Recyclanomics

A study comparing the economics of recycling and conventional waste disposal in the Far North

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1995

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Prepared by Cliff Colquhoun and Warren Snow for CBEC (Kaitaia Community Business & Environment Centre)
with support from the Ministry for the Environment's Sustainable Management Fund.

INTRODUCTION

The aim of 'Recyclanomics' is to show that based on the Far North experience there are compelling *economic* reasons to make recycling the key focus for local waste management strategies.

The cost of recycling is compared with the cost of *conventional* methods of refuse disposal in the Far North based on financial and volume data for both systems for the three year report period (1992 to1994).

Conversion Factors

The report also provides conversion factors to assist recyclers and councils to convert tonnages (of recycled materials sold) to cubic metres for all main categories of recyclables. The conversion factors will be useful in areas where refuse is handled and measured by loose volume with no compaction untill the landfill stage. (A practical application of the conversion factors based on one year from Kaitaia Recycle Station is given at the end of the document).

THE NEED FOR 'RECYCLANOMICS'

The case for setting up recycling schemes has usually been argued on the basis that costs to set up and run schemes can be largely offset by commodity returns along with savings in refuse disposal. The argument usually goes that landfills are only going to get more expensive - that we need to find alternatives and that we must invest now in recycling to be able to reap the savings in refuse diposal costs.. Proponants for recycling can point to a number of surveys showing that the public want recycling and often claim that recycling saves precious resources and overseas funds and creates jobs.

Whilst these seem logical enough reasons for communities to invest in recycling programmes they are often not enough for budget concious councils who have to

answer to the rate wary public. The reality is that the (operational) cost of recycling must be competitive with the (operational) costs of waste disposal before the sceptics will seriously consider recycling as a viable waste disposal option. Fortunately this can now be demonstrated.

Recycing has proven to be cheaper than straight disposal in the far North

After three years of gathering financial data on Far North recycling and refuse disposal schemes which were both set up at the same time we can say that the Kaitaia based recycling scheme is operationally a cheaper way to deal with waste than straight disposal. All of the other benefits such as avoided diposal costs, employment, environmental protection, community pride and overseas funds savings are extra advantages that make the case for resource recovery simply more solid and an attractive option for any community that has the will and the expertise to bring together the key factors of success. These extra benefits have not been factored in the following cost comparisons.

We've called it 'recyclanomics' because it's about the economics of recycling as compared directly to the economics of landfilling on a day by day operational basis - without factoring the costs or benefits of downstream effects

THE FAR NORTH STORY

In 1989 CBEC proposed to the Far North District Council that a recycling scheme be set up to reduce waste, save valuable landfill space, create employment and involve the commmunity in waste reduction.

Financial projections in the proposal indicated an initial cost to establish the recycling scheme of $202,212. Council was asked to contribute $122,000. The shortfall it was proposed would be made up from the sale of recycled materials and employment subsidies. (Employment subsidies were gradually phased out.) Projections also indicated that for their $122,000 investment Council would actually save around $128,459 in refuse transfer and landfill costs which meant a nett gain of $6,459. The recycling programme was to be based at Kaitaia's Transfer Station. Based on the cost to operate an equivalant facility at Taipa it would have cost Council up to $93,000 per annum to operate. The operation of this facility was included in the cost of the recycling programme budget so Council's actual contribution toward the recycling programme was $29,000. (Council's Investment of $122,000 less the cost to operate the Transfer Station of $93,000). Council using their own words 'unanimously and enthusisatically' accepted the prosposal as presented.

At the same that the Kaitaia Recycle Station was established the Far North District Council closed a number of environmentally innappropriate landfills and introduced via a single contract a comprehensive system of refuse transfer stations.

Thg two new refuse disposal systems operating in parrallel in the Far North provided a unique opportunity to evaluate the economics of recycling compared to the costs of collecting and landfilling refuse.The cost comparisons for the two systems are based on a contract period of 3 years during which the volumes and costs of waste recycled and waste landfilled were measured by the far North District Council Engineering Department.

