

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

Project number: PE/PO 011a

Project leaders: Jonathan Swain & Edward Hardy, FEC Energy

Report: Year Four, July 2018

Key staff: Jonathan Swain, Edward Hardy & colleagues, FEC Energy

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

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Project start date: 1st August 2014

Project end date: 31st July 2019

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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.

Signature Date ...

Report authorised by:

Signature

Date ...

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Headline

GrowSave delivers a programme of technology transfer and information dissemination activities to AHDB Horticulture protected crops levy payers and provides up-to-date information about energy saving and energy efficiency.

Between August 2017 and July 2018 the project has delivered the following activities:

- Technical presentations at the TGA and CGA conferences
- Technical seminar covering the topic of renewable heating systems and their viability following reforms to the RHI scheme
- Technical seminar on the efficient operation of biomass boilers
- Workshop on basic humidity control in glasshouses
- Next Generation Growing study groups with three online webinars
- Three editions of the *GrowSave News* newsletter, dedicated to energy topics
- Regular news and updates delivered via *The Grower* magazine and the GrowSave website
- Energy benchmark data via the GrowSave website
- Technical Update publications covering the topics of: modern heat storage, thermal storage for horticulture, understanding your energy bill, and seven tips for Next Generation Growing

All of the activities were designed to encourage growers to take energy saving actions in their own business.

Background & Introduction

GrowSave is AHDB Horticulture's communications platform that disseminates energy saving information and supports the implementation of energy saving technologies by the UK protected cropping sector. The programme has been running for over 10 years. It is delivered by the FEC Energy team and steered by a group of edible and ornamental growers. The format of outputs and the project programme are deliberately kept flexible, so as 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 builds on previous activities that were funded under a series of AHDB Horticulture (formerly HDC) projects, the latest of which was project reference PE/PO 011. This report outlines the activities delivered in the fourth year of the project, which ran from 1st August 2017 to 31st July 2018. Under the current contract, the project is scheduled to run for a further year.

Summary of Work Completed

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

Activity Area	Contracted Activity	Delivered Activity
Website	Provide at least one update per week	News stories added as per contract. Blogs from FEC Energy specialists added on a regular basis.
Grower workshops / technical seminars	Deliver three workshops / seminars	<p>‘Looking after your biomass boiler’ held at Roundstone Nursery, Chichester on 23/11/17.</p> <p>‘What’s Next for Renewable Heat?’ held at The Old Manor Hotel, Fife, Scotland on 12/12/17.</p> <p>‘Basic Humidity Control’ held at Bordon Hill Nursery on 24/01/18.</p>
Technical presentation at PC Crop Association conferences / meetings	Provide presentations / technical support to two Crop Association conferences / meetings	<p>Presentations were given at two Crop Association events:</p> <ol style="list-style-type: none"> 1. TGA Conference, Chesford Grange Hotel, 20/09/17. Topics were focused on energy storage, including effective use of heat stores, as well as battery storage and grid support. 2. CGA Conference, Waltham Abbey Marriott Hotel, 05/10/17. Topic was creating an even greenhouse climate using NGG techniques.
Energy benchmarks	Deliver information and data via the GrowSave website to allow growers to carry out energy use comparisons	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.
GrowSave News	Deliver three editions of the energy specific newsletter	Delivered to contract with three editions completed in September 2017, February 2018 and June 2018.
The Grower news columns	Deliver columns of ~750 words in each edition of AHDB Grower	Delivered to contract.

Activity Area	Contracted Activity	Delivered Activity
Technical updates	Publish four technical updates covering topics relating to recent energy developments	Updates have been written on the following topics: <ol style="list-style-type: none"> 1. Modern heat storage 2. Thermal storage for horticulture 3. Understanding your energy bill 4. Seven tips for Next Generation Growing
Study Tour	Attendance at Automation & Robotics study tour at Wageningen University & Research	
Fruit Focus	Attendance at show to market GrowSave to the Soft Fruit sector	Delivered to contract

Description of Activities

The activities of the GrowSave project were discussed and planned with the Steering Committee at meetings held on 20th September 2017 at the Chesford Grange Hotel, and 22nd March 2018 at the AHDB HQ. Those unable to attend in person were invited to join via video link. Regular contact was maintained with industry groups including the TGA, CGA, PTG and BPOA. These industry inputs formed the basis of the work programme described here.

