

# **Oxford Brookes University**

**Centre for Environmental Studies**

## **Report on the Green Cone Trial West Oxfordshire**

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# **Green Cone Trial in West Oxfordshire A Report on the Findings**

## **Background**

This report has been prepared by the Centre for Environmental Studies in the School of Hotel & Restaurant Management at Oxford Brookes University. It is a report for Green Cone Ltd on a trial of the Green Cone food waste digester administered by the West Oxfordshire District Council (WODC). The Centre for Environmental Studies has been commissioned by Green Cone Ltd to analyse and validate the trial data, and to report and comment on the findings of the trial.

## **Aims of the Trial**

The Green Cone is an aerobic food waste digester, the use of which can reduce the volume of waste entering the domestic waste stream, and which has the ability to handle all food waste. With the Landfill Directive (99/31/EC) setting a reduction target of 65% for biodegradable municipal waste by 2005, it is envisaged that the use of Green Cones can assist in meeting these targets. The aims of this study therefore, were to investigate the amount of waste that could be diverted from landfill through their use, and what, if any, barriers there are that discourage their use in domestic residences.

## **The Trial**

Trial participants were recruited through an advertisement in the local press (Witney Gazette), an e-mail to all staff employed by the Council and to all councillors. The sample therefore, is not necessarily fully representative of the general population, as it stands to reason that those who volunteer are likely to have some interest in environmentally conscious waste management. A total of 50 Green Cones were distributed to volunteers for the trial, and 32 participants returned data. The data was collected over a six-month period, from April to September 2001, the warmest part of the year and therefore theoretically the optimum time for the Green Cone to operate. Data on weight and volume was entered by trial participants onto a datasheet, prepared by WODC – see Appendix 4, as and when the 'kitchen caddy' was emptied into the Green Cone. A note was also made as to whether accelerator powder was used.

## **Questionnaire**

Three months after the end of the trial, a questionnaire (see Appendix 3) was distributed to 30 of the 32 participants who had completed the trial datasheets. From this, 24 responses were received and have been analysed in tabular format (see Appendix 2).

## **Validation**

The Centre for Environmental Studies has validated data from two participants (see Appendix 2A). Two people were randomly selected, representing 10% of questionnaire respondents, and they were contacted by telephone. Ten questions reflecting those in the questionnaire were asked, and answers were elaborated on through discussion. This enabled data to be corroborated as well as allowing people to make their own comments about the cone. The information given over the telephone was found to be consistent with the data given in the questionnaire.

The people contacted by telephone were positive about the cone, but both expressed reservations about using the kitchen caddy. One used the cone alongside a composter, and the other used the cone in preference to a composter. Both respondents were fairly happy with the performance of the Green Cone, and discussed some difficulties with its use, which tallied with the responses received in the questionnaires.

## **Results**

### Trial data

The monthly data was collated into a table by Robbie Warden of WODC, by trial participant and weight of waste deposited in the Green Cone by month. This table is included as Appendix 1.

- Over the six-month period of the trial, almost 10 kg of food waste per household per month was being put into the Green Cone. There is an average of 3 people per household in this trial
- Four of the cones in the trial, situated in sunny positions, each handled over 100kg of food waste in the six month period
- One Green Cone, situated in partial sun, became full after taking 63 kg of waste in 4 months
- The first month of the trial recorded an average 10.75 kg per household going into the Green Cone. This dropped to 8.9 kg in month 5, but improved to 10.44 kg in month 6.

### Questionnaire Results

The questionnaire covered 24 residences housing 73 people. All respondents felt the cone was a good way of managing waste, and they would all recommend its use to somebody else.

### Volume

- Surprisingly, 33% of respondents noticed no reduction on the amount of waste they were putting out for collection, which seems odd as all were placing waste in the cone.
- 29% noticed a reduction of less than 10%.
- 29% estimated a 10 to 20% reduction.
- 4% stated a reduction of 20-30%, and 4% a reduction in the 30-50% range.

### Difficulties

- Half the users had some difficulty installing the Green Cone, with 70% of these finding the 'digging in' a demanding task.
- Finding a location in the garden for the Green Cone was easy for 88%, although less than half of these were placed in full sun. Four of the cones were placed in shade, which is not recommended by the manufacturer.
- 71% of respondents commented on specific problems, mainly to do with flies. Slow breakdown of the waste matter was experienced by 24%, and there was one instance of a mole causing a problem.

