

Darebin Nappy Trial
Final Report
July 2007



Introduction

Australians are using 800 million disposable nappies per year, ending up as 145,000 cubic metres of landfill. (Source: WasteStreams.com.au).

Used by approximately 90% of parents, a single disposable nappy can take as long as 500 years to decompose in landfill. Many Australians are concerned about the effect this has on the environment. However, up until now there has been little done to reduce this potentially hazardous waste stream.

Within one generation, new parents have shifted from using disposables only on holidays to using them every nappy change.

In recent years, there has been little debate over the relative environmental impact of reusable (cloth) nappies and disposable nappies. It is the general understanding that overall no system clearly has a better or worse environmental performance, although the life cycle stages that are the main source for these impacts are different for each system. *(This was in fact the finding from the UK's Environment Agency's Life Cycle Assessment of Disposable and Reusable Nappies Report).*

It was the trial coordinators' experience that people who had not used cloth nappies assumed that cloth nappies are less reliable and more time consuming than disposable nappies.

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Trial Aims

The aims of the Darebin Nappy Trial were to:

- Put the 'nappy choice' back on the agenda, not let it be a forgone conclusion that disposable nappies are the only reliable and time-effective option.
- Increase understanding about the reusable (cloth) nappies, specifically looking at:
 - Performance (leakage);
 - Time required;
 - Ease of use;
 - Convenience;
 - The environmental impact; and
 - Cost.

The Trial in Detail

Two different nappy types were assessed in the trial:

- Disposable nappies; and
- Home laundered modern cloth nappies.

To compare the nappy types, two 14 day trials were completed by the participants. Upon completing the first trial (assessing disposable nappies), the participants were provided with modern cloth nappies. Two online surveys were set up to collect the participants' findings from both trials. This report summarises the participants' findings.

To view the surveys, log on to the following links:

- Disposable trial:
http://www.surveymonkey.com/s.aspx?sm=AJgj8xFm9PDXgT_2fqVZUtwQ_3d_3d
- Cloth Nappy Trial:
http://www.surveymonkey.com/s.aspx?sm=3cftnQBEt63rgrRfGo80yA_3d_3d

The modern nappy pack (Appendix 1) was designed as the most cost-effective way to give new parents enough nappies to use cloth all the time at the cheapest cost to them and contained several types of modern cloth nappies. The nappies in the pack were selected on merit by Meaghan and Trepheena with no input from any commercial business.

Criteria for Participants

1. Currently using disposables full time on a child younger than 18 months old.
2. Be prepared to complete two nappy trials.
 - a. A disposable nappy trial assessing key elements: cost, time, leakage, water. Time frame 14 days.
 - b. A modern cloth nappy trial assessing key elements: cost, time, leakage, water. Time frame 14 days.
3. Complete two online surveys and return the responses within 10 days of completing the trial.
4. Allow the results and a photo of their child to be published in newspapers and magazines.

Trial Participants

All of the participants were using disposable nappies full time before starting the trial.

- 20 families enquired about the trial.
- 14 families participated.
- 2 decided to withdraw from the trial (they completed the disposable trial but did not complete the cloth trial).
- 12 completed the entire trial:
 - The gender split of the children was 7 boys and 5 girls.
 - The ages of the children ranged between 3 months and 15 months.

Other Nappy Research

In 2005, the Environment Agency, the leading public body protecting and improving the environment in England and Wales, commissioned the Life Cycle Assessment of Disposable and Reusable Nappies Report.

This 209 page report can be found at

www.environment-agency.gov.uk/commondata/acrobat/nappies_1072099.pdf

The conclusion of the report was:

“For the three nappy systems studied [disposable nappies, commercially laundered prefold nappies and home laundered flat cloth nappies], there was no significant difference between any of the environmental impacts – that is, overall no system clearly had a better or worse environmental performance, although the life cycle stages that are the main source for these impacts are different for each system”.

The trial’s coordinators assessed the Life Cycle Assessment of Disposable and Reusable Nappies Report’s findings and found it did not trace back the forest growth flows associated with the fluff pulp used in disposables. The report did, however, trace back the flows to cotton growth and production for cloth nappies.

We contacted the Environment Agency in the UK with this concern and were told the report is currently being reassessed (Appendix 4). Investigating further, we found that two of the independent experts on the advisory board of the extensive study rejected the report as seriously flawed, based on poor quality data and missing the point of its own findings (Appendix 4). One, Women’s Environmental Network, concluded that even on the basis of the flawed data in the report, it could have concluded that cloth nappies prevented waste and didn’t cause any more global warming impacts than disposables. WEN calculated that parents could reduce the global warming impact of their nappy use by 24% more than the report said, by following a sensible washing routine. For WEN’s response to the report see <http://www.wen.org.uk/>

Dr Kate O'Brien at the University of Queensland will release findings from a Life cycle assessment of nappies under Australian conditions later this year.

Project Coordinators

The nappy trial was designed, coordinated and analysed by Meaghan Siemensma and Trepheena Hunter. They designed the trial based on their own experiences as new mothers and the fact that

most new parents they knew had selected disposable nappies for their babies. The trial was conceived with the question ‘Why do most new parents not consider using cloth nappies?’

Trepheena and Meaghan worked on the trial because they both believe strongly that cloth nappies are a great alternative to throwing tonnes of pulp and plastic into landfill every year. They also wanted to show other local mums how easy it can be to use modern cloth nappies.

Project Sponsors

Darebin Council donated 25 efficient light globes to 10 families that participated in the nappy trial. This was organised by Emma Hopkins, Darebin’s Sustainability Education Officer, under the Council’s ‘Better than Chocolate Program’ designed to help the community organise sustainability projects.

Two local businesses, the Environment Shop (www.environmentshop.com.au)and Chris' Dial-A-Nappy (www.dialanappy.com.au) provided the nappies to the project at wholesale cost. These businesses had no involvement in the design or management of the trial.

Key Findings

Topic	Disposable Nappies	Modern Cloth Nappies
Average amount of time spent per day	24 minutes	29 minutes
Number of nappies used per day during the trial	5.6 nappies	5.4 cloth nappies each day plus an average of 1 disposable nappy per day
Average number of leaks during the trial	0.2 leaks per day (equivalent of one leak every 5 days)	0.5 leaks per day for cloth (equivalent of one leak every second day)

- All 12 participants said they would recommend modern cloth nappies to new parents.
 - 8 of the 12 participants said they would recommend modern cloth nappies to every new parent.
 - The rest of the group (4) said they would recommend them if the topic was raised.
- All 12 participants said they would continue to use cloth nappies. The majority said that they would use cloth nappies only when they were at home during day and would continue to use disposables during the night although several said they would try to use cloth nappies all the time.
- 9 of the 12 participants said that cloth nappies were easier and better to use than they expected.
- The average weekly cost to use disposable nappies is \$14.08 (annual cost \$732), compared a weekly cost of \$9.06 (annual cost \$470.80). (The cloth calculation includes initial outlay of \$250 depreciated over the first year plus ongoing costs of laundering (\$1.66 a week, plus cost to use disposables at night \$2.59)). In subsequent years, people would only incur the ongoing costs if they continue to use the same cloth nappies.
- Water usage during the cloth nappy trial was on average 15.2% more than during the disposable trial.
- The two families that withdrew did so for time related reasons. *(Complete responses from the people who withdrew from the trial are documented in Appendix 3).*

Conclusions

This small nappy trial shows that for families that have the time to adjust to cloth nappies, it is a viable and good solution during the day. Disposables were, however, the preferred option for night nappies and holidays.

