

Project title: GrowSave; an Energy & Resource Efficiency Knowledge Transfer Programme for the PC Sector

Project number: PE/PO 011

Project leader: Chris Plackett, Farm Energy Centre

Report: Interim Report, August 2013

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Location of project: Farm Energy Centre, Kenilworth, CV8 2LS, commercial nurseries and various meeting venues.

Industry Representatives: Neal Ward, Roly Holt, Chris Need & Colin Frampton

Date project commenced: June 2012

Date project due to be completed: 31st May 2014

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AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

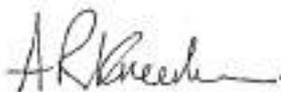
Chris Plackett
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Signature . 

Date. ...21st August 13...

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Farm Energy Centre

Signature . 

Date. ...21st August 13...

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Headline

The GrowSave project has delivered a programme of technology transfer and information dissemination activities to HDC levy payers that has given them up to date information about energy saving and energy efficiency. This has comprised of various communication activities including 6 meetings / seminars, 3 newsletters, 5 technical update publications and a re-design of the dedicated GrowSave website. All of the activities have been designed to encourage growers to take energy saving actions in their own business.

Background & Introduction

GrowSave is the HDC communications platform that disseminates energy saving information and supports the implementation of energy saving technologies by the UK protected cropping (PC) sector. The programme has run for 6 years, is delivered by the Farm Energy Centre (FEC) team, and steered by a group of edible and ornamental grower representatives. The format of outputs and the project programme are deliberately kept flexible. This is to allow the project to respond to the energy issues that the industry is facing at any given time.

The current phase of the project started in June 2012 and is due to end in May 2014. This report provides an update on the activities carried out in the first year of this phase of the project.

Summary of Work Completed

The following table summarises the deliverables in the first year of the project and compares them to the work plan specified in the contract:

Activity Area	Contracted Activity	Delivered Activity
Website	<ol style="list-style-type: none"> 1. Re-design the GrowSave website to make information more accessible and cover renewable energy in more detail 2. Provide at least one update per week 	<p>Delivered and completed by end of March 13</p> <p>News stories added as per contract. Also "blogs" from FEC energy specialists added on a regular basis</p>
Grower meetings & seminars	Deliver four meetings / seminars	<p>The meetings and seminars delivered were:</p> <ol style="list-style-type: none"> 1. Energy topics update for protected salad vegetable growers. TGA Conference 27/9/12 2. Energy saving options. BPOA Conference 7/2/13 3. Implementing energy efficiency in low temperature protected cropping – 19/3/13 4. Implementing energy efficiency in high temperature protected cropping – 20/3/13 5. Preparing your glasshouse for winter – 7/7/13 6. Biomass energy for protected edible crops – 30/7/13
Energy benchmarks	Deliver information and data via the GrowSave website to allow growers to do energy use comparisons	<p>Done via the Managing Energy section of the website where information is given on comparison methods using degree-days. Degree-day data and ambient temperature data given to allow comparisons to be made</p>
HDC Energy News	Deliver three editions of this energy specific newsletter	Delivered to contract with three editions completed in Dec 12, Feb 13 and June 13.
HDC News Columns	Deliver columns of approx. 750 words in each edition of HDC News	Done as specified
Technical updates	Publish five technical updates covering topics relating to recent energy developments	<p>Technical updates have been delivered on the following topics;</p> <ol style="list-style-type: none"> 1. Renewable Heat Incentive 2. Biomass heating systems 3. CO₂ options 4. Semi-sealed greenhouses 5. Air movement
Study tour	Deliver one study tour	<p>Planning is on-going for a tour to Denmark. This has now been held off until Jan 14 to fit with grower availability to attend</p>

Description of Activities

The delivered activities were discussed and agreed with the grower coordinators at the advisory group meeting held on 10th October 12. The action notes of this meeting are attached as Appendix One of this report

Website

A project website has been available for over 4 years, but feedback from levy payers indicated that they found it difficult to navigate. Also, since the original site was designed, some energy topics (particularly renewable energy) have increased in importance. It was therefore decided that the website functions should be evaluated and a re-vamp of the site carried out.

