If you think the solar thermal industry is all clean and green, please think again.

We assert that this state funded copyright document is legally republished, with annotations under "fair copy / right of reply" rights, by Solar Twin Ltd, February 2012. You can distinguish our comments from those of the EST because the EST's are left-justified and ours are centre-justified. It is with regret that we have resorted, again to this approach, but we have tried and failed over the last 5 months to get a fairer copy published. Hence this annotated copy.

Question: when is an old "sustainable technology" not really worth buying?

When it pollutes during operation - but you are not told about it?
When it is maybe a safety risk - and you are not told about it?
When its proponents try to squash greener safer innovations?

Enjoy reading this massively costly report.
(And our annotations.)

The Energy Saving Trust would like to thank our partners, who have made this field trial possible:

Government organisations
The Department of Energy and Climate Change
The North West Regional Development Agency
The Scottish Government
The Welsh Government
Sustainable Energy Authority Ireland

Manufacturers
Worcester Bosch

Energy suppliers
British Gas
EDF Energy
E.ON
Firmus Energy
Good Energy
Scottish & Southern Energy PLC
ScottishPower Energy Retail Ltd

Technical consultants
EA Technology Ltd
Energy Monitoring Company
GASTEC at CRE Ltd
Southampton University
The National Energy Foundation

Energy Saving Trust project team
Jaryn Bradford, project director
Frances Bean, project manager
with Tom Chapman and Tom Byrne

Interesting that Worcester Bosch used to conceal (ie calculate on a performance simulator as zero) the carbon and energy impact of the mains pumps used in their solar water heating systems. We ended up taking them to ASA to get this concealment sorted.

Also interesting that Worcester Bosch are the only sponsor of this report. Were other solar suppliers asked? What level of editorial control, if any, have they been given? Worcester Bosch hold the Vice Chair of the UK's Solar Trade Association.

Also interesting that electricity suppliers support the document.

We presume that the 6 figure budget required for this project was supplied by the top three groups of "partners".

Spin and unjustified market-shaping. It contains some subtle but important greenwash. It claims to be impartial, yet it is sponsored by Worcester Bosch, who hold the Vice Chairmanship of the Solar Trade Asssociation which has massive vested interests in concealment:

Concealment. NOT disclosing to the public the NET energy benefit of solar, which would be a more honest way to, for example, compare systems. Instead the report gave figures for the GROSS thermal benefit. But in mains pumped systems it would surely make sense to deduct the pump power. But not to the EST.

(Consequently solar heating consumers will mistakenly make buying decisions based on gross energy rather than net energy, which is a more sensible thing to so. This concealment disadvantages PV pumped suppliers.)

Contents

Concealment.

This repor does NOT disclose to the public the extent that their mains pumped solar water heating systsms all pollute CO2 during their operation. We suspect that in most of their installations, at least 10% of their carbon benefits are negated at the power station chimney. Surely pollution associated with using environmental technology should be discussed? There are numerous illustrations of solar water heating panels, but not even one of them is PV pumped, even though we offered photos to EST.

(Consequently solar heating consumers are not made properly aware of significant operational pollution impacts when they make buying decisions about this supposedly environmental technology, solar heating. They need to be told clearly how to eliminate these impacts by using PV pumping. Nor will they know what PV pumped solar thermal even looks like. Most have a small PV panel attached. They are easy to spot. Unlike some of the tricks contained in this partly-state-funded document.

Foreword

Boosting consumer confidence in green technologies is vital in driving the uptake of renewables in the UK. The UK lags behind its European neighbours, with just 1.3 per cent of energy generated from renewables compared with 8.5 per cent across Europe[1 2]. In order to meet the EU-wide target of 20 per cent by 2020 we need a step change in customer uptake of small-scale renewables, including solar water heating systems. According to a recent report, solar water heating could provide up to 6.3 per cent[3] of this EU-wide target, placing it as an important technology for the future.