For families that described themselves as very busy, cloth nappies were not a viable option as patience during a period of transition (ie learning to put on the cloth nappies and starting a washing regime) is required before efficiencies and capabilities are achieved.

From a behavior change perspective, this trial shows that parents are prepared to adopt new nappy behaviour habits, if they have the time and patience to adopt new practices.

To answer our initial question 'Why do most new parents not consider using cloth nappies?' we found the following reasons: New parents:

1. Think that cloth will be difficult and time consuming.
2. Don't perceive they have the time to investigate the multiple and potentially expensive cloth nappy options.
3. Have no impetus to change once they developed a habit that they find effective.
4. Are very busy and every minute saved on nappies makes a difference.

From a cost and land fill perspective modern cloth nappies are a substantially better alternative. From a time perspective, disposables are a marginally better option; an average saving of 5 minutes per day was documented in the trial.

The cloth versus disposable debate when it comes to comparing water, energy and CO2 emissions is hindered by a lack of current data. A detailed study of these issues is beyond the scope of this report. The University of Queensland study that will be released later in the year will hopefully shed some light in the area.

Detailed Trial Data and Analysis

The information in this section of the report represent the questions asked in the online surveys and the responses they were provided.

About the Participants Who Completed the Trial

How would you rate yourself when it comes to being environmentally aware:				
	Yes	No	NA	Response Count
I actively search out greener options and do what I can	91.7% (11)	8.3% (1)	0.0% (0)	12
I do the recycling & buy some eco-friendly/organic products but not much else	63.6% (7)	27.3% (3)	9.1% (1)	11
I am committed to being green in all areas of life (food, transport, energy, water, shopping) and spread the word as much as possible	36.4% (4)	63.6% (7)	0.0% (0)	11
I purchase Green Power (new accredited renewable energy sourced from wind, solar, biomass or mini-hydro)	50.0% (6)	50.0% (6)	0.0% (0)	12
I have an AAA or four star or greater rated water saving shower head(s)	36.4% (4)	63.6% (7)	0.0% (0)	11
I have dual flush toilet(s)	91.7% (11)	8.3% (1)	0.0% (0)	12
I have AAA or four star or greater rated washing machine	75.0% (9)	25.0% (3)	0.0% (0)	12
I have AAA or four star or greater rated dishwasher	58.3% (7)	8.3% (1)	33.3% (4)	12
	answered question			12
	skipped question			0

Experience using disposables

Please tell us your opinion about the following aspects of disposable nappies?							
	Excellent	Very Good	Good	Somewhat Good	Not Good	Rating Average	Response Count
Performance (Leakage)	50.0% (6)	33.3% (4)	16.7% (2)	0.0% (0)	0.0% (0)	1.67	12
Cost	0.0% (0)	0.0% (0)	16.7% (2)	33.3% (4)	50.0% (6)	4.33	12
Time required	33.3% (4)	33.3% (4)	33.3% (4)	0.0% (0)	0.0% (0)	2.00	12
Ease of use	50.0% (6)	33.3% (4)	8.3% (1)	8.3% (1)	0.0% (0)	1.75	12
Convenience	58.3% (7)	33.3% (4)	8.3% (1)	0.0% (0)	0.0% (0)	1.50	12
The impact on the environment	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (12)	5.00	12
	answered question						12
	skipped question						0

Expectations about using cloth nappies

What are your expectations about using cloth nappies?						
	Excellent	Very Good	Good	Somewhat Good	Not Good	Response Count
Performance (Leakage)	16.7% (2)	8.3% (1)	41.7% (5)	33.3% (4)	0.0% (0)	12
Cost	25.0% (3)	25.0% (3)	33.3% (4)	16.7% (2)	0.0% (0)	12
Time required	0.0% (0)	8.3% (1)	8.3% (1)	58.3% (7)	25.0% (3)	12
Ease of use	0.0% (0)	8.3% (1)	41.7% (5)	41.7% (5)	8.3% (1)	12
Convenience	0.0% (0)	18.2% (2)	9.1% (1)	45.5% (5)	27.3% (3)	11
The impact on the environment	33.3% (4)	33.3% (4)	16.7% (2)	16.7% (2)	0.0% (0)	12
	answered question					12
	skipped question					0

Were your expectations about cloth nappies different from your experiences?

- I'd been discouraged by so many people who had bad experiences. I thought they would be a lot more work, less effective and uncomfortable for my son.
- Experience was a bit better than the old terry towelling nappy system my younger sisters were in 20 years ago.
- I thought they would be more difficult to use.
- Once I mastered a system, they were much easier to use than I expected.
- Found them much easier to use than I anticipated.
- No.
- Yes a bit easier as you get in a routine.
- My expectations matched my experience fairly closely.
- Modern cloth nappies are not as time consuming as I expected.
- Didn't expect the variety of products. Removing poo was very easy with liner!
- Happy but hope they would be a little more absorbent. No leaks really but quite damp on their bottom.
- I expected them to be more difficult, I expected them to be harder to use, I thought they might be hard to use out of the home but they were not!

What was the easiest thing about cloth nappies?

- Maintaining the nappies.
- Bumis covers are very effective.
- Not having to go out and buy nappies and carry big bags of nappies home.
- Putting them on.
- Feeling good about not filling the rubbish bin so often.
- Not having to look out for disposables on sale all the time.
- Putting them on.
- I liked the fact that it eased my conscience about the environment to some extent - using disposables in the past, I felt guilty.
- Putting on are fairly easy.
- Having them readily available most of the time.
- Machine washing.
- Using them, washing them and dry piling them.

What was the most difficult thing about cloth nappies?

- Time required to change his nappy as he is a little impatient on the change table these days.
- Getting them dry in time to use again before I ran out.
- They need to be changed a little more frequently than disposables to avoid leaks.
- Cleaning off the poo.
- Getting through the night with a dry cloth nappy.
- The waterproof outer cover, I always had to make sure I had enough and having to carry and deal with the wet/soiled nappies.
- Dealing with the poo!
- Changing and disposing of the poeey nappies - my baby's poos tend to be fairly messy!
- Cleaning the leakages of poo.
- Making sure to wash every second.
- Getting rid of awful, messy poos when my son was sick.
-

- Having a baby with gastro meant a lot of nappy changes for a few days and leaking poo. We also had to change at night, which was more difficult as I had to clean the poo off at 2am.