Website and Social Media

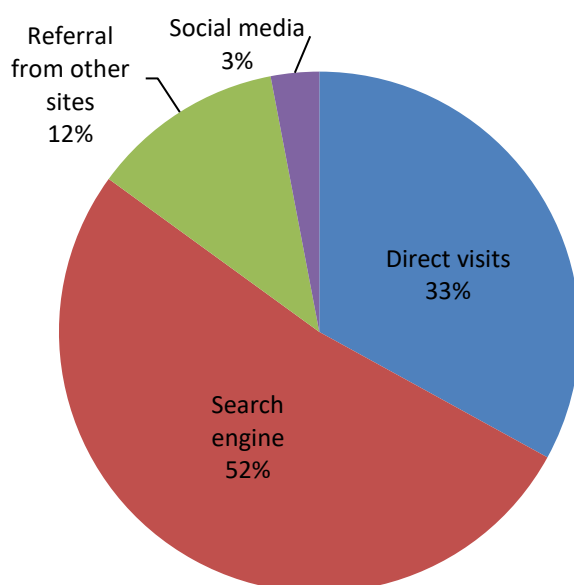
The project website has been regularly updated with articles and news items. In addition, reports from GrowSave events have been posted together with any associated hand-outs or presentations.

Website metrics have been recorded using Google Analytics. There were 9,080 website visits with 19,193 page views between 1st August 2017 and 31st July 2018. New visitors accounted for 6,773 (75%) of these visits. Direct website visits numbered 3,037, while 4,386 were directed via Google.

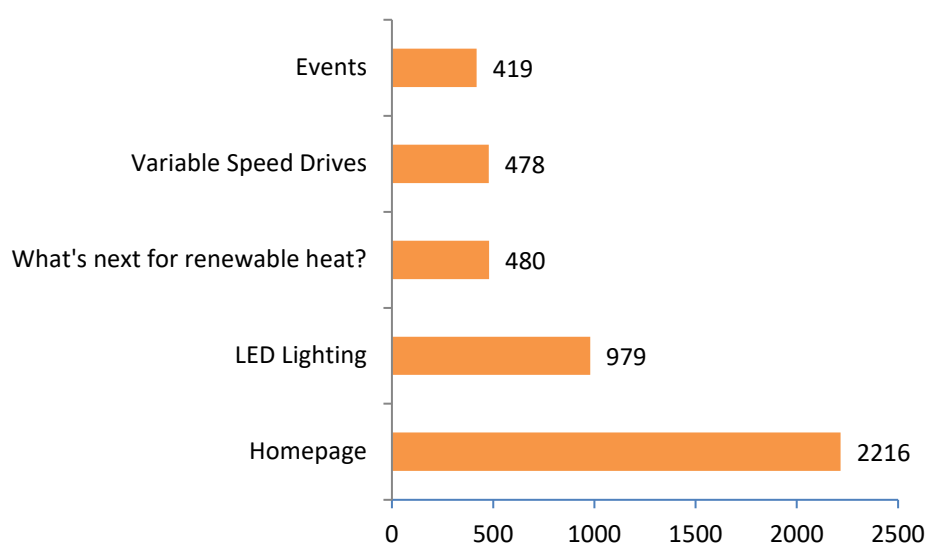
The number of visits to the website has increased by 18% compared to the same period in 2016-2017, believed to be due, in part, to our new regular email called GrowSave Monthly. This email notifies recipients of new technical updates, GrowSave News and upcoming events.

In addition to the website, GrowSave has been reaching growers through articles and press releases on websites, including HortiDaily and the AHDB website. The number of website sessions resulting from referral links increased from 9% to 12%.

The four most popular routes of access to the GrowSave website were:



The top five most popular subject pages were:



'What's next for renewable heat' was a popular topic during the last GrowSave year, and this shows through the statistics and how popular the event was. Once again, LED Lighting remains a popular topic, as does the Events page. The top five pages visited account for just under a quarter of all the page views, indicating that visitors view a wide range of site content.

Going forward, subject to available funding, GrowSave would like to implement a new digital strategy, with a focus on redesigning the website to bring it up-to-date in terms of both layout and content, making it easier for users to navigate and find the information relevant to them. An increase in the use of social media is also an ongoing focus, and it is hoped that this will drive more people to the website.

Workshops and Seminars

The topics for workshops / seminars were decided based on grower demand and the guidance given by the steering committee. Where possible, events were held that would attract both edible and ornamental crop growers.

