

Bonfield Review

Independent review of consumer advice, protection, standards and enforcement for UK home energy efficiency and renewable energy measures

**Written submission on behalf of the National Energy Foundation
December 2015**

The National Energy Foundation

[The National Energy Foundation](#) is an independent, national charity, and has been at the forefront of improving the use of energy in buildings since 1988. We aim to give people, organisations and government the knowledge, support and inspiration they need to understand and improve the use of energy in buildings.

We do this through:

- Delivering practical projects – using our experience and technical expertise.
- Inspiring action – providing building owners and occupiers with the encouragement, advice and real-life examples to achieve better performing buildings.
- Advancing knowledge - supporting collaboration to drive forward the frontiers of knowledge, innovation and practice.
- Identifying and addressing market failures using evidence, analysis and ideas.

The Foundation's work

Over the last 25 years, the Foundation has worked with installers and occupants of all types of dwellings, ranging from new-build to historic properties, and with all forms of tenure.

Most recently, we have worked on:

- The Green Deal Communities project with several local authorities.
- Affordable Warmth networks.
- Bicester Green Deal.
- Retrofit for the Future programme.
- Green Deal Providers Group.
- Building Performance Evaluation programme.

The Foundation also:

- Operates the online [YouGen advice service](#) on renewable energy.
- Operates the [SuperHomes network](#) of 200+ eco-friendly refurbished homes.
- Provides secretariat support for [Energiesprong UK](#).

The overarching issue

The UK Climate Change Act established a target to reduce CO₂ emissions by at least 80% from 1990 levels by 2050. There are around 25 million homes in the UK and 80% of those that will be standing in 2050 have already been built.

As domestic buildings are one of the major contributors to UK emissions and they consume 27% of all the country's energy, millions of existing homes will have to be made more energy-efficient, if the UK is to meet its reduction targets. The overarching question is how to achieve this.

Our position

The National Energy Foundation believes that future Government policy around energy efficiency and renewable energy is a fundamental driver in helping the UK to:

- Reduce its carbon emissions.
- Alleviate fuel poverty.
- Improve the nation's health and support the health service.

Underlying the overarching issue is a series of smaller problems. These are well-known to the industry and some of them (along with existing solutions) are covered below and in Appendices 1 - 10.

Different sectors of the market place must be treated differently. There is no one-size fits all solution and customers' needs/desires must be considered to be of paramount importance. Much previous policy has focussed on what we believe is best for a property or for a householder; this has led to inappropriate solutions being installed, with some solutions or customer segments being prioritised due to the availability of funding streams.

We firmly believe that:

- **Government policy and services provided to householders should be secure, certain and have an element of longevity. Constant change and the 'flip-flopping' of policies makes for an insecure, uncertain and overly complex landscape, with damaging consequences to the sector.**
- **The market should be locally-based.**
- **The supply chain and the market generally should be improved – for example, through better training in understanding energy and buildings, and on how to deliver energy performance improvements efficiently and cost-effectively.**

We also believe that there are already existing solutions to many of the underlying issues and we propose the following:

1. **Future policy needs to build on existing good practice.**
2. **Raising awareness among householders about the opportunities available for improving the energy efficiency of their properties when undertaking other home improvements must be the starting point, with advice, guidance and handholding following close behind.**
3. **Policy must help householders to help themselves.**
4. **Local installers, often SME or micro businesses, should be the basis of the private energy efficiency market.**
5. **Policy must be focussed on measureable outcomes rather than listed inputs.**
6. **Works must be monitored for compliance, satisfaction and results.**
7. **Data, which is already available, needs to be more accessible and used more effectively.**
8. **Social housing can be a major catalyst to achieving success, but we mustn't overlook those householders who are already interested in energy efficiency or renewables.**

1. Build on existing good practice

Householders undertake refurbishments for a whole host of reasons – environmental, financial, comfort, etc. However, many neither know nor understand the energy improvement options available to them. Furthermore, once they are aware of the options, they often have trouble deciding which is the most suitable for them. There is, however, a lot of existing good practice, in the form of innovative pilot projects and tried and trusted methods, products or systems. In order to help householders to make choices for their own homes, householders need to be more aware of these successes and have access to their results and benefits.

Existing projects and good practices should be encouraged and expanded (where possible) so that we not only learn from them but grow slowly and organically rather than developing a different version of an existing or previous project and hoping that it will work.

There is a significant number of private householders who are inspired to undertake refurbishments largely because of environmental reasons. These people are generally more focused and determined in what they need to do, and they are more resourceful than the average householder. Their needs should not be overlooked and should be catered for. These people, in particular, would benefit from wider availability of knowledge and learning from previous successful projects.

Whilst a national campaign might raise awareness of issues and solutions, it might also generate demand for advice where provision is currently limited. However, there are existing projects such as SuperHomes (see Appendix 2) and YouGen (see Appendix 3) which currently raise awareness, provide information on the options available and go on to provide guidance to householders.

2. Awareness-raising and providing advice and guidance

[SuperHomes](#) raises awareness, offers information via a multi-award-winning website and provides advice and guidance by:

- Email.
- Question and answer sessions.
- Direct contact with a householder who has already installed the relevant measure.

[YouGen](#) provides a comprehensive website on renewable energy and energy efficiency, which includes:

- Information pages.
- Advice and guidance through blogs written by experts and contributors with personal experience.
- A database of recommended installers.
- Access to a telephone and email helpdesk.

Clearly, there are other information and advice services, but what is important to the customer is that they are independent and unbiased. They should not be linked to specific products, manufacturers or funding schemes, otherwise the consumer's perception of the advice they provide is that it's not truly independent and not relevant specifically to them.