DESCRIPTION OF THE TWO SYSTEMS

Both waste systems in the Far North involve the collection of waste (or recyclables) from the kerbside and the collection and transport of waste from transfer stations to either landfill(or in the case of sorted and processed recyclable material) to end markets.

The two systems although separately run are partially integrated. Many of the recycling drop off facilities are located at refuse transfer stations for example. The total recycling programme operated by CBEC during the study period was based on direct contracts to council and subcontracts to other operators as well as stand alone self funding services as follows:

:

- Contracts to Council to operate the Kaitaia Recycling and refuse Transfer Station and kerbside recycling collections.
- Subcontracts to Council's main waste contractor to operate recycling facilities at Transfer stations and Ahipara landfill.
- Stand alone services (such as twice weekly cardboard collections in the Kaitaia and the East Coast business districts) that help underwrite the income of the recycling scheme.

1. The Refuse System -

Collection Transfer and Landfilling of Waste including operation of 6 Transfer Stations.

A system of transfer stations where the public dispose of refuse into standardised (30m3) containers which are transported to one central landfill. The containers are collected when full and carted as loose volume to a single new and more environmentally sound landfill at Ahipara adjacent to 90 mile Beach. This method of carting waste without prior compaction was considered the best option by Council as the volumes of waste at each site did not warrant the cost of compactor equipment.

2. The Recycling System -

Collection, proccessing and transport to various end markets including operation of Kaitaia Transfer Station

The Far North Recycling programme is operated by CBEC (Kaitaia Community Business & Environment Centre) in the Northern Ward of the Far North District Council. The programme is based at Kaitaia's Refuse Transfer Station which is also the central processing point for recyclables which are collected from:

- Other Transfer Stations in the Northern Ward
- Weekly kerbside collection serving 1700 Kaitaia households
- Twice weekly commercial sector Kraft (Cardboard) collection.
- Camping sites, functions and other minor collection points
- General Public use of 7 day recycling facilities at th Kaitaia Recycle Station.
- A municiple composting programme operating from Kaitaia that turns local garden waste into a commercial compost which is sold back to gardeners, nurseries and orchardists.

The population of the Northern Ward is currently ***16,464*** of which approximately ***5,500*** live in Kaitaia township. The most intensive recycling activity occurs in the immediate Kaitaia area mainly because of the kerbside and commercial recycling collections. Other Centres such as Awanui, Ahipara, Coopers Beach, Whatuwhiwhi, Houhora, Pukenui, Te Kao, Te Hapua, Herekino, Taipa and Mangonui rely on drop off points established by CBEC at Transfer Stations and other sites. During the study period CBEC operated the Taipa Transfer Station and the Ahipara Landfill as subcontractors to the main contractor. Some areas have a considerable influx of visitors during the holiday and toursit seasons.

SOURCES OF DATA

The data used to make the comparisons is based on the Northern Ward of the Far North District Council. Waste volumes and costs were supplied by Far North District Council Engineering Staff.. Recycling statistics were obtained from CBEC Recycle Station commodity sales receipts. All statistics and calculations have been checked and confirmed by Lynn Dow of Bray Cormack and Dow - chartered accountants. The process for comparisons between waste disposal and recycling and the conclusions have been checked and confirmed by Richard Tong of Tong and Associates Deveonport.

Note: All quantities in this report are expressed as loose volume which is how all waste is presently carted to landfill in the Northern Ward. No pre landfill compaction is undertaken.