The introduction of the Renewable Heat Premium Payment Scheme, Renewable Heat Incentive, the Feed-In Tariff and the Scottish loan scheme are important steps in helping to bridge the gap. Just as important will be ensuring that consumers can access in-depth advice and support founded on robust evidence. Yet for many renewable technologies there is little or no evidence to demonstrate the real-life performance of working systems. The Energy Saving Trust's trials of in-situ technologies have shown that understanding what works well, and what doesn't, is critical to building consumer confidence in low-carbon technologies. In some cases, it has even proven to be a driver for industry, creating a virtuous circle of understanding, trust and growth.

In this current study, we trialled solar water heating systems to provide evidence on how actual systems perform in real homes in the UK and the Republic of Ireland. This field trial, developed in 2008, follows our report on our field trial of domestic small-scale wind turbines, *Location, location, location*, and last year's report on our trial of domestic heat pumps, *Getting warmer*.

In line with the Energy Saving Trust's previous field trials, these results have been peer-reviewed by experts in the industry.

The Energy Saving Trust is committed to providing impartial and realistic advice to industry and to consumers, helping people to save energy and reduce carbon emissions. One of the key ways we do this is by providing expert insight and knowledge into low carbon/renewable energy technologies. Our activity in this area includes policy research, technical testing, and consumer advice.

The results of the trial have been integrated into our consumer advice network, continuing our role as impartial advisors in the field.

Overclaiming. The Energy Saving Trust say that it is "committed to providing impartial and realistic advice to industry and to consumers, helping people to save energy and reduce carbon emissions." In the context of reducing carbon emissions as far as it can, why does it not state in the report, the percentage carbon clawback of old solar? EST have the data, but they sat on it.

(Consequently solar heating consumers will mistakenly make buying decisions based on the tosh referred to above which is validated by the EST badge. This means consumers may get a raw deal.)

1 http://ec.europa.eu/energy/publications/doc/2011_renewable_difference_en.pdf

2 In Scotland 2.8 per cent of heat demand is currently met by renewables (http://www.energysavingtrust.org.uk/Media/scotland_redesign/PDF-s/Renewable-Heat-in-Scotland)

3 http://www.rhc-platform.org/cms/fileadmin/Documents/RHC_BROCHURE_140311_web.pdf

Executive summary

This study provides results from the largest independent trial of solar water heating systems so far carried out in the UK and the Republic of Ireland.

Its findings provide a valuable source of information about the real-life performance of solar water heating technology. This is important because the introduction of the Renewable Heat Incentive is likely to steer a wider variety of consumers to solar water heating installations.

The results of this study will help to inform policymakers as well as homeowners who are considering installing solar water heating technology.

The % of carbon saved (eg mains gas) compared to that emailled at the power station to power the pumps was NOT reported, despite th edate being available from the report.

This important but ignored parameter of a system's sustainability is called carbon coefficient of performance or carbon clawback.

Past reports suggest this is 17% for flat plate collectors and 23% for evacuated tubes.

It would have been interesting to see if performance had improved at all.

The report is intended not as a detailed technical analysis or a side-by-side comparison of different solar water heating systems, but as an accessible overview of how solar water heating technology performs and the potential for savings on carbon and energy bills. The report is based on detailed work that has been conducted behind the scenes to collect monitoring data, understand customer perceptions of the technology and conduct detailed analysis of the results.

The findings are listed under the following headings:

- System performance
- System set-up and design
- Householders' behaviour and perceptions
- Economics
- Carbon impacts in use

These findings will help the Energy Saving Trust to provide detailed advice to policymakers, the industry and customers about the actual performance of solar water heating technology.

Summary of key findings

1. Solar water heating systems have the potential to work well in the UK and the Republic of Ireland when installed properly and controlled adequately by the user.

2. From the properties we trialled, well-installed and properly used systems provided around 60 per cent of a household's hot water. The trial also found examples where systems were not properly configured or used, and where the contribution from solar was as low as 9 per cent. The median across all systems was 39 per cent.