A study group programme was also delivered and continues to run into the 2018-19 year. The programme focused on Next Generation Growing (NGG) techniques and made extensive use of the LetsGrow.com online data sharing platform. Within the programme GrowSave hosted three online training sessions covering the principles of NGG, which were led by a Dutch NGG expert. Consultancy visits were carried out to the individual growers together with the Dutch expert, who also provided detailed weekly feedback on the data gathered by the online platform.

In the final weeks of this GrowSave year, AHDB Soft Fruit contracted FEC Energy to carry out work specific to the Soft Fruit sector. The first activity was to attend Fruit Focus in East Malling to raise awareness of the project within this sector. GrowSave shared a stand with AHDB.

Details of the three GrowSave events and the NGG study group, including the background to them and the number of attendees, are given in the following table.

Workshop / Seminar Title	Details	No. of Participants
NGG Study Group Date: November 2017 - onwards	The aim of the study group was to introduce Next Generation Growing (NGG) techniques, pioneered by growers in the Netherlands, to UK growers. The programme revolved heavily around the LetsGrow.com online platform, where growers were encouraged to share their climate data. Weekly feedback was provided by a Dutch NGG consultant. Visits to the individual growers were carried out in February and June. Online training sessions were held in March, April and July.	Total: 6 5 growers 1 crop consultant
Looking After Your Biomass Boiler Location: Roundstone Nursery Date: 23 rd November 2017	This event was targeted at biomass boiler operators with the aim of informing them how to get the most out of their equipment. Speakers focused on how to ensure best performance from the system, and ensure all components integrate well with each other.	Total: 15
What's Next for Renewable Heat? Location: Old Manor Hotel, Fife, Scotland Date: 12 th December 2017	This was the same topic as the event held in March 2017, but the speakers and content were different. Information was presented on the viability of projects following changes to the RHI scheme, with the aim of highlighting the financial impact of the new regulations on anyone considering installing a renewable heating system in the near future.	Total: 11

In addition to the specific GrowSave events, technical support on energy topics has been given to several protected crops sector events / Crop Association meetings. Details of these events are as follows:

1. **TGA Conference, 20th September 2017.** Tim Pratt from FEC Energy gave delegates an update on the latest issues affecting energy use in greenhouse horticulture. This covered several topics including energy pricing, the viability of renewable heating systems and Climate Change Levy targets.
2. **CGA Conference, 5th October 2017.** Jon Swain presented the topics of NGG, thermal screens and glasshouse maintenance, highlighting the importance of keeping the crop in balance by maintaining a homogeneous glasshouse climate.

Two event days were carried over from the 2016-17 programme and were allocated to the NGG study group, which also required a portion of the GrowSave budget to be reallocated. This was taken largely from the budget allocated to video summaries.

Energy Benchmarks

GrowSave continues to provide information to allow growers to benchmark the performance of their nurseries against other similar facilities. However, factors such as the wide range of protected crops grown in the UK and the existence of some established industry initiatives, such as the Tomato Working Party, mean that providing energy use benchmarks is not feasible under the current project.

Two of the largest factors affecting the energy use of glasshouses are the prevailing weather conditions (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.

Throughout the project, the GrowSave website has provided weather data (temperature and solar radiation) and degree-day information so that growers can use this to carry out energy performance benchmarking. The webpages showing graphs for Energy Performance Indicators received a total of 205 views during the period 01/08/2017-31/07/2018, while Energy Price Trends received 89 page views.

GrowSave News and The Grower

Three editions of GrowSave News have been produced and delivered as inserts within AHDB's *The Grower*. 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 levy payers as possible.

A short column (500 to 1000 words) with topical news on either the GrowSave project or energy related projects has also been included in all five editions of *The Grower*. Topics covered include news on upcoming events, reports of recent meetings, information on the progress of AHDB Horticulture energy projects and general energy developments.

These publications are distributed to a mailing list of around 3000 levy payers. The following table describes the articles and the publications they appeared in.

Date	AHDB Grower Topic	GrowSave News Topic
Oct – Nov 2017	Cold Storage	<ul style="list-style-type: none"> • Battery Storage • Grid Support • NGG Tip 4 • Energy market update • Dates for your diary
Dec 2017 – Jan 2018	Basic Humidity Control	
Feb – Mar 2018	Energy consumption issues and saving money for Soft Fruit Growers	<ul style="list-style-type: none"> • New grants available • What the grants are worth • NGG • Energy market update • Venting on glasshouse ridge
Apr – May 2018	Basics in humidity	
Jun – Jul 2018	NGG Study Groups	<ul style="list-style-type: none"> • Heat pumps in horticulture • Don't get caught out by ESOS • RHI Update • Energy market update

Other Articles

In addition to the AHDB publications, GrowSave has had additional material published, including two articles for The Commercial Greenhouse Grower (April & June 2018) and several articles on hortidaily.com.