Percentage of participants that would recommend modern cloth nappies to other new parents

66.7% (8) Absolutely, to every new parent

33.3% (4) Yes, if the topic was raised

Experience using cloth nappies

Please tell us your opinion about the following aspects of cloth nappies?						
	Excellent	Very Good	Good	Somewhat Good	Not Good	Response Count
Performance (Leakage)	16.7% (2)	41.7% (5)	25.0% (3)	16.7% (2)	0.0% (0)	12
Cost	25.0% (3)	33.3% (4)	33.3% (4)	8.3% (1)	0.0% (0)	12
Time required	0.0% (0)	16.7% (2)	33.3% (4)	41.7% (5)	8.3% (1)	12
Ease of use	0.0% (0)	16.7% (2)	66.7% (8)	16.7% (2)	0.0% (0)	12
Convenience	0.0% (0)	16.7% (2)	41.7% (5)	16.7% (2)	25.0% (3)	12
The impact on the environment	33.3% (4)	50.0% (6)	16.7% (2)	0.0% (0)	0.0% (0)	12
	<i>answered question</i>					12
	<i>skipped question</i>					0

Future Use of Cloth

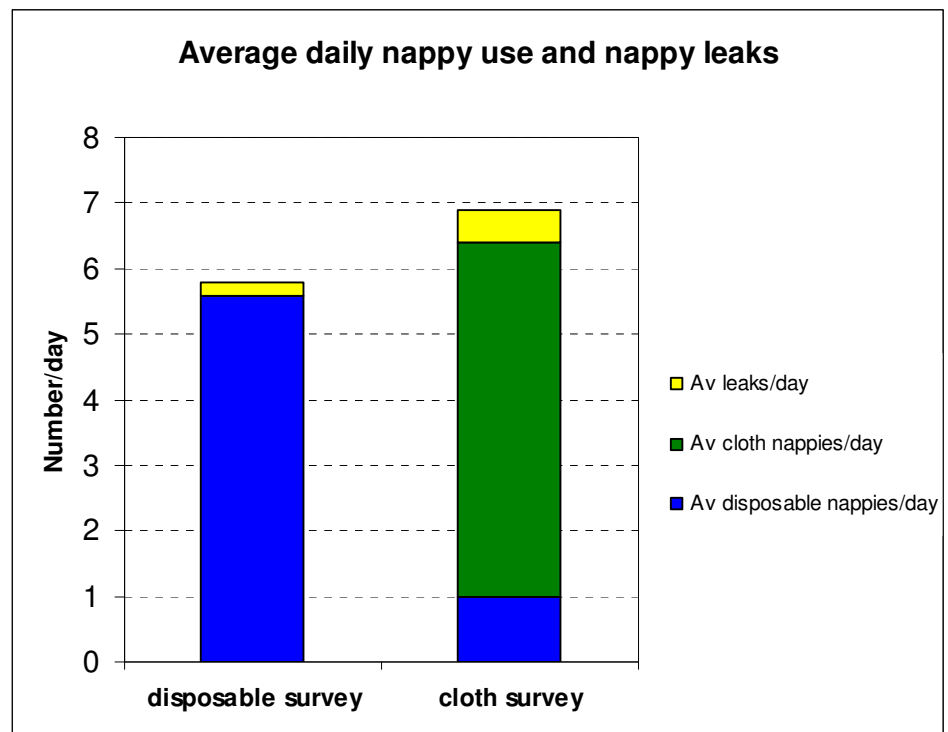
Do participants plan to continue to use cloth nappies? If so, with what frequency?

- During the day when I am at home
- During the day at home
- Yes, we will continue to use cloth nappies but not at night as we found none of the types could go through the night without a leak
- I'll definitely use them all the time except at night (because my baby sleeps better in a disposable). I use them when I go out as well as when I'm at home, except on holiday
- Yes, all day including when out. Night time sometimes.
- I will certainly continue to use them. I will use a disposable at night (they are not as bulky and do not tend to leak at all), otherwise I will use cloth.
- Yes but not overnight
- Yes, as much as I can. I will try to use them when I am out and overnight. Although I find that when I am really pressed for time or stressed I tend to lean towards disposables.
- I will continue to use cloth nappies most of the time but not when travelling.
- I plan on using cloth. If nappy rash flares up, will use disposable during night. Considering disposable for some nights.
- Yes, all the time. I'll probably buy a few more weenee pants and microfibre inserts so we don't need to do a wash as often
- I plan to use cloth nappies fulltime and I think I will never use a disposable again.

Nappy Use

Average disposable nappy use during the first survey was 5.6 per day, with an average of 0.2 leaks per day (the equivalent of one leak every 5 days).

During the cloth nappy survey, participants used an average of 5.4 cloth nappies each day as well as an average of 1 disposable nappy per day, with an average of 0.5 leaks per day (the equivalent of one leak every second day). During the cloth nappy survey, participants mainly used disposables at night, with some participants also using them for outings or when life was too hectic. There was a significant range in disposable nappy use during the cloth trial, with some participants using no disposable nappies at all and others using several each day.