3. Householders in the trial were happy with their solar water heating systems: 84 per cent were "satisfied" with their system, and over 50 per cent were "very satisfied".

4. In the field trial, there was little difference between the total solar energy yield of those installations that used flat-plate solar collectors and those that used evacuated-tube solar collectors.

But no data given on the parasitic carbon emisisons from power stations even though this would have been available.
Greenwash?

The background

In 2010, the United Kingdom's solar water heating market for both small and large-scale installations grew by 18.1 per cent, to 73,640 kWth of installed capacity[6]. This is perhaps surprising given a 13.1 per cent decrease across the rest of Europe. An uncertain economic outlook, high fuel prices, and the proposed introduction of a Renewable Heat Incentive seem likely reasons for continued growth in the UK.

With any technology, the performance of products and installed systems can vary significantly. Advice can be inconsistent, which is often confusing to consumers. The Energy Saving Trust and its partners are committed to clarifying customer confusion by providing trusted advice and guidance to anyone who is considering investing in low-carbon technology.

The latest in a series of technology field tests, this trial of solar water heating installations provides insight on the in-situ performance of solar water heating systems in real homes. The trial was launched in 2008, and the Energy Saving Trust has worked with industry partners to carry out comprehensive trials, including technical monitoring of the technology, and speaking to those who had the systems installed, to gather feedback.

The resulting data[7] and analysis provides insight on solar water heating system installation and performance, consumers' interaction with their solar water heating systems, and consumers' attitudes towards their solar water heating systems. This insight feeds into advice for consumers, installers, manufacturers and the government.

By using the latest monitoring techniques, the trial collected live data over a full calendar year from solar water heating systems across the UK and the Republic of Ireland. Researchers also questioned occupants (all householders were sent online questionnaires, and eighteen in-depth interviews were carried out) to understand how systems have performed and to gather feedback about their experiences using the technology. Experts in the field have carried out detailed analysis. The headline results are shown in this report.

6 http://www.estif.org/fileadmin/estif/content/market_data/downloads/2010%20European%20Solar%20Thermal%20Markets.pdf

7 123,931,181 data points were collected from the 88 sites over a 12-month period.

The field trial

By trialling low-carbon technology, we can gain an insight into the actual performance and carbon savings of systems being used by real-life households. This information can help manufacturers, retailers, installers and others to understand how customers use new and innovative technologies, and to identify the potential future uptake of these technologies.

In delivering this latest trial we aimed to understand:

- The actual measured in-situ performance of solar water heating systems
- Customer behaviour and perceptions of the technology
- Potential for carbon savings
- Factors that affect the performance of solar water heating systems, including:
    - User behaviour
    - Installation practices

Concealment. NOT using the word Legionella regarding the safety of stored water in solar water heating systems. The report delivers this cover-up. This matter is so important that I have had a “you are on your own, Barry” phone call from Neil Scofield, Worcester Bosch’s Head of Sustainability following me raising the Legionella safety issue with Which/ Magazine and the solar water heating industry’s successful pulling of their article on the subject of solar and legionella in 2010.

(Consequently consumers, by being kept in the dark on what to even ask suppliers about when it comes to legionella safety, will make bad buying decisions: choosing higher risk solar thermal systems over those which intrinsically have less. This concealment disadvantages suppliers who are more proactive.)

Is figure 1 a poor choice of plumbing? There is an area of potential legionella risk is outlined in grey in the diagram. If EST are about promoting best practivce, why did they not (a) add a shunt pump (b) show a heat to base system (c) show a thermal store. These are all rather safer installations.

Why promote twin coil cylinders? As shown they may impose avoidable Legionella risks on consumers (who are not asked to consent).

From how many
of these 88
sites were the
data actually
used?

We think not.

The electrical energy used to operate the pump and
control system WAS measured, But the energy and carbon parasitics
were NOT reported. Is this a cover-up?

Yet again, a potential Legionella risk area outlined in grey.