RECYCLANOMICS - IN A NUTSHELL

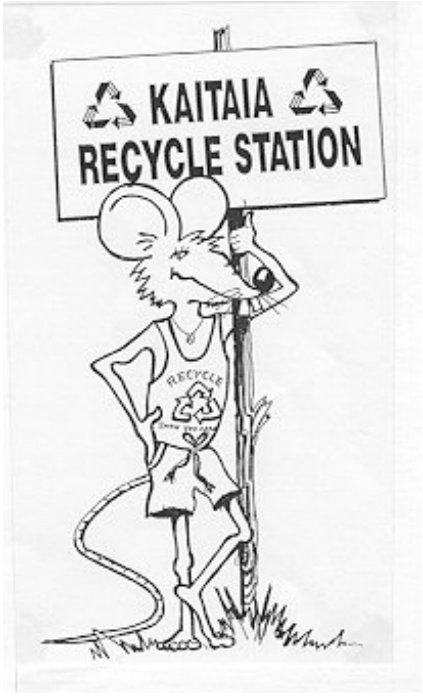
- The cost to collect a cubic metre (m3) of recyclable waste, process it and send it from the Far North to various commodity markets is $4.91 cheaper per m3 than the cost of collecting a cubic metre of waste and transporting and landfilling it.
- In other words It's $4.91 cheaper to recycle a cubic metre of rubbish in the Far North than it is to shove it in a big hole.
- If avoided landfilling costs of $4.01 per cubic metre are included then its $8.92 chepaer per cubic metre to recycle. If landfill aftercare, monitoring and replacement costs are factored in it may have been cheaper to never have had one.

Note 1:
For this report we have used operational and maintenance costs only. Benefits such as avoided refuse disposal and landfill costs, savings in overseas funds, reduced enviornmental and resource pressures and employemnt generation that are often attributed to recycling are not included in the calculations.

For example the $4.01/ m3 figure used (i.e. total non-recycled volumes handled annually divided by total annual costs) is only the **current contract cost** to landfill 1m3 of waste and does not reflect the true cost of operating the Ahipara Landfill. Full costing would include landfill replacement costs (including research and planning consents), land values and rentals, ongoing contract administration, aftercare for closed landfills and monitoring and managing environmental effects. If these additional costs were factored into present landfill values, recycling would be the first and obvious waste disposal choice for any community even witjouit "recyclanomics. . (for further information see the Paliamentary Commissioner for the Environment's report: "Local Authority Solid Waste Reduction Initiatives.")

Note 2: CBEC costs to operate the Kaitaia Recycling facility and network of Recyclable Collection and Drop-off centres includes NZES labour subsidies of approximately $25,000 in the first two years. This subsidy will not be available long term and cost increases in Recycling Budgets should allow for this.

Note 3: Note: Recycling rates have continued to improve since the report period. Volumes handled at the Kaitaia Recycle Station have risen from 11,000 m3 in year 3 to 16,570 m3 in year 4. Waste volumes have not risen in the same proportion.



ATTITUDES TO RECYCLING & WASTE DISPOSAL

Often when recycling is mentioned people say "its' great but it's too costly" the inference being that if it didn't cost anything they would support it . The same people seem to ignore that conventional waste disposal is ALL cost with little or no redeeming benefits. With landfills filling up and resource consents ever more dificult and expensive to obtain we need a safer more economical alternative. Recycling is that alternative.

It doesn't seem to be noticed by recycling's protracters that over the last 20 years waste disposal has become one of the fastest growing and most profitable businesses in the world with huge international clomglomerates gradually taking control of even small local waste systems. Waste disposal costs will continue to increase and to be a burden to local economies. But every day that communities accept the rationale that "recycling costs" without comparing it to the costs of conventional refuse disposal, precious resources will continue to move in great quantities at great cost to expensive landfills and opportunities for local employment and savings for ratepayers will be lost.

Waste disposal costs will continue to increase.

Communities may in the future not be able to afford the cost of conventional waste disposal if made to fully comply with increasingly stringent environmental standards. Recycling whilst not removing at present the most hazardous wastes from landfills does reduce the amount of material for disposal while at the same time creating an ethic of conservation. Perhaps the most important point to remember when exploring waste options is that the things we are throwing away are valuable resources that the world wants to buy. Waste disposal without minimisation and recycling programmes is simply resource abuse.

Recycling does cost to implement and operate but unlike conventional refuse disposal it does have returns and does make savings and the more recycling the more savings. Like most business initiatives an investment has to be made to reap the savings and other benefits. In the case of The Far North Recycling programme these savings and benefits have gone beyond original expectations to in fact show a profit.

The authors challenge anyone to demonstrate that conventional refuse disposal is anthing but cost with no benefits apart from creating the illusion that our waste has gone and is no longer a problem.

