

An evaluation of the Energy Audits carried out for small businesses in Pembrokeshire under the PLANED Energy Savers Scheme.

By Rebecca Johnson on behalf on ARENA Network



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1. Executive Summary

47 Pembrokeshire companies received Energy Audits between May 2006 and October 2007 through the PLANED Energy Saver Scheme. Of the 42 companies that responded to an evaluation survey, which was carried out in December 2007 by telephone, 18 had gone on to take some kind of action following receipt of the written report. The actions taken so far equate to an annual saving of 63,021KWh and 26,388kg of carbon dioxide. A further 7 organisations indicated they intend to implement measures in the near future and of those who had already implemented measures 9 intend to implement further measures. Satisfaction with the reports was generally high with 53% rating it 4 or above on a scale of 1-5.

2. Introduction

Between 23 May 2006 and 24 October 2007 46 energy reviews were prepared by ARENA Network for businesses around Pembrokeshire under PLANED's Energy Savers Scheme. Businesses visited were very diverse, ranging from companies like Kiln Park in Tenby employing 200 staff and accommodating thousands of visitors during the Peak Season, to small one man bands such as Tenby Town Trails.

During December 2007 an evaluation exercise, involving telephone interviews with each company was undertaken. The aim of the evaluation exercises was ***to assess how effective the energy reports have been at encouraging companies to take actions that reduce their energy consumption and related carbon dioxide emissions.***

The following information was collected during and after the telephone interviews and has been compiled in this report.

- Energy saving measures already implemented as a result of the Energy Savers report recommendations
- Energy saving measures organisations intend to implement as a result of the Energy Savers report recommendations
- Assessment of carbon dioxide savings relating to each implemented measure.
- Assessment of average spend on energy saving measures implemented.
- Record of the number of companies who have gone on to implement Green Dragon
- Further services / grants accessed as a result of the Energy Savers support – what type? Who has helped?
- Further advice organisations want/ need?
- Summary of any other comments made by interviewees.

To supplement the report, three case studies have been documented in more detail in order to highlight some of the achievements made by companies following the audit. These case studies are summarised in the conclusions section and are included in full in the appendices.

3. Methodology

A questionnaire was developed (see appendix i) and a complete list of companies visited drawn up (see appendix ii). Each company was then telephoned and asked to participate in a feedback exercise over the phone following the energy audit they had received.

Some companies were extremely hard to get hold of and in four cases it proved impossible to get hold of the appropriate person despite repeated calls and messages.

Companies were asked for information on any measures implemented since the audit and also any measures planned for the near future. They were also asked to rate the usefulness of the report on a scale of 1-5. Companies were asked whether they had received any further help from other organisations the report had signposted them to, whether they had investigated implementing Green Dragon and finally whether they required any further help or assistance.

Results from all the successful 42 interviews were logged in a table and some data was then put into an excel spreadsheet to generate appropriate graphs to illustrate the findings. Carbon dioxide savings were calculated by assessing the likely impact of each measure on the organisations energy consumption and applying a conversion factor. These calculations are recorded in appendix iii.

4. Results

Table 1: Interview results with companies listed alphabetically.

Organisation	Measures	Motivation (Environment or financial)	Approx. cost	Approx. savings in KWh and kg's of CO2	Overall rating (1= not useful 5= v. useful)	Other comments and further action taken.
Bloomfield Centre	Implemented: <ul style="list-style-type: none"> Topped up insulation in older part of building (200mm – 300mm) and lagging pipes from boiler Timers on 2 vending machines in foyer. Reducing consumption by up to 40%. 	Env & financial	£300 (DIY) £10	2581KWh/ 490kg 2336KWh/ 1,004kg	5	Report v. useful. Would have liked to have had it done earlier.
Bramble Lodge Guest house	Original proprietor moved out in March 07. New proprietor not aware of the report.					
Broadlane Kennels	Implemented: <ul style="list-style-type: none"> Improved general energy housekeeping Changed some bulbs – approx 4 60w changed to 11w 	Both	£0 £8	526KWh/ 226kg 358Kwh/154kg	5	Has recently purchased small holding/ livery type property and may contact PLANED for further advice.
Canina B&B	None	Both	n/a	n/a	5	Report felt a pat on back as well as help with signposting to things – Did look into wind further but decided very small turbines didn't produce enough and payback on the large ones would not make it worthwhile. Mr Bromley died in March and energy has not been a priority since then.
Court House and Curtis House	Implemented: <ul style="list-style-type: none"> Begun monitoring meters. 	Both	£0	None yet but	6!	Report really useful in providing a clear

	<p>Planned:</p> <ul style="list-style-type: none"> • Hope to implement others following discussions with board. E.g. timer on immersion heaters, change storage heaters to central heating. 			monitoring crucial to help identify possible savings.		overview and a useful tool to present to board. Further information on ground source heat pumps sent.
Cwm Deri	<p>Implemented: None</p> <p>Planned:</p> <ul style="list-style-type: none"> • Time clock on cooled drinks cabinet. 	Both	n/a	n/a	3	Report largely common sense. Sent a leaflet about Green Dragon.
Darwin and Bowie Solicitors	Report got lost in the office and was never seen by Mr Darwin. Another copy was e-mailed out on 30/11/07					
Day-Today	Unable to get a reply – tried to phone repeatedly in day and evening. Also left message but calls not returned.					
Edgecombe House	<p>Implemented:</p> <ul style="list-style-type: none"> • Monitoring of electric and gas meters • Improved general energy housekeeping • More low energy bulbs – approx 5 60w changed to 11w 	Both	£0 Approx. £2/bulb	526KWh/226kg 448KWh/193kg	4	Monitoring has already led to a rebate of over £100 on both gas and electricity bills. Planning to stop the B&B business which has reduced motivation to invest in energy efficiency measures.
Grange Residential Home	None	Both	n/a	n/a	2-3	Major building work due to start next year, which may incorporate energy efficiency measures.
Havard Stores	None	Both	n/a	n/a	3	Found report interesting rather than useful. Confirmed what was already known.
Hidden Springs B&B	<p>Implemented:</p> <ul style="list-style-type: none"> • Changed 40 60w bulbs to 11w 	Both	£80	3577KWh/ 1,538kg	4	Common sense but a catalyst to actually do something.