FEC staff developed a specification for the new site and then worked with a specialist website provider to deliver a new site. Particular focus has been given to;

1. Separating out energy topics into a logical structure that a user can easily navigate.
2. Keeping information up to date and looking “fresh”
3. Have wider information sources than just HDC originated information
4. Have a “personal touch” so that growers can readily see the opinion of FEC’s energy specialists on current energy topics

Ultimately all of these aspects were incorporated into the new website which can be viewed at www.growsave.co.uk.

Full details of visitor numbers to the GrowSave website are given in Appendix Two. This shows that prior to the launch of the re-vamped site visits were less than 50 per week. Since the launch of the upgraded site, this has increased to approx. 140 per week.

Meetings and Seminars

The topics for seminars were decided based on grower demand and the guidance given by the project advisory group. Where possible, events were held that would attract both edible and ornamental crop growers, but in some cases the events were specifically tailored to the needs of the two separate PC sub-sectors.

Where possible, activity was also integrated with established industry events as this enabled energy saving information to be given to a “captive audience”. Examples of this

were the presentations to the TGA Conference (for PC edibles) and the BPOA Conference (for PC ornamentals).

Through the HDC's PC edibles technical manager and communications team levy payers requested two workshop based events that allowed delegates to appraise the various energy saving measures available and help them identify any potential barriers to uptake. These events took place in March 13 and were split into separate "low temperature" and "high temperature" meetings. For both events an independent meeting facilitator (Brendan Hickling) was used to manage proceedings. At these events the attendees determined the topics that were covered and the precise agenda of the meeting. This allowed them to access FEC's energy expertise to help them explore how energy saving techniques could be applied to their specific circumstances. Energy purchasing, energy saving and renewable energy generation were all covered at the meetings. Attendance was lower than hoped, with a combined audience of 15 growers attending the events. However, those coming to the meetings found them very informative and helpful.

A technical meeting was specifically held for the ornamentals sector to give growers information on improving energy efficiency. Topics covered included heating system efficiency, controls operation and maintenance, air movement and renewable heating systems. The event was held at Bordon Hill Nursery, Stratford upon Avon, and a grower walk of the host site was included. This allowed the delegates to see how the technical messages of the day should be applied in practice. 20 growers, 1 consultant and 1 press reporter attended the event.

The government's Renewable Heat Incentive (RHI) has raised interest in using renewable heating systems (and particularly biomass) for horticultural applications. As a result a significant amount of the GrowSave effort over the past year has concentrated on answering levy payers questions about RHI and biomass. In response to this demand, a meeting on the options for biomass heating systems was held in the Lea Valley. The meeting particularly targeted PC edible crops and it considered system selection, boiler sizing, fuels and funding options. Delegates were particularly interested in the funding solutions based on zero capital outlay that some suppliers were offering. 16 growers and 4 manufacturers / equipment suppliers attended the event.

Energy Benchmarks

The aim of GrowSave is to provide information to allow growers to benchmark the performance of their nurseries against other similar facilities. Factors like the wide range of protected crops grown in the UK and the existence of some established industry initiatives

like the Tomato Working Party means that providing energy use benchmarks is not feasible under the current project.

Two of the largest factors affecting the energy use of greenhouses are the prevailing weather conditions (and most particularly the ambient temperature) and operating temperature. Therefore, if information on these two parameters is used by growers alongside their own energy use data they can compare their own performance against others.

The GrowSave website has historically provided both weather data (temperature and solar radiation) and degree-day information, however the information was both difficult to find and understand. As a result, the new website has focused on improving both the accessibility to the information and its usability.

HDC Energy News and HDC News

Three editions of HDC Energy News have been produced. They have been delivered as inserts with HDC News. The content of each of the editions focused on topical stories and information at the time of publishing. In all cases the stories were designed to appeal to as wide a cross section of HDC levy payers as possible.

A short (500 to 750 word) column with topical news on either the GrowSave project or energy related projects has also been included in HDC News. Topics covered include news on upcoming events, reports of recent meetings, information on the progress of HDC energy projects and general energy developments.

Technical Updates

The technical updates are short (one or two page) documents designed to summarise information about the latest energy topics and techniques. They can provide information about topics such as new commercial developments or latest research results.