Once householders have the necessary information and advice to enable them to make an informed decision, they usually require some handholding to guide them through the process. This is particularly true of the more invasive measures such as solid wall insulation. Our experience with many projects, most recently a DECC-funded Green Deal Communities project, has endorsed this view. An average householder does not understand any of the technical aspects of the installation; indeed they often prefer not to and to trust their installer to do the right thing and to do it well. In our experience in the role of Project Manager, we have seen many instances where installations have not been done well.

[WHISCERS](#) (see Appendix 1) is an effective and successful internal wall insulation system. It's a proven technology which makes it easier, faster and cheaper to install internal solid wall insulation, whilst removing many of the existing barriers. This can be offered as an effective solution for Internal solid wall insulation.

There has already been a suggestion from within government and industry for the role of Retrofit Co-ordinator, and we would certainly endorse the need for this kind of skilled customer assistance.

3. Helping householders to help themselves

Essentially, we know that there are householders already wanting to undertake energy efficient renovations, what they require is support and guidance, as described above. They are already actively seeking help; therefore policy should begin by supporting this group rather than trying to convert the unmotivated.

On the whole, householders lack access to accurate, comprehensive and usable information about the energy performance of their homes. Although Energy Performance Certificates provide this kind of information, they are a paid-for service, are often difficult to understand and involve the intrusion and hassle of having an assessor visit the home. [My Home Energy Planner](#) (see Appendix 4) is a free online tool which provides householders with detailed information about the current and potential energy performance of their homes.

Again, it is crucial that householders are given advice that is relevant to them. If they are only looking for a particular measure, being encouraged to assess their whole home, install other measures or incur additional costs might put them off. Customer service is vitally important here, particularly when experts are agreed that a whole-house approach should be considered.

4. Local installers – skills and training, quality and standards

Local installers (see Appendix 5) are trusted sources of information. Most have built their businesses on accountability and their reputation is crucial to them. They should be encouraged to up-skill and provide good quality workmanship and high standards, as well as being the facilitators for considering and (ideally) ensuring that energy efficiency works are included in every job.

Much has been said on linking energy efficiency measures with trigger points or usual repair, maintenance and improvement works. Local installers are the people to do this. There is much existing good practice here with initiatives that identify installers such as the YouGen installer database, [Trustmark](#) and the various Competent Persons Schemes – all of which help to ensure good quality and high standards. These should be promoted more effectively to consumers and they should be encouraged to use them to source reliable, vetted, recommended and trustworthy installers.

We have been involved in many projects which have focussed on up-skilling local installers, most recently around the Green Deal, and we have found that good installers are busy installers. Therefore, there is often little incentive for them to re-train or take part in networking or knowledge exchange events. Installers must be either incentivised or forced to take part in any kind of up-skilling or re-training initiatives. This carrot and stick approach will work, especially when householders begin to demand the additional services that installers might up-skill and re-train themselves to provide. If installers can see a way of either winning more work or increasing their profit margins then they will be happy to be involved. If, however, they view an initiative as an additional burden in terms of regulation, paperwork, cost or resource efficiency they are, understandably, reticent to participate.

As mentioned above, we support the role of Retrofit Co-ordinator. Working on the ground, local Domestic Energy Assessors or Green Deal Advisers could take on this role but they would need to be:

- Better qualified and more professional.
- Multi-skilled.
- Aware of all the options available.
- Trained in customer service skills, in order to guide the householder through the process.
- Well-informed about the technical aspects of each measure.

Furthermore, they could ensure that the householder is provided with all the relevant guarantees and certificates and they could be responsible for handover and commissioning, thus ensuring that the customer gets the best from their new install.

5. Prioritise outcomes and not inputs

Recent policy initiatives, such as the Green Deal and ECO, have focussed on inputs; how many lofts have been insulated or how many boilers have been installed? Whilst this might lead to a high volume of installs, it doesn't necessarily follow that they have been installed well. The only way to ensure that this happens is to measure the starting position and monitor the outcomes. Previous schemes have also focused on selling the work - at the expense of a proper appreciation of what needs to be done and which measures would be most effective.

The [Energiesprong](#) concept (see Appendix 6) is a revolutionary approach which turns our historical approach on its head. Rather than specifying which measures need to be installed, it focuses on the planned outcome, from the inception of the project. The Energiesprong concept is all about specifying the outcome and not prescribing the input or the measures needed to achieve the desired result.

Another example of this is where measures are installed in the homes of those in fuel poverty or with health conditions. We are currently working with 11 local authorities to provide information, advice and, in some cases, the installation of measures to help those with specific health conditions which would be exacerbated by living in cold or damp homes. Whilst some focus will be put on the number of measures installed, success criteria will mainly be based around outcomes. Metrics will include actual reductions in energy use/energy cost for participants, fewer visits to medical services, and any reduction in excess winter deaths.

6. Compliance and enforcement - measuring and monitoring

Measuring and monitoring brings added cost, but until we reach a position where we know that the vast majority of installations are completed correctly, there is little option. There is an added benefit here in that effective solutions will be prioritised by householders. SuperHomers very often measure the effectiveness of installations by monitoring energy use and they are able to corroborate, or otherwise, manufacturers' effectiveness claims. A householder who has had a demonstrably effective installation is more likely to recommend it to a friend. The cost of this more robust measuring and monitoring might appear too much when compared with the actual cost of some measures but for more comprehensive measures, such as solid wall insulation, this must be considered at the outset.