	Planned: <ul style="list-style-type: none"> Considering converting open fire to a stove. May also investigate solar energy more. 					
Jelly Egg	Repeated calls, messages and e-mail no feedback achieved. Manager very busy in run up to Christmas and difficult to get hold of.					
Kestrel Models	Implemented: <ul style="list-style-type: none"> Improved use of storage heater controls. 	Env & financial	£0	2300KWh/ 989kg	2	Small workshop, not a lot to advise on really.
Kiln Park	Implemented: None Planned: <ul style="list-style-type: none"> Beginning a switch over to low energy lighting, which will really get underway this coming year. Have taken further advice about the cost of a solar system and may implement something in 2008. 	Both	n/a	n/a	4-5	Change of park manager has caused some disruption. Report was also passed on to Bourne Leisure Green Team.
Lawrenny Community Shop	None	Both	n/a	n/a	3	Shop is awaiting a grant for re-roofing.
Lawrenny Hostel	Some confusion about report. Chairman of committee referred me to administrator. Administrator referred me back to chairman.					
Letterston Farm	Implemented: <ul style="list-style-type: none"> 8x100w bulbs replaced with 20w 	Env	£16	1168KWh/ 502kg	4	
Loveston Cottages	Implemented: <ul style="list-style-type: none"> Went to visit a ground source heat pump installation to learn more. Planned: <ul style="list-style-type: none"> Interested in wind energy. 	Env	£0	0	4	Keen to do more next year when finances allow.
Lowless & Lowless	Implemented: <ul style="list-style-type: none"> Created new policy of low energy lighting only. Changed 20 100w bulbs to 20w so far. 	Both	£40	2,336KWh/ 1004kg	4	Interested in recycling too. Limited by staff resources. Hope to

	<ul style="list-style-type: none"> Improved energy housekeeping and appointment of a staff energy champion. 			7500KWh/ 3,225kg		encourage a drip, drip effect.
Luther Lewis Food Depot	Unable to get a reply – tried to phone repeatedly in day and evening. Also left message but calls not returned.					
Lydstep Park	Report lost during handover to new manager. Was re-sent to new manager on 30/11/07.					
Lydstep Nurseries	None	Both	n/a	n/a	1	Report was too basic
Morris Bro	Implemented: <ul style="list-style-type: none"> 60 fluorescent tubes switched to narrower. T12's to T8's. Couple of time clocks on coolers with non perishables Improved staff awareness 	Both	£114 £10	1248KWh/ 537kg 2920KWh/ 1,256kg	3	Good first step. More action would be taken given time and fewer financial constraints. Concentrating on waste at present and has brought a cardboard baler.
Mountain Farm Business Units	None	Both	n/a	n/a	4	Project still being set up. Contacts in report were particularly useful.
Narbeth Rugby Club	Implemented: None Planned: Hope to upgrade the floodlighting	Both	n/a	n/a	3	Report viewed with interest. Committee the limiting factor. Original contact has stood down and is no longer driving it.
Porthlisky Farm	Implemented: None Planned: Improved monitoring Keen to use renewables if possible.	Both	n/a	n/a	3	Feedback requested very soon after audit with little time to actually implement anything.
Queens Hall	None. Ashley Calvert, the contact, left suddenly and whereabouts of report not known.					
Rhydwllym Chapel	Unable to get a reply – tried to phone repeatedly in day and evening. Also left message but calls not returned.					
Span Arts	None	Both	n/a	n/a	4-5	Report useful but funding cutbacks have prevented action. Awaiting re-furbishment which will focus on providing

						disabled access.
Steiner School	None	Both	n/a	n/a	3	Finances are limiting factor.
Sun Inn	Implemented: <ul style="list-style-type: none"> • 36 40w bulbs switched to 11w • Better housekeeping, using timers to switch heaters and coffee machines off. 	Both	£60	2199KWh/ 946kg	4	Have had to put electric heaters outside since smoking ban. This doesn't seem to have affected bills due to switch to low energy lighting.
Swallow Tree Leisure Park	Implemented: <ul style="list-style-type: none"> • Light bulbs replaced with low energy as they go. Planned: <ul style="list-style-type: none"> • Due to maternity leave this year not much action has been taken. There are plans to implement more measures next year. 	Both	£10	448KWh/ 193kg	4	Has joined a cardboard recycling scheme.
Tavernspite Garden Centre	Implemented: <ul style="list-style-type: none"> • None Planned: <ul style="list-style-type: none"> • Shop refurbishment will include low energy lighting. • Time switch on drinks cabinet. 	Both	n/a	n/a	4	
Templeton PO	Implemented: <ul style="list-style-type: none"> • None Planned: <ul style="list-style-type: none"> • Improve monitoring procedures 	Both	n/a	n/a	3	
Tenby County Club	Implemented: <ul style="list-style-type: none"> • Have started using de-stratification fan to improve heat circulation. Planned:	Both	n/a	n/a	3	Club heavily influenced by financial constraints.

