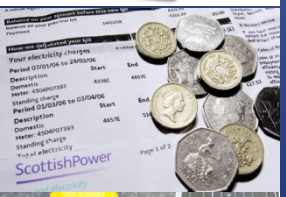

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Practical experience of managing renewables for resident well being

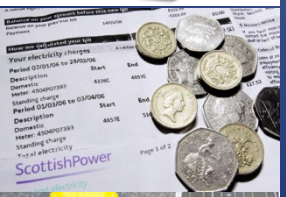
Paul White, Design & Quality Manager, TCHG

The TCHG Experience

Content

- TCHG Solar Homes PV FIT programme
- Solar Hot Water experiences
- Air Source Heat Pump experiences
- Ground Source Heat Pump experiences
- RHI claims
- General observations
- Questions

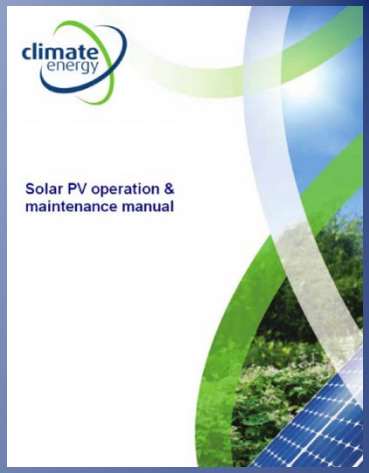
ofgem



TCHG Solar Homes Headlines

- £1.1 million spent
- 132 houses and 4 blocks of flats (93) benefitted – rural areas mainly – SAPs raised 8-11 points
- Annual income circa £120,000 for 25 years (mainly)
- Actual generation better than predictions – ~ 15%
- Payback in 14 years (NPV) but probably earlier due to PV over performance (~ 10 years in cash terms)
- Total annual generation ~340,000 kWh (~390kWp)
- Carbon footprint reduced by 4300 tonnes in 25 years
- Residents elec bills reduced by up to 50% use – good feedback
- Monitoring platform invaluable for income & maint.

Resident advice & experience



- Need to clearly advise residents not to increase their electricity usage – less perceptible than heat
- Confusion over FIT
- Transparency of savings / interfaces
- Some suspicion of us – rejected then came back requesting later
- Existing metering clashes – perception adding to bills
- 1 – 4 kWhrs typically in winter / 8 to 12kWhrs in summer
- Found benefit to be 10% of generation for some – normally elderly
- Turned PV electricity into heat via energy management devices
- High users discovered – 130 kWhrs on one December day in 2012!! Sent information and tried engagement

Maximising bill savings

Electricity generated by the panels will automatically be diverted into the property if there is an immediate electricity demand to meet. However, you will continue to use electricity from the national grid as usual if the panels are generating less than the property demand.

You are strongly advised not to deliberately increase your energy usage or simply move all of your current electricity usage to day time because solar panels have been installed.

You can maximise savings by matching energy usage within the property to generation from your panels, both day to day and over the year. Looking at the annual and daily PV generation profile graphs above, panels will generate at or close to full capacity between approximately April and August. Moving existing use of a few appliances to the middle of the day at these times of year will maximise the free PV energy used.

You should aim to match the total kW rating of these appliances to a little under the PV generation capacity. On sunny days between April and August you can match the system kW rating to the combined kW rating of appliances in use to ensure minimal or no reliance on grid energy at that time or alternatively throughout the year you can check the PV generation meter (see above for instructions) for how many kW the PV system is generating at any one time.

To help you match electricity demand to PV generation, the table below gives some typical appliance kW ratings for when they are in full use. **Please note these are intended as guidance only and will vary, sometimes significantly, from product to product and as technologies change.**

Appliance	kW rating	Appliance	kW rating
Electric shower	8.5	Electric mower	1.2
Immersion heater	3	Electric drill	0.8
Dishwasher	3	Microwave	0.8
Washing machine	2.5	Vacuum cleaner	0.75
Tumble dryer	2.5	Hairdryer	0.5
Kettle	2	Plasma TV	0.4
Electric fire	2	Fridge-freezer	0.3
Deep fryer	2	Freezer	0.3
Toaster	1.4	Heating blanket	0.2
Oil-filled radiator	1.4	Fridge	0.1
Iron	1.2	Video, DVD or CD	0.1
Electric oven	1.2	PC/laptop	0.1
Grill/hob	1.2	LCD TV	0.1

climate energy

Solar PV operation & maintenance manual

Generation meter

The Generation Meter is installed in addition to your existing electricity meter to record how much electricity the system has produced. The electricity produced is measured in kilowatt hour (kWh) units. The amount of electricity generated will vary from day to day and throughout the year dependant on weather conditions and the time of year.