Again, there is much good practice already in this area. For example, for a number of years, we have been working with community groups who conduct thermal imaging projects (see Appendix 7). Thermal imaging has proved popular with householders and these projects have been used to both raise awareness and to identify problems with their properties. Initially, thermal imaging is used to identify problem areas and where a particular measure might be needed (loft insulation for example). Later, it is used again following installation, to ensure the measure's effectiveness and to check that no new areas of concern have been caused.

Equally, in the area of air tightness, a blower door test can be used both pre- and post- install. To make this process easier and more effective, we have been working with the University of Nottingham

on a simpler, quicker and easier method of measurement, and have recently begun promoting a patented system called Pulse (see Appendix 8).

Post install measurements can be used to highlight problems with the installation itself, while further on-going monitoring is required to highlight issues with the effectiveness of products – for example, whether they are as efficient at retaining heat, etc. Monitoring can also show householders when a technology has ceased to work (such as the failure of a PV inverter) or where their own energy usage has started to climb. We need to reduce the cost of these measuring and monitoring techniques as much as possible, ensure that they are less disruptive to the householder and make them more readily available.

Measuring and monitoring are essential in order to prove compliance (or lack of it). Where works are shown to be non-compliant or faulty, stronger and more robust procedures are required to ensure remedial work is undertaken and to rid the industry of rogue and poorly-performing installers.

As mentioned above, policies which revolve around health outcomes or those which are designed to help to alleviate fuel poverty must be monitored so as to ensure that causal links are proven.

7. Big data

The data from monitoring these installations must be made available to others. It should be freely available so that other organisations, and to an extent householders, can learn from past experience.

One example of this use of data is the NEED database. This is widely utilised in research projects and is often used as a baseline against which other projects can be judged. Please see Appendix 9 for details on our recent work with Suffolk County Council on the establishment of a county-wide housing stock database. This new facility provides the council with the benefits of being able to target energy efficiency and carbon emission reduction campaigns and programmes to specific audiences and types of households – for example, those most affected by fuel poverty.

Other data sets are also available, but they are currently either difficult or expensive to access. For example, EPC information can be accessed on an individual basis by use of the postcode, but this only provides access to the EPC itself and not the underlying data (or XML files). Access to the more detailed information is available on a paid-for basis but the cost is prohibitive for many organisations. Although widespread access to the more detailed data might cause concerns in terms of protecting customers' personal information, it should be possible to make it available in a limited and cheaper way to local authorities, or in an anonymised way to research institutions or NGOs. Additional data sources will continue to be mined by these organisations, such as those which link to excess winter deaths. These statistics and data are crucial in being able to prove the efficacy of projects.

8. Social housing and private residents

Social housing (see Appendix 10) can often be the catalyst to action in the private sector. There are many advantages to trialling measures in the social housing arena; the most important of which is that social housing providers have a vested long-term interest in maintaining the value of their housing stocks. They can also realise economies of scale in retrofit projects, the savings from which can be used to facilitate additional and more robust testing and monitoring. They can then work alongside their chosen installers to revise plans where changes are required.

With the advent of the right to buy, there are now private homes scattered amongst social housing providers' properties. These private owners should be offered measures on an 'at cost+' basis whereby there is no profit in the works, just a facilitation charge. On the basis of this small-scale approach, measures which are shown to be effective can then be rolled out more extensively to the wider private sector.

However, as mentioned above, we also know that there are private householders who are already interested in progressing energy-efficient renovations. Statistics from SuperHomes (see Appendix 2) show that many people are actively looking for help, advice and guidance, and are ready to take the next step. This cohort should not be overlooked.

Conclusion

Fundamentally, NEF believes that there have been some very positive and innovative developments over the past few years in the area of domestic retrofit. We have witnessed increasing enthusiasm from householders across the spectrum to invest in energy efficiency and renewables. What is important now is that future Government policy:

- **Is consistent and stable, and looks to the long term, to restore the retrofit industry's confidence and encourage it to invest again.**
- **Provides a support mechanism for these renovations.**
- **Accepts that different householders have different rationales for renovation, work at different paces and get their advice and guidance from different sources.**
- **Involves subsidies that are planned to ensure longevity, with degression planned and built in from the outset.**

Focuses on the specific and the achievable, and does not attempt to target too many different concerns, such as fuel poverty at the same time as energy reductions. Working towards our carbon reduction commitments will never be an easy challenge, but it is achievable and, along the way, we should be able to generate more jobs, more business for UK companies and healthier and more comfortable homes for our population.

Appendix 1: WHISCERS™

The problem

Solid wall insulation is very disruptive. Although external insulation provides a solution which doesn't involve much disruption within the property, it can take weeks to install and is often prohibitively expensive. It can also be difficult in many buildings because of architectural features, proximity to pavements or on planning grounds. Internal insulation is the obvious solution in these cases, but the mess within the home puts people off and, in many cases, residents have to physically move out whilst the works are undertaken.

The solution

To find an internal wall insulation system that can be fitted quickly and cleanly with the minimum of disruption to the residents.

WHISCERS™ (Whole House In-Situ Carbon and Energy Reduction Solution) is a revolutionary patented process and an ideal way of retrofitting internal wall insulation in hard-to-treat housing. It's a volume solution, which provides a host of benefits over traditional methods.

WHISCERS™ is a three-part process:

1. **Surveying.** A Surveyor visits the property and uses a laser to measure the internal dimensions of the room(s). This process takes between 60 and 90 minutes for a typical three-bedroom house. Sophisticated software then converts the room measurements into the required insulation board sizes, and the resulting digital data is downloaded to a factory-based, off-site cutting machine.
2. **Cutting.** Using special software, the machine cuts the insulation boards to match the walls perfectly and optimises the process to minimise wastage.
3. **Fitting.** The boards are delivered to the site as a kit. Trained, multi-skilled installers deal with any floor coverings and fittings before fitting the boards to the walls and finishing with a plaster skim, leaving the walls ready for decorating.