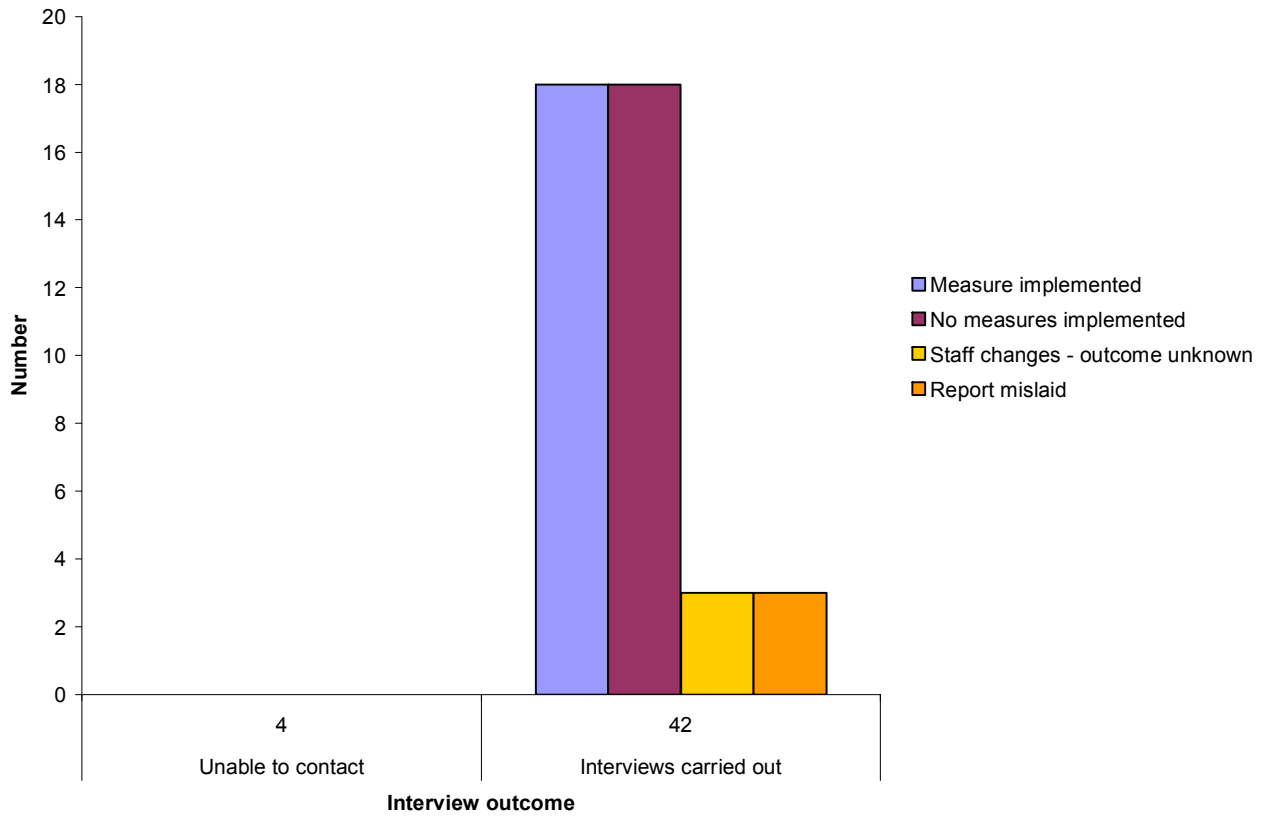
	<ul style="list-style-type: none"> Looking at new boiler options. 					
Tenby Town Trail	<p>Implemented:</p> <ul style="list-style-type: none"> None <p>Planned:</p> <ul style="list-style-type: none"> Insulate loft. 	Env	n/a	n/a	4	Felt visit was well followed up by PLANED energy meetings and extra support accessible.
Tidy Like Records	<p>Implemented:</p> <ul style="list-style-type: none"> No energy measures directly but has started using more environmentally friendly packaging. <p>Planned:</p> <p>Looking into alternative power sources for events.</p>	Env 1 st financial 2 nd .	n/a	n/a	5	Environmental impact important to the business. Also starting to look at supply chains.
TP Hughes	<p>Implemented</p> <ul style="list-style-type: none"> Changed 250 50w halogens to 9w low energy bulbs Improved energy monitoring 	Both	£2,000	28642KWh/ 12,316kg	3-4	Time limiting factor. Currently looking at plastic v paper bags, sent further information regarding this.
Trefwynt Farm	<p>Implemented:</p> <ul style="list-style-type: none"> Timer fitted to immersion heater to avoid unnecessary use and to washing machine to use E7 7 60w and 3 100w bulbs switched to 11w and 20w. <p>Planned:</p> <ul style="list-style-type: none"> Insulate loft (looking into fleece) Change 4 outdoor lights from incandescent to sodium. 	Both	-	2190KWh/ 942kg 1064KWh/ 457kg	4-5	Felt report balanced the advice with practical considerations well.
Tycanol Farm	<p>Implemented:</p> <ul style="list-style-type: none"> Ongoing bulb replacement <p>Planned:</p> <ul style="list-style-type: none"> Loft insulation due to be increased from 2 	Both	£2/bulb	268KWh/ 115kg	4	

	inches to 10 now that some electrical work has been completed.					
Ty Rhos Trees	<p>Implemented:</p> <ul style="list-style-type: none"> • Draught proofed external doors <p>Planned:</p> <ul style="list-style-type: none"> • Draught proof windows. • Investigating replacing oil fired Stanley with a new efficient woodstove. 	Env first. Financial second	£10	395KWh/ 75kg	3	Sent further information about sempatap insulation. Suggested that it would be useful for the advisor to have a box of sample products and insulation solutions etc to hand to help make the advice more real.
Tything Barn Holidays	None	Both	n/a	n/a	2	Involved in energy group locally but feeling a bit frustrated that it's not moving on to tackle more detailed issues, particularly surrounding renewable energy. Would like more practical help with understanding the best options, facts and figures, system comparisons etc.
Vine Cottage Guest House	None	Both	n/a	n/a	3	
Woodlands Hotel	None. Did not recall receiving report. Has been sent again with additional contact for investigating solar panels.					
Woodreef Honey Farm	None	Both	n/a	n/a	1	Very well informed anyway. Didn't tell them anything new.

