



Waitakere Eco-City



WAITAKERE CITY COUNCIL CLEANER PRODUCTION PARTNERSHIP PROGRAMME

REPORT ON CLEANER PRODUCTION AT WAITAKERE ENTERPRISE BOARD HENDERSON AND NEW LYNN

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**INDUSTRY AND
ENVIRONMENT
LIMITED**

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1.0 INTRODUCTION

Waitakere Eco City's Cleaner Production Partnership Programme (CP3) seeks to establish Cleaner Production in Waitakere industries by:

- Providing information on how to establish an ongoing Cleaner Production programme through the CP3 workshop and folder;
- Providing the services of a consultant to offer site specific advice.

Waste audit information was collected for baseline monitoring as part of the company's individual programmes, and is also to be used in Council's strategic waste management planning. The experience gained from the CP3 programme will help Council better approach the development of Cleaner Production in Waitakere city.

2.0 BACKGROUND

Waitakere Enterprise Board provides business development assistance and occupational training, and operates from two premises.

The John Henry Centre in Pioneer St Henderson houses the corporate functions of the Board, administration, and computer training room.

The Pururi Street training centre in New Lynn has a staff of between 9 and 10, and provides training in several employment related courses. These include industrial sewing, preparation skills for industry, training and career planning, office skills, and childcare. English as a Second language is also offered as a support service to the courses. A small office on-site handles local administration.

3.0 PURPOSE OF REPORT

The purpose of this report is to:

- Provide waste audit information for council's strategic waste management planning;
- Advise on areas in which there is further potential for Cleaner Production at Waitakere Enterprise Board;
- Report on the process used to establish Cleaner Production programme and the options investigated;
- Discuss the effectiveness of the approach used in establishing the Cleaner Production programme.

4.0 METHODOLOGY

Management commitment to the CP3 programme was obtained, and a Cleaner Production coordinator appointed at each site.

A draft environmental policy statement was developed by the consultant for consideration by the Board. This was to be put to the staff for feedback, and a final policy developed and adopted. The policy is shown in Appendix 1.

Walk-through audits were conducted, focusing on:

- Energy use;
- Water use;
- Raw materials use; and
- Waste management.

Potential areas for improvement were identified by the consultant from the walk-through audits and waste audit information provided from records.

The coordinator at Pururi St was introduced to the CP3 folder and given background information on environmental issues and Cleaner Production. It was intended to find one or two other staff to help coordinate running of the programme, but no other staff felt that they had the time to be involved. The coordinator and consultant then investigated four areas for cleaner production:

- Lighting;
- Photocopier waste;
- Water use; and
- Disposable cups.

A presentation was given by the consultant to staff at each site. The purpose of this was to inform staff of the background to the CP3 programme, and motivate them to become involved in Cleaner Production. Topics discussed were:

- Agenda 21;
- Sustainability;
- Waitakere as an eco-city;
- Environmental impacts in relation to everyday activities;
- Managing environmental impact through input, process and output stages; and
- The waste management hierarchy.

These presentations were structured but informal, and were successful in getting staff involved in discussion. Based on interest from staff, a Cleaner Production team at each site was formally established.

The initial John Henry Centre CP team meeting set the scope of the programme, established what information already existed, and what further information was needed. Broad objectives were then set. From there a series of areas for improvement were investigated by the team:

- Power metering;
- Air conditioning;
- Light switching;
- Photocopier;
- Waste aluminium cans.

At Pururi St, a system was developed by the team for monitoring individual inputs and outputs to each course. Once this baseline information was established, it was planned to identify areas of priority for investigation.

5.0 WASTE AUDIT AND SITE VISIT INFORMATION

5.1 ENERGY

Electricity is the only energy form used at both sites. Records were available between July 1995 and March 1996, representing the first nine months that WEB has been at the premises.

Table 1: Electricity consumption and charges for period July 1995 to March 1996

Site	Day rate (\$)	Day Cost (\$)	Units (kWh)	Unit Cost (\$)	Total Cost (\$) (ex GST)
John Henry Centre	4.67	2 830.02	53 954	6 112.99	8 943.10
Pururi St Centre	2.84	1 445.56	45 936	5 204.55	6 650.11
TOTAL		\$4 275.58	98 890	\$11 317.54	\$15 593.21

Day charge components of each sites charges are:

- 31.6% at John Henry centre; and
- 21.7% at Pururi St Centre.

Two meters are installed at the John Henry Centre, and one at Pururi St. As well as being charged at a higher daily rate charge than Pururi St (4.67 versus. 2.84), the two meters at John Henry Centre result in a doubling of the fixed day charge. Unit rate is \$0.1133 per kWh at both sites.