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The **Energy Monitoring Platform -** *"You need to know"*

www.energymonitoringplatform.com

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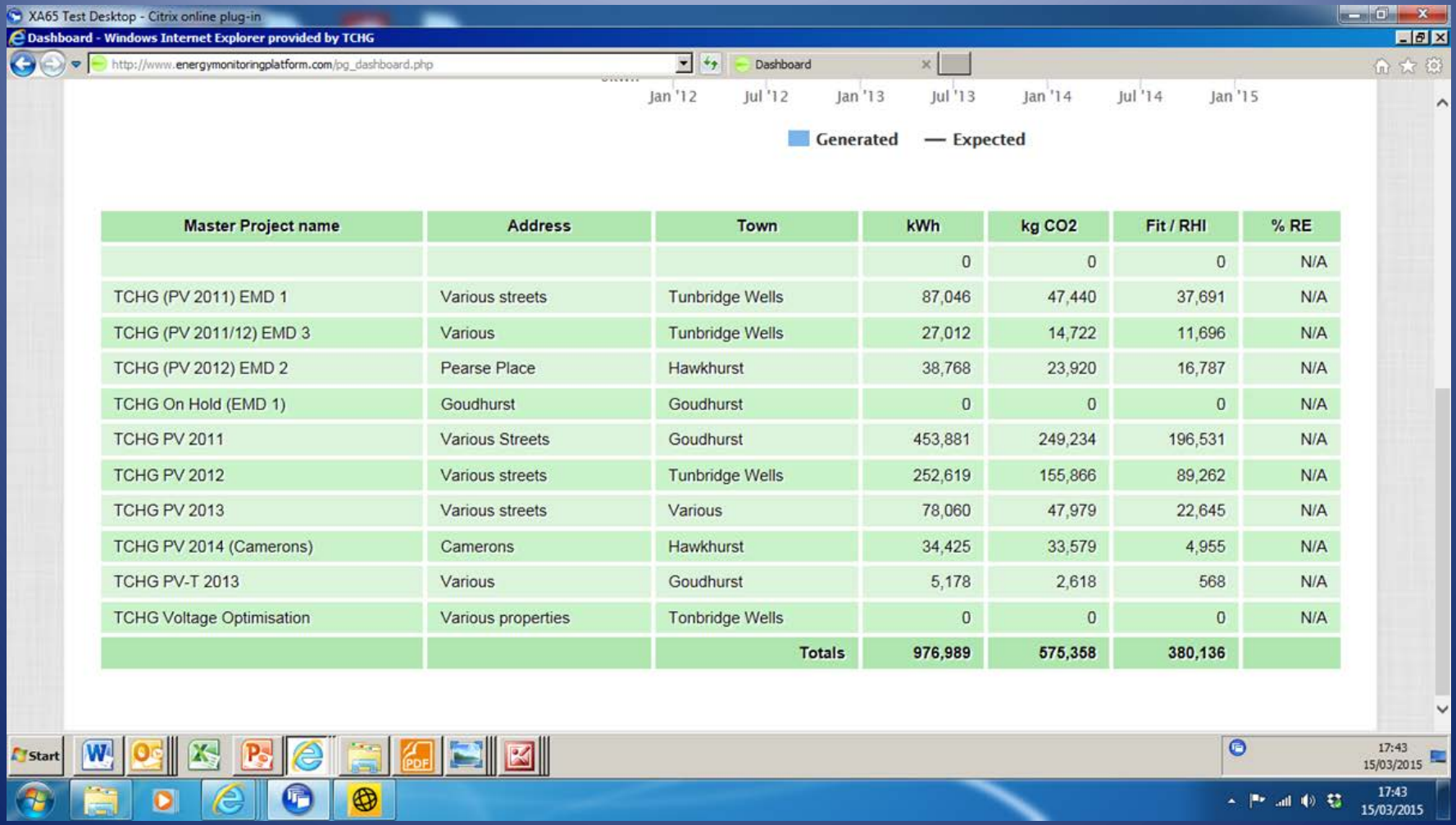
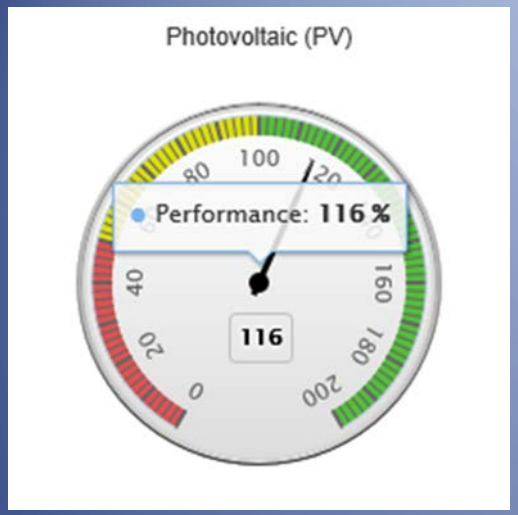
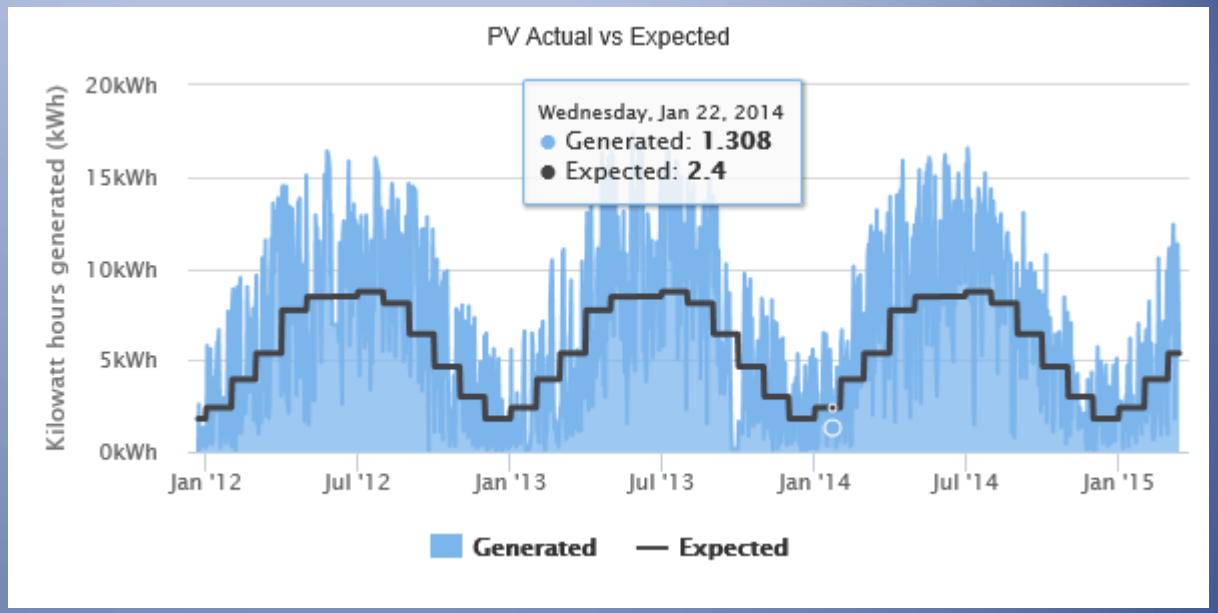
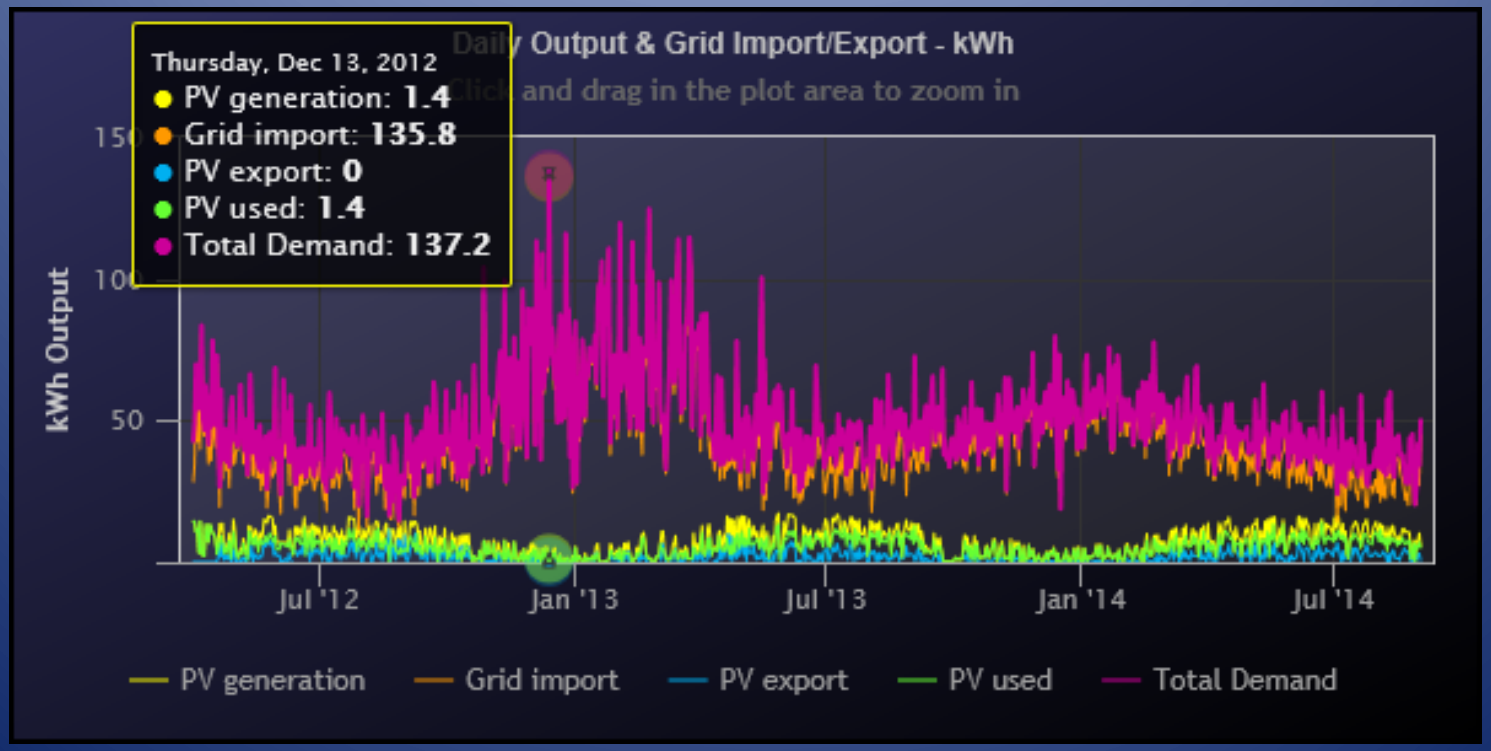