As previously highlighted, over the last year growers have been keen to exploit the potential funding for renewable heating systems that's available from the RHI so, in response to this interest, two updates relating to this topic have been produced. A third update has also been completed on a very closely related topic; the options for sourcing CO₂ for greenhouse enrichment. At the moment technologies are not available that will allow CO₂ to be recovered from the flue gasses of biomass boilers, so this update examines the options currently available to growers.

Two other updates that summarise developments in sealed greenhouses and air movement technologies have also been produced.

Study Tour

Initial planning has been carried out for a study tour to Denmark. Discussions have been on-going with Carl Otto Ottenson of Aslev University. Carl is happy to host a visit for GrowSave that will focus on both the work of the University and developments in commercial practice that have been adopted by Danish growers. Topics are likely to focus on climate controls, lighting and renewable energy. The topics are most likely to attract growers of ornamental crops, but some edibles growers will also benefit as the University is also currently carrying out work on tomatoes.

Unfortunately, because of the availability of suitable dates, it was not possible to conduct this tour in 12/13 so it is now planned for Jan 14.

Although it is not specifically a GrowSave activity, the FEC team are also involved in organising a study tour to Canada in February 14. This tour is part funded by Defra through its RDPE scheme. The tour will focus on energy saving developments in Canada and will predominantly feature biomass heating options. A specific objective is to allow growers to see first-hand a Canadian project that is operating CO₂ recovery from a biomass heating system on a commercial tomato nursery. The tour is most likely to attract interest from PC edibles.

Future Events

A number of events & initiatives previously discussed with the grower advisory group have not yet been delivered due to lack of resources during the first year of the project. These include;

- **More effective use of climate control computers** - the guidance from growers is they would like to see some training that is manufacturer specific (i.e. Priva, Hoogendorn etc.)
- **“Getting to know your” events** - these could concentrate on areas like heating systems, controls, lighting etc. and would give practical information on the most common faults and set up issues that compromise operating efficiency
- **Energy glossary and explanation of common energy terms** - this is a website section that explains the terminology used in energy and energy related legislation

- **Humidity controls training** - although this has been covered extensively by GrowSave in the past there is still demand for more information from levy payers. Information appears to be required at two levels;
 - Ornamental growers require relatively simple information as many are struggling to convert the theory of humidity control into an effective practical solution
 - Edibles growers are comfortable with humidity control methods but they want to be kept up to date with the latest developments. Also they are constantly looking for areas where they can improve the methods they are using at present

Five more update technical updates are scheduled for 2014 and topics for these need to be finalised.

The continued relevance of the above topics and deliverables will be discussed at the 2013 Grower Advisory Group meeting for the project which is scheduled for 19th September 13.

Financial Benefits

Estimates are that the energy costs for the PC sector are currently £125 million/year. CCL discount available to the sector is worth £22 million over the term of the current phase that runs for 10 years until 2023. For this discount, growers will need to achieve 14% energy savings compared to 2008. Therefore, providing information to growers so they can make the savings needed to achieve the imposed savings targets has significant financial value.

Assuming that this programme has helped stimulate a modest 5% saving over just 10% of the protected cropping sector, the savings have been over £300,000.

Summary & Highlights

1. The GrowSave website has been redesigned and re-launched to levy payers. The new website is easier to navigate and the information is easier to find. The topics covered by the website are now more all-embracing and information relating to renewable energy has taken a higher priority.
2. A series of seminars and grower meetings have been delivered. These have concentrated on working with growers to identify the best energy efficiency solutions for their business. Renewable energy, biomass heating and the RHI have feature highly in these events.

A meeting specifically for the ornamentals sector focused on practical improvements that growers should implement to improve energy efficiency prior to the 13/14 autumn and winter growing seasons.

3. Five update technical updates have been produced which give information on some of the latest developments in greenhouse energy saving. Again renewables, biomass and the RHI has featured here alongside sealed greenhouse technologies.
4. The programme of deliverables for 2013/14 needs to be finalised and this will be done in conjunction with the GrowSave Grower Advisory Group in September 13.