Community Action Creates Jobs and Saves Dollars

The Kaitaia recycling scheme has proved to be an econmically viable option for council in spite of the fact that most of the end markets for recycled commodities are 400 kms away. The average distance for cartage of refuse is 40Km. It took vision and courage on the part of council to make the initial investment in waste reduction through recycling. Like any good business investment the pay back comes later and now council is enjoying the savings.

The biggest reason for the success of the Kaitaia waste/recycling model is that from the start the community through a local non profit business was involved. The community had the incentive to not only save resources and waste costs but to also create badly needed local jobs. The community saw that money and jobs were being thrown into a big hole which in it self had ongoing negative side effects and costs and took the initiative to create jobs and save money.

The Kaitaia model demonstrates the potential for Councils to work with their communities for local benefit.

Good outcomes for Councils that work with local Non -Profit organisations.

Councils can work with non - profit organisations to achieve high waste diversion results as well as economic benefits that flow on to the community in a variety of ways - including to the private business sector.

Every community has enthusisasts who will put their energy behind initiatives that benefit their communities - all the more if there are positive environmental outcomes. Councils that learn how to tap into this energy will achieve better waste reduction results along with improved community acceptance of programmes. Councils have massive resources tied up in traditional methods of waste disposal. Many Councils are attempting to break the prevailing 'waste away' pattern and are beginning to focus on reduction and recycling. Some have set up special positions and units to promote the reduction of waste. In many cases the gains from doing this have been minimal mainly because of a lack of true community involvement and input. Community groups extend Council funding and programmes through grass roots activism and enthusiasm.

In CBEC's case the recycling programme was set up and run as a business but the commitment to TOTAL recycling meant that profits from high value commodities such as Aluminium cans and Kraft were used to subsidise the lower uneconomic commodities such as plastic green waste tin cans and waste oil. In a normal commercial environment only the currently economically viable commodities are recycled which also explains the normal boom bust nature of recycling. For CBEC the maximum number of people achieving the highest possible waste diversion was and is the prime motive and this is where any profits have been applied.

Finally in Kaitaia through Council working closely with a non-profit group an open book system has been possible where Council has been able to examine incomes and costs and to fully evaluate the performance of the pilot scheme. There has also been the opportunity in Kaitaia for Council to devleop with CBEC busineess performance standards and the conversion factors.

Perhaps the most important role for Non - profit organisations is in the area of public education and promotion of waste reduction programmes. Councils s could look on themselves as wholesalers here and community groups or non-profits the retailers in terms of communicating messages. Community groups have the networks and contacts along with low cost structures to achieve the maximum

community involvement for Council dollars. Whilst key people may be salaried, non - profits can also attract volunteer help in a way that Councils cannot. Furthermore no matter how well designed a Council's waste reduction prgramme their is always an element of resistance to being enthused by the same organisation that just put up rates or turned down a building permit application. Even using the top marketing agency will not achieve anything like the results that a well connected locally run non-profit can. The fact is that Council's regulatory role limits the effectiveness of Council messages. On the other hand community groups that are resourced by Councils will enhance councils image whilst cost effectively achieving greater penetration of messages.

The role of Not for Profit businesses does not exclude the private sector. In Kaitaia local businesses have benefited from sub contracts in construction, haluage, advertisiing, and vehicle manitenance - all adding value to the local economy. Two joint ventures with the local private sector has enabled local businesses to win contracts that would have certainly gone to larger out of town companies.

The key point here is that a solid waste system based arounsd reduction as the first priority will work best with a balanced mix of Public private and non profit components.

This has been proven in the Far North. There are also good models in the United States where the concept of Non Profits providoing a range of services to local government is well accepted.

The role of The Market and Incentives in the success of recycling and waste reduction programmes.

The vitality and flexibility of the market will ensure that where there is an economic return above the cost of collection that most commdities will be collected. Where their is insufficient economio return the market will favour landfilling even if it is not in the public interest. The only way to add value to commodities that are uneconomic to recycle is through economic incentives based on anticipated savings

Council's Role is Key

Councils have an incentive to reduce landfill costs.The public and the recycling industry through waste reduction and recycling can reduce those costs for Councils. Councils must in turn provide the incentives based on savings in landfill costs to activate the community and private sector to initiate programmes that will recycle and reduce waste.