Not only is WHISCERS™ faster, better and more cost-effective than traditional insulating methods, it's installed with less mess, little noise and minimal disruption. A room can be insulated in under 90 minutes.

The benefits of WHISCERS™

- **Resident convenience.** WHISCERS™ is a quick process that minimises mess, noise and disruption, so residents can remain at home and get on with their lives with minimal inconvenience.
- **No decant.** Installation with the residents in-situ avoids the need to decant, saving thousands of pounds in hotel and relocation costs. It also allows the work to be done without waiting for voids, which is common in Social Housing properties.
- **Speed and accuracy of room surveys.** Laser scanning provides far greater accuracy than traditional methods and the dimensions of a typical externally-facing wall can be collated in 10 minutes.

- **Automated, off-site cutting.** Factory cutting provides a much more accurate and controlled process, avoiding hassle and re-working, as well as reducing mess and costs.
- **Quick fitting.** The boards arrive on site and can generally be fitted in one hour or less per room, resulting in lower installation costs and less occupant disruption.
- **No dangerous equipment on site.** Because cutting does not happen on site there is no need for hazardous tools and as a result, work can take place with the residents in-situ.
- **Good vapour-resistant sealing.** Tests have shown that interstitial condensation is not a problem, and no moisture or other difficulties have occurred in hotter or colder climates.
- **Helps protect landlords' rents.** When used in social housing, we know that tenants who pay less for their energy are more likely to avoid rent arrears.

Results

WHISCERS™ has now been installed in properties in the UK, Austria and Athens. It has been installed in individual properties and tower blocks:

- **Reduced costs.** Typically, WHISCERS™ is 25% cheaper than traditional internal insulation and 40% cheaper than external wall insulation.
- **Energy savings and tackling fuel poverty.** In most homes, the installation of WHISCERS™ saves 30-40% on heating bills. What's more, residents notice that their homes feel warm and comfy, are free from annoying draughts and retain heat better than previously.
- **Less waste.** Typically, waste from board cutting is over 10% but with WHISCERS™ it's less than 6%. Any remainder material is uncontaminated and can be easily recycled.

More information can be found on the [WHISCERS webpage](#) or by watching our videos on [YouTube](#).

Appendix 2: SuperHomes

The problem

The Government has a target of reducing carbon emissions by 80% by 2050. Given that some sectors won't be able to reach this goal, others will inevitably need to go further and buildings have been cited as one area where major savings can be achieved.

Many homes have already had some energy efficiency measures installed, but few have gone as far as we all need to go. Fundamentally, most householders don't know where to start and often don't know what measures will need to be installed to help them to achieve substantial carbon savings.

The solution

To educate and inspire householders so that they can begin to understand what they need to do and how they need to do it.

SuperHomes provides a network of homes which have all been renovated to save at least 60% of their carbon emissions. Many have gone much further and some are now climate positive (ie they contribute more energy than they use). These homeowners open their homes to the public to help others. They tell their story of what went well and what didn't. They offer advice on how visitors can avoid certain issues, how to choose the right solution for their particular needs and how they can find good local installers.



Although SuperHomes come in all shapes and sizes, it's worth noting that SuperHomers are often pioneers. The journeys they take to ensure that they achieve their carbon savings targets have often been long and, in many cases, quite arduous. Consequently, they are perfect advocates for energy efficiency and renewable energy, and they include many well-known faces in the industry such as Charlie Baker, Robert Cohen, Andy Simmonds and Russell Smith.

The results

Results take time to materialise, not least because householders often require time to make decisions and get their finances ready.

- 3 in 5 visitors say it is *very likely* they will improve the energy efficiency of their home.
- 86% say it's *very likely* or *likely* they'll investigate a product recommended by a SuperHomer.
- Visitors plan to spend on average £5,770 on energy saving measures over the next 12 months.
- For 77% of online bookers the 60%+ carbon saving achieved by a SuperHome was an important factor in making up their mind to visit.
- 55% of visitors installed some energy/water saving measures since visiting a SuperHome. 27% of visitors installed energy saving measures within 12 months, and 41% within 24 months.
- 1 in 5 visitors went on to invest significant amounts (£3,000 - £35,000) in energy saving measures.
- From 10 options, the 3 most frequently selected reasons for wanting to visit a SuperHome were "To learn what works and what doesn't" (79%), "To see technology in action" (68%) and "To learn about the installation process" (52%).

Appendix 3: YouGen

The problem

Householders don't know where to find expert, trusted and unbiased information and advice. Historically, by far the majority of information has been linked to a particular funding stream (eg Green Deal) or a particular product. This means that householders can get help, but it tends to steer them in a certain direction and at a timescale which is not necessarily of their choosing. Once they have made a decision on what to do, they often can't find a reliable tradesman to undertake the work.



The solution

The provision of independent information for the majority of householders, with follow up expert advice for those who want to move to the next stage and a place to list recommended installers.

YouGen is a website and advice portal which is designed to make it easy for people to get the information they need to make the best choices when improving their home's energy efficiency or energy generation. The website has a particularly well used 'find an installer' section which helps consumers to find reputable and recommended tradesmen.

Our blogs are written by internal NEF staff or external experts who have experience in a particular field. They are made up of up-to-the-minute news items such as forthcoming changes to subsidies, advice notes such as how to get the most of your PV panels and technical information such as how much money could you save by installing a certain technology.