Appendix One

Minutes of project advisory group meeting held on 10th October 2012



Meeting Notes

Subject	GrowSave Grower Advisory Group Meeting	Present	Chris Plackett (CP), Debbie Wilson, Wayne Brough, Colin Frampton, Chris Need, Neal Ward, Roly Holt
Date	10 th October 2012		
Venue	Farm Energy Centre	cc	

No	Topic	Actions
1.	<p>Ornamentals events – where possible try to integrate energy topics with other events in this sector. It is recognised that ornamentals growers are less likely to be fully engaged in energy topics and are unlikely to be attracted to an “energy only” event. A good example is to try integrating energy considerations (e.g. humidity control, lower temperature varieties etc) into Poinsettia events.</p>	CP to liaise with Wayne Brough on incorporating energy topics into ornamentals events.
2.	<p>The location for ornamentals events to be rotated around key production locations including Lancashire / NW, Lincolnshire, Sussex, South West, Evesham etc.</p>	FEC to select venues on this basis.
3.	<p>Target ornamentals sector events to at the grower manager / supervisor level. There are no issues with repeating previously considered topics because the constant turnover of staff and need to update knowledge mean that subjects and technical content are still valid.</p> <p>Subjects for consideration include;</p> <ul style="list-style-type: none"> • <i>Energy Saving Fundamentals</i> – delivered at a simple to understand level • <i>“Getting to know your.....”</i> events* covering topics such as heating systems, control systems, measurement systems (including measuring boxes, plant sensors, energy meters etc.), cold stores / refrigeration etc. • <i>Humidity control training</i> – again at a simple level that nursery staff can understand. <p>* Topics that could be included in an event of this type are heater / boiler types, what affects boiler efficiency?, what is a 3 port valve and what does it do?, why insulate?, what affects insulation efficiency?, what affects overall heating system efficiency?</p>	CP to devise event & topic proposals that will then be circulated to the group for comment.
4.	<p>Plan better the nursery visit / practical exercise component of events. Some criticism received that this component of previous events has not been well planned or delivered. Subsequently, growers feel that they did not get full value from looking at practical issues and how to solve them.</p>	

Meeting Notes

5.	<p>Understanding the role of renewable heating schemes and the RHI. This to include topics such as economics and the technical capabilities of renewable heating systems (particularly biomass); e.g. is steam raising possible on a wood boiler, and if it is can it be used for soil sterilisation? This topic is of interest to both the edibles and ornamentals sectors, but the edibles growers are most likely to want more details on the CO₂ enrichment implications of moving to renewable energy sources. This aspect to be integrated with edible grower's need for more on the economics of CO₂</p>	RHI information & communication plan to be integrated in the programme
6.	<p>Edible crop grower's needs centre on humidity control and CO₂ enrichment. Humidity control workshops are needed to make sure that growers keep up with the current thinking and put it in to practice. It is recognised that the limits of humidity control have been relaxed by many growers as knowledge of risk and crop performance improves. This is why there is a need to keep reviewing control strategies and how to use them. Growers are looking closely at the economics of CO₂, especially as energy saving is reducing the quantities of CO₂ available for enrichment. Workshop and/or information on CO₂ economics and CO₂ sourcing would be welcomed.</p>	
7.	<p>Using climate control computers. It is recognised that delivering information and training at a generic level can only go so far, and to get the best from their systems growers need manufacturer specific information and training. The group want GrowSave to explore how manufacturer (e.g. Priva, Hoogendoorn, Hortimax etc....) involvement can be incorporated into events</p>	FEC to contact manufacturers to discuss involvement in climate control events & communications
8.	<p>Study tours are considered as very valuable. Need to be run at a time of the year that is convenient to growers and be of a duration / cost that is attractive. It was suggested that visiting best practice examples in northern Europe was probably the best option. Denmark suggested as a possible option for 2013.</p>	CP to get in touch with previous contacts in Denmark to explore the possibility of a visit
9.	<p>GrowSave website needs a re-vamp to make the information more accessible. For example the weather data and instructions on how to use it to calculate weather influences on energy use was considered to be valuable information that many growers don't know how to access. Also most of the technical information can only be found through key-word search, and often growers can't find what they are looking for. Also send out more information emails to growers highlighting key topics of interest that are relevant to current grower issues (i.e. time of year, stage of crop development, weather patterns etc). Short email with hyperlink to the relevant website page is the preferred format.</p>	Website re-design already initiated by FEC, but key points to be included in the specification for the re-vamped site

