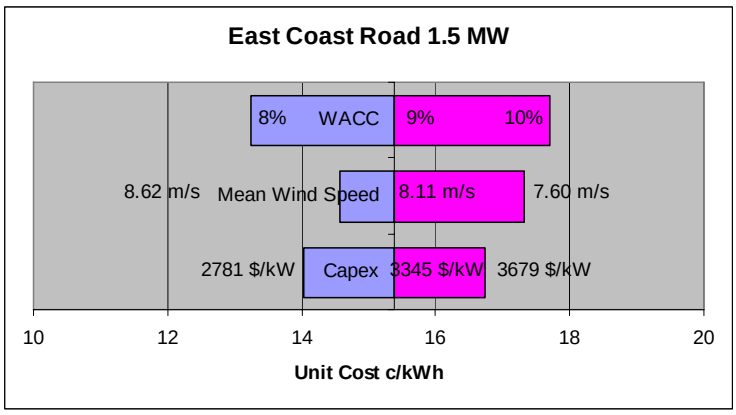


Figure 12



Interpretation of the analysis results indicates that wind speed and capital cost are the two principal drivers of the cost of generation at these sites. At the completion of the work undertaken by Wairoa Power it had been recommended that further and more appropriate wind monitoring needed to be undertaken, particularly of the Table Cape area. The current analysis reconfirms this need.

Wind energy is very dependant on the height the turbine hubs are above ground level. Previous monitoring has been from use of short towers. Higher monitoring masts would be required to get a more accurate indication of the wind energy potential.

The previous monitoring indicated a wind speed of only 6.7m/s yet monitoring on higher towers north of Gisborne have indicated wind speeds closer to 8m/s. If the wind speed were around 8m/s then the cost of electricity generated would be around 12 c/kWh which would be getting attractive for the Wairoa area and worth further investigation.

Solar

There are two solar technologies available to the region; solar water heating and production of electricity using photovoltaic cells. The region is attractive for solar energy being one of the best areas of NZ with Mean Daily Global Radiation of 14.6 MJ/ m^2 which is the same as Kaitia and greater than Whangarei (13.8). The 2184 annual sunshine hours is greater than Kaitaia (2070) and Auckland (2060).

Solar Water Heating

Solar water heating technology is well proven and readily available. For a 2-4 children family approximately 42% of household electricity is use to produce hot water. Installation of a solar hot water system can save approximately 70% of the electricity otherwise used to produce the hot water. This means that approximately 30% of household electricity (8000kWh pa) can be saved by installation of a solar hot water system.

Much of the Wairoa area has ripple control installed and so in conjunction with installation of solar water heating in say 20% of dwellings it is possible to reduce 0.8MW of peak load and not affect access to hot water

Solar water heating can be used as a preheater for industrial / commercial applications using significant volumes of hot water, eg Affco, fast food outlets, bakeries, rest- homes, motels, motor camps etc. There are a number of these suitable applications for installation of solar water heating and they can provide financial benefits to facility owners, while having a significant effect on the electricity supply to the Wairoa area.

In a large commercial application hot water can be available from solar hot water systems at around 5c/kWh.

Installation of solar hot water has an up front capital cost but on-going electricity costs are reduced by 30% in a residential application. This results in the capital expenditure being paid off within about 8-10 years for 2-4 children residential dwellings, and approximately half this for industrial commercial applications.

The most significant barrier to uptake of the use of solar water heating in the Wairoa area is the lack of knowledge and experience locally. The second largest barrier will be the cost of installation.

The NZ solar industry has been extending its capacity in areas such as Auckland but this has not yet been taken to the regions. Solar industry capacity building is based on implementation of quality systems, knowledge and experience, and development of trained personnel.

Wairoa can assist speed up the time before the solar water heating industry expands to its area by taking local initiatives. These could include:

- Local promotion of solar water heating by say mail out with Council rate demands,
- Distribution of information on solar water heating with building consent information,
- Public seminars on solar water heating,
- Encouragement of local plumbers to be agents for system suppliers,
- Adoption by an existing community trust of a solar water heating programme

A third significant barrier to the installation of solar water heating systems is that tenants of a property would obtain benefits from reduced electricity costs but the investment is a fixture on the dwelling. In a number of overseas communities this has been overcome by local trusts owning and installing the solar system and recovering the capital cost through the monthly electricity bill. The Wairoa community may be able to set up such a scheme by a partnership with the incumbent electricity retailer.