Master Project name	Address	Town	kWh	kg CO2	Fit / RHI	% RE
			0	0	0	N/A
TCHG (PV 2011) EMD 1	Various streets	Tunbridge Wells	87,046	47,440	37,691	N/A
TCHG (PV 2011/12) EMD 3	Various	Tunbridge Wells	27,012	14,722	11,696	N/A
TCHG (PV 2012) EMD 2	Pearse Place	Hawkhurst	38,768	23,920	16,787	N/A
TCHG On Hold (EMD 1)	Goudhurst	Goudhurst	0	0	0	N/A
TCHG PV 2011	Various Streets	Goudhurst	453,881	249,234	196,531	N/A
TCHG PV 2012	Various streets	Tunbridge Wells	252,619	155,866	89,262	N/A
TCHG PV 2013	Various streets	Various	78,060	47,979	22,645	N/A
TCHG PV 2014 (Camerons)	Camerons	Hawkhurst	34,425	33,579	4,955	N/A
TCHG PV-T 2013	Various	Goudhurst	5,178	2,618	568	N/A
TCHG Voltage Optimisation	Various properties	Tonbridge Wells	0	0	0	N/A
		Totals	**976,989**	**575,358**	**380,136**	


Photovoltaic (PV)
Performance: 116 %
116
0
20
40
60
80
100
120
140
160
180
200


PV Actual vs Expected
Kilowatt hours generated (kWh)
20kWh
15kWh
10kWh
5kWh
0kWh
Wednesday, Jan 22, 2014
Generated: 1.308
Expected: 2.4
Jan '12
Jul '12
Jan '13
Jul '13
Jan '14
Jul '14
Jan '15
Generated
Expected