Meeting Notes

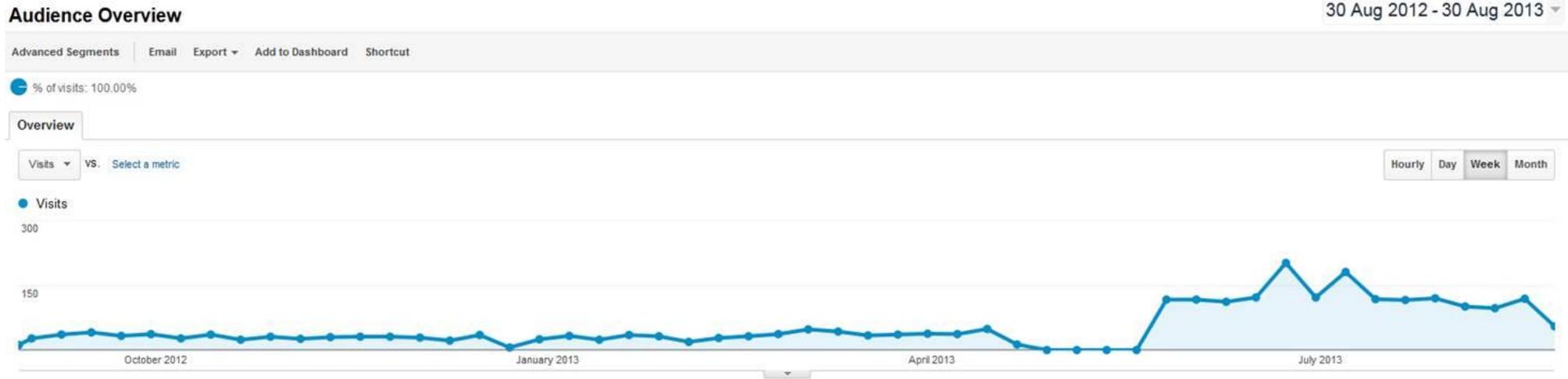
	Also, emails don't have to centre on newly produced information; growers forget (or need reminding about) previously communicated messages, so reminders about existing factsheets, guides etc are very valuable; especially when the topic coincides with problems /issues that growers are currently facing.	
10.	Simple energy glossary etc. needed on the GrowSave website. It is often taken for granted that growers understand energy terms, acronyms etc. This is not the case, and a list of energy terms etc is needed. Also include information on energy metering, how to read meters etc.	FEC to action
11.	The next steps. FEC to plan programme through to summer 2013 and circulate to all attendees for comment.	

Chris Plackett
23rd October 12

Appendix Two

Website visit statistics

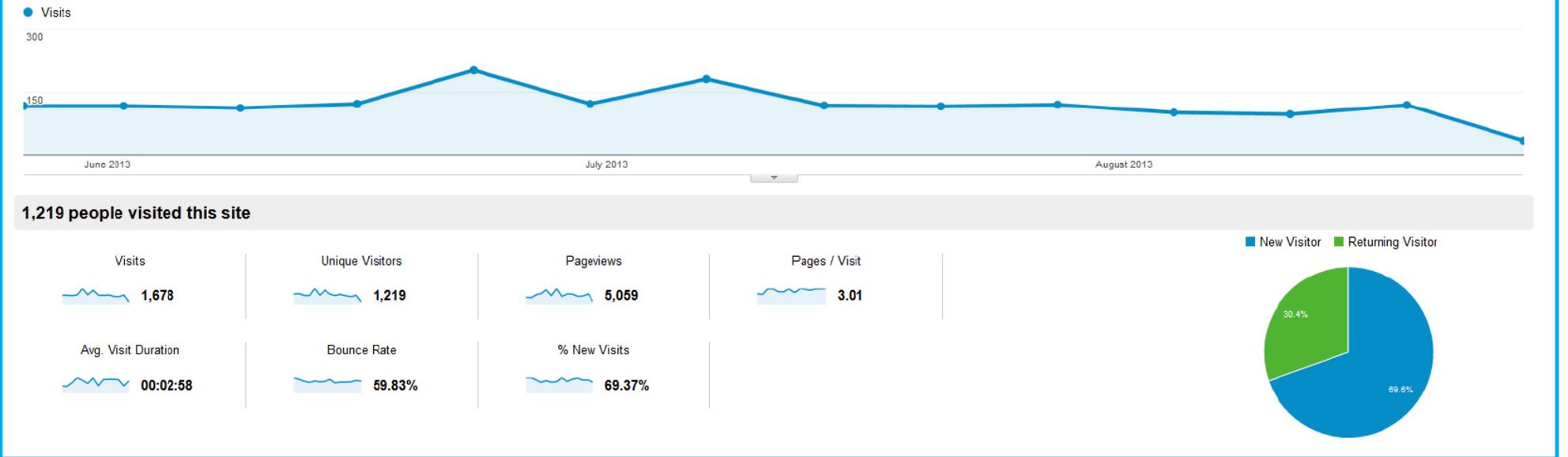
1. Website visits per week, 30th Aug 12 to 30th Aug 13