Table 2: Summary of measures implemented and related carbon dioxide savings.

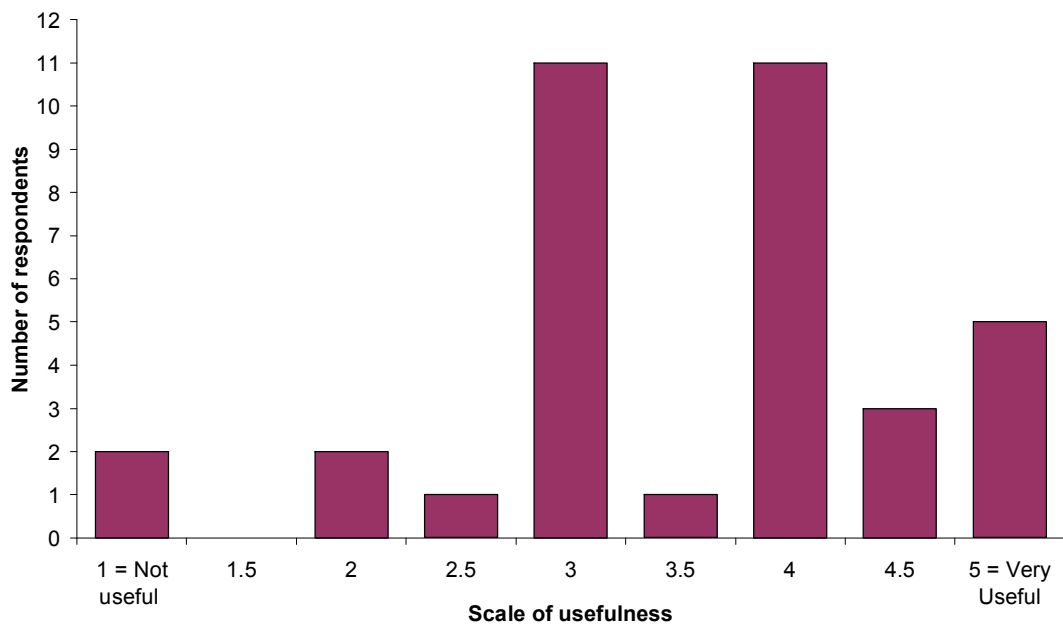
Measure	Number of measures installed	Total energy saving (KWh)	Total carbon dioxide saving (kg)
Insulation and draught proofing	2	2,967	565
Timers on appliances and vending machines	3	7,446	3,202
Behavioural and good housekeeping measures	7	10,852	4,666
Low energy bulbs	11	41,756	17,955
Monitoring	2	0	0
Other	2	0	0
Total	27	63,021KWh	26,388kg

Graph 1: How many companies have implemented measures so far?



Of the 18 companies listed as not having implemented any measures, 7 listed one or more measures they planned to implement in the near future, pending resources of time, money and/or approval from management teams/committees.

Graph 2: How useful did organisations find the audit?



Average spend on energy saving measures.

The range in what companies spent on energy saving measures was vast, due to the huge amount spent by TP Hughes (£2,000) on lighting. Putting TP Hughes to one side spend ranged from £10 to £300, with most companies that implemented measures spending under £100 and sometimes, such as in the case of Kestrel models nothing at all.

Companies going on to implement Green Dragon.

Tidy Like Records and Porthllisky Farm are both now underway with implementing Green Dragon. Following the evaluation leaflets providing further information on the Green Dragon Standard were sent to TP Hughes and Cwm Deri. Hidden Springs was also considering the scheme.

Further services accessed.

Edgecombe house entered discussions with energy suppliers about overestimation of bills following their energy audit. Other than that the most commonly sought service seemed to be information on renewable energy and low carbon building grants, with several organisations following up relevant contacts and websites given in their reports in order to gather further information.

PLANED energy group meetings were commented on as a good way to provide some level of support for businesses, post audit. Although it was also commented on that these meetings could be more beneficial if they were able to offer a greater level of practical knowledge and help with renewable systems particularly.

Further information/ advice requested.

During the evaluation several companies requested and were sent small amounts of further information. These were as follows:

Courthouse – ground source heat pumps.

TP Hughes – lifecycle analysis information of paper v plastic bags

Ty Rhos – sempatap insulation.

Broadlane Kennels was the only company who foresaw a future need for information relating to a new business property they are purchasing.

Other comments made.

- A couple of organisations considered the report a pat on the back/ confirmation they were doing the right things rather than a report with useful suggestions.
- 4 organisations commented that the report was a useful tool for helping them make the case for investment in energy efficiency to senior management.
- 1 organisation commented that the report had balanced the practical circumstances of the organisation with the technical information very well.
- 1 company commented that although they found most of the recommendations to be common sense the report had acted as a catalyst to actually implement some changes.
- On several occasions organisations were very keen to bring waste and recycling into the discussion, feeling it was intrinsically linked to the energy topic.
- Finance availability, staff resources, appropriate timing repeatedly came up as barriers to companies implementing measures.