The market will not automatically transfer the benefits of reduced costs that accrue to Councils through community and private sector recycling and waste reduction activitiess. Nor will it anticipate and transfer future cost savings as long as there is no present incentive to do so.

By utilising non profits or community based organisations Councils can best ensure that the organisational self-interest of waste reduction systems is aligned with the public interest.

Note: The private sector being completely profit driven is more sensitive to fluctuations in commodity prices and is less likely to internally subsidise the cost of recycling low value commodities than say a Non Profit Company which views employment and reduced waste costs as equall objectives along with balance sheet profits.

A Word on the Waste Heirachy

The internationaly accepted waste heirachy states the order of importance for waste reduction and handling activities as Reduce, Reuse, Recycle and finally residual management.. Unfortunately the heirachy is too often used as if each action is exclusive of the next. For example It's common for waste experts to say that we should put our energy into reduce and reuse before recycling which is further down the waste heirachy. At the same time it seems to be forgotten that picking up, hauling and landfilling waste, the lowest rung on the heirachy is being favoured above all above it at massive cost.

Recycling is a driver of behaviours that will increase particpation in the other rungs of the waste heirachy. People that take enough care at home to recycle are mor likely to be involved in other waste reduction initiatives at work and play.

Recycling also **reduces** waste, **reuses** waste and extends landfill space.

Perhaps we should look at the heirachy in different ways. Whilst the top rung 'reduce' is ideally the most important it will take some time before we all take this option fully in our daily lives so it represents the long term gains. If we ask where we can make the most immediate it's obviously recycling. Even when promoting Cleaner Production it's the savings that can be achieved through recycling of waste that demonstrate the eayly economic gains. It's the early economic gains that help sell the longer term cleaner production concepts to cost concious companies.

Mike Morris the founding Chairman of the Recycling Operators of New Zealand suggests that when planning waste initiatives the waste heirachy should be turned on it's side with all rungs being addressed at once with resources applied carefully in each area to achieve maximum long term and short term gains.

CONVERSION FACTORS

In the Far North as with many small communities, refuse is collected carted and contracts let on the basis of loose volume. No compaction takes place untill refuse is landfilled. The problem is that recycled materials are sold on the basis of weight making it difficult to compare the amounts handled by the different systems.

Having no accurate method of measuring the amount of recycled material handled and comparing it to conventional waste costs has made it difficult to justify the economic advantages of recycling to cost concious Councils.

CBEC developed the conversion factors so that Councils and Recyclers would be able to accurately measure quantities that are handled and processed at recycling facilities. The proccess for establishing accurate volumes can be adapted to any standard set of financial accounts as long as different income cateogories are separated (by commodity) in the accounting system. This simple method means that Councils can verify tonnages from annual accounts which are based on sales recepits from end markets. Accuracy is especially important where Councils are paying an avoided disposal rebate to recyclers.

To arrive at the conversion factors (tonnes to cubic metres) CBEC staff in conjunction with FNDC engineering department measured the weight of a cubic metre of each main recyclable commodity.

Also included is an example of the use of the conversion factors based on the Kaitaia Recycle Station.

RECYCLED MATERIALS - CONVERSION FACTORS

Weight to Loose Volume

The following chart shows the weight to loose volume ratios of the main

commodities that are traded at the Kaitaia Recycle Station and most recycling programmes.

Aluminium Cans	30kg	1m3
Whole Bottles/Jars	240kg	1m3
Newspaper & Mixed Waste	320 kg	1m3
Craft/Cardboard	30 kg	1m3
Plastic HDPE Milk	7kg	1m3
Plastic P.E.T Drink	10 kg	1m3
Plastic HDPE Household	?	1m3
Plastic Film	14 kg	1m3
Cullet	240 kg	1m3
Car Bodies	124kg	1m3
Whiteware	124kg	1m3
Light Grade Steel	124kg	1m3
Heavy Steel	1000kg	1m3
Green Waste	200kg	1m3

Note: Scrap Steel and Green Waste conversion ratios may not be consistant at different recycling facilities. We have established a general rule for these categories in consultation with two recycling operators with extensive experience in these fields. Roger Wark - Managing Director of "The Living Earth Company" who handle the bulk of Auckland's green waste and Mike Morris of Gamma Compaction who handle and compact the bulk of the car bodies, whiteware and light grade steel from throughout the North Island.