5.1.1 USAGE PRACTICES

Main electrical equipment at John Henry Centre is:

- Air conditioning;
- Lighting;
- Computers;
- Photocopier.

The main air conditioning system operates continuously during the day until 6:00 pm. There is no facility to shut off operation to spaces not in use. Additional heating is provided by wall mounted heaters, which can be operated individually. These were observed running when not required, in one case when a window was open adjacent to the unit.

Lighting type is mostly recessed fluorescent tube, with recessed halogen bulbs in the board room. It is not possible to switch fluorescent lights off for each room individually.

Computers are used in the corporate administration section, and the computer training room. These are shut down at night, but may be left running during the day when not in use.

The photocopier is left powered up during the day, and has the facility for automatic switching into a low power consumption mode when not in use. It is leased along with two others at Pururi St.

Main electrical equipment at Pururi St is:

- Fluorescent lighting;
- Computers;
- Photocopiers;
- Heaters;
- Microwave and conventional oven.

The light switching is configured so that some areas cannot be operated separately, and the switches are often very remote from the lights each operates. Lights are often left in operation because of this, and also because of a need to maintain minimum lighting.

Considering these factors, there were some cases observed where lighting use could be reduced. On one occasion, 18 light fittings were in operation in a room occupied by one person, and on another occasion, when the room was empty. The 28 fluorescent light fittings in the common area were more than enough to provide background lighting needs. These were seen on when the space was empty.

Computers in the office skills training room appear to be switched on only when required.

The photocopiers are sometimes switched off to conserve power.

Heaters were seen on in the student cafeteria when windows were open and no one was present. The ovens were not observed in use.

5.2 WATER

John Henry Centre premises water charges are divided as a share of the overall water charges for the building. This cost is then incorporated with other costs in the lease payments, and so cannot be isolated.

Water use is mainly for toilet facilities.

- Water saving devices installed are dual-flush toilets and urinal sensor.

Additional water is used in the cafeteria by:

- An industrial dishwasher is used, which is more efficient than the domestic type, and uses less water than washing by hand; and in
- A water cooler.

Pururi St water use is for toilets, showers, and in the student and staff lunchrooms.

- Toilets are not fitted with dual flush mechanisms.
- Dishwasher in student cafeteria is a domestic model.

Table 2: Water consumption and charges for Pururi St between July 1995 and April 1996

Month	Quantity (m³)	Unit Price (\$)	Cost (\$)
July (1995)	116	0.93	107.88
August			
September			
October	70	0.93	65.10
November	56	0.93	52.08
December			
January (1996)	53	0.93	49.29
February	65	0.98	63.70
March	65	0.98	63.59
April	68	0.98	66.29
TOTAL	493		\$467.93

5.3 RAW MATERIALS USE

The most significant raw material use is paper at both sites. This is made up of A3 and A4 paper. Total cost between July 1995 and April 1996 was \$1 782.40.

A five dollar freight charge is incurred on orders of less than \$100 in value. Costs of orders ranged between \$11.95 and \$162.88. It was thought that in some cases the freight charge could not be avoided through ordering over the \$100.00 threshold. The larger stock would collect damp and cause photocopier jams, and students would help themselves to the supply.

It is common practice to reuse paper before recycling at the John Henry Centre.

Pururi St uses about one ream of A4 paper per month and one box of envelopes. The training courses reuse paper, and envelopes are reused internally. New paper is used in administration. One of the first actions of the CP team was to put in place separate containers for reuse and recycling of paper next to the photocopiers and in all training rooms.

About 100 m of fabric per month was used in the industrial sewing course, with students now buying their own fabric.

5.4 WASTE WATER

Water discharges to the sewer at both sites are from kitchen and toilet facilities, with no trade waste discharges required. The quantities will be similar to that of water consumed.

5.5 SOLID WASTE DISPOSAL

Solid waste disposal at John Henry Centre is handled by the cleaning contractor, who does not charge separately for waste disposal. The volume is estimated to be approximately 20 rubbish bags per month. Composition is mainly waste paper from office activities, and plastic and organic waste from the cafeteria.

Waste disposal is managed at Pururi St. by use of a 1.5m³ Wastecare bin. Charges for this include a day cost of \$1.48, and a disposal charge of \$28.39 per empty. The bin is typically serviced between one and three times per month. Composition is an assortment of paper, plastic, food and textile wastes. Approximate quantities generated by each department were estimated from interviews with staff, and are shown in Table 3 below.

Table 3: Approximate quantities of solid waste generated by each department per month at Pururi St.