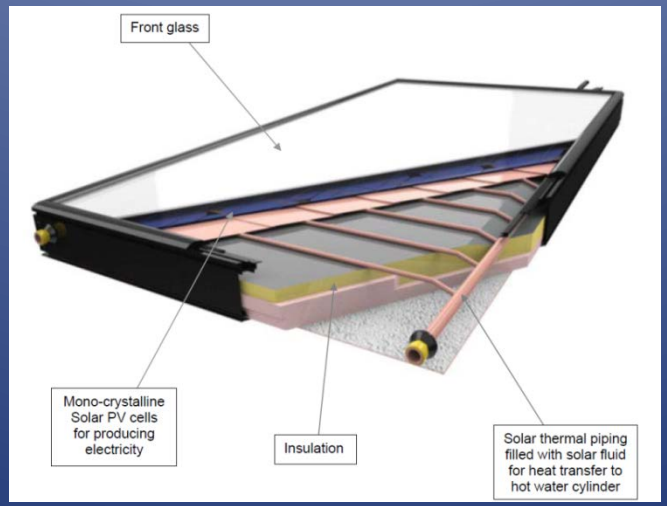

Thursday, Dec 13, 2012
PV generation: 1.4
Grid import: 135.8
PV export: 0
PV used: 1.4
Total Demand: 137.2
Output & Grid Import/Export - kWh
and drag in the plot area to zoom in
kWh Output
150
100
50
Jul '12
Jan '13
Jul '13
Jan '14
Jul '14
PV generation
Grid import
PV export
PV used
Total Demand

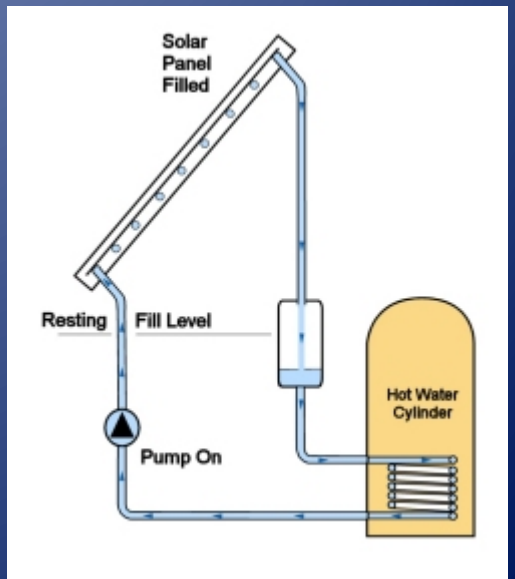
Solar Hot Water

- 15 units retrofit installation programme
- £77,000 cost with DECC RHPP grant of £20,400

And an on-going annual legacy grant Renewable Heat Incentive (RHI) of only £30 p.a. per unit for 7 years (not worth applying).

3 units have integrated PV with an extra £150 p.a. per unit FIT income. Typical RHI tariff = £270 p.a. approx.

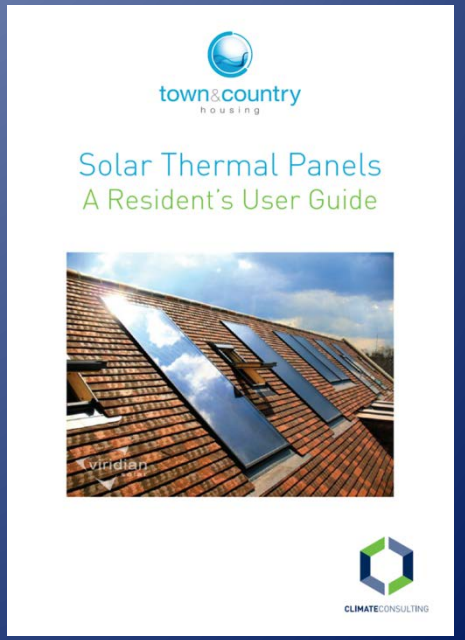





Quick Guide
viridian

Solar Hot Water Resident Experience

- Relatively popular and can be less disruptive to fit / existing plumbing?
- Lifestyle choices to maximise benefits / bathing times and sunrise – some stagnation issues
- Some enjoy making it pay during the summer
- Roof and airing cupboard size – policy to consider if the roof size is too small for a decent amount of PV
- Large cylinder – less storage
- Electric showers reduce benefit
- 'Drain backs' for panels and easy maintenance
- Visability of savings? £50 to £100 pa gas / £150 pa off gas
- SAPs raised