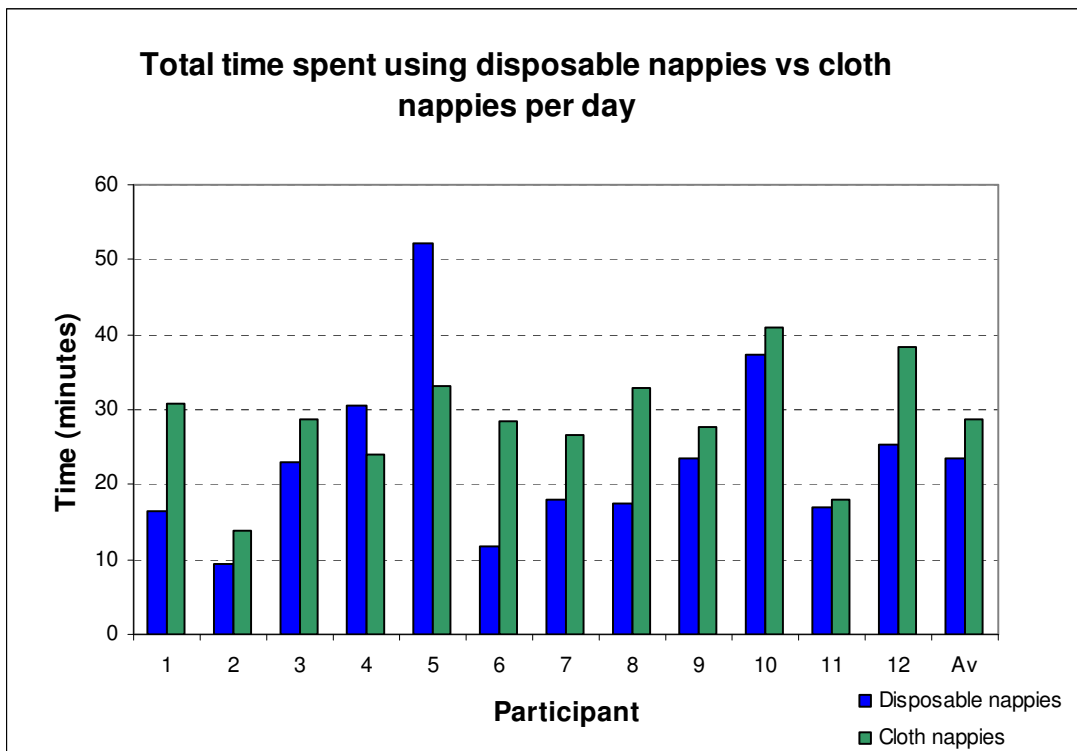
Activity Analysis

The time spent on nappy-related activities is an important consideration for people when deciding whether to use cloth or disposable nappies. This trial has shown that the changes in time spent is not as great as many people assume. Of the twelve participants in this study, the average time spent on disposable nappy-related activities was 24 minutes per day compared to 29 minutes per day when using primarily cloth nappies.

While the majority of participants (10 out of 12) reported a slight increase in the time spent on nappy related activities when using the cloth nappies, this was not statistically significant (based on a 95% confidence interval).¹ Over the 12 participants there was considerable variation in the time spent on nappy activities, ranging from 9 to 52 minutes per day for disposable nappies and 14 to 41 minutes per day for cloth nappies. This variation combined with the fact that two of the 12 participants spent less time using cloth nappies than they had when using disposable nappies meant that the general trends observable in graph were not statistically significant.

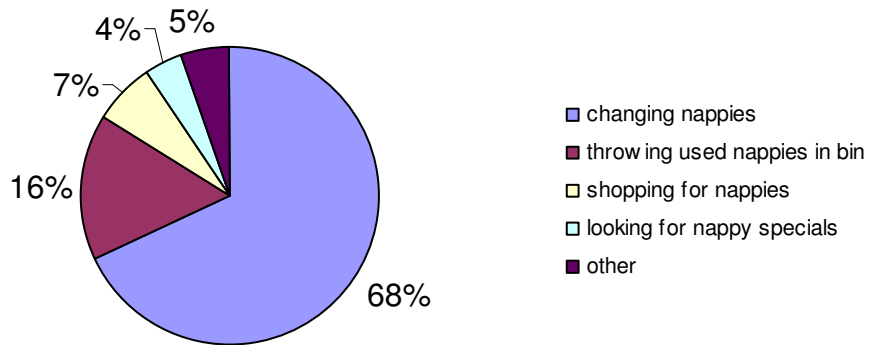
The majority of time spent on disposable nappy-related activities was spent changing nappies (average of 16 minutes per day) and the remaining time involved disposing of dirty nappies, shopping for nappies and searching out nappy specials at retail outlets.

When using mainly cloth nappies, participants spent an average of 11 minutes per day changing nappies and 6 minutes per day preparing nappies for use. Washing was done every day to every fourth day and took an average of 17 minutes, including washing, hanging nappies out and bringing them back in once dry.

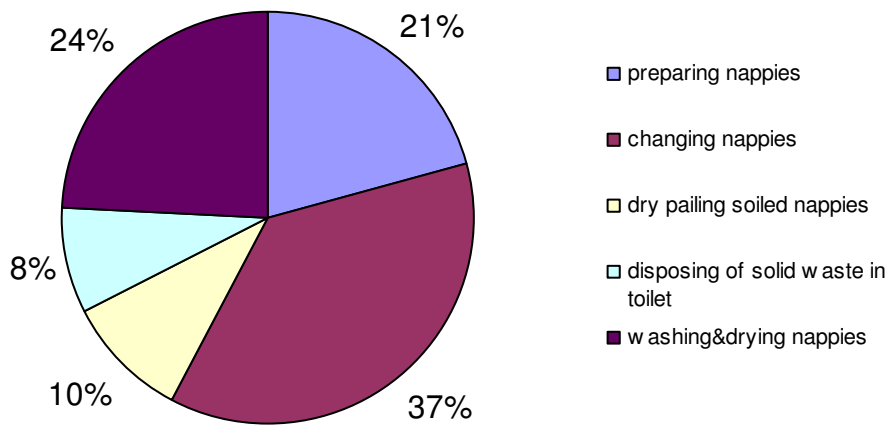


¹ $p = 0.112$ based on either a paired t-test or a one-way anova blocked for participant (p value is the same with either method of analysis)