Housing NZ has a house modernisation programme which in some areas includes installation of solar water heating. There is currently a stream of work being undertaken between EECA and Housing NZ on how a greater number of solar water heating systems can be installed in Housing NZ properties. Wairoa needs to ensure that it works closely with regional Housing NZ staff to attract any installations to Wairoa.

Photovoltaic

Solar energy can be used to produce electricity at around c/kWh. In isolated applications such as on farms this is very cost effective. However while photovoltaic equipment costs are reducing annually the technology has not yet reached the maturity level for wider mass market application such that it could affect electricity supply to the Wairoa area.

6. Energy Supply Issues and Options

Size of Additional Generation

The maximum level of embedded generation that the area could benefit from is around 13-15 MW. It would appear that at a minimum an additional 2-3 MW of electricity generation would be useful to the Wairoa area for reducing peak energy costs and to increase supply security at the lowest cost.

The area already has about 1.6 MW of ripple control that is operational for peak reduction.

Possible Solutions To Energy Constraints

There area number of opportunities for gaining additional supply capacity and these involve;

- new generation,
- peak load reduction, and
- general overall area electricity use improvements

Implementation of some of these will also change the cost of electricity particularly to those making the investments.

Exposure to Electricity Spot Prices

Some businesses in the area are exposed to the electricity spot price and have been severely hurt by current high spot prices because of the hydro water shortage. Whether a company takes a fixed price electricity supply contract, or takes electricity based on spot prices is usually a risk management decision. Where a company has an ability to control and vary the amount of electricity used then in this situation it can be advantageous to have the variable quantity covered by spot prices. When prices are high the amount of electricity used can be cut back to reduce costs. If a company is highly exposed to the spot prices they will usually take a financial hedge to cap prices paid.

For companies with manageable electricity demands part exposure to spot prices can be financially very benefiicial.

A difficulty of the current electricity market has been that it has been difficult to obtain hedge contracts. It is also been a major difficulty that there have been many more companies unable to secure fixed price contracts and have been 100% exposed to spot prices. Many companies have also had little experience working without fixed electricity prices.

Companies having even only a small percentage of their electricity demand exposed to spot prices have a strong incentive to have load management and planned load shedding capability. Examples are;

- Restricting pumping of water to off peak times,
- Restricting heating of water to off peak times,
- An ability to turn off chillers for periods of an hour.
- Rescheduled high electricity use activities.

Energy Efficiency Improvements for Business

Businesses and significant electricity users are generally in the situation that they use energy without having thought of the most efficient ways, or not having reviewed the way in which additional electricity using equipment has been added over the years.

Many companies also don't have anyone on staff taking an interest in the electricity contracts they have signed. For a number there may be a more appropriate contract for them.

Two initiatives can be taken by the Wairoa business community. The first is to organise a series of seminars to increase the knowledge base on electricity contracts and energy efficiency improvements available. Improved knowledge of alternative energy contracts available may reduce electricity supply costs.

Secondly, and at the same time, a programme of energy audits should be undertaken. Funds are available from EECA to assist with the undertaking of audits and support may also be likely for a seminar programme. Economies of scale of bringing appropriate personnel to Wairoa is possible if seminars and audits are undertaken as a block programme.

Energy Efficiency Improvements for Residential Housing

The government has a number of home energy efficiency programmes available. Funding for these is available on a contestable basis and is best accessed by energy

trusts or other similar type entities who have the capability to negotiate contracts and manage their implementation. Funding was increased in the 2003 budget.

In addition to achieving electricity demand reduction and reducing household electricity costs the improvement in residential energy use has major benefits for health and welfare. Energy efficiency usually increases the winter household temperature with the result that warm people are healthy people.

There are a number or areas throughout NZ (eg Opotiki, Thames, Christchurch) where very successful energy trusts have been in operation for some time. These trusts have over time built up a body of experience, provided community leadership on energy use, and developed the skills of successfully obtaining government energy efficiency programme funds.