### Waste Composition

- 38% included meat and bones in the contents of their waste deposited in the Green Cone.
- Cooked food was put in the cone by 71% of respondents
- 75% were using it for vegetable peelings and similar organic matter

### Frequency of use and emptying

- Virtually everyone (over 90%) placed waste in the Green Cone at least twice a week
- 21% used it daily, and 46% every two days.
- During the six-month trial, 92% of the users did not have a need to empty the cone.

### Price

- The Green Cone sells for around £50, but no respondent indicated a willingness to pay more than £30
- 58% were prepared to pay between £10 and £30 for a Green Cone

### Suggestions for Improvement

- The size and nature of the opening could be modified, although most users were not instructed to remove the 'bar' across the opening, which hindered their access
- Screws should be made of stainless steel to prevent rusting
- Improve the durability of the kitchen caddy
- Access to the 'compost' residue to facilitate emptying

### **Conclusions**

Although this was a relatively small trial, and there are inevitably reservations about issues such as leachate and gas emissions without running a larger trial over a longer period (to include the winter months), there are noticeable patterns and some positive points emerging. With this taken into account, it can be concluded that:

- The monthly average of about 10kg of food waste placed in the Green Cone, equating to about 12% of the domestic waste stream, is a significant reduction. Assuming widespread take-up of the Green Cone throughout West Oxfordshire, the potential reduction in the waste stream could be in the region of 3,500 tonnes.
- All respondents felt the Green Cone was a clean and environmentally friendly way to manage waste, and would recommend its use to others.
- Amongst the follow-up questionnaire respondents, there was a palpably positive tone, although this did not translate into willingness to purchase a cone at the manufacturer's price.
- There are some operational problems with using the Green Cone, but mostly these are not sufficient to prevent people continuing to use the cone.
- The positioning of the Green Cone is important, as it is less effective in shady areas.

### **Summary**

The Green Cone's ability to accept additional items not recommended for a compost heap make it complementary to a conventional composter. In addition to this, an interesting point to come out of the trial was that some participants were using the cone residue as compost, and many liked its cleaner way of functioning. Ten kilograms a month (120 kg per annum) is a significant reduction in kitchen waste, so there is definite potential for the Green Cone to play a role in reducing the domestic waste stream.

**Green Cone Trial – Data from volunteers**

**Appendix 1**

**GREEN CONE TRIAL RESULTS 2001**

<b>Volunteer No.</b>	<b>Apr-01</b>	<b>May-01</b>	<b>Jun-01</b>	<b>Jul-01</b>	<b>Aug-01</b>	<b>Sep-01</b>	<b>Total</b>
1							
2	11,150	17,000	10,535	8,340	10,410	11,340	68,775
3	10,150	8,075	9,170	7,550	15,170	10,095	60,210
4							
5							
6	23,452	18,071	18,538				60,061
7	3,150	8,550	6,150				17,850
8							
9	11,030	12,768	11,050	9,060	8,795	18,685	71,388
10				992			992
11	5,989	1,172	897	798	1,051	857	10,764
12							
13	7,200	6,800		7,500	9,000		30,500
14	7,165	8,600	12,600	5,435	9,900	11,575	55,275
15	8,375	12,150	13,760				34,285
16	9,600	8,400	7,200	7,200			32,400
17	22,430	7,125	4,725	9,220	10,465	7,190	61,155
18	6,921	19,360	17,080	21,120	18,415	18,314	101,210
19	15,053	21,574	10,149	18,539	4,423	18,711	88,449
20							
21	18,585	11,220	13,760	25,984	22,370	15,275	107,194
22	22,450	13,125	22,815	20,750	25,425	27,400	131,965
23	1,705	1,667	2,483	1,924	1,540	1,308	10,627
24	1,388	3,425	3,050	4,555	2,200	1,325	15,943
25	8,460	7,565	9,635	10,205	3,560	9,065	48,490
26							
27	19,920	22,620	19,475	11,030	13,980	16,390	103,415
28							
29	7,400	5,000	3,900	4,550	3,400	5,000	29,250
30		2,424	3,175				5,599
31							
32			5,300	4,200	4,475	2,700	16,675
33	12,451	6,907	6,775	7,560	10,715	5,990	50,398
34							
35							
36							
Cone full *37	14,650	10,800	19,800	18,100	390		63,740
38		7,850	8,650	8,600	6,800	3,150	35,050
39	11,325	9,885	7,375	7,100	8,875	14,200	58,760
40							
41							
42	10,145	4,390	6,445				20,980
43	9,900	13,900	5,800	10,100	5,400		45,100
44	5,325	6,855	4,075	9,025	5,425		30,705
45							
46							
47	11,360	18,950	13,850	10,850	11,300	10,150	76,460
48	4,300	5,100	3,500	4,300			17,200
<b>Total kg</b>	<b>301.03</b>	<b>301.33</b>	<b>281.72</b>	<b>254.59</b>	<b>213.48</b>	<b>208.72</b>	<b>1560.87</b>
Average kg per house per month	10.75	10.04	9.39	9.43	8.90	10.44	9.82
Annual equivalent kg	129.01	120.53	112.69	113.15	106.74	125.23	117.89
% decrease household waste pa	12.90	12.05	11.27	11.31	11.88	11.63	11.84
No. of responses	28	30	30	27	24	20	26.5