Percentage of time spent on disposable nappy use per day



Percentage of time spent on cloth nappy use per day

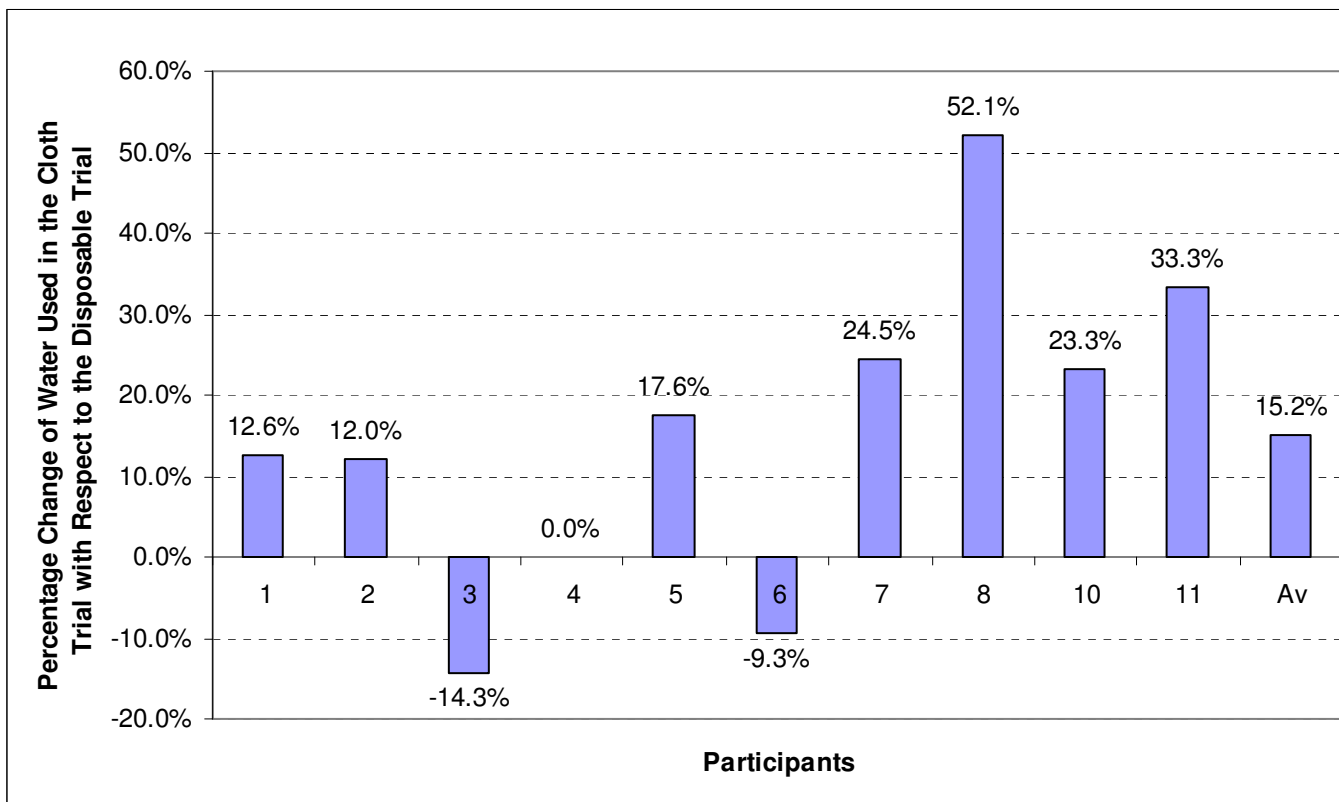


Resources: Water Usage

Overall, in this small sample, water usage while using cloth nappies increased on average by 15%.

There was considerable variation between the participant's water usages. Two participants used less water, one used the same amount of water and six used more water. One participant used 52.1% more water, whereas the other five showed an increase of between 12 %and 33.3 %. One participant's water data was not included as the participant did not collect the water meter data during the cloth trial.

The significance of these findings is difficult to assess due to the large number of variables involved in household water consumption. The general assumption is that changing to cloth nappies will increase household water use by an extra washing load or two each week. For some of the participants, the trials were conducted over a large time frame, with one trial completed during summer and the other in autumn. During this time, there were changes in enforced water restrictions and seasonal changes that may have affected water use. The trial recorded total household water usage only, without looking at other factors such as the type of washing machine (top or front loader), whether additional people lived in the house during the trial, whether there were any other changes imposed between the trials such as changes to water efficiency of showers and toilets, changes in baby bathing routine and so on. It would be useful to look at this area in more detail however it was beyond the scope of this trial.











Costs

Nappy Options	Weekly	Yearly	Comments
Disposable Option: Total	\$14.08	\$732	Average cost per disposable nappy used during the trial (37 cents) multiplied by the average number of disposable nappies used in trial (5.6 per day)
Cloth Nappy Option			
Purchase of cloth nappies	\$ 4.81	\$250	Assume you start with the 20 nappies that were in the cloth nappy kit (Appendix 1) - weekly cost is therefore \$250 divided by 52 weeks)
Disposables (used at night 37cents * 7 nights):	\$2.59	\$134.68	An average of one disposable nappy was used per day (a night nappy) during the trial
Laundering costs	\$1.66	\$86.12	(Calculations in Appendix 5)
Cloth Nappy Options: Total	\$9.06	\$470.80	

Appendix 1: The Cloth Nappy Pack

The participants received the following products in the cloth nappy packs.

Nappy Pack Composition

Item	Description	Photo	Comments about this nappy item	Comment by various locals	Quantity
Bummis Supper Whisper Cover	This velcro closing cover is made from a super resistant waterproof laminate sandwiched between two layers of a soft polyester knit. The generous cut of this cover makes it suitable for any type of flat or prefold nappy. A durable, heavy-duty elastic around legs and tummy which will not wear out with repeated washes.		After 6 months of trying different cloth nappy options, I tried this cover combined with a prefold and/or a terry nappy. It is great and covered my criteria of: simple and easy to use, leak proof, cheap and fast drying.	Meaghan	4
Bummis Prefold	Soft and absorbent unbleached cotton prefold nappies		I was tired of folding and unfolding flat nappies, but wasn't convinced that fitted nappies was the way to go. Prefolds are inexpensive, fast drying and require minimal folding.	Meaghan	18
Fitted Nappy - Baby BeeHinds Bamboo One-Size nappy	Wonderfully trim, our bamboo nappies have been designed with comfort (so soft!) and absorbency in mind. Please note these nappies do take longer to dry than the hemp nappies because they are very, very absorbent. Professionally made and fully customisable, these nappies are not only great during the day, but are great for use on heavy wetters and for times when the nappy will be on longer than usual, for example, at night.		I have tried other cloth nappies, these are the best because they are very absorbent. I use them overnight. I have washed mine over and over and the colour and softness remains. I love these nappies as they can last until bubs is toddler and can be re-used for the next little one that comes along!	Kate	1 fitted nappy (either Baby BeeHinds or Cute Tooshies)
Cute Tooshies	Cute Tooshies® nappies are made to fit approx 4-15kg, which means you don't need to buy multiple sizes as your baby grows. The side-snapping design of these nappies reduces bulk at the front of the nappy and gives a nice smooth fit. These nappies have a large amount to stretch to them and come complete with absorbent inserts.		I have found the Cute Tooshies wonderfully easy and convenient. I love the fact they are one size fits all, so I can just keep on using them up until toilet training. I've had Spencer in one of them for up to 5 hours without any leaks. They are quick drying and the more I use them the more absorbent the nappy has become. The dry pailing approach suits us and I like the fact there is less water usage involved. We just throw the used nappies into the wash, hardly any detergent is used - again better for the environment and they are dry inside of a day.	Kim	1 fitted nappy (either Baby BeeHinds or Cute Tooshies)
Weenees Pouch Pants	Colourful stretchy cotton/elastane outer pants with back Velcro fasteners to keep away from little fingers. These new unique nappies have a removable inner waterproof pouch which supports any type of absorbing pad, from pre-fold nappies, rectangular folded cloth, Eenee Microfiber cloth and of course our flushable compostable Weenees disposable eco pads.		I use the pouch pants on my four month old son Hamish. I love the bright colours and find them the easiest option for us. After a bit of practice, it becomes easy to put them on and get very few leaks. They are easy to wash and quick drying. They can be used with either the Eenee microfibre or a standard flat nappy. Folding either is simple and quick.	Trepheena	1
Eenee Microfibre Nappy	Made from tiny microfibers (polyester and polyamide) which are only about 1/100th the size of a human hair. This amazing technology absorbs moisture faster and more easily than other fabrics. Ultra-soft, lint free and if used for cleaning, gives a streak free finish. They can absorb 6 times their own weight in water and they dry superfast (saving energy). Reusable and washable up to several hundred times.		The microfibre nappies are absorbent, easy to wash and quick drying. Folding is simple and quick. I use two microfibre nappies in the pouch pants at night and they are great for up to 12 hours.	Trepheena	3
Eenees Disposable Pad	Weenees Eco Disposable Pads are superabsorbent, flushable and compostable. Available in two sizes Small (200ml) and Medium (400ml), pads can be combined for extra absorbency if required. Suitable for use in all Eenee Designs waterproof garments or they can be combined with other reusable nappies as booster pads.		I use Eenees for Callum (5 months) during the day as they are as absorbent as a mid range disposable nappy but don't have plastic components so are compostable/flushable. I don't feel quite as guilty about filling up landfill with nappies. The Eenee pants are very funky too!	Michelle	6
Eenee Flushable Nappy Liners	Flushable stay dry nappy liners for use with reusable cloth nappies or can be used as a flushable nappy liner with 'plastic' disposable nappies. Helps keep the skin dry and makes cleaning of nappies easier. Available in pack of 50 or bulk packs of 500. Liners are fully compostable and are made from cellulose (plant) based material.		I use the liners over either an eenees microfibre nappy or flannel nappy in an eenees cover. I find that they keep Hamish feeling dry and they make it easier to get poo off the nappy.	Trepheena	50