Air Source Heat Pumps

- 26 air source heat pump retrofit programme
- Cost £182,000 with £90,000 RHPP grant from DECC

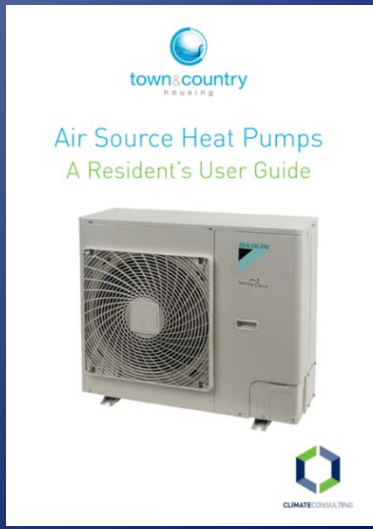
The annual legacy RHI income p.a. per pump for 7 years is too small for us to apply. Typical RHI tariff = £400 – 500 p.a. approx depending on specific EPC heat demand / SPF calculations but greatly varies.

- 'Monoblocs' used - mix of 'heating only' and full central heating systems. Looking at 'Split' systems

DAIKIN

Air Source Heat Pumps

- Legacy of bad, mainly new build installations (+ NIBE Fighters experience)
- Warm ambient heat / radiator temperatures less than fast react heating but still adequate – liked by residents
- Rad sizing and how heat demand calculated - insulation
- Need to leave running and not switch off and on – resident view / Set backs for night and holidays
- Existing fuel? Storage heaters and houses, oil - lump sums for refills/ security / smell – SAPs raised?
- Hot water prioritising and baths / showers?
- Pre-payment meters stopping continuous running?
- Pipework in dwelling / boxing issues
- Removing storage heaters – décor and carpets?
- Noise and location of units – planning req'd?



Before leaving the property following installation, the installer will have set appropriate system operational settings using this central system controller.

It is advised that you do not use this controller to change settings for your system and instead use just the temperature adjustment and set back functions on the digital thermostat installed in your hallway (see below).

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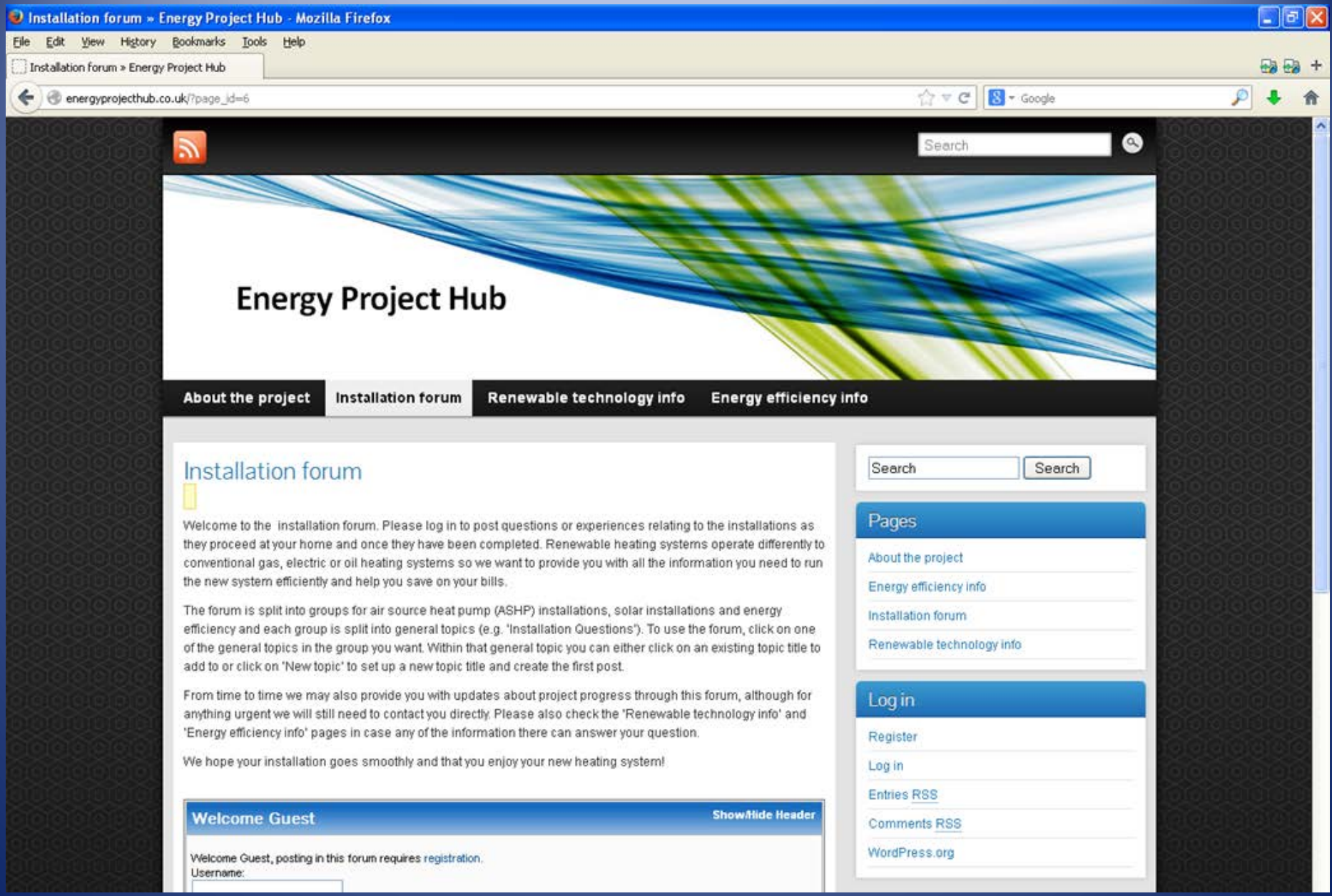
Air Source Heat Pumps