4. Conclusions

- This report shows that the Energy Saver audits have been successful in stimulating companies to implement energy efficiency measures and consequently make significant carbon dioxide savings. It is likely that this report does in fact underestimate the total measures likely to be stimulated by the audits. Staff changes, financial restrictions, committee pathways are all factors which delay the implementation of measures. For some companies there was very little time between the audit and the evaluation. Many companies listed measures they intend to implement in the near future, indicating that there is potential for further significant savings.
- There was quite a wide spectrum of companies requesting energy audits with differing levels of energy awareness. Whilst the majority of those questioned rated the report highly on a scale of usefulness, a few felt the report told them nothing new. The audit formula could be made more flexible to accommodate this. Gathering further information at the audit request stage and at the point of making an appointment could help screen out those companies that will not get much benefit from an audit, or actually need an entirely different service altogether, such as an installer to size up and cost a system for them.
- There are some genuine barriers to organisations wanting to install energy efficiency measures. It may be possible to help combat some of these barriers such as staff time availability by developing Energy Savers further. For example developing a kit including things like a meter for monitoring consumption of appliances and a template excel spreadsheet with automatic graphing of data to help companies begin monitoring their energy consumption.
- Cost of measures is another barrier for many companies, especially those smaller ones with limited resources. However, as the case studies show the payback period on energy efficiency measures can be very fast. Examples of payback periods can be a valuable tool in helping incentivise the implementation of energy efficiency measures.

Case Study 1.

The Bloomfield Centre was leaving its cold drinks vending machines on overnight despite the fact the centre was closed between 10pm and 8am. Following the audit they installed a timer switch on each at a cost of no more than £15. Up to 40% reduction in energy consumption is likely resulting in an annual energy saving of 2,336 KWh, a financial saving in the region of £187/year. Consequently it will take the Bloomfield Centre just 1 month to recoup the costs of the timer switches and start making savings.

Case Study 2.

TP Hughes spent £2,000 on improving the efficiency of the lighting in one department. This investment is likely to reduce energy consumption by 28,642KWh each year, a financial saving of in the region of £2,291/year. Consequently it will take TP Hughes less than a year to recoup the costs of the lighting improvements.

- A lot of reports had gone by the wayside due to staff changes and failure to pass the information on. In these cases an evaluation exercise like this is effective at ensuring reports do eventually reach the right person.

- Monitoring is one of the easiest and cheapest actions to implement yet only two companies referred to having implemented it. This could be improved by providing companies with the type of spreadsheet described in point number 2.

Case Study 3.

Edgecombe House began monitoring consumption of gas and electricity following the Energy Savers audit. It quickly became apparent that the energy suppliers had been overestimating consumption and consequently overcharging the business.

Edgecombe house received a £100 rebate for both gas and electricity

- Whilst the savings reported here are good, motivation to make improvements in energy use might be greater in the presence of some kind of incentive scheme. Such as a prize for company making biggest savings over course of a year.
- There is an opportunity to combine some waste advice with the energy audit. Several companies were keen to access that information at the same time.

Appendix I – Questionnaire Template:

1) General

Company details	
Industry sector/nature of business	
No of employees	f/t p/t
Date of energy audit	

2) Measures implemented

Have you implemented or do you plan to implement any energy saving measures following the audit? Yes / No

If so please give details?

	Implemented	Planned
Heating		
Insulation		
Lighting		
Appliances		
Monitoring		
Behavioural		
Other		

What did they replace?

NB/ Approximate carbon savings will be calculated for each measure listed by a company, based on what the new measure replaced. (e.g. CFL's replacing tungsten bulbs or 250mm insulation replacing 100mm of loft insulation.)

When were the measures installed?

How much did the installation cost and was it DIY or done by an installer?

Were you motivated more by financial savings or carbon savings?

If appropriate:

Would you be happy for your details to be recorded in a case study? Yes / No

3) Other information

Did you access any further services or grant funding as a result of the report?

Have you gone on to implement Green Dragon?

On a scale of 1-5 (1=not useful 5 = extremely useful) how useful did you find the report?

Is there anything you can identify that would have made it more useful?

Is there any further information or assistance you need in order to make improvements?

Any other comments

Appendix II – List of participating companies.

(Listed in chronological order according to date of audit)

	Name	Organisation	Contact details	Business sector	Audit Date & auditor	No. of employees	Comments
1	Marion Davies	Town trails of Tenby, Chamber of Trade & Tourism	Highlands, Serpentine Road Tenby SA70 8DD 01834 845841 guidedwalks@talktalk.net	Tourism	23/5/06 Sue Mackie (SM)	1	Report Sent
2	Howard Lewis	Morris Bro	High Street, Tenby, 01834 842105	Retail	27/6/06 SM	5	Report Sent
3	Chris	TP Hughes	12 High Street, Tenby 01834 842233	Retail	25/9/06 Becci Johnson (BJ)	34 mainly f/t	Report Sent
4	Nick Yabsley (previously David Smith)	Lydstep Park	Lydstep Park, Lydstep 01834 871871	Tourism	18/9/06 BJ		Report sent
5	Clare Danaghan	Kiln Park	Marsh Road, Tenby 01834 844121 clare.danaghan@bourne-leisure.co.uk	Tourism	06/10/06 BJ	200 in peak season. Mix of f/t and p/t	Report sent
6	Nicole Bowles	Woodlands Hotel	St Brides Hill, Saundersfoot 01834 813338 mail@hotelwoodlands.co.uk	Tourism	27/6/06 SM		Report sent
7	Tim Farnfield	Lowless & Lowless	Tenby 01646 683222	Solicitors	23/5/06 SM	98 Approx. 64 f/t and 34 p/t	Report Sent
8	Rowland Sturdy	Lydstep Nurseries	Manorbier SA70 7SJ 01834 871475	Plant nursery	19/6/06 SM	4f/t and 3p/t	Report sent
9	Trimmings	Vine Cottage Guest House	The Ridgeway Saundersfoot	Tourism	19/9/06 BJ	2p/t	Report sent