Reduce Necessity For Diesel Backup Plant.
Installation of additional embedded generation in certain parts of the distribution network may assist Eastland Network maintain supply voltage and allow them to remove the diesel generators at Mahia and Frasertown

Extension of Ripple Control
Ripple control is generally not favoured by network companies and electricity retailers as their use reduces electricity sales volume. Wairoa is fortunate in that it still has a l ripple control network that covers the whole area and Eastland Network use it to reduce peak network costs. The community may also like to see it being used and should seek regular reports from Eastland Network on how it has been used and the benefits gained.

Use of ripple control and solar water heating can reduce peak electricity load by 30% without reducing the availability of hot water.

Ripple control needs to be seen as a beneficial tool for communities to reduce peak energy costs rather than something to be avoided. However it should be noted that the benefits of load control will only be recognised when electricity retailers send out effective pricing signals to consumers , eg. The lack of interest by retailers is shown by the current lack of differential between controlled and uncontrolled tariffs offered by retailers

For people who feel affected by ripple control they can either pay an uncontrolled electricity price, or install a solar hot water system.

Bio-digestor at AFFCO
The quantities of waste produced at AFFCO are such that consideration should be given to installing a bio-digestor to produce methane. The gas could be used as a fuel in the coal boiler. Alternatively this could be done in conjunction with a bioenergy plant at STBS. They could be operated as a single entity with the methane being used as an auxiliary fuel in the wood waste boiler. This would have the advantage of having only one turbogenerator thus reducing capital costs.

Time of Use Metering
Installation of time of use meters empowers electricity users to manage their energy. From these meters and the subsequent services they can receive they receive the information that will allow them to take action to reduce costs. Introduction of time-of-use metering by each business would also allow integrated load scheduling between major electricity users in order to smooth peak electricity demand.

Bioenergy Facility
While initial studies by STBS have suggested that between the two sawmills, AFFCO and the District Council there could be up to 1500 tons of waste per week available as fuel, and that there is a possibility of other fuel sources, this assessment appears optimistic.

Clapham sawmill is the only reliable low cost provider of woody biomass suitable for fuel. It is estimated that once the target production level of 250 m3/day is achieved that 160tonne/day of woody biomass waste could be available as a fuel. The mix of fuel source is;

Green sawdust	10%w/w as received logs
Bark	5% w/w as received logs
Slab wood to hogged fuel	30% w/w as received logs
Dry shavings	14 t/day

The slab wood chips can be sold for export or used as a fuel. It is assumed that they would be used as fuel as this is the current stated intentions.

East Coast Lumber could contribute only about 4 tonnes/day of woody biomass suitable as a fuel as most of their waste (60 tonnes/day) is chipped and sold. If used in a bioenergy facility it would have an opportunity cost equivalent to its current sale value. It has not been included as a fuel source as it is currently sold.

East Coast Lumber estimate that their current dump cost is about $5-15 /tonne.

For this study it is assumed that Council waste does not come on stream for some years

If surplus steam is produced, or there is any surplus after use for electricity production, then it could be piped to AFFCO which is 1.5km away, or to the town swimming pool approximately 1.5km across the river.

The production of around 2 MW of electricity could produce electricity network savings that could result in Eastland Network paying the generator up to around $30-40,000 pa.

Based on the quantity of secure wood waste available it appears that a 10 MW boiler could be utilised. Feeding all the steam into a 2.6 MW steam turbine generator would result in electricity being produced at a cost of 9-11c/kWh. To produce more electricity than this would require fuel to be brought in which would be at a cost and thus would increase the cost of electricity produced. Use of a new steam turbine generator would increase the cost of electricity very significantly.

7. Analysis of Options

Bioenergy Facility
The economics of producing electricity from free wood waste appears to be cost effective for STBS and should be pursued further.

Ownership Of Bioenergy Facility
A bioenergy facility could be built, owned and operated by STBS, a local consortia, a third party such as Meridian Solutions, or an energy trust. The decision on ownership is usually dependant on the risk profile each of the parties have. If the parties are risk averse they will wish to share risk with other parties. If they wish to believe that they are

best placed to handle risk they will wish to own and operate the bioenergy facility themselves.