The static pages on the site explain how different renewable energy and energy efficiency technologies work and they provide information on potential finance.

YouGen is fairly unique in that it provides unbiased information and advice, not linked to an end of line sale, and is run by a trusted and independent charity.

We provide a comment section on each blog where the authors respond to specific questions and we also provide a phone line and email service to answer specific questions.

The results

The website is very popular with consumers, with some 1.2 million page views in the last 12 months. Our section of blogs, which provides detailed and up-to-the-minute information, is particularly popular with around 53,000 views a month. In fact, this attracts around 50% of our hits. Some specific articles receive very high hit rates. Our article on *Damp and Condensation in Cavity Wall Insulation* has had almost 80,000 views and our *How to Store Solar Electricity* has had 65,000. Average time on our top ten articles is some 4.45 minutes, so we are confident that our site are being well read, rather than glanced over. More information on YouGen web statistics are available, if required.

Appendix 4: My Home Energy Planner

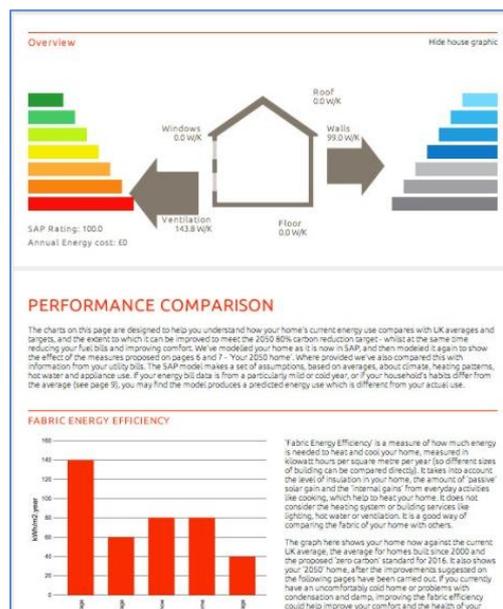
The problem

Accessing trusted and tailored advice on the full range of energy improving refurbishment options available can be difficult for householders. Householders don't know where to start and lack access to accurate, comprehensive and usable information about the energy performance of their homes.

The solution

In partnership with Carbon Co-op, URBED and OpenEnergyMonitor, we are developing My Home Energy Planner, an open source online tool which provides householders with detailed information about the current and potential energy performance of their homes.

A free and easy-to-use version of the web-based tool empowers householders to self-assess the energy performance of their homes. This 'Lite' version uses 10-15 inputs to quickly generate a tailored report about their energy use and the impact of different improvement options, signposting to sources of advice, funding and installers. Ordinance Survey and Land Registry data calculates floor area and exposed surface area, removing the tape measure from the assessment process.



A 'Pro' version of the tool enables more technically competent householders and building professionals to explore improvement options in more detail. This second implementation requires more granular data entry and therefore a more detailed survey of the property. This version provides a paid-for assessment service delivered by trained assessors.

The results

My Home Energy Planner offers a source of advice which householders can trust. The service is independent, not-for-profit and community-led, and the underlying calculation methods are open source and can be interrogated and examined. Benchmarking enables householders to compare their performance against targets and objectives, and the use of Ordnance Survey and Land Registry data means the accuracy of the outputs is unrivalled. Data generated by the tool is owned and controlled by the user and can be imported or exported and tracked and updated over time.

Carbon Co-op and URBED have delivered over 60 paid-for whole house assessments in Greater Manchester using a spreadsheet-based tool, but demand is much greater. My Home Energy Planner will make assessments quicker and easier to deliver, generating an almost completely automated report, enabling a greater number of assessments to be delivered at a lower cost. Ordnance Survey data has been accessed through local authorities in Greater Manchester; access to the required Ordnance Survey data at the national level would enable the 'Lite' tool to have national coverage.

Appendix 5: Local Installers

The problem

The standard of energy efficient installations is not always as high as it should be. There is a need to ensure that the right products are fitted in the right properties in the right way during installation. The focus to date has been on installations by large installers who have had the resources and time to map their competency against PAS2030 (for ECO) and to produce a Quality Management System (QMS) to become Green Deal Installers (for Green Deal). So far, few local installers have been involved in the installation of energy efficiency measures through Government-funded projects and incentives.

The installation of energy efficiency measures (such as solid wall insulation) is often perceived to be a standalone job, instead of an integral part of other building work. Customers want to be able to install measures alongside existing work to minimise disruption, and this is often the most sensible and cheapest time – for example, installing solid wall insulation when putting in a new kitchen or bathroom.

Installation work undertaken by larger companies tends to be sub-contracted to teams of installers who have limited local knowledge and little connection with an area beyond the end of their contract. What's more, it's difficult for main contractors to supervise the quality of sub-contracted work over long distances and sub-contractors quite often have no contact with the householder before starting the job, often resulting in poor customer service and low quality installations.

The solution

The general public trust local installers to work on their homes and are willing to listen to their advice on how things could be done and any consequential improvements that could be made. These installers are already working with them to undertake home improvements such as extensions, loft conversions and replacement kitchens. With the right training, these installers are in an excellent position to cross-sell the benefits of energy efficiency improvements.

The general public seek recommendations for reliable installers to work on their home from friends, family members and neighbours. Local installers rely on these recommendations to find new work. Many are proud of the fact that they have no need to advertise and guard their reputation carefully. Unlike some large national companies, which draft in installers from around the country, they depend on their local reputation to stay in business. They live in the communities they serve and will still be around long after the latest incentive scheme or funding has been and gone.