CONVERSION FACTORS - PRACTICAL APPLICATION

A typical year of Kaitaia Recycle Station's income has been used to apply the conversion factors.

Steps

1. Operator itemises all income categories by recyclable commodity in annual accounts.
2. The conversion factors are applied to the commodity incomes by category as demonstrated in the following example.

Data Used

1. Kaitaia financial accounts for income
2. Conversion factor list (As above)

MATERIALS SOLD	*INCOME*	*AVERAGE PRICE PER Kg*	*TOTAL KILOGRAMS*	*CONVERSION FACTOR*	*TOTAL LOOSE VOLUME m3*
Alluminium Cans	$1,629.00 ÷	.75c	2,172 ÷	30	72m3
Whole Bottles, Jars	All sold as Cullet			240	
Paper (Newspaper and Mixed Waste)	$2,179.00 ÷	.025c	2,179 ÷	320	272
Cullet (Broken Glass)	$5,586.00 ÷	.048c	116,375 ÷	240	364
Craft (Cardboard)	$11,981.00 ÷	.08c	149,762 ÷	30	
Plastics (HDPE Milk)		.30c	6,000	7	857
Plastics (HDPE Janitorial)	$1,347.00 ÷	.20c	6,735 ÷	(12) Average	
Plastics (PET Soft Drink)				10	561
Plastics (Shrink Wrap Film)				14	
Scrap Metal (Car Bodies Heavy Items Removed)				124	
Scrap Metal (Whiteware)	$1,419.00 ÷	.012c	118,250	124	953
Scrap Metal (Light Grade)				124	
Scrap Metal (Heavy Grade)				1,000	

Note 1: Most of the scrap steel sold at KRS in this year was light grade and whiteware so the average price is low.

Note 2: CBEC's Kaitaia Recycling are currently extending the range of income categories within their accounting system.

Measuring Green Waste

The accurate estimation of green waste volumes has always posed a problem for recyclers and Local Authorities. To overcome this and to achieve an acceptable estimation range we suggest the following approach:

Measure the compost windrow by area or record all compost sales and apply a reduction factor of between 4.5-1 and 10-1 The reduction factor is dependent on the bulk of the material coming into the facilituy. e.g. where heavy branches are the main bulk received the reduction will be at the high end of the scale 10 -1. Where the majority is grass clippings and resdential garden waste the reduction is more likely to 7-1.

Two Options:

1. Directly measure loose windows of green waste before mulchings.
2. If compost sales are made, the cubic metres of compost sold annually can be converted back to loose volume using conversion ratios:
    - Domestic light branches and grass clippings 4-1
    - Commercial heavy branches and prunnings 6-1

APPENDIX 1.

REFUSE DISPOSAL VOLUMES AND COSTS (1992-1994)

For a three year period in the Northern Ward of the Far North District Council.

BASED ON:
1. **Transfer Station Contract (United Carriers)**
2. **Household Refuse Collections (McBreen & Jenkins)**
3. **Kaitaia Recycling Station Operation (CBEC)**
4. **Ahipara Landfill (United Carriers)**
5. **Kaimaumau Transfer Bin (United Carriers)**

(All volumes and costs include site development and operating costs for 3 years)

1. **Transfer Stations Contract**

Year 1) including Green	31,270 m3		- Site Development (15year spread)	
Year 2) Matter not	37,150 m3		66,600	
Year 3) Transfered	47,356 m3		- Operation and Maintenance	
Total Volumes		115,776 m3	- ($286,356 x 3 years)	859,068
LESS:				
First remove green waste not transported by transfer bins 1,000m3 x 3 years	112,776 m3			
Containers not full arriving at Landfill average 87.5% Full	98,679 m3			
ACTUAL TOTAL VOLUMES		**98,679 m3**	**TOTAL COSTS**	**$925,668**