Appendix 2: Modern Cloth Nappy Options

There are many different options when using cloth nappies. The nappy pack in this trial included a range of modern cloth nappies – Bummi's prefold nappies, Bummi's Super Whisper nappy covers, fitted nappy (Cute Tooshie or Baby BeeHinds), Weenees pants and Eenees microfibre nappy as well as one “disposable” nappy, the Weenees disposable pad.

Prefold nappies have been folded for primary thickness in the centre. The absorbent nappy layers are then sewn into place, resulting in a cloth nappy that may have from 6 to 8 layers of thickness in the centre panel and 2 to 4 layers on the outer two panels. These nappies are placed in a waterproof cover, such as the Bummi's Super Whisper covers.

Fitted nappies look a lot like a disposable nappy and are very easy to put on – they are effectively a cloth disposable. They generally fit a large size range so the one size will fit for a long time. These nappies need a waterproof cover over the top. In this trial, participants were able to use the Bummi's covers. The fitted nappies used in our trial pack were made from bamboo, an environmentally friendly crop and highly absorbent material. The Cute Tooshie nappies come with two hemp/cotton boosters that go inside the nappy to increase absorbency. Both hemp and bamboo have natural antimicrobial and antifungal properties. These fabrics are more absorbent than cotton-based cloth nappies.

Weenees pouch pants comprise an inner plastic pouch and outer fabric pants. The plastic pouch is removable so that it can be washed separately while the fabric pants are used with another pouch. There are a number of options to use in the plastic pouch. In this trial, participants were provided with Weenees disposable pads and Eenees microfibre nappies. The pouch pants can also be used with a traditional flat terry or flannelette nappy (not included in trial pack).

Weenees disposable pads contain no polyethylene or polypropylene and are therefore fully compostable. Used pads can be composted or flushed down the toilet. Soiled pads should be flushed but wet pads are compostable. The microfibre nappies are smaller than a traditional flat nappy. Microfibre is highly absorbent and quick drying. These are folded and placed in the pouch.

The pack also included 50 Eenees flushable nappy liners. Nappy liners are not essential but are useful as they keep the skin drier and make it easier to remove faecal material from dirty nappies.

Summary of participant's ratings of the products in the trial

	Excellent	Very Good	Good	Not good	Bad	No response
TOTAL (12 participants)						
Bummi's Super Whisper Cover	8 (67%)	3 (25%)	0 (0%)	0 (0%)	0 (0%)	1 (8%)
Bummi's Prefold	4 (33%)	5 (42%)	2 (17%)	0 (0%)	0 (0%)	1 (8%)
Fitted nappy	1 (8%)	4 (33%)	4 (33%)	3 (25%)	0 (0%)	0 (0%)
Weenees Pouch Pants	4 (33%)	4 (33%)	3 (25%)	1 (8%)	0 (0%)	0 (0%)
Eenees Microfibre Nappy	4 (33%)	2 (17%)	3 (25%)	1 (8%)	1 (8%)	1 (8%)
Eenees Disposable Pad	2 (17%)	3 (25%)	2 (17%)	3 (25%)	0 (0%)	2 (17%)
Eenee Flushable Nappy Liners	8 (67%)	1 (8%)	1 (8%)	0 (0%)	0 (0%)	2 (17%)
BOYS (7 participants)						
Bummi's Super Whisper Cover	5 (71%)	2 (29%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Bummi's Prefold	3 (43%)	4 (57%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Fitted nappy	0 (0%)	2 (29%)	2 (29%)	3 (43%)	0 (0%)	0 (0%)
Weenees Pouch Pants	3 (43%)	2 (29%)	2 (29%)	0 (0%)	0 (0%)	0 (0%)

Eenees Microfibre Nappy	3 (43%)	2 (29%)	1 (14%)	0 (0%)	1 (14%)	0 (0%)
Eenees Disposable Pad	1 (14%)	2 (29%)	1 (14%)	2 (29%)	0 (0%)	1 (14%)
Eenee Flushable Nappy Liners	6 (86%)	0 (0%)	1 (14%)	0 (0%)	0 (0%)	0 (0%)
GIRLS (5 participants)						
Bummi Super Whisper Cover	3 (60%)	1 (20%)	0 (0%)	0 (0%)	0 (0%)	1 (20%)
Bummi Prefold	1 (20%)	1 (20%)	2 (40%)	0 (0%)	0 (0%)	1 (20%)
Fitted nappy	1 (20%)	2 (40%)	2 (40%)	0 (0%)	0 (0%)	0 (0%)
Weenees Pouch Pants	1 (20%)	2 (40%)	1 (20%)	1 (20%)	0 (0%)	0 (0%)
Eenees Microfibre Nappy	1 (20%)	0 (0%)	2 (40%)	1 (20%)	0 (0%)	1 (20%)
Eenees Disposable Pad	1 (20%)	1 (20%)	1 (20%)	1 (20%)	0 (0%)	1 (20%)
Eenee Flushable Nappy Liners	2 (40%)	1 (20%)	0 (0%)	0 (0%)	0 (0%)	2 (40%)

This trial showed that preferred style of nappy is highly individual – no single product was preferred over the others. The most suitable style of nappy for any family depends on a number of factors, including the age and sex of the child as well as how heavily they wet and how often nappy changes are done. Ease of washing and drying are also important factors. There were some trends when feedback was separated by gender – the prefold nappies and the Weenees pouch pants were more popular with boys than with girls. This study was not large enough to examine any effect of age on preferred style of nappy.