Figure 8. Two solar water heating systems showing good (left) and poor (right) levels of insulation

While installing the monitoring equipment at some sites, we discovered a number of problems, including:

- Malfunctioning air vents on the solar collectors
- Glycol leaks from solar collector circuits
- Inadequate or absent insulation (shown in Figure 8)
- Pump flow rates set too high

Many of these issues should now be addressed by the Microgeneration Certification Scheme (MCS), which did not exist when these systems were installed. However, we believe that a thorough review of industry guidelines and standards should be undertaken to ensure that these issues are fully addressed. Most of the installers of these sites were registered with Clear Skies (a predecessor to MCS) – an indication that early standards were not sufficiently robust.

So why did EST not declare the operational CO2 emissions at all?

Householder feedback

In addition to the technical monitoring, we also undertook research with the householders at our trial sites, collecting data on their behaviour and satisfaction levels. As well as providing insight into the impact of their behaviour on system performance, this has helped to inform the advice we should provide to customers.

All householders in the trial were sent questionnaires on how they use their hot water, and on their experience and satisfaction with their solar water heating system. We also conducted eighteen face-to-face interviews to gain a deeper insight into householders' experiences.

The majority of the householders (95 per cent) stated in the questionnaires that they found their systems either very easy or fairly easy to operate. None of the householders found their system 'not at all easy' to operate. Most householders received some form of advice from their installer about their system (in terms of the effects of shading, roof orientation, and/or integration with their existing heating system type). However, only 36 per cent of the householders stated that their installer gave them information on how they might make best use of their solar water heating system. Of this advice, most related to advice on modifying the time of day they use hot water (have showers, baths or use appliances), and only a quarter to advice on hot water system settings and integration.

The householders, when interviewed, felt that the advice and information they received by installers was generally good or excellent. Reasons for it being deemed inadequate were due to potential confusion on the part of the installer due to complex/unfamiliar property type or the level of information being too basic.

Overall, householders showed a high level of satisfaction: 84 per cent were either fairly or very satisfied with their system, and over half of them were very satisfied. The main reasons for overall satisfaction were reducing CO_2 emissions, savings on energy bills, and system operation and performance. The main reasons for dissatisfaction were system operation and performance and product quality and performance. The analysis of customer responses with the monitored system performance data reveals that satisfaction is not strongly related to the actual contribution solar water heating systems make towards household hot water needs.

"Dedicated solar volume" is referred to by some more progressive solar installers as a "dedicated Legionella volume". Did the EST's "experts" explain this to them?

Our observation is that adding insulation at the cost of £10 to a hot water cylinder can have the same energy benefit as adding a solar water heating system.

Insulate BEFORE you generate...

Above point about timing of backup heating is welcome. Best to put it on in the evening as the sun goes down.

installed, includes a requirement for the installer of a solar water heating system to:
"Ensure that all pipes are lagged / insulated to protect against burns and unnecessary heat loss." [10]

Given that a lack of insulation was also observed with other types of hot-water systems, it is important that any work on heating systems includes a check of pipe and cylinder insulation. The Energy Saving Trust estimates that by installing a 75mm thick hot-water-cylinder jacket on a standard cylinder you will save around £40 per year; and adding insulation to pipes will save £15 per year (for a typical gas-fired water heating system).

Hot water temperature

Some households with solar water heating systems that provided the best results often allowed the hot water temperature to vary; nor did they require high temperatures at all times. This meant that less back-up heating was required to meet high temperatures when the solar collector could not provide sufficient energy, and it also reduced heat loss.

It is important to ensure that the hot water cylinder reaches high temperatures at times to undertake a pasteurisation cycle. Doing this after the solar water heating system has heated up the water as much as possible will reduce the amount of energy required by the back-up heater to reach high temperatures. This will improve performance.

Shockingly poor wording. It should say:

It is important to ensure that the hot water cylinder reaches 60C for an hour, typically daily to minimise legionella risk. The cylinder should be heated to the BASE, not part-way down only (as is currently done with many twin could cylinders).

The original text looks like a deliberate fudge.