Technical Updates

The technical updates summarise information about the latest energy topics and techniques. They provide information about topics ranging from new commercial developments to the latest research results. In the period covered by this report, text has been prepared for Technical Updates on the following topics:

1. Important Characteristics of Modern Heat Storage

Design features and considerations when choosing a heat store.

2. The Basics of Thermal Storage for Horticulture

Explanation of what thermal storage is and how it can be of benefit, including the use of phase-change materials.

3. Understanding Your Electricity Bill

A breakdown of terms and charges found on an electricity bill.

4. Seven Tips for Next Generation Growing

An overview of the aims of and techniques used in Next Generation Growing.

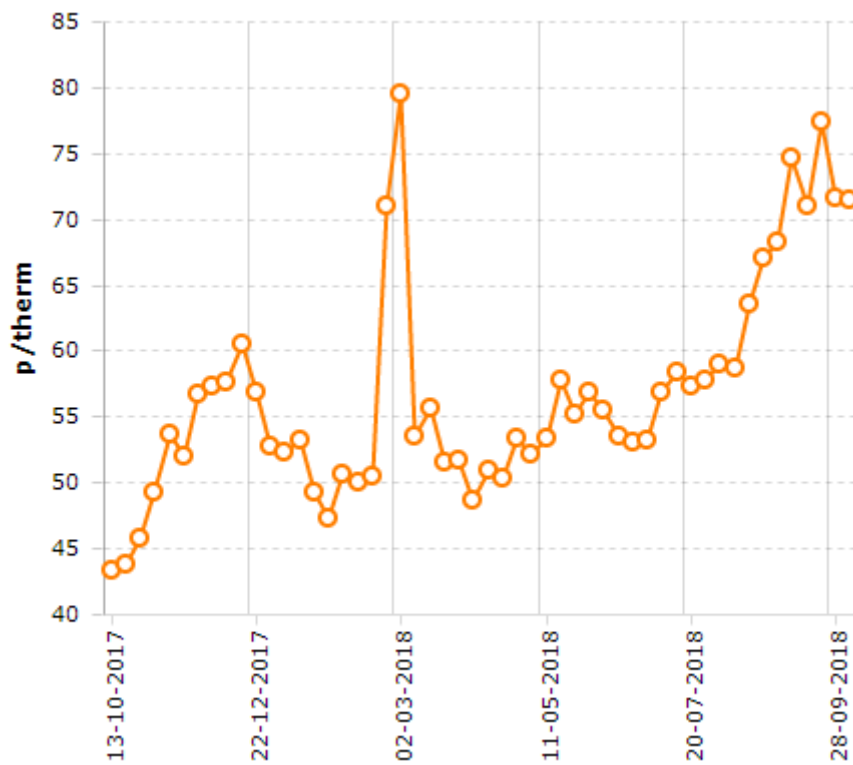
These Technical Updates are available via the GrowSave website:

<http://www.growsave.co.uk/technical-updates>.