			01834 814422				
10	Lilian Lang	Edgecombe House	The Ridgeway Saundersfoot 01834 812810	Tourism	19/9/06 BJ	2 f/t	Report sent
11	Folder	Tything Barn Holidays	West Williamston Pembs SA68 0TN 01646 650187	Tourism	03/10/06 BJ		Report Sent
12	Stace	The Grange Residential Home	Manorbier 01834 871311	Care home	19/6/06 SM		Report sent
13	A Roberts	The Sun Inn	St Florence 01834 871322	Public House	28/09 BJ	1 f/t 4 p/t	Report Sent
14	Deborah Webber	Leisure Park	Swallow Tree Leisure Park, New Hedges 01834 812398	Tourism	03/10 BJ		Report Sent
15	Sparks	Guest house	Bramble Lodge guest house, Tenby 01834 842393.	Previously tourism, now private dwelling.	28/09 BJ		Report Sent
16	Lindsey Roberts / John Davies	Steiner School	Nant y Cwm Steiner School Llanycefn, Clunderwen 01437 563640	School	26/09 BJ	8	Report Sent
17	Mr & Mrs Morgan	Holiday accommodation	Loveston Cottages Upper Loveston SA68 0NL 01834 891356	Tourism	28/10 BJ	2	Report sent
18	Mr & Mrs Williams	Tycanol Farm	Tufton Maenclochog 01437 532445	Farm	30/10 BJ		Report sent

19	Mr and Mrs Thomas	Letterston Farm	Letterston 01348 840760	Farm	10/11 BJ		Report sent
20	Mrs Bromley	Canina B&B	Ludchurch 01834 831631	Tourism	01/11 BJ	1f/t	Report sent
21	Suleyman Mowat	Ty Rhos Trees	Felindre Farchog SA41 3XD 01239 820701	Tree nursery	08/12 BJ	1f/t 3p/t	Report sent
22	David Hughes	Mountain Farm Business Units	Mountain Farm Tavernspite Whitland Carms SA34 0PB 01834 831145	Planned farm shop and business unit development.	01/03/07 BJ	0	Report sent
23	Tracey Williams	Span Arts	Span Arts Ltd, Town Moor, Moorfield road, Narberth, Pembrokeshire, SA67 7AG 01834 869323	Music and Arts	01/03/07 BJ	3	Report sent
24	Richard Barlow	Havard Stores	East Street Newport Pembrokeshire SA42 01239 820300	Retail	16/03/07 BJ	1f/t 2p/t	Report sent
25	Kathryn Bradbury	Trefwynt Farm, Bethesda	Bethesda SA67 8HF 01437 563312	Farm	24/04/07 BJ		Report sent
26	Robin Benson	Tidy Like Records	Beltane Llawhaden SA67 8HL 01437 541217	Music and Arts	27/04/07 BJ	1	Report sent
27	Peter Spacey	Tenby County Club	The Croft	Private club	08/05/07	1	Report sent

			Tenby 01834 861875		BJ		
28	Peter Spacey	Narbeth rugby club	01834 861875	Sports club	08/05/07 BJ	1 f/t 5 p/t	Report sent
29	Janine Perkins	Bloomfield Centre	Redstone Road Narbeth Pembrokeshire SA67 7ES 01834 860293	Community Centre	15/05/07 BJ	25 mainly part-time	Report sent
30	Ashley Calvert	Queens Hall	High Street Narbeth Pembrokeshire 01834 861212	Community Centre	15/05/07 BJ		Report sent
31	Mr Lewis	Luther Lewis Food Depot	Units 2-5 Kingswood Industrial Estate London Road Pembroke Dock Pembrokeshire 01239 820900	Retail	31/05/07 BJ		Report sent
32	Mr Lewis	Day Today	Day-Today Cefniethin Road Gorslas Llanelli Dyfed 01239 820900	Retail	31/05/07 BJ		Report sent
33	Mr Darwin	Darwin and Bowie Solicitors	High Street Narbeth Pembrokeshire darbo@clara.co.uk 01834 860436	Solicitors	07/06/07 BJ		Report sent
34	Paul Webb	Tavernspite Garden Centre	Tavernspite Garden Centre Tavernspite Nr. Whitland Pembrokeshire SA34 0NL	Plant nursery / garden centre	07/06/07 BJ	2f/t 5p/t	Report sent

			01834 831671				
35	Elsa Davies	Rhydwlwym Chapel	Nr. Llandissilio SA66 7QJ admin@rhydwlwym.com	Chapel and planned visitor centre.	15/06/07 BJ	1 p/t	Report sent
36	Mike Caine	Cwm Deri	Martletwy Pembrokeshire SA67 8AP 01834 891274	Vineyard	19/06/07 BJ	2f/t 6p/t	Report sent
37	Mike Hart	Broadlane Kennels	Lawrenny Pembrokeshire SA68 0PS 01646 651133	Kennels	19/06/07 BJ	2 p/t	Report sent
38	Gill Jones	Templeton PO	Narbeth Pembrokeshire SA67 8LY 01834 860304	Post Office	19/06/07 BJ	1p/t	Report sent
39	Mrs Mc Bean	Lawrenny Community Shop	01646 651866	Retail	27/07/07 BJ	1 f/t plus volunteers.	Report sent
40	Mr Alan Haynes	Lawrenny Hostel	01646 651561	Tourism	02/08/07 BJ	1	Report sent
41	David Lidgate	Kestrel Models	01834 861427	Model making	02/08/07 BJ	1f/t	Report sent
42	Karen Bannister	Jelly Egg	01834 860797	Retail	02/08/07 BJ		Report sent
43	Mrs Harrison	Hidden Springs B&B	Princes Gate 01834 861215	Tourism	13/09/07 BJ	2 p/t	Report sent
44	Debbie Kearsley	Court House and Curtis House	St. Davids 07901 732255 courthousestdavids@googlemail.com	Accommodation and community centre	27/09/07 BJ	1 p/t	Report sent
45	Peter Phillips	Woodreef Farm	Amroth 01994 453571	Honey farm	24/10/07 BJ	2	Report sent
45	Robin Elliott	Porthllisky Farm Cottages	St. David's 01437 720377	Farm	24/10/07 BJ	2 p/t	Report sent

Hidden Spings

1) Bulbs

40 60w bulbs switched to 11w

2400w replaced with demand of 440w

Assuming average daily use of 5 hours:

4,380KWh/year replaced with 803KWh/year

Saving of 3,577KWh = 1,538kg of carbon dioxide/year.