10 MCS Installer Standard 3001 http://www.microgenerationcertification.org/admin/documents/MIS%203001%20Issue%202.0%20Solar%20Heating%2010.08.26.pdf

Other impacts on savings:

Pumps and controllers

All systems in the trial used an electric pump to circulate the solar heat-transfer fluid to and from the solar collector. Some systems used a small solar PV panel to run the pump, but the majority used mains electricity to run the pump and controller.

Where mains electricity was used, generally only a small amount of energy was used in comparison to the total heat energy provided by the system (the median was about 5 per cent and 55kWh per year in total).

However, there were a small number of sites that used a high amount of electricity (up to 180kWh per year in total). Investigation of the monitoring data has shown that the excessive electricity consumption was due to faults causing pumps to run at times when there is no solar energy. This can have a significant impact on the savings associated with installing a solar water heating system and could increase the cost of running the pumps and controllers from about £8 for a typical system to £26 per year.

One can extrapolate the operational carbon clawback from the above.

In a typical gas-displaced UK home, these parasitics of 5% of energy probably equates to around 10-20% of the carbon savings, depending on the "carbon intensity" of the electricity of the daytime (generallyt high carbon) electricity which is used to power the pump.

But why did EST not state the carbon clawback? There is so much flannel elswhere in the report. (There is even blank space available right here on this page!)

Key findings

Our analysis of performance data from 88 solar water heating sites gives the clearest picture we have had of how solar water heating systems perform in real life, when installed in homes across the UK and the Republic of Ireland. In addition to the monitoring equipment, we asked householders at trial sites about their experience of using their system, to improve our understanding of how customer behaviour affects system performance.

Overall, the results illustrate that solar water heating systems, if installed and used correctly, can perform well.

Myth consolidation. It is interesting to know that well-installed and properly used solar water heating systems provided around 60 per cent of a household's hot water and that the median figure was 39%. However how useful is this "solar fraction" figure really? It's a bit of a red herring. You can boost the figure to 100% simply by having no backup heating at all and putting up with cold showers on gloomy days (and elevated Legionella risks). Funnyfunny that solar fraction was reported without this explanation while % operational carbon clawback was not.

(So UK's unfortunate solar thermal consumers will mistakenly believe that solar fraction is important, when it is not really that important at all.)

The following section outlines the field trial's key findings along with our headline recommendations.

System performance

1. From the properties we trialled, well-installed and properly used systems could provide around 60 per cent of a household's hot water and produce around 1,500kWh of energy a year.

2. The trial also found examples where systems were not properly configured or used properly, and therefore these systems had significantly reduced benefits. Across the whole trial, the proportion of domestic hot water energy provided by solar power ranged between 9 per cent and 98 per cent (with a median of 39 per cent).

Interesting wide range.

3. There was no difference in the annual solar energy yield observed between solar installations using flat-plate solar collectors and those using evacuated-tube solar collectors. This may be because although evacuated-tube collectors have higher insulation, flat-plate solar collectors generally have a larger working area as a proportion of the collector size.

System set-up and usage

4. The way a solar water heating system is installed, set up and used strongly influences how well it works. The factors that impact performance include:

   - Volume of hot water used. Generally, houses with high occupancy can expect more from their solar water heating system.
   - Timing of back-up heating and hot water use. Systems provided more energy when the back-up heating was used just before the main hot water use or at the end of the day. This provides a better opportunity for the solar collector to heat the water rather than using the back-up.
   - Temperature settings. High temperature settings for hot water require significant back-up heating and increase standing losses from the cylinder.
   - Level of insulation. Poor insulation of hot-water storage cylinders and pipes contributed significantly to heat loss and low performance. This is a common issue with all water-heating systems (not just solar water heating systems).

5. Where mains electricity was used to power pumps and controllers, the amount of electricity used was generally small compared with the overall heat delivered. However, the amount ranged from 1–23 per cent (10kWh to 180kWh per year in total), showing that in some cases a large amount of electricity was used. The high figures were due to faults causing pumps to run at times when there is no solar energy. This could increase running costs from about £8 for a typical system to £26.