A second consideration is the availability of finance. Those in a strong cash flow situation will be able to finance the facility themselves while those who are cash short will be more ready to outsource the ownership and operation.

In the case of the bioenergy facility at Wairoa the availability of fuel at an appropriate cost throughout the economic life of the facility will be the most significant risk. The principal fuel provider is clearly the STBS sawmill. The involvement of other parties such as AFFCO or East Coast Lumber have to be ancillary to this primary relationship.

If the respective commercial entities were closer then a more integrated facility could be considered, particularly if AFFCO heat plant were included within the project boundary. On the surface there does not seem to be the commercial drivers that would suggest such an arrangement. An integrated facility would also introduce unnecessary complexities unless the integrated facility were outsourced to a third party such as Meridian Solutions.

Integration of the two sawmill energy requirements does make a lot of sense. The two sites are close enough that steam or hot water can be transferred between them and they could share a managed electricity supply in order to integrate their peak load requirements.

External Cluster Funding

Assistance can be obtained from Industry NZ if the Wairoa solution can be addressed as a cluster. For a cluster to exist there needs to be a common economic benefit which will produce a growth in sales of $5million. Projects can cost up to $200,000 and the cluster has to fund half the project. A further grant may be available to implement the solution. The criteria however excludes funding from local government. The cluster can form a legal entity through which the project can be organised.

The Wairoa energy issues are multifaceted and the activities and solutions are integrated. They lend themselves to being addressed through a single co-ordinating body. This is accentuated by Wairoa's small size and cohesiveness.

The solutions cover commercial activities such as the investment in a bioenergy cogeneration facility, co-ordination of energy planning within the Wairoa area, installation of solar water heating, upgrading business energy utilisation, and improvements of in residential energy efficiency. Collectively the benefits should be in excess of the $5million criteria for cluster funding.

The single co-ordinating entity could obtain collective funding.

Wairoa Energy Trust

A number of communities have established community base energy trusts that work on a number of community energy projects. Trusts in Thames, Opotiki and Christchurch have been very successful. These trusts however are often run on a voluntary basis and are dependant on funding from government energy efficiency programmes. A number of these trusts were started with seed funding (and often still receive on-going funding) when the previous regional electricity companies were disbanded.

The Christchurch Community Energy Trust has structured a number of its installation activities on semi-commercial lines and employs staff to implement projects.

The establishment of a Wairoa Energy Trust as the single entity to provide the co-ordination and professional management for the full range of energy initiatives available will assist ensure its single focus and achievement of area wide financial benefits. The success of such an entity will however depend on its leadership, establishment of commercial disciplines, and funding.

The Wairoa Energy Trust could be the owner of the bioenergy facility or an anaerobic digestor taking AFFCO waste to produce methane, with contracts for the supply of fuel from relevant parties and the sale of heat and electricity. Over time it could also invest in small hydro and wind farm developments.

To assist support the growth of existing business such as plumbers for installation of solar water heating systems the trust could limit itself to programme and asset management. It could outsource the implementation of specific programmes.

Funding Of Energy Efficiency And Solar Programmes
The government runs a number of energy saver grant programmes through the Energy Efficiency and Conservation Authority. These funds are usually contestable and are structured specifically for community based implementation. There are also specific capacity building programmes that can be accessed to assist development of energy efficiency in the community.

A number of communities who are successful at accessing these funds do so through establishment of a community based energy trust.

8. Conclusions & Recommendations

The scoping study has identified that while Wairoa experiences high electricity costs because of its location on a spur of the transmission system and its low population density, the community has a number of initiative that can be taken that could reduce the costs of energy and increase community well being.

Bioenergy Plant
Preliminary analysis indicates that a wood waste cogeneration facility at STBS would produce electricity at 9-11 c/kWh. If this were operated in conjunction with a bio-digestor using waste from the AFFCO plant there would be significant economies of scale. It is recommended that a wood waste bioenergy cogeneration plant be investigated in greater detail for installation at the STBS sawmill. This investigation should also consider inclusion of a bio-digestor producing methane from AFFCO waste.

