

Utilising ERDF for Energy Efficiency in Social Housing

A review of the economic and environmental benefits

ESTA



Environmental Sustainability
Technical Assistance

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Environmental Sustainability
Technical Assistance

The ENWORKS Environmental Sustainability Technical Assistance (ESTA) project is designed to support North West LEPS and their partners to embed sustainable development into their economic development priorities and strategies.

The project is funded by the European Regional Development Fund (ERDF) and delivered in collaboration with the Environment Agency.

The four key work streams are:

- Support the strategic input of Local Enterprise Partnerships (LEP) and other local partners – establishing an environmental sustainability evidence base and priorities for sustainable growth to inform the transition to a low carbon and resilient economy.
- Support applicants in developing ERDF eligible projects.
- Support the delivery of ERDF communications.
- Capture lessons learnt and best practice.

This report was commissioned by ENWORKS to provide a review of the economic and environmental sustainability benefits derived from ERDF funded energy efficiency in social housing projects in Cheshire and Warrington, Cumbria, Greater Manchester and the Liverpool City Region. Good practice and learning from these projects has been identified to maximise the effectiveness of future similar activities through EU programmes or other sources of funding. The report was produced by Quantum Strategy & Technology Limited.

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Executive Summary

This report provides a review of the economic and environmental sustainability benefits derived from ERDF funded energy efficiency in social housing projects in Cheshire and Warrington, Cumbria, Greater Manchester and the Liverpool City Region. Good practice and learning from these projects has been identified to maximise the effectiveness of future similar activities through EU programmes or other sources of funding.

Project Overview

The European Regional Development Fund (ERDF) provided 50% funding to four projects in these Local Enterprise Partnership (LEP) areas to retro-fit social housing properties with a range of new energy efficiency measures and renewable energy technologies, and to act as a stimulant for the low carbon economy. These projects are:

- Conservation and Acceptance of Renewable Energy in Social Housing (CARE) – Cheshire & Warrington
- Cumbria Cohesion
- Greater Manchester Energy Smart Homes (GMESH) – Greater Manchester
- Renewables & Energy Efficiency in Community Housing (REECH) – Merseyside

Over 5,000 homes will have been improved by the end of the projects, with an investment totaling over £40 million including £20 million ERDF and £20 million match. Match funding was provided through a mixture of the social housing provider's own capital reserves, Community Energy Saving Programme (CESP) and Carbon Emissions Reduction Target (CERT). In all the projects match funding was also contributed by local authorities, in varying levels, mainly for project administration and management costs. 17 Housing Associations were involved in the projects.

These four projects have delivered a range of valuable benefits including jobs created, skills developed, energy and CO₂ savings and increased capacity to deliver further schemes. There are a number of key findings that have been identified as part of this review which should be considered when putting together future funding bids and programmes.

Key Findings

1. Fabric-first Approach

Out of the 5,000+ homes that have been improved more than 4,000 (80%) have been fitted with external wall insulation. Insulation (the fabric-first approach) delivers the most cost effective energy savings and also supports the largest number of jobs. Any future projects should include insulation of hard-to-treat properties as a key priority and not simply focus on innovative technologies.

2. Impact on Local Supply Chain and Investment

An estimated 80% of the investment (£32 million) has been spent in the LEP areas. Over 50 businesses have been involved in the projects, 80% of which are based in the same areas. Smart procurement processes have made a positive contribution to the growth of local jobs and should be replicated. Opportunities for local companies can be maximised by ensuring procurement frameworks and contracts contain clauses to support the use of local labour and the development of local skills (possibly separating installation from materials to further support local businesses).

Peaks and troughs in demand are caused by funding schemes coming to an end before follow on schemes are available. This reduces confidence in the market and limits the recruitment of new members of the workforce.

The strong partnerships developed through this programme are likely to continue to work together in the future and explore potential opportunities for developing joint projects. This should help to maximise opportunities for sustained local jobs and growth of local companies, and further partnerships should be encouraged.

3. Skills

Training has been a key success of this programme, particularly in external wall insulation and renewable energy installation techniques. There has been a demand for new skills, and over 200 construction staff have received training and accreditation. At least 20 apprenticeships have been created.

Training has been provided for Housing Association staff as well as contractors, which will be particularly important in ensuring the systems installed can be managed and maintained. Many residents have also received training on energy efficiency awareness and their new systems.

In several instances, equipment manufacturers, installers and colleges have come together to provide relevant local courses. Previous evidence from small businesses suggested that few training courses were provided by colleges or equipment manufacturers, as there was limited demand. The size of contracts awarded under ERDF, and the emphasis on generating local jobs, has given training providers the confidence to develop and run suitable courses which otherwise would not have been developed.

4. Job Creation and ERDF Criteria

Only one project included an ERDF target for direct job creation which was that 20+ people should secure access to employment, training or education. The two main contractors on that project have already employed at least that number as a result of the project. Based on estimates from other studies and interviews with contractors, the potential impact not captured by the ERDF reports could be between 240 and 880 jobs.

The nature of construction contracts, often involving numerous sub-contractors and short duration, makes it very difficult to meet the ERDF definition of jobs created. For future projects it will be useful to develop a reporting method that captures the true level of job creation whilst also providing adequate evidence for ERDF. This could include monitoring person-days on the job and where these people live to demonstrate equivalent full-time jobs.

5. CO₂ Savings

Determining the level of CO₂ savings from the projects has been difficult. These are estimated to be in the region of 8,000 tonnes/year which would equate to 250,000 tonnes over the lifetime of the technologies. However these figures should be treated with caution for the following reasons:

- Actual data on energy usage before and after installation was not readily available so savings have been calculated using models based on generic buildings, which do not reflect the specific building performance, fuel type saved or residents' behaviour.
- Households in fuel poverty typically spend less on energy than the models predict, and increasing insulation in these households results in improved comfort and reduced fuel poverty, but lower energy/CO₂ savings.