Householders' behaviour and perceptions

6. The way in which householders use their system and their controls is crucial, so comprehensive and easy-to-understand advice for users on how to control solar water heating systems could improve the way in which the systems are used and how they perform overall. The level of advice provided to householders in the trial varied greatly.

7. 84 per cent of householders in the trial were either "fairly satisfied" or "very satisfied" with their system, with over 50 per cent very satisfied. So, overall, householders were happy with their systems.

Economics

8. Solar water heating systems can achieve savings on bills. Properly installed/controlled systems can save from £30 to over £100 per year, but poorly installed/controlled systems could actually increase fuel costs. The savings depend on the type of system and fuel the solar water heating system has replaced and vary from user to user. The typical savings are £55/year when replacing gas and £80/year when replacing electric immersion heating. However, the Renewable Heat Incentive (see text box on page 23) may increase this saving.

Concealment. NOT debating properly and disclosing to the public the very real maintenance costs associated with solar water heating. Water hardness control, valve, pump and antifreeze replacement cycles were not even mentioned in this report, which is supposed to help consumers. There is an industry wall of silence on this important issue of maintenance costs.

(Consequently consumers, by being kept in the dark on what to even ask suppliers about, will make bad buying decisions: choosing high maintenance solar thermal systems over those which require less.)

Carbon savings

9. A solar water heating system is likely to provide carbon savings, depending on the heating system being replaced. Properly installed/controlled systems can save 50 to 500 kilogrammes of CO_2 per year, but poorly installed/controlled systems could lead to an increase in overall household emissions. The typical savings are 230kg/year when replacing gas and 510kg/year when replacing electric immersion heating. This is the roughly the same carbon saving you would get from draught-proofing round all the doors, windows and skirting boards in a gas heated or electrically heated home.

Omission.

No statement of operational carbon clawback.

Further lack of vision.

The report could have called for Life Cycle Analysis, which would have forced suppliers to publish "years to carbon and energy breakeven" data. Sadly it did not. Ours breaks even on energy in 2 years.

(Publishing LCA would allow consumers to choose greener products, such as PV pumped, or retrofits, or both.)

Conclusions

Our analysis of performance data from 88 in-situ solar water heating systems has shown how solar water heating systems can perform in real-life conditions when installed in homes across the UK and the Republic of Ireland.

Overall, the results are positive, and they illustrate that if the system is designed, installed and used correctly, solar water heating systems can be an efficient way of providing domestic hot water. Customer behaviour can also make a significant difference to how effectively the generated heat is used. A number of systems, which demonstrated lower levels of performance than anticipated, did not fulfil these criteria.

We found that set-up and installation can significantly hamper the performance of solar water heating systems. In particular, systems should be designed to provide adequate storage, and they should have sufficient insulation and suitable pump settings. This will prevent unnecessary heat loss, ensure that the heat generated is stored effectively and reduce unnecessary electricity consumption. In general, as the demand for hot water and the supply of hot water by the solar water heating system tend to occur at different times of day, effective hot-water storage is the key to making the most of the heat generated.

The way in which people use the energy produced by their solar water heating system plays an equally important part in its overall performance. Simple and clear advice from installers is important to ensure the householders' understanding of the effective use of controls and the optimum heating pattern (especially around timing of hot water use and back-up heating). It is clear that customers can make cost savings and reduce their carbon emissions; and that they can do simple things to maximise both of these.

The findings from this trial will be of importance to those who provide, sell and install solar water heating systems, and also to consumers, and those who advise them. The Energy Saving Trust's advice on solar water heating has been updated to ensure that consumers have access to the latest information, and we will also incorporate this into the work we do through our advice network.

Advice for consumers

The Energy Saving Trust provides support through our trained advisers, websites and consumer guides, to help you decide whether investing in solar water heating system is the right choice for you, and how to get the most out of your system.