Department	Rubbish bags generated per month
Administration	20
Industrial sewing	4
Childcare	< 4
Preparation skills for industry	2
English as Second Language	1
Training and career planning	< 1
TOTAL = < 32	

The large proportion of waste produced by administration is a result of external supplies and packaging being managed by this department. Quantities produced by other departments can be seen to be relatively small.

Taking an average volume of each rubbish bag as 0.1 m³, an average monthly volume of 3.2 m³ can be estimated, which goes to landfill. This matches well with waste bin records of between 3.0 and 4.5 m³ per month.

Assuming the same average volume for rubbish bags at the John Henry premises, this gives a volume of 2.0 m³ per month. The combined total for waste going to landfill for Waitakere Enterprise Board is then 5.2 m³ per month, or 62.4 m³ per year.

5.6 HAZARDOUS WASTE DISPOSAL

No hazardous waste were identified at the John Henry Centre.

Used lubricating oil for the sewing machines was the only special waste identified at Pururi St. There was no procedure in place for disposing of this, and it was not known what happened when replacement was last necessary.

6.0 CLEANER PRODUCTION OPTIONS INVESTIGATED

6.1 JOHN HENRY CENTRE

6.1.1 POWER METERING

The use of two meters was found to be costing an unnecessary 16% of the total electricity cost as a fixed charge.

The possibility of using only one meter was investigated and implemented, saving around \$1 700.00 per year, with no reduction in consumption.

6.1.2 AIR CONDITIONING

Areas for improvement included both reducing operation when not required, and effective maintenance to ensure maximum efficiency.

The air conditioning is in operation in all parts of the premises continuously, and no facility existed to not service some areas.

Repeated maintenance visits had still not cured operational problems with the air conditioning.

Investigation by the team of these areas showed no potential for improvement. Regular filter changes every two months will continue to be performed to maintain current efficiency and health standards.

6.1.3 LIGHT SWITCHING

The team monitored light usage and found that many lights were left in operation between 3:30 pm and 5:00 pm for three days per week. This is the period after training classes had finished, but lights in other areas were still required to be on.

Installation of additional switches to allow for individual switching for each room was investigated. This has now been implemented.

6.1.4 PHOTOCOPIER

The photocopier was the biggest contributor to waste paper generation. A problem existed with damp paper which jammed.

A power saving modification was possible, where the machine would automatically power-down after a period of inactivity.

Discussions were held with the leaser of the photocopier, but nothing had been finalised at the time of writing this report.

6.1.5 WASTE ALUMINIUM CANS

Waste aluminium cans from the vending machine were a significant proportion of solid waste generated. They were collected for recycling by a staff member on an informal basis, but this required drop-off at a local can cage and was not always done.

The vending machine owner was approached about taking responsibility for disposal, and agreed to do this during servicing of the machine. The machine has since been removed due to lack of demand for it. Students instead tend to drink water from the cooler.

6.2 PURURI ST CENTRE

Areas identified for improvement were:

- Lighting;
- Water use;
- Photocopier waste;
- Disposable cups.

6.2.1 LIGHTING

Lighting use is a major part of the energy consumption at Pururi St. The light fittings installed are fluorescent tubes, which are more efficient than incandescent lights when operated continuously.

The greatest barrier to efficient operation of lights is the switching system.

- Switches were often remote from the light fitting(s) each operated; and
- The main switches appeared to be layed out in no logical order.

Renovations are planned for the Pururi St centre, which could involve improving ventilation and lighting. Because of this, it was thought uneconomic to make equipment changes.

6.2.2 WATER USE

Main water use was seen to be the toilets, which did not feature dual flush capacity. Because of the uncertainty over future building alterations, upgrading of these cisterns was not considered.

'Gizmos', weights which reduce the volume of flush water, had been tried before, and there had been problems with incomplete flushing. It was decided that bricks in the cistern would be trialed as volume reduction devices, saving between 10 and 20% per flush.

6.2.3 PHOTOCOPIER WASTE

The main generators of paper waste were the two photocopiers. One of these had the facility for automatic double siding, but would regularly break down, requiring servicing on-site. The other was reliable but required manual operation for duplexing.

There was no option for upgrading the photocopiers without incurring a significant penalty under the leasing agreement. The photocopiers are to be upgraded when the contract expires.

6.2.4 DISPOSABLE CUPS

Disposable cups were provided for use with the water cooler. This was located in the main common area for use by visitors and students. The cooler has since been relocated to the student cafeteria, which has a supply of mugs, eliminating any reasonable need for disposable cups.