**Green Cone Trial – Follow up Questionnaire**

**Green Cone Trial  
Volunteer Feedback Questionnaire**

1. What type of house do you live in?

Bungalow      Terrace      Semi-detached      Detached

2. Please enter the number of people living in your house in the following age brackets?

(Please enter number)

0-18              19-30              31-45              46-60              61 and over

3. Was the Green Cone straightforward to install?

Yes              No              If No what problems did you

experience?.....  
.....  
.....  
.....

4. Was it easy finding a suitable location in your garden for the green cone?

Yes              No              If No what problems did you

experience?.....  
.....  
.....  
.....

5. Is your green cone situated in:

Full sun              Partial sun              Mostly shade

6. How often do you put material into your green cone?

Daily

Every other day

Twice a week

Fortnightly

Monthly

**Other**.....

7. What materials do you place in the green cone?

.....  
.....  
.....  
.....

8. Did the Green Cone require emptying at all during the trial?

Yes

No

If Yes please outline how often

.....

9. Did you experience any problems with the Green Cone during the trial?

Yes

No

If Yes please outline any particular problems

.....  
.....  
.....  
.....  
.....

10. During the Green Cone trial did you notice any reduction in the volume of waste your household put out for refuse collection?

Yes                      No

If Yes please outline by how much per week

<10 %                      11-20 %                      20-30 %  
30-50 %                      Over 50 %

11. What in your opinion are the benefits of using a Green Cone?

.....  
.....  
.....  
.....  
.....  
.....

12. What in your opinion are the disadvantages of using a Green Cone?

.....  
.....  
.....  
.....  
.....  
.....

**Appendix 3 (Cont'd)**

13. Would you recommend the Green Cone to a friend?

Yes

No

Please explain your answer

.....  
.....

14. What improvements to the green cone would you recommend?

.....  
.....  
.....  
.....  
.....

15. How much would you be prepared to pay for a Green Cone?

.....

Thank you very much for your help and support with the Green Cone trial.  
Please use the prepaid envelope to return this questionnaire.

**Appendix 4**

**Green Cone Trial Datasheet (extract)**

Date	Volume (buckets)							Weight (g)	Accelerator Powder Used
	1/2	1/2	3/4	1	2	3	4		
Monday 16/4/2001									
17/4/2001									
18/4/2001									
19/4/2001									
20/4/2001									
21/4/2001									
22/4/2001									
Monday 23/4/2001									
24/4/2001									
25/4/2001									
26/4/2001									
27/4/2001									
28/4/2001									
29/4/2001									
Monday 30/4/2001									
01/5/2001									
02/5/2001									
03/5/2001									
04/5/2001									
05/5/2001									
06/5/2001									
Monday 07/5/2001									
08/5/2001									
09/5/2001									
10/5/2001									
11/5/2001									
12/5/2001									
13/5/2001									
Monday 14/5/2001									
15/5/2001									

Thank you for completing the record sheet please send to:

Robbie Warden  
 Environmental Services Department  
 The Gables  
 New Yatt Road, Witney, Oxfordshire OX28 1PB