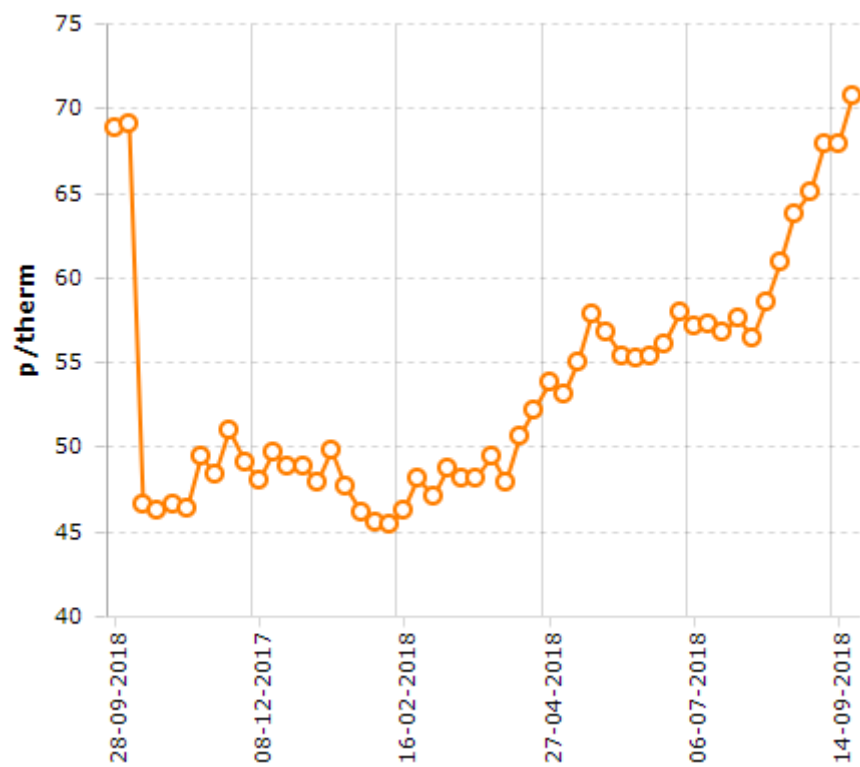
Financial Benefits

Energy prices have fluctuated over the last 12 months, with a general upward trend meaning consumers are paying more this year than last (see <http://www.growsave.co.uk/energy-price-trends>).