7.0 DISCUSSION

7.1 FURTHER POTENTIAL FOR CLEANER PRODUCTION

7.1.1 JOHN HENRY CENTRE

Most Cleaner Production options investigated have centred on equipment modifications: for air conditioning; light switching; and the photocopier efficiency. From the technical side, use of water, energy and raw materials would seem to have little room for reduction as things stand.

The other side of the coin is the way in which equipment is operated, resources are used, and waste is disposed of. It is good housekeeping and operating practices that

will determine how much energy can be saved, for example, by switching out the lights when not needed, and how much paper is reused or recycled instead of thrown out. It is essential then that this be promoted to students and staff, to make the options implemented effective, and to target other improvements that cannot be reached through equipment changes. As the activities here are not mechanically process intensive, this is also where the most improvements will be realised in the future, at no or little cost.

The biggest improvement which could be targeted for now is the efficient use of electrical equipment such as lights, now that the switching makes this viable, and computers. Efficient operation of these has a significant cumulative effect, and in any case promotes waste minimisation awareness.

7.1.2 PURURI ST CENTRE

As at the John Henry Centre, the equipment/technical side does not have any real room for improvement as things stand. The potential for reducing lighting electricity consumption is possible through better switching, but this is dependent on the operation practices to be effective. The uncertainty over building renovations eliminates the possibility of upgrading any equipment for now, such as the light switching.

The focus should be operation of existing equipment as best as possible, including turning off lights, photocopiers, heaters when not needed. Additional awareness of the paper reuse/recycling system should be promoted now that it has been set up.

7.2 EFFECTIVENESS OF CP APPROACH

The options investigated have targeted the most preferable areas of the waste management hierarchy:

- Reduction of electrical use for air conditioning and heating, and water use in toilets
- Reuse of paper;
- Recycling of paper and other materials.

The environmental policy statement has formalised the Board's commitment to the environment.

The Cleaner Production options run through followed a series of defined steps. These were designed to ensure that options were identified, evaluated, implemented, and measured. The advantage of using such a comprehensive model for setting up the programme is that this has the ability to adapt to the organisation's changing needs. It also integrates environmental management as part of a holistic approach to the organisation's overall management.

This does of course require an intensive time input initially, which at Pururi St was a definite barrier to getting staff involved in the programme. Where there is insufficient time for establishing a full-blown Cleaner Production programme, a form of checklist

would be useful to evaluate existing environmental performance, and identify where improvements could be made without going through a formalised team. This is not the most desirable approach, as it could easily be done once and then forgotten, whereas a CP team periodically reviews and evaluates. However it would be useful in promoting awareness, and provide an accessible way for companies to begin improving their environmental management.

The success of the presentations to staff in motivating staff has shown the benefit of environmental education when setting up the system. This works in two ways: by showing that environmental impacts are the result of everyday activities; and that there is something that everyone can do about it. It was also shown how well the programme can work when staff cooperation is gained.

8.0 CONCLUSIONS

8.1 FURTHER CLEANER PRODUCTION AT WEB

Further potential for improvement through equipment changes is limited until more detail is known about potential renovations at Pururi St. Refinement of operation practices still has potential for improving environmental performance at little or no cost. The awareness and cooperation of staff is necessary for maximising the benefit of equipment changes made. This could be targeted through:

- Assigning responsibility for turning off equipment where appropriate;
- Informing all staff and students of the programme objectives and waste minimisation rationale;
- Publicising existing projects and progress made.

Time may be the main limitation on the ability of staff to adequately participate in the programme.

8.2 SUCCESS OF APPROACH FOR CP PROGRAMME

The overall approach used in establishing Cleaner Production at Waitakere Enterprise Board has been successful.

- Management commitment through the environmental policy statement has been formally secured.
- The Cleaner Production programme and teams have been established.
- Reductions in energy, water, raw materials use and waste production have been made as part of the CP programme.
- Staff awareness and motivation has been raised.

The improvements have been realised through a mixture of equipment and operational practice changes.

The overall objectives of Council have also been achieved:

- Obtaining waste audit information for strategic planning;

- Establishing an ongoing Cleaner Production programme;
- Trialing the methodology for establishing Cleaner Production programmes in Waitakere businesses.

The value of individual parts of the system has been demonstrated.

- Obtaining management commitment to ensure initiatives are given priority.
- Stating what priorities are through the Environmental Policy Statement, and ensuring continual improvement by its adoption.
- Formalisation of the programme has secured a mechanism through which environmental performance can be continually evaluated and improved.
- Establishing the CP teams was important to allocate responsibility, and providing a forum for the programme.
- Regular meeting times keep up the profile of Cleaner Production.
- Implementation of options with staff knowledge to maximise effectiveness of changes.
- Monitoring of results to review effectiveness of options
- Use of Waitakere City Cleaner Production folder useful resource for back-up information.