2. **Household Refuse Collections**

- Mangonui / Hihi	14 m3 per week		- Mangonui / Hihi	91,978
- Ahipara / Kaitaia / Awanui	24 m3 per week		- Ahipara / Kaitaia / Awanui	126,072
38 m3/wk x 52 x 3 years				
ACTUAL TOTAL VOLUMES		**5928 m3**	**TOTAL COST**	**218,050**

3. **Kaitaia Recycle/Refuse Transfer Station**

Year 1) estimate only		7,500 m3	Site Development: $92820/15 years = $6188 / year	
Year 2)	Recyclables	10,664 m3	$6188 x 3 years	
Year 3) estimate only		11,000 m3	18,564	
			Operation Costs: (Include $17,000 kerbside Collection /Yr):	
	29,164 m3		Year 1 = 46,180.00	
			Year 2 = 93,000.00	
			Year 3 = 93,000.00	232,180

Kaitaia Transfer Station Refuse

1620 m3 x 3 years	4860 m3		**TOTAL COSTS**	**$250,744**
ACTUAL TOTAL VOLUMES		**34,024 m3**		

4.	**Ahipara Landfill**			
	- direct dumping 4 sea containers per week 4 x 30 x 52 x 3 years = 6,240 x 3 years	18,720 m3	Preparation for Contract 30,000 Site Developments (5 Year spread) 33,000 Operation: $159000 x 3 years	477,000
	- Commercial Dumping (Refuse Contractors) 1,628 m3 1993 year 1,628 x 3 years	4,884 m3	Additional: Earthworks within 3 year contract 40,000	
	- Green matter) 3 Year Period - Car Bodies)	2,050 m3 estimate only 4,000 m3 estimate only	Balance of income from Commercial dumps 4884 m3 x $3 / m3	-14,652
	ACTUAL TOTAL VOLUMES	**29,654 m3**		
			TOTAL COSTS	**$565,348**
5	**Kaimaumau**			
	Average 1.5 bins per week @ 8m3 12m3 x 52 weeks x 3 years		Three Years x 7500	
	ACTUAL TOTAL VOLUMES	**1,872 m3**	**TOTAL COSTS**	**$ 22,500**
	TOTAL VOLUMES FOR FAR NORTH WARD	**170,157**	**TOTAL COST OF REFUSE DISPOSAL**	**$ 1,982,310**

SUMMARY OF STATISTICS

INCLUDING RECYCLING, TOTAL DISPOSAL COSTS PER m3 FOR NORTHERN WARD:

= TOTAL VOLUMES DIVIDED BY TOTAL COSTS
= $1,982,310 DIVIDED BY 170,157m3
= $11.65 per m3
= TOTAL DISPOSAL COST PER m3 WITH RECYCLE VOLUME AND COST REMOVED
= $1,731,566 DIVIDED BY 140,988 m3
= $12.28
= PERCENTAGE OF RECYCLE STATION VOLUME AND COSTS OF THE TOTAL WASTE SCHEME
= PERCENTAGE OF TOTAL VOLUME 34,024 m3 DIVIDED BY 170,152 m3 = 20%
= PERCENTAGE OF TOTAL COSTS $250,744 DIVIDED BY $1,982,310 = 127%
= BALANCE OF TRANSFER SYSTEM AND WASTE SYSTEM VOLUME AND COST
= PERCENTAGE OF TOTAL VOLUME = 80%
= PERCENTAGE OF TOTAL COST = 87.3%
LANDFILL COST PER m3 (WITH RECYCLING VOLUMES REMOVED)
= $565,348 DIVIDED BY 140,993 m3
= $4.01

APPENDIX 2

COMPARATIVE COSTS

The Far North District Council funds has a range of transfer stations. The two major ones are at Taipa and Kaitaia. The following comparison shows how the Kaitaia Transfer Station has been utilised by CBEC to add value to the Far North District's waste disposal system.