Appendix 3: Reasons Participants Withdrew from the Nappy Trial

1. I have decided not to continue on with the trial. I have had no success in the cloth nappies at all. I have had constant leaks and huge embarrassments in public and just can't get a handle on them. Not to mention the whole management of storage of soiled nappies, washing etc. I have a baby, a very active three year old and I run two businesses all at the same time - so I think my lifestyle just isn't cut out to do cloth although I would love to have thought I could - maybe I just don't have enough patience. I have, however, turned to Ecobots, which I have found to be very effective (this is from someone who only believed that Huggies worked). I'd still like to know the outcome of the trial if that's possible.
2. I have decided not to do the nappy survey for a number of reasons. The main one is time both to do the survey and more particularly the time it takes to wash dirty nappies. With time so precious as a new mum (baby is 4 weeks old). I felt that I spend enough time washing the face washers I use to clean her bottom (midwife recommended washers rather than baby wipes) and her messy clothes (from reflux) and did not want to create more work. Also because water is so limited now I would rather create landfill. Also I felt the survey was also a way of promoting the purchase of all the lovely new cloth nappy options which the two shops involved have in stock. I believe this kind of survey has been done before and the answer in terms of water and energy use is generally already known. However I am still planning to purchase one of the cotton/bamboo nappies out of curiosity as they look great, so soft and I believe very absorbent.

Trial coordinators' note: This trial was organised and managed by two local mothers in a voluntary role with the primary aim of giving local families the opportunity to try cloth nappies. There was no commercial aspect to the trial. The Environment Shop and Chris' Dial-A-Nappy kindly supported the trial by supplying the nappies at wholesale cost but neither company had any influence over the design or running of the trial. The cloth nappy pack was designed by Meaghan and Trepheena to have a range of nappies that we believed - from personal experience and that of our friends - were the best options available.

Appendix 4: Correspondence to and from the UK's Environment Agency

Hello Tricia Henton

It looks like the consulting firm that compiled the Life Cycle Assessment of Disposable and Reusable Nappies Report has omitted the water needed to grow the trees (required to produce 425 kilograms of fluff pulp) in the Life Cycle Assessment.

This is despite mentioning on page 5 of the report that...

the flows associated with the fluff pulp used in disposables were traced back to paper and forest growth. For cloth nappies, the flows were traced back to cotton growth and production.

On page 88 of the report in table 7.3 'Inventory analysis: disposable nappy manufacture', it states that 17,700kg of water is required for fluff pulp.

Given that on average it takes 35kgm³ of water to make a tonne of pulp, (source: <http://ec.europa.eu/research/growth/gcc/projects/sustainability-pp.html>), this equates to approximately 14,875 kg of water required to make 425 kg of pulp.

Best wishes

Meaghan

The response below is sent to you on behalf of Tricia Henton, Director of Environment Protection:

Thank you for your e-mail on 11 February 2007.

I am advised that you have now received a response from our National Customer Contact Centre. I would add that this was an extensive study peer reviewed by independent experts and overseen by a project board which included the Women's Environmental Network (WEN), the Real Nappy Association, Proctor & Gamble and the Absorbent Hygiene Products Manufacturers' Association, as well as DEFRA and local government.

Our consultants used the best available information at that time. We have no further detail other than the source of the fluff pulp was North American and Northern European and the underlying data was gleaned from publicly available sources.

We do believe our report to be an accurate representation of the prevailing situation at the time of the study. We appreciate the situation is not static and are currently carrying out an updated study and we will pass on your comments to the consultants.

Regards

Tricia Henton

Director of Environment Protection - Environment Agency

We forwarded the response from the Environment Agency to Women's Environmental Network (WEN), and this was their response

>>> "Liz Sutton" <comms@wen.org.uk> 26/02/2007 12:55:57 >>>

Dear Anne,

Please will the Environment Agency stop naming WEN and the Real Nappy Association as members of the advisory board for the Life Cycle Assessment of Disposable and Reusable Nappies Report? Our names should only be mentioned in association with the report if the Agency also makes clear that:

- a) Real Nappy Association withdrew from the process at an early stage and therefore was not involved in the final report
- b) WEN rejected the report as seriously flawed, based on poor quality data and missing the point of its own findings.

WEN considers the report to be confusing to parents and that, even in its flawed state it shows that parents who use cloth nappies can save waste confident in the knowledge that washing them will cause no more global warming than disposable nappies.

Naming both organisations as members of the advisory board without the above qualifying statements implies endorsement of the final report that neither organisation gave and is damaging to WEN's reputation. As is known to the agency staff and consultants involved in the original report, WEN was dissatisfied that much of our advice as members of the steering group was glossed over or ignored. I attach a copy of the letter Ann Link wrote to Baroness Young and copied to Tricia Hinton and others at the time. I also attach the press release we issued in response to the publication of the report.

I am prompted to write by the correspondence pasted below. I would be grateful if you would pass this request on to Tricia Hinton and to all EA staff involved in dealing with media or public enquiries about the LCA.

Liz Sutton
Central & Communications Co-ordinator
Women's Environmental Network
PO Box 30626
London E1 1SA
t: 020 7481 9004
f: 020 7481 9144
e: comms@wen.org.uk
w: www.wen.org.uk

Appendix 5: Ongoing Cost to Wash Nappies at Home

The information below was sourced from a website called The Australian Real Nappy Information website http://www.clothnappy.com/articles/the_cost_of_washing_cloth_nappies.html

The energy and water usage figures and how to calculate them were obtained from four different retail washing machine stores in Perth (Feb 2003). Washing estimates are based on using 7 nappies per day and washing a maximum of 24 nappies per load, therefore washing every third day - or 121 times per year.

The short answer to how much does it cost (including electricity, water and detergent costs) to wash cloth nappies is around **\$86.12** if you line dry and \$114.12 if you tumble dry PER YEAR. I don't know about you, but I think that is quite amazing. I have to admit that I did believe the disposable nappy companies advertising about it being expensive to wash cloth nappies because I would not have been surprised if it had worked out to cost three or four times that amount.

The following three tables show Water Usage and Costs, Energy Usage and Costs and Total costs per year of washing cloth nappies. The remainder of this article explains how I arrived at these figures so that you can work them out yourself if you want to.

Water Usage Table

for 121 washes for nappies and 121 washes for covers at approximately half the water usage as nappies per wash.

Machine Type	Water/ year - nappies (litres)	Water/ year - covers (litres)	Total water/ year (litres)	Cost/ year - nappies	Cost/ year - covers	Total Water Cost
5-5.5kg Top Loader	15,730	7,865	23,595	\$13.88	\$7.00	\$20.85
6.5kg Top Loader	18,150	9,075	27,225	\$15.99	\$8.00	\$23.99
7.5kg Top Loader	21,780	10,890	32,670	\$19.18	\$9.60	\$28.78
Av. front Loader	7,260	3,630	10,890	\$6.39	\$3.20	\$9.60
Average Water Cost per year: \$20.80						

Total water costs for washing cloth nappies per year ranges from around \$9.60 for a water efficient front loader to around \$28.78 for a large top loading machine. The average cost per year is around \$20.80.