Kestrel Models

1) Improved use of Storage heater controls

Turn storage heater input control down to half rather than full.

Small storage heater is rated at around 1.7KW.

Charged for 7 hours on high = 11.9KWh = 4,344KWh/year

Charged for 7 hours on half = 5.6 KWh = 2,044KWh/year

Saving of 2,300KWh = 989kg of carbon dioxide.

Letterston Farm

1) Bulbs

8 100w bulbs replaced with 20w

800w replaced with demand of 160w

Assuming average daily use of 5 hours:

1,460KWh/year replaced with 292KWh/year

Saving of 1,168KWh = 502kg of carbon dioxide/year.

Lowless and Lowless

1) Bulbs

20 100w bulbs replaced with 20w

2,000w replaced with demand of 400w

Assuming average daily use of 4 hours:

2,920KWh/year replaced with 584KWh/year

Saving of 2,336KWh = 1,004kg of carbon dioxide/year.

2) Good housekeeping

Large office with equivalent of 81 members of full time staff.

Assuming 80 PC's running for 8 hours/day. In use for 4 hours, idling for 4.

Typical power rating when in use = 125w.

Typical power rating when idling = 120w

Power rating when idling and energy saving enabled = 45w

No Energy saving:

4 hrs @ 125w + 4hrs@120w = 0.98KWh

Multiplied by 80 staff for 250 days = 24,500KWh

Energy saving features when idling:

4hrs@125 + 4hrs@45w = 0.68KWh

Multiplied by 80 staff for 250 days = 17,000KWh

Saving of 7,500KWh = 3,225kg of Carbon dioxide per year.

NB// Figures do not take account of other type of office equipment such as printers, photocopiers, Fax machines and vending machines. Information about overnight practices was not requested either. This figure gives a very approximate idea of the savings that may have been achieved.

Morris Bros

1) 60 Fluorescent tubes switched from T12's to T8's

5ft fluorescent tubes:

T12 = 65w £11.80

T8 = 58w £1.90

6ft:

T12 = 85w £10.00

T8 = 70w £2.40

http://www.firstlightdirect.com/mcp/Fluorescent_Tubes.html

Assuming 5ft bulbs:

3.9KW replaced with demand of 3.5KW

Assuming average daily use of 10 hours for 312 days every year.

12,168KWh/year replaced with 10,920KWh/year

Saving of 1,248KWh = 537kg of carbon dioxide/year.

2) Timers on cooling cabinets:

Similar savings to the cooled drinks vending machines at Bloomfield.

Likely to use in the region of 8Kwh/day, assuming a large amount of time spent in low power mode when required temperature has been reached and is just being maintained.

Assuming shop open from 8am – 5pm

Approximately 50% reduction in consumption likely by turning off at night.

= Reduction from 8 to 4 KWh/day

= 4 x 365 = 1,460KWh/year

Multiplied by 2 (2 cooling cabinets) = 2,920 KWh

Carbon Savings = 0.43 x 2,920 = 1,256kg of carbon dioxide/year

Swallow Tree

Light bulbs

Very vague information about how many bulbs actually replaced so far. Estimate of 5 made.

5 60w bulbs switched to 11w low energy bulbs.

300w replaced with demand of 55w

Assuming average daily use of 5 hours:

548KWh/year replaced with 100KWh/year

Saving of 448KWh = 193kg of carbon dioxide/year.

TP Hughes

Light bulbs

Changed 250 50w halogens to 9w low energy bulbs in recently refurbished ladies wear department on ground floor.

Lights are on for 9 hours/day for 312 days/year.

12.5KW replaced with 2.3KW

35,100KWh/year replaced with 6,458KWh

Saving of 28,642KWh = 12,316kg of carbon dioxide.

Trefwynt Farm

Immersion Heater put on timer.

Typically rated at 3KW. Every hour the immersion is off rather than on saves 3KWh/ units of electricity.

Assuming the timer avoids 2 hours of unnecessary use of the immersion heater on average, every day = 6KWh

= Saving of 2,190KWh

= **942kg of carbon dioxide/year**

Light bulb

7 x 60w and 3x100w changed to low energy equivalents

720w replaced with 137w

Assuming average daily use of 5 hours

= 1,314KWh replaced with 250KWh

= **Saving of 1,064KWh = 457kg of carbon dioxide/year**

Sun Inn

Bulbs

36 40w bulbs switched to 11w.

1440w replaced with 396w

Assuming average daily use of 6 hours
= 3,066KWh replaced with 867KWh
= **Saving of 2,199KWh = 946kg of carbon dioxide/year**

Ty Cannol

Light bulbs slowly being replaced.
Estimated 3 60w replaced with 11w so far
180w replaced with 33w
Assuming average daily use of 5 hours
= 328KWh replaced with 60KWh
= **Saving of 268KWh = 115kg of carbon dioxide/year**

Ty Rhos Trees

Draught proofing based on mains gas heated, 3-bed, semi detached house.
Ty Rhos was 2-bed, detached, with oil fired heating, so although smaller the fact it is detached and on oil will approximately balance out the smaller size.
= 150kg/yr (EST)
http://www.energysavingtrust.org.uk/energy_saving_assumptions
150kg divided by 2 for doors only
= **75kg of carbon dioxide/year**

Appendix IV – Case Studies.