To help you to get started, the Energy Saving Trust has compiled a simple consumer checklist. However, more detailed advice can be found in the Energy Saving Trust's buyers' guide on solar water heating systems, available at www.energysavingtrust.org.uk/Publications2/Generate-your-own-energy/A-buyer-s-guide-to-solar-water-heating.

When considering a solar hot water system, it is essential that you first consider what energy-efficiency measures can be implemented, such as draught proofing, loft and cavity wall insulation. These simple measures will provide long-term financial and carbon savings, as well as improving the overall thermal comfort of your property.

Consumer checklist:

When you are considering installing a system you should:

- Consider **roof orientation and any potential shading issues**. Unobstructed south-east to south-west facing roofs are ideal, although systems facing east and west still provide a significant benefit. Shading from objects such as trees, chimney stacks and other buildings will reduce the performance of your solar water heating system. It is not recommended to install a system on a north-east, north or north-west facing roof. An MCS certified installer will be able to advise you on this.

- Consider your **existing heating system**. Solar water heating systems are designed to be compatible with most existing heating systems. However, not all combination boilers will work effectively with a solar water heating system. If you do have a combination boiler, a Gas Safe installer, OFTEC installer or MCS certificated installer should be able to advise you on any compatibility issues.

- Check **building control and planning regulations** in your area. An MCS certificated installer can advise further. If you are in doubt check with your local authority.

- Consider how much you spend on your **current fuel source**. If you switch to a new solar water heating system, then the amount of money and carbon you save will depend on how much you are spending now.

- Consider **how you currently heat your hot water**. If you rely heavily on appliances that heat water at the point of entry (for example, electric showers), you may not be taking full advantage of the hot water generated through your solar collectors. Again, your installer should be able to advise you on how to get the most out of your system.

Wrong: not if you are retrofitting solar!

- Consider **availability of space**. You need room for a suitably sized hot-water cylinder, and sufficient space – normally on the roof – to fit the collector. Roof space: typical hot water panels vary in size from around two to four square metres, although some systems may be even larger depending on hot water demand. Again, an MCS certificated installer should be able to advise you on this.

- Select a **Microgeneration Certification Scheme** (MCS) certificated installer, who uses **MCS** or **Solar Keymark** accredited products. This will ensure that your installation satisfies the necessary Government backed and industry approved installation standards. The Energy Saving Trust can help you find an MCS approved installer by calling 0800 512 012, or by visiting www.energysavingtrust.org.uk in order to obtain a minimum of **3 quotes** from certificated installers.

What to expect from your installer:

- All MCS installers should be able to provide a detailed breakdown of the specification and costs of their proposed system. They should:
  - Complete a technical survey.
  - Explain how they calculated the size of the system to be appropriate for your hot water usage.
  - Provide an estimate of how much heat will be produced by any proposed system.
  - Supply clear, easy-to-understand and detailed information and advice on how best to use the system and operating instructions.

What's next?

What to expect from your solar water heating system:

- On average, you should expect a solar water heating system to provide roughly **half of your hot water** requirements across the year, with highest output in the summer months.
- The **financial payback** of the system will depend on many things including:

No mention of replacement pumps or antifreeze.

  - What fuel is being displaced
  - How much hot water is used in the home and when it is used
  - How much the system cost to install

Properly installed/controlled systems can save from £30 to over £100 per year, but poorly installed/controlled systems could actually increase fuel bills. Typical savings are £55/year when replacing gas and £80/year when replacing electric immersion heating.

As fuel prices increase so will the savings earned from using a solar water heating system. By generating your own clean energy, you will be future-proofing your energy supply.

The Renewable Heat Premium Payment Scheme (RHPP) will reduce the initial installation cost of a solar water heating system by £300. However, the RHPP runs only until 31st March 2012 or when the funds run out, whichever is sooner. More information is given on p.22. The UK government intends to introduce a domestic element to the Renewable Heat Incentive (RHI), which is currently available for industrial, commercial and public sectors. Details of how the RHI will apply to RHPP participants will be published alongside details of the Government's 'Green Deal'.