Note that the period between April 13 and May 13 shows zero visits per week due to a failure of the recording system

2. Visits per week for the new Website

To date - i.e. May to August 2013 (shown by week):



3. Page view statics for the new website

www.growsave.co.uk – page view stats
to date (27th May to 28th August)

Page Title	Pageviews	Unique Pageviews	Avg. Time on Page	Entrances	Bounce Rate	% Exit
GrowSave: Home	692	517	84.20	477	35.43%	31.21%
GrowSave: News	200	159	74.23	5	0.00%	15.00%
GrowSave: Study trip to Canada - register your interest NOW to secure funding and reserve your place	190	150	221.77	100	59.00%	56.32%
GrowSave: Biomass for edible crops	174	129	197.73	87	48.28%	47.13%
GrowSave: 'Preparing your glasshouse for winter' - Energy Day for energy-intensive ornamental growers	159	123	222.30	86	67.44%	53.46%
GrowSave: Energy Events	158	119	44.40	22	22.73%	13.92%
GrowSave: Energy Saving	134	101	49.78	8	25.00%	13.43%
GrowSave: Past Events	129	79	130.99	10	30.00%	18.60%
GrowSave: Renewable Energy	105	91	42.12	4	25.00%	18.10%
(not set)	100	70	43.71	12	25.00%	14.00%
GrowSave: About	96	71	66.76	11	27.27%	22.92%
GrowSave: What is the cost of humidity control?	95	71	120.73	34	85.29%	46.32%
GrowSave: Publications	91	77	55.70	8	0.00%	4.40%
GrowSave: Wood & Straw Boilers	84	53	43.82	26	46.15%	27.38%
GrowSave: Energy Management	79	66	79.83	3	66.67%	10.13%
GrowSave: Page Cannot be Found	78	60	49.25	32	40.63%	23.08%
GrowSave: Energy Price Trends	69	56	238.20	33	69.70%	56.52%
GrowSave: LED lighting economics calculators	69	63	124.03	28	82.14%	50.72%
GrowSave: LED lighting for horticultural applications	61	55	181.47	49	73.47%	68.85%
GrowSave: Technical Updates	61	49	339.11	3	100.00%	39.34%
GrowSave: RHI rates looking to improve for biomass	58	43	102.92	5	80.00%	36.21%
Farm Energy: Energy Saving	57	22	33.38	4	50.00%	7.02%
GrowSave: Booking Thank You	53	49	108.44	4	50.00%	49.06%

www.growsave.co.uk – page view stats

to date (27th May to 28th August)