A Resident's User Guide

CLIMATECONSULTING

The 'Warm/Cool' button can be used to switch between two pre-set temperature settings of 21°C (Warm) and 15°C (Cool). The programmer is set to switch between these settings automatically in day and night time so you should not need to use this feature regularly.


Installation forum » Energy Project Hub - Mozilla Firefox
File Edit View History Bookmarks Tools Help
Installation forum » Energy Project Hub
energyprojecthub.co.uk/?page_id=6
Google
Search
Energy Project Hub
About the project
Installation forum
Renewable technology info
Energy efficiency info
Installation forum
Welcome to the installation forum. Please log in to post questions or experiences relating to the installations as they proceed at your home and once they have been completed. Renewable heating systems operate differently to conventional gas, electric or oil heating systems so we want to provide you with all the information you need to run the new system efficiently and help you save on your bills.
The forum is split into groups for air source heat pump (ASHP) installations, solar installations and energy efficiency and each group is split into general topics (e.g. 'Installation Questions'). To use the forum, click on one of the general topics in the group you want. Within that general topic you can either click on an existing topic title to add to or click on 'New topic' to set up a new topic title and create the first post.
From time to time we may also provide you with updates about project progress through this forum, although for anything urgent we will still need to contact you directly. Please also check the 'Renewable technology info' and 'Energy efficiency info' pages in case any of the information there can answer your question.
We hope your installation goes smoothly and that you enjoy your new heating system!
Welcome Guest
Show/Hide Header
Welcome Guest, posting in this forum requires registration.
Username:
Search
Search
Pages
About the project
Energy efficiency info
Installation forum
Renewable technology info
Log in
Register
Log in
Entries RSS
Comments RSS
WordPress.org


Warm / Cool


BAXI

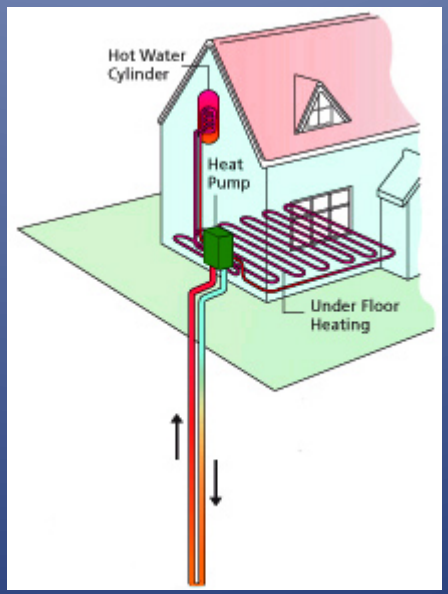

HeatKing

Happy customers!