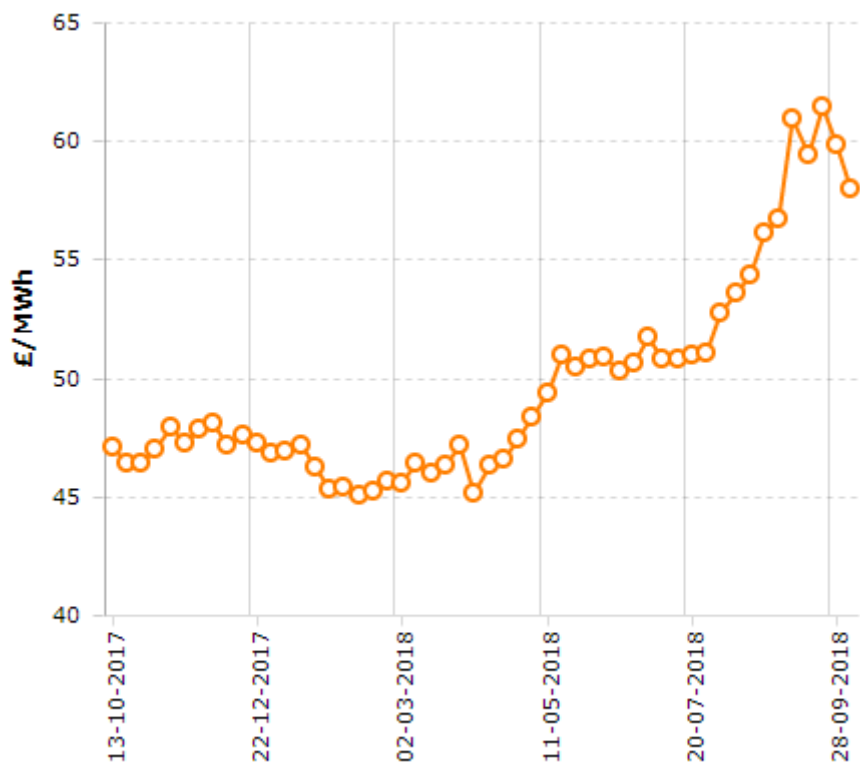
Gas – day ahead



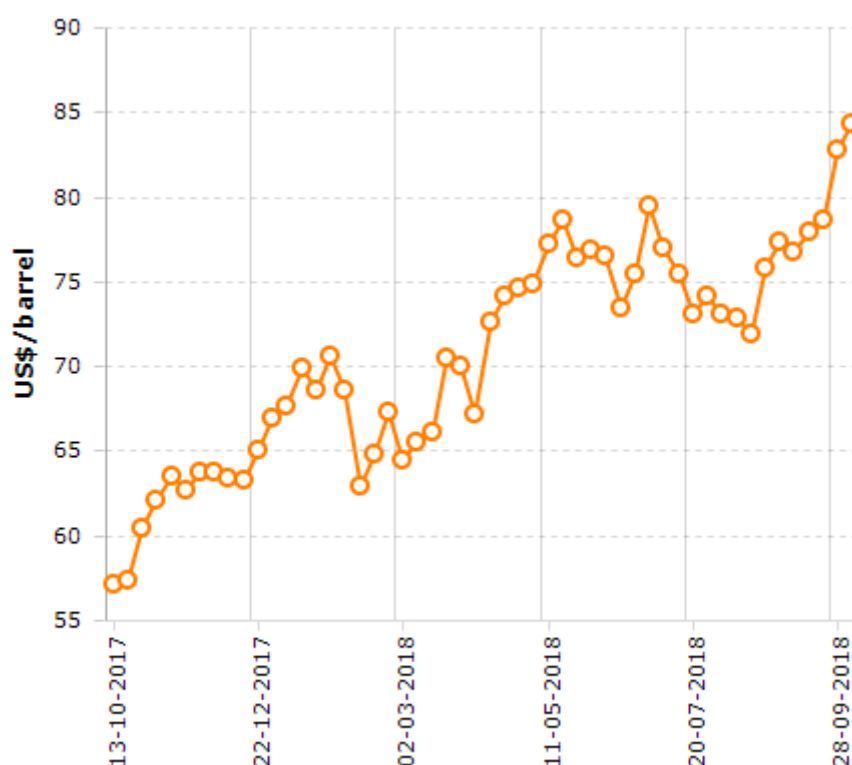
Gas – season ahead



Electricity – year ahead



Oil – Brent crude



With increased energy costs comes an increased desire to reduce energy usage.

Sector Impact

Quantifying the impact that the GrowSave Programme has on UK Horticulture has always been a challenge and this year has not been easier. Climate Change Levy Data is one metric we have used and this reporting year for GrowSave falls between two reporting years for CCL therefore the data we have available is less robust. However, a number of sites have reported their energy and production data. In 2015-16, these sites used 322 GWh p.a. of reportable primary energy, which accounted for 22% of the energy reported by the entire sector. In 2017, this figure was 394 GWh, an increase of 22%. There were also changes in production, both in terms of growing area and weight of crop. Those reporting area increased reportable production area by 3% from 54.3 ha p.a. in 2015-2016 to 55.8 ha in 2017. Those reporting weight of crop also showed a 3% increase from 30,880 tonnes p.a. in 2015-16 to 31,917 tonnes in 2017.

A significant contributor to the increase in energy consumption is believed to be due to a single member, who accounted for 36% of the energy reported in 2017, moving to lit crops and year-round production. While the biggest reported increase in energy use was over 100%, two separate sites reported decreases of around 30%.

One of the largest impacts to protected horticulture in the last few years has been the uptake of biomass heating driven by the Renewable Heat Incentive. There is much anecdotal evidence to demonstrate that the availability of subsidised heat has caused UK cropping to change to higher temperature and higher value crops, especially in the

PO sector where Poinsettia have been more popular. The strength of the GrowSave programme in these areas has ensured accurate, timely advice regarding the uptake of biomass heating ensuring good quality installations that are considerate of efficiency.

For example, as a direct result of the programme, a large ornamentals grower in Lincolnshire has invested in a large-scale glasshouse project to be heated by a biomass boiler setup. The biomass boilers will be eligible for RHI payments, which will return an annual benefit to site in the region of £250,000. Plans are currently in place for a significant increase in area and larger biomass boiler set-up.

For most sites, energy remains one of the three biggest costs (the others being labour and plants & materials). With increasing energy prices, energy efficiency becomes even more important. GrowSave will continue to provide relevant information on energy savings and efficiency to help minimise the financial impact on the horticultural industry. The impact of GrowSave in these areas is not insignificant, although attributing quantifiable benefits at this stage is difficult. Anecdotal evidence suggests that several growers have either changed their production methods or improved their energy efficiency following GrowSave workshops.

Summary & Highlights

1. The GrowSave website has continued to be regularly updated with the latest energy information for growers. The materials from GrowSave events, such as technical meetings, have also been made available via the website. Statistics show that there were 9,080 website visits over the period covered by this report and the most popular topics included LED lighting and variable speed drives.
2. A series of seminars and grower meetings has been delivered. These have concentrated on working with growers to identify the best energy efficiency solutions for their business. The main topics covered included biomass heating and the RHI, as well as air movement and NGG techniques.
3. Four Technical Updates have been written, which give information on some of the latest developments in greenhouse energy saving. These feature information on heat storage, understanding your electricity bill, and Next Generation Growing.