GrowSave: Heating Ventilation and CO2	52	35	20.12	2	50.00%	1.92%
GrowSave: Contact	51	41	184.53	3	33.33%	33.33%
GrowSave: Thermal screens - essential for an energy efficient greenhouse?	50	49	170.79	40	75.00%	62.00%
GrowSave: Greenhouse Structure	49	38	65.11	2	0.00%	8.16%
GrowSave: Where should you position your measuring box?	49	45	101.65	19	84.21%	53.06%
GrowSave: Humidity	46	26	20.00	2	100.00%	8.70%
GrowSave: Biomass	43	32	11.95	4	0.00%	2.33%
GrowSave: Biomass boiler sizing	41	39	162.50	25	92.00%	75.61%
GrowSave: News - Energy-contracts-and-prices	37	23	18.25	0	0.00%	2.70%
GrowSave: Spark Spread: what is it and what does it mean?	37	34	862.00	32	93.75%	91.89%
GrowSave: EPI Graph North	35	27	18.59	2	100.00%	17.14%
GrowSave: Climate Control	34	27	21.29	2	0.00%	8.82%
GrowSave: Is your cold store leaking energy?	33	30	84.44	26	84.62%	72.73%
GrowSave: Screens	32	23	31.11	4	25.00%	15.63%
GrowSave: LED interlighting for tomatoes - a view from Philips	31	29	40.00	25	92.00%	83.87%
GrowSave: A short guide to the Renewable Heat Incentive (RHI) - could it work for you?	30	28	55.65	9	88.89%	43.33%
GrowSave: Future Events	30	22	127.59	4	25.00%	10.00%
GrowSave: Economics of biomass	29	27	276.27	19	78.95%	62.07%
GrowSave: LED lighting	28	25	250.63	15	46.67%	32.14%
GrowSave: Variable Speed Drives - what are they and how do they work?	28	28	65.00	20	90.00%	64.29%
GrowSave: Our Team	27	22	134.63	4	50.00%	29.63%
GrowSave: Using 'degree days' to see how the weather is affecting your energy use	27	25	90.33	22	90.91%	88.89%
GrowSave: Pumping	26	19	30.00	0	0.00%	3.85%
GrowSave: Biomass CHP	25	19	21.68	3	33.33%	12.00%
GrowSave: Storage and Cooling	25	20	10.96	0	0.00%	8.00%
GrowSave: CO2 dosing: Maximum and minimum boiler capacity	24	24	53.75	18	100.00%	83.33%

www.growsave.co.uk – page view stats

to date (27th May to 28th August)

GrowSave: Ventilation fans	15	11	30.21	1	0.00%	6.67%
GrowSave: What are the energy implications of using 'pre-night' or 'drop'?	15	14	42.50	9	88.89%	60.00%
GrowSave: Energy management in protected cropping: horticultural lighting	14	12	17.75	7	85.71%	71.43%
GrowSave: Energy management in protected cropping: management of CO2 enrichment	14	14	130.83	9	88.89%	57.14%
GrowSave: Plant temperature data helps to save energy	14	12	39.78	5	100.00%	35.71%
Farm Energy: Greenhouse Structure	13	10	39.17	4	50.00%	53.85%
Farm Energy: Lighting	13	12	28.92	3	33.33%	7.69%
GrowSave: A guide to fuel oil duty rebate for horticulture	13	13	367.50	7	100.00%	69.23%
GrowSave: Boilers	13	11	29.58	0	0.00%	7.69%
GrowSave: Dutch research investigates the effect of reduced CO2 dosing	13	11	29.38	0	0.00%	38.46%
GrowSave: Electricity Generation	13	10	21.38	0	0.00%	0.00%
GrowSave: Implementing energy efficiency measures in high temperature protected cropping	13	10	30.67	7	100.00%	53.85%
GrowSave: Sending Failed	13	11	14.67	2	0.00%	30.77%
GrowSave: Should my screen gap in extreme cold weather?	13	12	73.67	6	83.33%	53.85%
Farm Energy: Biomass	12	12	20.10	1	100.00%	16.67%
GrowSave: DECC hints at reward scheme for reducing electricity use	12	10	24.25	2	100.00%	33.33%
GrowSave: Deciding when to open and close screens to save energy	12	12	92.80	6	100.00%	58.33%
GrowSave: Practical steps to improve refrigeration efficiency	12	11	27.25	7	100.00%	66.67%
Farm Energy: Heating Ventilation and CO2	11	6	25.70	2	0.00%	9.09%
GrowSave: Energy management in protected cropping: good housekeeping	11	10	71.67	7	100.00%	72.73%
GrowSave: Energy Price Update w/e 21st June 2013: An over-supplied market drives prices down	11	10	20.88	1	100.00%	27.27%
GrowSave: Energy Price Update w/e 5th July 2013: The market's driven up by gas supply reductions and oil price increases	11	9	20.29	1	100.00%	36.36%
GrowSave: Heat Pumps	11	10	25.88	1	100.00%	27.27%
GrowSave: Optimising screen and vent control with lights	11	10	24.80	5	100.00%	54.55%
GrowSave: Stop unnecessary venting	11	11	97.50	6	100.00%	63.64%