Energy Usage Table for 121 washes for nappies and 121 washes for covers.

Machine Type	Cost per wash	Cost per year - nappies	Cost per year - covers	Total Cost per year
560KW Top Loader	\$0.153	\$18.88	\$15.88	\$34.76
644KW Top Loader	\$0.175	\$21.18	\$18.18	\$39.36
198KW Front Loader	\$0.05	\$6.05	\$4.05	\$10.10
330KW Front Loader	\$0.09	\$10.89	\$8.89	\$19.78
Average Energy Cost per Year: \$26.00				

Average Total costs of washing cloth nappies per # of years

# washing years	Energy	Water	Washing Detergent	Total Cost - Line Dried	Total Cost - Tumble Dried
1	\$26.00	\$20.80	\$39.32	\$86.12	\$114.12
2	\$52.00	\$41.60	\$78.64	\$172.24	\$200.24
2.5*	\$65.00	\$52.00	\$98.30	\$215.30	\$243.30
3	\$78.00	\$62.40	\$117.96	\$258.36	\$286.36
3.5	\$91.00	\$72.80	\$137.62	\$301.42	\$329.42
4	\$104.00	\$83.20	\$157.28	\$344.48	\$372.48

*Most babies who wear cloth nappies toilet train between six months and a year earlier than babies who wear disposables. The average age is between 2 and 3 years which means the average cost of washing cloth nappies for the period of time your baby is in nappies will range from \$172.24 to \$286.36.

Water Usage

Top Loading Machines (average usage based on a high or full load)

5-5.5kg	65 litres fill	65 litres rinse	130 litres total per load
6.5-7.5kg	75-90 litre fill	75-90 litre rinse	150-180 litres total per load

130L x 121 washes per year for 5-5.5kg machines is 15,730 litres (15.73KL) per year
 150L x 121 washes per year for 6.5kg machines is 18,150 litres (18.15KL) per year
 180 L x 121 washes per year for 7.5kg machines is 21,780 litres (21.78KL) per year

Front Loading Machines

(These type of machines automatically adjust the water level according to the weight of the load. The average water consumption is 60 litres per load)

60L x 121 washes per year is 7,260 litres (7.26KL) per year

To calculate the cost of water consumption, I contacted the Water Corporation (WA) and was given the following residential tariff rates (effective July 2002) per kilolitre which are calculated for use per 12 month period:

First 150 KL	\$0.403/kl
Next 200KL	\$0.652/kl
Next 200KL	\$0.881/kl
Next 200KL	\$1.070/kl
Next 400KL	\$1.071/kl
Next 800KL	\$1.193/kl

This means that if you use 350KL per 12 month period, you will be charged at the following rate:

150KL x \$0.403 =	\$60.45
200KL x \$0.652 =	\$130.40
Total	\$190.85

The Water Authority advised me that the average residential usage was 350KL per 12 month period for a family of four, a family of six would use around 540KL for the same period.

If you are seriously concerned about the water usage in either regards to the financial or environmental costs, I think its reasonable to say that your water usage would be close to or under the residential average of 350KL, but I am going to calculate the water useage costs at the next tariff level of \$0.881 (if you are frugal with your water use it will obviously cost you less).

7.26 kilolitres x \$0.881 =	\$6.39	Front Loading machine
15.730 kilolitres x \$0.881 =	\$13.85	Top loading machine
18.150 kilolitres x \$0.881 =	\$15.99	Top loading machine
21.780 kilolitres x \$0.881 =	\$19.18	Top loading machine

Machine washing nappy covers at the same rate (using four covers per day and washing every 3rd day) would cost you around half these figures as you do not need to fill the washing machine as high for 12 covers as with 24 nappies.

Washing Detergent

Based on using half the recommended amount per load (half a scoop), a one kilogram box of concentrated laundry detergent will wash 27.7 loads of nappies. At an average price of \$4.50 per box, this equates to \$0.1625 per load or \$19.66 per year for 121 nappy washes (\$39.32 for nappies and covers).

Energy Consumption

Energy consumption for washing machines is calculated in kilowatts per year based on one wash per day and is only calculated for hot washes. For some reason the Government doesn't include the energy for cold water washing in the energy consumption ratings, and the ratings are only based on electricity useage, so I am assuming, (and will try to confirm this) that energy consumption would be less if you have a gas or solar hot system. In addition, the energy rating for washing machines apparently also includes the water used (as water is also an energy source), so the cost of electricity is probably a bit less than my calculations.

According to the retail stores I contacted, the average top loading washing machine uses 560-644 kilowatts based on one wash per day over a year, for a dollar value of \$56-64 per year or \$0.153-\$0.175 per wash. Based on these estimates, a top loading washing machine would cost you between \$18.88 and \$21.18 per year to wash cloth nappies 121 times. Washing cloth nappy covers the same number of times would cost you slightly less as a shorter wash cycle should be used for covers, so I have estimated that it would cost about \$3.00 less per year, therefore between \$15.88 and \$18.18 per year.

Front loading machines range from 198KW per year to around 330KW per year, which equates to approximately \$19.80 to \$33.00 per year or \$0.05 to \$0.09 per wash. Based on these estimates, a front loading washing machine would cost you between \$6.05 and \$10.89 per year to wash cloth nappies 121 times. Washing cloth nappy covers the same number of times would cost you slightly less as a shorter wash cycle should be used for covers, so I have estimated that it would cost about \$2.00 less per year, therefore between \$4.05 and \$8.89 per year.

Line or Air Drying Nappies and Covers

The only cost associated with this is your time.

Tumble Drying

Tumble drying will add to your energy consumption costs for cloth nappies, and may shorten their life expectancy. This is an expense that you could avoid, or at least minimise by only tumble drying in winter. Nappy covers should be line/air dried only - if you do one quickly, ten minutes in the drier on warm is sufficient for most types of covers.

As with washing machines, the energy consumption of driers will vary according to make and model, however my understanding is that the energy rating of clothes driers is not as accurate as for washing machines as driers are used seasonally while washing machines are used all year round. To try and clarify the energy useage for tumble dryers I contacted one of the large manufacturing companies who confirmed this information and advised that clothes driers ranged from 198KW useage per year for a 3kg drier to 228KW for a large 5kg drier, although I was also told that other brands may go up to 280KW. The manufacturers work on \$0.10 per kilowatt to determine that on average using a dryer will cost you \$19.80 to \$28.00 per year. Due to the normal seasonal use of clothes driers it is impossible to work out a per use cost, therefore to keep this from getting even more complicated, I have taken the higher figure of \$28.00 as the cost of tumble drying cloth nappies per year.