The success of the presentations in motivating staff has shown the benefit of environmental education when setting up the system. This works in two ways: by showing that environmental impacts are the result of everyday activities; and that there is something that everyone can do about it. It was also shown how well the programme can work when staff cooperation is gained.

Waitakere Enterprise Board is in a unique position to influence the businesses it helps, and lead by example in environmental management. Publicity of the success of the programme would be very valuable in promoting Cleaner Production throughout Waitakere City.

9.0 RECOMMENDATIONS

9.1 CLEANER PRODUCTION PROGRAMME

It is recommended that in support of the ongoing Cleaner Production programme, the following is done:

- Consideration of light switching and efficiency in renovations at Pururi St;
- Promotion of better operational practices through staff education, publicity of Cleaner Production projects and assigning of responsibility;
- Periodic review of the environmental policy statement to ensure relevance to the Board's current situation;
- Monitoring and periodic evaluation of progress in terms of resource use and waste production, and new objectives set;
- Provision of adequate time and resources to ensure that all staff have the opportunity to participate in the Cleaner Production programme;

9.2 ESTABLISHING CLEANER PRODUCTION PROGRAMMES

For the purpose of establishing Cleaner Production programmes in other Waitakere businesses, it is recommended that a process be used of:

- Establishing management commitment;
- Developing environmental policy;
- Formalising the Cleaner Production programme;
- Establishing a Cleaner Production team;
- Gathering baseline information;
- Identifying areas for improvement;
- Investigating options;
- Implementing options;
- Monitoring and reviewing progress.

Where businesses do not have adequate time to establish a comprehensive Cleaner Production programme, it is recommended that checklists of environmental improvements are provided.

To make the functioning of the programme as effective as possible, it is recommended that:

- Staff are educated on the environmental background to Cleaner Production;
- Staff have input to the environmental policy statement;
- Appropriate information and training is provided to staff to support Cleaner Production options initiated.

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APPENDIX 1

WAITAKERE ENTERPRISE ENVIRONMENTAL POLICY

At Waitakere Enterprise Board we recognise our responsibility for the sustainable management of resources. To achieve this we are committed to continually improving our environmental performance, and will do this through:

- **meeting and where possible exceeding environmental law requirements;**
- **progressively minimising environmental effects of our services through their life cycle;**
- **operating an ongoing cleaner production programme involving all staff to monitor, review and continually improve environmental performance;**
- **using resources as efficiently as possible and minimising waste production at source;**
- **minimising use of non-renewable resources;**
- **disposing of any waste in a responsible and approved manner;**
- **integrating environmental criteria with all significant purchasing specifications, purchasing and subcontracting;**
- **ensuring that all employees are informed and have suitable resources to implement this environmental policy;**
- **making this policy available to all employees, clients, and the public;**
- **Waitakere Enterprise should be prominent in actively promoting open communication with the community on environmental matters.**

This policy will be reviewed annually.

EXECUTIVE SUMMARY

The Waitakere City Council Cleaner Production Partnership Programme (CP3) seeks to assist businesses in Waitakere to establish Cleaner Production programmes. This has been initiated at Waitakere Enterprise Board through the CP3 workshop and folder, and providing the services of a consultant to advise on the programme establishment.

Waitakere Enterprise Board provides business development assistance and occupational training, and operates from premises in Pioneer St, Henderson, and Pururi St, New Lynn.

This report summarises:

- Waste audit information for council's strategic waste management planning;
- Areas in which there is potential for Cleaner Production at Waitakere Enterprise Board;
- The process used to establish the Cleaner Production programme and the options investigated;
- The effectiveness of the approach used in establishing the Cleaner Production programme.

An draft environmental policy statement prepared by the consultant has been modified and adopted by the Board.

A Cleaner Production team was established at each site, and investigated a variety of options. Some of these were successful in reducing energy, water and raw materials use, and reducing waste production.

Further potential for reduction is mainly through improvements in housekeeping practices, with equipment changes a possibility during Pururi St renovations.

The approach used in establishing Cleaner Production at Waitakere Enterprise has been successful, and the objectives of council have been achieved.

Waitakere Enterprise Board has the opportunity to promote Cleaner Production to the organisations and individuals it has dealings with by leading by example.

Key recommendations of this report are:

- Further steps to support the Cleaner Production programme at Waitakere Enterprise, including the provision of resources and information;
- The approach that should be used in developing Cleaner Production in other Waitakere organisations, including key steps and support considerations.