Rather than insisting that local installers qualify to do work by gaining accreditations and showing a suite of qualifications to match the requirements of PAS 2030 and the Green Deal (or its replacement) we suggest that more onus be put on installers to produce manufacturers' warranties and insurance-backed guarantees for their work. Local Building Control Officers and Competent Persons Schemes have a role here and could request sight of these documents before signing off installations.

Result

Customers would be able to use local installers that they trust to get the work done on their home. They would also be able to get the work done at the pace they want (room by room, if they wish), leading to a higher number of installs. These trusted local installers are in a position to work to a higher standard because their reputation is highly prized and they rely on local referrals from within their existing customer base, rather than successful tenders or sub-contracting to major companies. Further reading on this topic can be found in *Installer Power – The Key to unlocking low carbon retrofit in private housing* by Catrin Maby and Alice Owen (September 2015).

Appendix 6: Energiesprong

The problem

Historically in the UK, the pace and approach to retrofitting and improving energy efficiency in buildings (often involving single, piecemeal attempts) have not achieved the scale needed for it to meet its emissions targets. There is a need for refurbishment on a scale and at a pace never seen before.

The solution

Energiesprong is a revolutionary, fully-integrated, zero-carbon and funding approach to delivering attractive 'whole-house' refurbishments that have a guaranteed net-zero-energy performance (producing at least as much energy during a year as they consume). Energiesprong refurbishments achieve EPC band 'A' or better and have a life expectancy of at least 60 years. Refurbishments are undertaken on a large scale and each one is completed within a week to ten days and without any Government subsidy.

Energiesprong aims to create a market transformation by introducing a new, game-changing business model into the refurbishment industry. One of the starting points for Energiesprong is that it's technology-agnostic. The aim is simply to achieve net-zero-energy within a fixed price and guarantee the performance for a specified period (eg 30 years) through an extended warranty.

In the Netherlands, where it originated, the programme has already completed over 800 net-zero-energy refurbishments and has begun to deliver against an agreement between housing associations and builders to refurbish 111,000 homes, with scope for expansion to include additional housing types, private sector properties and new-builds.

Several manufacturers already offer Energiesprong solutions. They use 3D scanning technology to capture the exact dimensions of existing buildings, followed by bespoke off-site manufacturing to construct mass-customised walls and roofs, which are pre-fitted with windows, doors, high levels of insulation and renewable energy measures. This improved building envelope also comes with a services pod, which houses the technical equipment and intelligence to provide heat and power. The whole package is delivered to the site where each new wall and roof section is precision fitted to the existing house with the minimum of on-site finishing.



Basic principles of Energiesprong

The Energiesprong model is a break-through solution that transforms homes. It is a radical transformation of the existing refurbishment model – both practically and conceptually - as it focuses on creating a volume market for solutions that satisfy four key criteria:

1. An extended performance guarantee ensuring energy savings are locked in and guaranteed.
2. Fast installation (within 7 to 10 days) without the need for occupants to move out.
3. Affordable, which is maintained through the development of a competitive supply sector that keeps the cost of refurbishment as low as possible.
4. Modern and attractive end results that occupants aspire to.

How is Energiesprong paid for?

The cost of an Energiesprong refurbishment is paid for by using the money that the householder previously paid to their energy supplier. This is done through an agreed Energy Plan, which ensures that the tenant can afford to pay for the house in the long term. The cost is either the same as the previous energy bill or less. Instead of paying a utility company, the tenant pays either the housing provider or the construction company.

Each householder receives an annual allowance for their electricity consumption (lighting, cooking, hot water and space heating). However, the householder is charged extra if they exceed the agreed annual allowance, but they are protected from cost fluctuations and energy price rises as the cost of both the Energy Plan and the investment it funds are fixed and are for a set period of time.

Developing Energiesprong in the UK

Energiesprong UK (a group of industry partners keen to develop the Energiesprong sector in the UK) exploring whether the Dutch Energiesprong approach can be applicable in a UK context, and how to kick-start the changes that are needed in the market.

Energiesprong UK aims to stimulate and mobilise the construction sector to challenge its 'business as usual' approach to refurbishment and revolutionise its retrofit building processes through the development of stronger supply chain integration, product-focused collaboration and industry-led innovation.

We already know that there's plenty of market potential in the UK. The English Housing Survey 2013 states that there are 9.2 million houses built between 1945 and 1980, and having an average EPC at low band D. Properties in this category are those most likely to benefit from Energiesprong solutions in its initial phase leading to full market scaling to different property types/age bands.

Appendix 7: Thermal Imaging in the Community

The problem

Householders don't know where energy is leaking from their homes and, even when they identify the problems, they don't know what they can do to resolve them.

The solution

To involve community groups in identifying problem areas in homes and work with a trusted, unbiased expert to provide advice on potential solutions.