- Email says '….regarding the new heating system it has been working very well and a great improvement on my old unit being far more efficient in keeping my flat warm and damp free. I am also very pleased that this winter my electric bills are about a third less a month on last year which is a great saving indeed. Hopefully it will continue to be reliable. '
- You need to know!!! Multi media surveys etc – telephone calls certainly work

Ground source heat pumps

- 8 to 10 Ground source heat pumps (2014/15)
- Considered funding options including a mixture of Eco funding and Renewable Heat Incentive (RHI)



Ground source heat pumps

- Good tech but need clusters in one street to make it viable
- Fences and other obstructions removed to get drilling rig in
- Position of main pump?
- Couldn’t get enough residents to sign up
- Had to return £58,700 grant – not enough time to do full engagement and preparation by deadline
- New build GSHP has been very good.

Kensa Heat Pumps
A KENSA GROUP COMPANY

RHI applications

- Prepare – My RHI Guidebook
- 1st application need to confirm identity
- Legal Title for ownership of 1st application
- MCS certs
- EPCs (Green Deal Assess'ts relaxed for RPs)
- Bank statement & Authorised Signatory Letter
- Legacy deadline April 8th / balance above RHPP
- Typically ~ £500 pa ASHPs / £270 SHW 7 years

General observations

- Hawthorne effect & Rebound effect – temperatures running home & ‘comfort take’ but less mould / better health?
- Tariff level correct? Tariff (e.g. Econ 7) / resident inertia to switch supplier demographic / use profile?
- Energy price rises per kWh appearing to eat up savings
- Don’t raise expectations too high
- Lifestyle changes by choice – new tumble drier, reptile tanks, new baby etc
- Visability of savings
- Suspicion of provider / need for resident champions / need to keep reaffirming – DVDs, Youtube etc ?
- How extreme are the financial circumstances? – oft quoted ‘Every little helps’

General observations

- Simple, accessible controls and meters, immersions / showers ?
- Defects and perception of faults
- Maintenance regimes, capabilities, training, parts availability and help desks / housing managers briefed ?
- Certificates not enough – 3rd party checks etc
- Positive image / happier residents / better engagement / social media

Any questions?

March 2014

TOWN & COUNTRY HOUSING GROUP
Town & Country Energy Savers

A Programme of Air Source Heat Pump Installations

General information :-

Specialist Consultant:	Climate Energy Consulting Ltd
Contractors:	Swale Heating Ltd using preferred product mTacturer Daikin
Funding:	DECC funding plus TCHG Fuel Poverty Budget top up
Start on site:	July / August 2013
Anticipated completion:	March 2014

'Evaporator' box in garden

Internal pipework needs planning

Horstmann AS2 simple control

How it works (Much like a fridge in reverse.)
An external box (evaporator) captures latent solar heat energy in the external air even at lower temperatures, which is pumped via a refrigerant medium in pipes. The increased temperature turns the refrigerant into a gas state to a compressor which puts this under pressure ramping up the amount of useable heat (Boyles Law) at 40 – 50oC. This heat is further transferred to be used in the home for heating (and hot water too). As the gas cools it turns back into liquid state to be recycled in the external box for the process to be continually repeated. For every 1 kilowatt hour of electricity used to run the system it should achieve at least 2.5 kilowatts of useable energy for heating.

Details. Why? + pros and cons
Fuel bill reduction - used correctly it should save significant amounts in off gas areas compared to storage or oil heating. They even up the cost of electric heating with gas if used and installed correctly Typically 2 days to fit. Cost of install is £6000 – 8000 depending what it's replacing and can save up £300 pa on annual bills in the right place
Need homes to be sufficiently insulated, so insulation is upgraded where necessary in retrofits. Need very careful installation and there has been evidence of naive installs elsewhere (see separate TCHG standards sheet including dealing with condensate and lagging spec) Low maintenance, long lifespan if cared for correctly.
It does require resident understanding to leave it running to get best results. It's not good or efficient if switched on and off all the time. Can work with pre- pay meters although less efficient if turned off too often. Using showers not baths helps. Careful thought needed for easy controls and where to site kit. The external unit does make some noise (much like a large fridge) and MCS calculations are needed to prove it won't cause a nuisance to residents and neighbours if situated in a certain position (otherwise planning permission req'd). The box must not be obstructed and is quite large. Internal pipework easy need boxing. Sometimes cages are used for protection of the external box.

Current stock
26 units on older properties in off gas rural areas. Cost £115,458.74, Income - £56,760 grant from DECC. We also have 18 external heat pump units on recent new build properties.