Energy Co-ordination and Facilitation
Energy is like many other community infrastructure requirements that affect the whole community but for which no one has full responsibility. In recent years this has been accentuated with the splitting of the energy sector into a large number of players, all with different and often conflicting interests. Previously the local electricity entity (Wairoa Electric Power Board) provided co-ordination and looked after local energy interests. The attributes of this co-ordination and local interest has been lost and needs to be replaced. Current electricity retail and distribution companies also are structured around increasing sales and have no incentive for improved energy use, particularly if it could lead to

demand reduction and reduced energy costs. ***It is recommended that Wairoa District Council establish an energy coordination function, as it does for roading, to assist business and the community obtain energy at the cheapest cost, and gain the benefits of wider national initiatives.***

Electricity supply in the area has specific issues relating to the electricity distribution network and supply capacity. The distribution network can and is being developed by Eastland Network so as to get better use of current assets and to defer upgrading costs. Eastland Network planning is dependant on close and early feed back from the Wairoa area so that appropriate actions can be taken. ***It is recommended that regular communication be established between the Wairoa District Council (if it picks up the co-ordination role) and Eastland Network so that the feedback between demand and supply results in sound energy infrastructure planning.***

AFFCO Initiatives

Some companies in the Wairoa area such as AFFCO are exposed to electricity spot prices. This may be by desire or an inability to obtain fixed price contracts (generally the latter). Introduction of electricity load management capability on such sites can minimise the financial risk they face when spot prices are high. With such capability they are also in a position to also gain when spot electricity prices are low.

Electricity prices in the area are specifically affected by the AFFCO electricity load which is about 40% of the area's total load demand. The initiatives that AFFCO can take to manage their peak electricity load and cost of energy will have a positive flow on to the area. This is probably the most important initiative that can be undertaken. Integration of AFFCO load management will also assist local peak reduction and provide significant community energy cost benefits. It is becoming usual elsewhere in NZ that with projects such as this that the network company will share the financial benefits between the project investor and the network company. This is often enough of a financial attraction to swing the project to occur.

Initiatives currently being evaluated by AFFCO include;

- Installation of a larger diesel generator to allow reduction in peak demand particularly when spot prices are high (above 18-21 c/kWh),
- Installation of cogeneration equipment to utilise surplus steam available from the boiler (10-12 c/kWh),
- Addition of additional chiller equipment to allow flexibility for changing time of use,
- Addition of an additional point of connection to the Eastland network.

It is recommended that AFFCO work closely with Eastland Network to identify how energy management initiatives being considered can benefit the local distribution system and such benefits can be shared.

Business and Community Energy Management

Other companies in the Wairoa area who are on fixed price electricity supply contracts can also benefit significantly from the introduction of load management and energy efficiency improvements. The barrier to this occurring is generally knowledge and experience, and upfront capital funding. Funds to assist with audits are available from EECA. ***It is recommended that a series of energy efficiency seminars be held for local businesses and that these be integrated by energy audits.***

Distributed Generation

Eastland Network have identiified that there is about 2-3 MW shortfall in energy within the Wairoa area. This is principally driven by possible expansion by AFFCO, and by additional electricity demand by the two wood processors. To bring this additional demand in from the Transpower system or from Genesis Energy direct would entail Eastland Network spending around $2million to upgrade parts of their system.

In addition Eastland Network already has difficulty meeting electricity demand in the Mahia area over the December/January holiday period. Eastland Network have already committed to increasing the size of the diesel generator at Mahia and are considering other initiatives.

There are a number of distributed electricity generation initiatives that can be undertaken within the Wairoa area to meet the 2-3 MW shortfall. Eastland Network have identified distributed electricity generation as a key component of their strategic planning. Local business such as AFFCO and the wood processors are ideally positioned to utilise cogeneration to reduce electricity connection and energy costs. If integrated with the peak demand reduction requirements of Eastland Network they should be in a position to share some of the financial benefit to assist their own investment, plus reduce area energy costs. These cogeneration projects will be driven by the commercial incentives on each company.