Data gaps. There is no helpful data for users of solar heating where costly fuels such as oil or coal or biomass are "displaced" by the sun. People who live off the gas grid will be disappointed at this omission of both the potential money savings and the likely carbon savings potential of solar thermal.

This solar water heating field trial of real-life, in-situ performance shows that the efficiency of solar water heating systems is strongly affected by how they are controlled and used. Additional research into the impact of installing controls and/or smart home energy management and educating householders on system performance would provide a greater understanding of their potential performance within real homes.

A review of standards and guidance, including British Standards, MCS and the Energy Saving Trust's Solar thermal guidance for installers (CE131) guide, is also critical to ensure that installations are meeting best practice requirements. This review should consider whether advice to householders should be included within the handover requirement and strengthen existing requirements for insulation and controls.

Conclusion. Here comes the sun. But draw some strategic clouds over it please…

In all, this report is another crummy solar thermal industry fudge.

Transparency, consumers, safety and the environment play second fiddle to the imperatives of zebigboyz.

11 Part L of UK building regulations requires that all pipes leaving a hot water cylinder should be insulated.

If you think the solar thermal industry is all clean and green, please think again.

Yes, much of is great. But not all of it.

Take a look at three of the hard-hitting stooges who are credited by EST (below right):

1/ Dr Chris Laughton FIDHEE: Ex-Chairman of the Solar Trade Association, ordered Solar Twin Ltd NOT to republish, brand by brand, a UK government funded report which showed that the typical operational carbon clawback was 17% for flat plate solar panels and 23% for evacuated tubes such as Thermomax, a brand which he promoted at the time. We tried to assert our supposed rights to republish but despite us compromising (by publishing generic average data) as revenge we were fined £1000 by the STA board aspunishment for seeking outside advice on how to hande their coercion. Dr Laughton later wrote a market limiting solar technical document CE 131 for EST (referred to on the previous page) which, bizarrely, defined old solar as best practice: a sure way to stuff innovation. EST had his docment independently reviewed, at our request, found it to be flawed, promised to update it, but failed to do so. Dr Laughton has left the STA and is now Chair of the BSI solar thermal technical committee, where he has further hindered innovation.

2/ David Matthews: Ex-Chief Executive of the Solar Trade Association, wrote: "The legionella issue is best left alone... as any mention of legionella and solar brings customer concerns out that are unjustified. .... any mention of legionella will reduce total sales... I do not want to see any mention of safety issues raising any unnecessary concerns with customers... just be very careful... Any mention of potentially negative perceptions that are unjustified such as electrical safety or legionella that is just not happening and I will take action." Subsequently exclusionary action, against our company, our business plan, our people and our product took place. David Matthews has left the STA and as a fee paid consultant he now sits on three Microgeneration Certification Scheme Technical Committees.

3/ Stuart Elmes: Technical Chair Of the Solar Trade Association, threw us off his STA solar thermal technical committee for expressing concerns about the potential market-limiting content of THIS very document to EST. Soon after the STA later threw us out of the whole organisation for supposedly bringing it into disrepute, after we tried and failed to get its AGM to introduce some clean-up motions on matters of market access for innovation. STA promised us an appeal but (4 months later) has still failed to provide an apppeal process, during which time without a trace of irony, its leadership has repeatedly condemned the government for failure of process regarding a solar consultation.

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Footnote. UK's solar innovators are apparently meant to be grateful for the appearance of this eviscerated market limiting junk. Ha! This report was supposed to be our funeral song. Old solar Stooges such as The Solar Trade Association's Top Technical Writer, Stuart Elmes, who gets the first named credit in the report, could easily have abused their position of trust, as past solar stooges have tended to do, to insert killer clauses against innovations, such as ours. I wonder why he did not get to spike our business this time? Sue us, Sleazy Stuart Elmes: you KNOW that what I write is true! RESIGN.

Prepared by the Energy Saving Trust
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