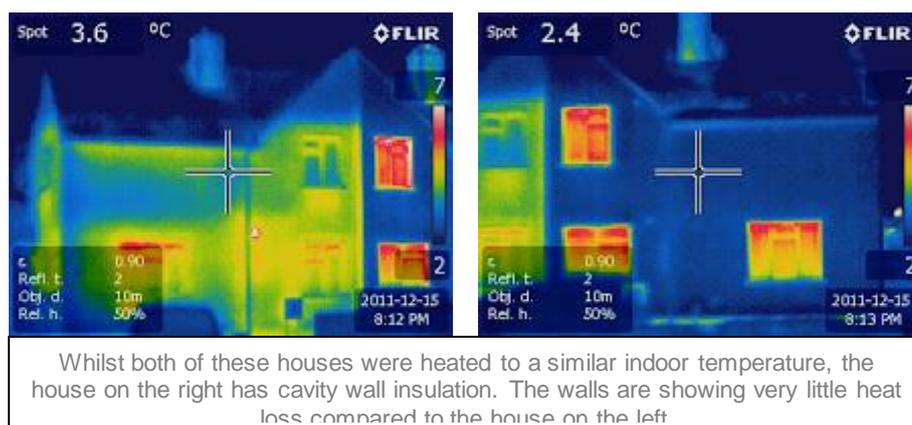


Groups across West Oxfordshire volunteer their time to help residents across the district to identify where heat (and therefore money) is leaking from their homes. Many groups then organise a 'results day' where residents come and see the images of their homes, sit down with an expert from the National Energy Foundation (a local charity working in partnership with the council) and discuss ways to improve the thermal efficiency of their properties.

Typical images clearly show heat loss where:

- Radiators are located on external walls.
- There was an absence of wall or loft insulation.
- Draughty doors/windows/letter-boxes need attention to improve their thermal efficiency.

Financial assistance to implement some of the larger improvements are highlighted to householders, and referrals are made where the householder wants to go ahead with energy-efficiency measures straight away.



The results

Over the last two years (2013/2014), our Community Thermal Imaging projects have:

- Surveyed over 500 homes.
- Provided tailored advice to residents.
- Recommended almost 1,900 measures.
- Utilised over 200 hours of volunteer time.

Whilst it's difficult to measure the outputs from these projects in terms of the number of insulation/draught-proofing measures, it is likely that a significant number of improvements have taken place. Also, some residents have requested to be re-surveyed so that they can check that the measures they installed really are making a difference.

Appendix 8: Pulse

The problem

Uncontrolled air leakage in buildings can account for a high proportion of the total heat loss. Pre and post installation testing can be one of the few controls which demonstrate the effectiveness of measures. For both these reasons, a cheap, quick and accurate system of measurement is urgently required.

Currently, air-tightness testing largely involves the use of the 'blower door' test which fixes a large heavy fan within one of the property's outside doors. A flexible frame is sealed around the door and the property is pressurised and de-pressurised to take a variety of readings. Known ventilation systems are sealed and unsealed to test planned and unplanned ventilation. This system is time-consuming, usually taking around 30mins to half an hour per property. The equipment is heavy and cumbersome and difficult to transport. What's more, the results are often inaccurate and specific measurements are almost impossible to replicate.



The solution

The National Energy Foundation has been working with The University of Nottingham, Elmhurst Energy, and Absolute Air and Gas to develop the patented Pulse system to measure a building's air tightness.

This innovative system centres on the use of a low-pressure air pulse, which is passed through a dwelling to provide a more accurate measurement of the way in which pressure drops and air infiltration occurs. Not only is the approach more accurate but, by using low pressure, it offers the following benefits over conventional tests:

- The test can be carried out using a relatively small, lightweight composite pressure vessel, which is standalone, portable and capable of fitting into the boot of a small car.
- There is less disruption and intrusion for occupants as the test is quiet and will not disturb household objects.
- Provides a more accurate measurement of fabric infiltration.
- Reduces the time taken to complete a test.
- Reduces the need for site preparation – further reducing the overall time taken to test.
- The pressure vessel is simple to operate so there is less scope for user error.
- Designed to enable a low unit price.

Our research shows that this new method will dramatically improve the accuracy of baseline performance assessments as well as the applicability of impact modelling and upgrade recommendations.

The results

The system is now commercially available and could revolutionise the way airtightness testing is done.

- Low pressure and therefore more reflective of actual infiltration whilst also causing less discomfort for occupants.
- Reduced cycle time, less preparation and a test that takes just seconds to perform.
- Lightweight and compact with interchangeable tanks means units are easy to handle and can be transported in the boot of a car.
- Simple press button operation, strong repeatability and reduced sensitivity to gusting winds means greater accuracy.

Appendix 9: Suffolk County Council Housing Stock Database



The problem

As part of the UK's commitment to reduce its carbon emissions, Suffolk County Council has an ambition to reduce its carbon emissions by 60% by 2025.

The solution

The council recognises that investment in the region's housing stock will be vital to hitting this target. An essential first step was to develop a housing stock database, in order to understand both the physical characteristics of the region's housing as well as the socio-economic circumstances of its residents - information that is crucial in helping to design and appropriately target domestic energy efficiency programmes and campaigns, and effectively tackle fuel poverty across the region.

With the Ordnance Survey AddressBase address list for the region and a 40% EPC sample at its core, the database identifies at an *individual property address level* the built characteristics and energy performance of housing for a variety of geographical scales from property address up to district/borough level.

Database key features

- 310,000 addresses with individual property level insight into built characteristics and energy efficiency performance for all homes.
- 140,000 Energy Performance Certificate records as well as information from Land Registry, Xoserve, Census, Defra and also council-supplied information.
- Experian Mosaic socio-economic householder data mapped to all address points providing insight into householder demographics, financial circumstances, health and well-being and accessibility.
- 25 detailed archetype models mapped to the full stock, projecting the baseline energy performance for properties where an EPC is not present.
- Improvement upgrade packages modelled for all properties, indicating potential energy and CO² savings as well as resident fuel bill savings and required investment estimates.
- User interface that allows all data to be searched, filtered and reported upon at all geographical levels – output area, Lower Super Output Area (LSOA), ward, local authority, town, postcode.
- The facility to search and review in isolation non-address level data such as LSOA and Output Area level statistics.