KAITAIA RECYCLE & TRANSFER STATION

Cost to Council $93,000 per annum

- Volume recycled:10664 m3 transported and sold to end markets 325 kilometres and further.
- *1620 m3* unrecyclable waste transferred annually to landfill at no cost to Council (see note)
- Weekly kerbside collection for 1700 Kaitaia housholds
- Cost of refuse transfer user pays not borne totally by ratepayer
- Green matter: accepted and proceessed into high quality saleable compost.
- Employment:5 full time plus 3 part time

Downstream and other benefits

- High community and national profile
- Used for school tours

TAIPA TRANSFER STATION & RECYCLING DROP OFF CENTRE

Cost to Council $94.000 per annum

- Volume (waste) 6433 m3 waste transferred to landfill 50km.
- Cost of refuse transfer totally borne by ratepayer.
- Green matter: accepted and burnt
- Employment: 1 person full time.

Summary

For $1,000 per year below the cost of operating a smaller transfer station at Taipa that handles ½ the volume Kaitaia Recycling Council get a total recycling facility and Transfer Station in one operation, a weekly Kerbside Recyclables Collection for 1,700 Kaitaia households, twice weekly commercial Recyclable collection and a municiple Composting Programme.

CBEC charge the public to dispose of waste at the Kaitaia Transfer Station the only transfer station in the north (during the study period) to do so. By charging for waste disposal at Kaitaia there is an incentive to recycle and a disincentive to unneccesarily dispose of waste.

Recyclanomics

RECYCLANOMICS

Cost comparisons between 2 waste handling systems in the Far North.
Based on present operational costs only.

1 Recycling System

Motor camps & D.O.C reserve
Taipa Transfer Station
Whitehills Transfer Station
Local drop off of Greenwaste for compost
Whatuwhiwhi Transfer St.
Houhora Transfer St.
Awanui Transfer St.
Schools (Aluminium)
Herekino Transfer St.
Weekly kerb-side collection Kaitaia

Kaitaia Recycle Station & Transfer St.

Unrecyclable waste transferred to landfill

Markets
- Glass
- Aluminium
- Steel cans
- Craft/cardboard
- Newspaper
- Scrap steel
- Used oil
- Rags

Other incomes
- Compost sales
- Truck hire
- Commercial waste collections
- Charges for unrecyclable waste transferred to Ahipara

Further Spin offs
- Employment
- Saves natural resources
- Avoided disposal costs
- Less energy costs
- Reduced Greenhouse gases
- Community involvement
- Greater citizen "waste awareness"

Percentage of total waste stream handled **20 %**
Percentage of total waste cost **12.7%**

Total annual cost to operate recycling scheme (collection, transfer, processing) **$170,000**

Average annual council contribution $ 83,581 (49%) ÷ **Total m³ handled via recycling scheme = 11,341 m³** = **$7.37 per m³**

Summary

The recycling programme recycles 20% of the Far North's total waste stream for $7.37 per m³, which is $4.91 less than the $12.28 it costs via the conventional method of collection and disposal to landfill.
When direct savings in landfill costs* of $4.01 per m³ are included the true cost to recycle is $3.36 per m³.

* Note: Operational costs for conventional waste disposal do not include costs for landfill replacement or downstream environmental hazards management.

2 Waste Disposal System

Recyclables

Transferred at no cost to council

Taipa Transfer St.
Whitehills Transfer Station
Whatuwhiwhi Transfer St.
Houhora Transfer St.
Awanui Transfer St.
Herekino Transfer St.
Weekly kerb-side refuse collections
Commercial & direct dumping

Ahipara Landfill

Spin offs
- Ongoing leachate control
- Contamination of groundwater
- Replacement costs for new landfill much higher
- Downstream environmental hazards
- Rising costs
- Methane production damages Ozone layer
- Wasted land

Percentage of waste handled **80 %**
Percentage of waste costs **87.3%**

Annual cost to operate waste system (collection, transfer, disposal) **$577,188**

Council contribution $ 577,188 (100%) ÷ **Total m³ handled 46,996 m³** = **$12.28 per m³**

RECYCLANOMICS