Distributed generation is where small electricity generators can be installed to produce electricity and other useful outputs such as heat. Possible initiatives in the Wairoa area include;

- Installation of a 3 MW back pressure steam turbine generator to the existing AFFCO boiler.
- Installation of a 10 MW steam boiler with 2.6 MW turbogenerator at the STBS Clapham sawmill site.
- Addition of increased height to the Waihi hydo dam.
- Installation of a 3 MW of wind farm in the Mahia area.
- Installation of gas turbine associated with gas field development.
- Investment in new hydro power station,

Analysis of the options indicate that the opportunities can be prioritised in the order listed above.

The cost of electricity from a generator at AFFCO could be in the order of 10-12 c/kWh, and a bioenergy generator at 9-11 c/kWh . If this generation is embedded to meet respective site electricity demand then there will be no need for additional network distribution costs, and it can be expected that Eastland Network would be able to share some of its network benefits with the generator owner.

A risk associated with the bioenergy plant relates to security of fuel supply. The woody biomass which is used as fuel is currently waste and its characteristics as a fuel is dependant on the form of wood processing being undertaken. Over time the waste stream will change as additional processing equipment is added. There is also a risk that the processing plant will close down. Evaluation of the bioenergy facility is dependant on securing a risk minimisation strategy through multi-fuel streams and relationships with other parties. STBS could install a bioenergy facility itself or contract to a third party to install, own and operate the facility. ***It is recommended that STBS explore in greater detail the options of installing a bioenergy plant itself and the alternative of getting a third party to install, own and operate the facility and thus manage the long term risks.***

Waihi Hydro

No analysis has been undertaken in this study on the value of increasing the Waihi dam height. However as the value will be determined by the manner in which the stored water can be used to reduce peak energy costs the value can be expected to be reasonably high, and from experience elsewhere it would be surprising if this was not a sound investment decision. ***It is recommended that Eastland Network investigate increasing the dam height to add greater value to the assets.***

Wind

Analysis of previously collected wind data indicates that wind generated electricity in the Mahia area would be at 15-17 c/kWh. (In addition network distribution costs would be required to get the electricity to users.) The analysis however also identified that the wind speeds previously collected are significantly lower than that collected from a site north of Gisborne and that the data may not be accurate. This confirms the recommendations at the completion of the previous study which was that more appropriate monitoring be undertaken.

While it is unlikely that it would be economic to invest in the wind farm in the immediate future consideration should be given to installing appropriate wind monitoring equipment long term so that accurate analysis can be undertaken and the investment could proceed at the ideal time. ***It is recommended that a full height wind monitoring programme be established in the Mahia area.***

Energy Demand Reduction

As an alternative to bringing in additional energy from Transpower or Genesis Energy, or installing local generation, is the opportunity for reducing electricity demand within the area. Energy demand reduction is a viable long term option that not only can assist with the balance of electricity supply and demand, but can provide long term energy cost reductions. While often small in themselves the community has shown during both the 2001 and 2003 winter electricity shortages that they can contribute 5-10% of total demand reduction without difficulty. The barriers to using demand reduction as a permanent energy management tool are generally a lack of knowledge and experience, and upfront capital costs of appropriate equipment.

Wairoa Energy Trust

Government has a number of energy initiatives related to improving the well being of communities. These include improving the energy efficiency of housing, educating for the use of energy, and assisting with the choice of options. Many of these initiatives are based around funding programmes that are available to communities. Communities that have established energy trusts in order to improve their capability of accessing these funds secure most of the funding***.*** It is recommended that a number of the initiatives (solar, home energy use improvements) require local leadership and management if they are going to occur. They need to be integrated into a professional work programme and managed by a dedicated project manager.

Installation of solar water heating can provide significant immediate benefits to hot water users and provide electricity load reduction to the area. It has long term permanent benefits and can link to existing government programmes including that of Housing NZ. The main barrier to greater numbers being installed again relate to knowledge and experience of its application.

It is recommended that;

1. ***either the Council take a role in establishing community energy programmes or an independent Wairoa Energy Trust be established.***
2. ***A series of community energy information programmes based on existing technologies such as solar water heating be established.***
3. ***The community energy information programmes be integrated to business energy audits and national implementation programmes utilising visiting auditors and other experienced personnel.***
4. ***That solar water heating be initiated as a priority programme***

Some of the community energy initiatives can provide local employment for plumbers, electricians etc. For example local plumbers can easily become trained agents/ installers of solar water heating systems. These opportunities can broaden their existing businesses with consequent employment flow on.