Exciting applications

For the first time, the database offers Suffolk comprehensive insight into all housing in the region. Whilst this obviously has immediate benefits in terms of targeting energy efficiency and carbon emission reduction programmes, wider uses and benefits include:

- Informing the application for, and targeting of, funding to support investment in energy efficiency measures.
- Supporting the work of the council's Housing and Public Health teams to deliver plans and programmes that aim to reduce the health effects associated with cold and poor quality housing.
- Identification of vulnerable and fuel poor households as well as the potential energy efficiency measures that will benefit them.

- Improved housing-related dialogue and activity in conjunction with other key stakeholders in the region, including other local councils, landlords and social housing providers.
- Targeting of other services and behaviour change campaigns related to housing and residents, including recycling and composting, planning and building control, housing regulation enforcement and also welfare and mobility.

Following the project, the council and its partners can now design energy efficiency publicity campaigns for targeted audiences and with more effective and tailored messages. For example, Public Health Suffolk is now working on a specific first-time central heating scheme to identify households most affected by fuel poverty, and can use the database to identify properties of a particular type, age and heating system.

Appendix 10: Social Housing Providers

The problem

Many of the larger commercial installers are not set up to deal with individual householders. Equally, many smaller installers don't have the resources to undertake all the additional training, purchase the necessary accreditations or manage the additional paperwork to become accredited for Government schemes. This is particularly relevant when considering solid wall insulation.



The solution

To begin by working with the social housing sector, and use registered providers as a catalyst to realise economies of scale and grow supply chain skills and awareness. Then ratify the most effective solutions before expanding into the private market.

The social housing sector represents 18% of the total UK housing stock, approximately 4.7 million homes, and it also has an existing supply chain that is active in maintaining and refurbishing homes in a way that is acceptable to occupants.

As social housing providers such as local authorities and housing associations own their stock for much longer than private residents, they have a longer term interest in the performance of their properties. What's more, in many cases their residents are the least well off, vulnerable to fuel poverty and are unable to pay for energy efficiency measures themselves.

Registered providers often commission works which affect many homes at the same time, such as insulating a block of flats or a terrace of dwellings. This means that they are usually dealing with larger sums of money and following strict procurement rules. They will ask for tenders from a number of installers and have comprehensive metrics to award any resulting contracts. They will continue to own their properties for many years and have their tenants' best interests at heart. Also, for contract and organisational performance monitoring purposes, registered providers often commission evaluation reports on both measureable energy savings and tenant attitudes; insight that is much more difficult to accrue in the private sector.

The social housing sector's suitability to lead a national refurbishment programme is exemplified by the works previously undertaken to meet the Decent Homes Standard) from 2001 to 2010/11). This led to an average of £10,000 per home being invested in basic repair, weatherproofing and installation of modern kitchens and bathrooms, with around a total of 1.4 million homes benefitting from some kind of intervention.

This track record should be embraced as many of the challenges of delivering retrofit at an effective scale -such as the need for high levels of private borrowing repaid via rental streams, volume procurement, large -scale delivery of improvement measures, gaining access to people's homes and engaging extensively with residents - are all areas where registered providers have vast experience.

For the installers, there are significant benefits to winning work with registered providers. They only have to deal with one client, can order their products in bulk at large savings and managing the expectations of residents is typically far less complicated. For example, the specification of the works is agreed in consultation with the residents and changes aren't usually made once the works have begun. Furthermore, the customer service part of their work is dealt with by a Resident Liaison Officer.

The extent to which installers and system manufacturers value relationships with registered providers can be seen by the extent of innovation in procurement, with supply chains often working together

with a group of registered providers, aggregating demand and separating out supply and installation streams to enable large national manufacturers to work with local installers. In turn, such framework arrangements come with considerable protection for all parties, with project management, quality and performance assurances, work pipeline stability all happening much more readily than it currently does in the private sector. All that the social housing provider sector requires is clarity, buy-in from central and local government and steadfast targets - and it will respond.

Often the social housing sector is either undervalued or even ignored, for having already invested in energy efficiency via Decent Homes and its exploitation of CERT, CESP, ECO, FITs, RHPP and RHI. However, despite this positive progress, it should be noted that the nature of works have largely been restricted to 'shallow' refurbishments, comprising medium cost measures, whereas if we are to achieve the substantial emission cuts required, more substantive action is needed. Failing to press harder will, in fact, lead other sectors to eventually arrive at a similar position, where low-hanging fruit has been dealt with but the overall savings aren't enough. Instead, registered providers should be given the baton to drive innovation, bring down costs, upskill the supply chain and discover how deep, whole-house retrofit can truly be made to work.

The results

Whilst the track record and performance of the existing social housing stock speaks for itself, NEF has much first-hand experience which leads us to conclude that registered providers are best placed to lead on energy efficiency.

Working directly with registered providers, we have drafted strategy documents, written technical procurement specifications, supported the development of quality assurance checking processes for solid wall insulation schemes and undertaken a range of pre and post-performance testing; all interventions that we simply don't encounter on private schemes.

Many large-scale retrofit and renovation projects have begun with little or no interest from the local private residents. For example, in our recent project in Watford, solid wall insulation was offered to private homes to avoid 'pepper-potting' but, at the cut-off date, only a handful of homes had expressed an interest. However, as the social housing provider's works started, interest from private owners began to gather momentum. At the time of writing, it is now anticipated that 74 of the 93 private homes will have the works completed. This shows that as the works begin on registered providers' properties and private householders see the impact of the measures, they become interested and sign up to have similar works completed on their own homes. This has been further evidenced by projects undertaken by Affinity Sutton, Radian Housing and Thrive Homes.