The case studies below help illustrate some important principles of sustainable energy management and also highlight some achievements made by organisations that received energy reports.

1) Bloomfield Centre

The Bloomfield Centre is a community and sports centre in the centre of Narbeth. The centre has a good range of facilities including a tennis dome, sports hall, fitness suite crèche, day care centre for elderly people plus offices and meeting rooms.

Pre- audit data:

Annual Energy Consumption (calculated at time of audit) = 635,909 KWh (mains gas – 516,224KWh and electricity – 119,685 KWh mix).

Annual associated carbon dioxide emissions = 149,548kg

Annual cost of energy being used = £22,214

Measures installed and improvements made:

Following the energy review meeting and receipt of the report Bloomfield implemented the following measures:

- Topped up loft insulation in older part of the building by approx 100mm
- Installed two time clocks on the chilled drinks vending machines in the foyer.

Loft insulation is a cheap and easy energy efficiency measure to install; costs can be kept lower still by doing DIY installation. The biggest savings are made where the transition is from no insulation at all. Insulating an un-insulated loft can result in savings on heating costs of up to 25%. Building on existing levels of insulation is always worthwhile but the payback will be slightly longer.

It is estimated that topping up the loft insulation at Bloomfield could potentially save up to 5% on heating costs for that part of the building, assuming heating controls are used to effectively control the heating system.

Annual energy saving = 2,581KWh Annual carbon dioxide saving = 490kg

The amount spent on the extra insulation was approx. £300. However assuming a business unit rate in the region of 3p/KWh of gas the annual financial saving would be in the region of £77/year

Payback period = 3.9 years

Vending machines in the foyer are rated at 950watts and 1380 watts respectively these machines are likely to use in the region of 8Kwh/day, assuming a large amount of time spent in idling mode and depending on amount door is opened and closed. The centre is open from 8am – 10pm but overnight there is no need for these machines to be left on as they contain nothing perishable. Up to 40% reduction in consumption is likely by turning them off at night.

Annual energy saving = 2,336 KWh. Annual carbon dioxide saving = 1,004kg.

Two timers are likely to have cost no more than £15 for the two. Assuming a business rate in the region of 8p/KWh of electricity the annual financial saving would be in the region of £187/year.

Payback period = 1 month

2) TP Hughes

TP Hughes is a large department store in central Tenby.

Pre- audit data:

Annual Energy Consumption (calculated at time of audit) = 280,043 KWh (Mains gas and electricity mix).

Annual associated carbon dioxide emissions = 76,358kg

Annual cost of energy being used = £15,806

Measures installed and improvements made:

Following the energy review meeting and receipt of the report TP Hughes implemented the following measures:

- Replaced 250 50w halogen bulbs with 9w low energy bulbs in recently refurbished ladies wear department on ground floor.
- Improved energy monitoring.

Low energy lighting is one of the easiest most visible changes organisations can make. Low energy lights have the advantage of lasting longer than incandescent bulbs and also have a very quick payback period. The TP Hughes energy audit was carried out shortly after a major re-furbishment of the ladies wear department had been carried out involving the installation of 320 new 50w halogen bulbs. Lighting this department alone was using 128 Kwh/day costing in the region of £8/day.

Annual saving = 28,642KWh. Annual carbon dioxide saving = 12,316kg of carbon dioxide.

The replacement lighting cost TP Hughes approx £2,000. However assuming a business unit rate in the region of 8p/KWh of electricity the annual financial saving is likely to be in the region of £2,291/year
Payback period = 1 year.

3) Edgecombe House

Edgecombe house is a large detached 3 storey house currently used as a B&B.

Pre- audit data:

Annual Energy Consumption (calculated at time of audit) = 65,053KWh (Mains gas – 51,605 and electricity – 13,448KWh mix).

Annual associated carbon dioxide emissions = 15,587kg

Annual cost of energy being used = £1,801

Measures installed and improvements made:

Following the energy review meeting and receipt of the report Edgecombe House implemented the following measures:

- Monitoring of electric and gas meters
- Improved general energy housekeeping
- 5 60w bulbs changed to 11w low energy

Monitoring energy consumption does not automatically generate savings however a monitoring procedure provides valuable information about patterns of energy use that can assist companies in identifying how and where savings can be made. It can also provide a valuable record when negotiating any billing problems with energy suppliers. This was well illustrated by Edgecombe House; having begun monitoring consumption of gas and electricity, following the audit, it quickly became apparent that the energy suppliers had been overestimating consumption and overcharging the business. Edgecombe house received a £100 rebate for both gas and electricity.

Improving energy housekeeping is a general term for just having a common sense approach to energy efficiency. Turning things off when they are not in use and using appliances appropriately, only using the washing machine for full loads for example. Good housekeeping is a no cost measure and based on a typical figure of a 60w per house for standby consumption alone Edgecombe house is likely to reduce consumption by 1.4KWh/ day by just turning all appliances off standby. Annual energy saving = 526KWh Annual carbon dioxide saving = 226kg Payback period = 0

Low energy lighting was the only measure installed by Edgecombe hose that involved spending money. 5 60w bulbs were switched to 11w low energy bulbs. Annual saving of 448KWh = 193kg of carbon dioxide/year. (Assuming 5hours use/day)

The replacement lighting cost approx £2/bulb, £10. However assuming a business unit rate in the region of 8p/KWh of electricity the annual financial saving is likely to be in the region of £35/year.

Payback period = 3-4months

Disclaimer

The information given in this report is based on information provided by companies visited. Where assumptions have been made in order to make estimates of energy and carbon savings, these have been clearly stated. ARENA Network will not be held responsible for the misuse or misapplication of the information provided in this report.