Solar Water Heating

A barrier to installation of solar water heating systems is where the hot water user is a tenant. In some areas overseas this has been addressed by Energy Trusts owning the system and leasing it to the tenant with payment being recovered through the their monthly electricity payments. Such a system could be introduced in Wairoa. ***It is recommended that the Council or Wairoa Energy Trust establish a system for getting solar water heaters installed on tenanted dwellings.***

Annex A

Solid Timber Building Systems

Tauranga Site

STBS occupies four sites within Maleme St, Greerton, Tauranga.

The company is primarily a wood processor having the ability to take rough sawn kiln dried lumber and converting it through planer mills (four major machines), finger jointers (two machines), cut to length and docking saw lines (three), band resaws (two), laminating presses (three), and a number of other processes including wide panel sanding and morticing/trenching machines.

Among the products produced are custom processed timber for outside clients, glulam construction beams, and high grade finished components for domestic housing and hotel accommodation.

STBS is the owner of the INTALOK housing and light industrial brand, and component sets for those buildings are produced as part of the companies standard product range.

The production capacity of the Maleme St factories varies according to the type and nature of the product being made, but in normal circumstances the combined factories are able to process up to 80 cubic metres of wood per shift.

In recent times the company has supplied all of the wooden components for the new 102 unit Sheraton Bora Bora (Tahiti) development including over 50km of moulded hardwood decking manufactured using a process unique to the company, and over 2500 cubic metres of New Zealand pine. All of the timber supplied to this project was finished to a very high degree rather than just raw lumber, and was sent to the site completely ready for installation.

The company at the height of the Bora Bora contract had almost 100 staff including a number of temporary workers. Using its key staff the company is able to expand at short notice to accommodate such contracts .

Total under cover space when the redevelopment of the largest site has been completed will be approximately 5700 sq m plus yard space.

Projected developments . STBS plans to install Kiln Drying and LOSP Treatment facilities, is currently redeveloping one site to give additional under cover space and is installing additional press capacity for the production of laminated beams for export to Australia.

Wairoa Site

The Wairoa Clapham Sawmill was purchased from its founding owner Robin Clapham at the beginning of 2002. At the time of purchase the mill was severely run down and lacked a number of key machine centres which restricted its production capability to a maximum of about 15 cubic meters of sawn lumber per day. Even this low figure was further reduced by a lack of reliability of the plant and a need for more and better trained staff.

Over the 12 months under the new management additional land has been purchased bringing the land area to approximately 10 acres with negotiations proceeding to obtain another 6 acres. Major modifications have been made to the sawmill and ancillary equipment, additional equipment has been installed and the staff has increased from 8 to 36 persons.

The current production per shift is approximately 75 cubic meters of sawn timber per day, the planer mill has been upgraded and is now operated by skilled staff and is capable of processing up to 60 cubic meters per shift. Both the sawmill and planermill have had major development work done over the Christmas 2002 break which will substantially increase productivity.

STBS has been successful in recruiting an experienced sawmill manager, and an engineering team with the necessary skills to further develop the mill to its target production of 250 cubic meters of saw lumber per day, the timeframe for that target being end of 2004.

Clapham Sawmilling produces sawn and planed Douglas Fir structural lumber, the bulk of which is exported. Log supplies for this species is adequate for 5 to 8 years providing there is continued cutting of the Douglas Fir forest. Logs are supplied by Pan Pac forests, JNL, Carter Holts forestry company Forest Fibre solutions and will in the future include several private forest lots in the area.

Development plans for Clapham Sawmilling include the Grading, Kiln Drying, and additional remanufacturing facilities needed to enable it to make the switch to cutting high grade New Zealand Pine logs for export markets requiring feedstock for furniture and other high value markets.

The company is currently operating right at the limit of the existing electricity supply Infrastructure, and will require capital works to that infrastructure to enable the planned expansion to continue, negotiations are under way with local lines company Eastland Networks but we understand that there is a shortage of transmission capacity into the area which is beyond the scope of our negotiations with Eastland.