- Household size, economic activity and behaviour have a significant impact on energy use and emissions, and the savings achieved.
- How well householders understand and use new technology has a significant impact on energy/CO₂ savings especially more innovative technologies.
- Assumptions on technology “lifetimes” make a considerable impact on predicted lifetime savings.

Effective monitoring can be difficult for a time-limited project such as those funded by ERDF, but should be designed in the early stages of a project. Investment in smart metering may assist this. Alongside any housing retrofit programme it is necessary to deliver information and advice to residents to ensure that the potential energy savings are realised.

6. Process

Experience gained on the ERDF projects has enabled the Housing Associations to plan further large-scale energy improvements, leveraging in at least £10 million for further work so far.

Energy improvements can be disruptive and require advance engagement prior to the works commencing as well as ongoing liaison and support to tenants whilst they are being carried out. This includes raising energy awareness and providing information to get the best from the technologies after the measures have been installed. Tenant engagement should be a core part of any future project and is key to maximising the benefits.

Matching funding from different sources with different deadlines and payment timescales can create a level of exposure which is difficult for providers. These issues need to be fully understood by applicants before bidding for funding. They will also need to ensure that they have undertaken a risk assessment to determine whether timescales for delivery are achievable and that their procurement processes are compliant.

European funding is complicated and partnerships to deliver large scale projects require time and resources to manage, but also generate additional value from sharing experiences and building the capacity to develop and manage further projects. It will be necessary to make sure that there are adequate skills in the organisation to manage the process and that the valuable lessons learnt and experience gained by those involved in these four projects is not lost.

Recommendations

In order to ensure that the local benefits of housing improvements are maximised, and local areas are able to attract as much external finance as possible, the following recommendations should be considered:

1. Make housing energy efficiency a priority in investment plans: LEP areas that have an understanding of what types of housing will qualify for ECO and EU funding, and have developed investment-ready packages of energy measures will be best placed to negotiate good ECO deals with the energy companies and future ERDF support.
2. Insulation delivers the most cost effective energy savings and also supports the largest number of jobs. Future projects should include insulation of hard-to-treat properties as a key priority and not simply focus on innovative technologies.
3. Ensure residents and community-wide engagement/communication is a core part of any project relating to energy efficiency and renewable energy in housing.

4. Ensure procurement frameworks and contracts contain clauses to support the use of local labour and the development of local skills.
5. Support or facilitate the development of partnerships to attract future investment in housing energy improvements.
6. Support the sharing of lessons learnt by the partners and project co-ordinators involved in these four ERDF projects.
7. Support the development of more robust methods of capturing data on job creation and CO₂ savings.
8. Ensure that project developers fully understand funding requirements before bidding and undertake a risk assessment to ensure timescales are achievable and procurement processes are compliant.

1 Introduction and Method

The European Regional Development Fund (ERDF) has supported four projects in the Cheshire and Warrington, Cumbria, Greater Manchester and the Liverpool City Region, to improve the energy performance of social housing and through these to help develop the local low carbon economy. This report provides a review of the economic and environmental sustainability benefits derived from ERDF funded energy efficiency in social housing projects across these LEP areas. Good practice and learning from these projects has been identified to maximise the effectiveness of future similar activities through the next EU funding programme or other sources of funding.

The projects are:

- Conservation and Acceptance of Renewable Energy in Social Housing (CARE) – Cheshire & Warrington
- Cumbria Cohesion
- Greater Manchester Energy Smart Homes (GMESH) – Greater Manchester
- Renewables & Energy Efficiency in Community Housing (REECH) – Merseyside

The projects have installed a range of measures in social housing, which include insulation, low carbon energy supply and energy efficient technologies. As the projects were not complete at the time of drafting this report, the figures are provisional.

As a condition of the ERDF funding all four projects are required to meet output targets on CO₂ savings and the number of measures they install. This review aimed to investigate the environmental and economic impacts of the projects, including jobs created. For the purposes of this review, the environmental benefits are limited to CO₂ savings, which are predicted rather than actual, and a discussion on the validity of this is given in Chapter 4.

The economic benefits considered are jobs created or safeguarded, businesses supported and training/skills development. Economic benefit was a key driver for all of the projects, but this data is not being collected in a consistent format by the four projects, and due to the timing of this report is not complete. For this review, an assessment of the jobs created has therefore been made based on interviews with selected contractors and the findings of other studies into the benefits of investment in energy measures.

This study provides an overview of the projects and examples of their experiences based on interviews with the project managers, Housing Associations and contractors. At this stage, it cannot be a comprehensive analysis of the final outputs of the projects, but is intended to give an overview of their impacts and draw out key learning for future similar activities, based on the extensive experience gained by those working on the current projects.

Interviews with the organisations involved have formed a key part of this research. Findings from these interviews and detailed information on the projects are given in the Appendices.

2 The Projects

Four projects have been supported by ERDF in Cheshire, Cumbria, Greater Manchester and the Liverpool City Region.

17 Housing Associations were involved.

Over 5,000 homes will have been improved by the end of the programme.

ERDF provided 50% funding to four projects in the LEP areas to retro-fit social housing properties with a range of new energy efficiency measures and renewable energy technologies, and to provide a catalyst to develop the local low carbon economy. The projects had a combined budget of over £40 million and were scheduled for completion by the end of June 2014.

2.1 Projects and Partner Activities

The four projects and their partners are outlined below.

CARE – Conservation and Acceptance of Renewable Energy in Social Housing (Cheshire & Warrington)

CARE is a partnership of six Housing Associations, with project management provided by Cheshire West and Chester Council (CWAC), and project evaluation provided by Energy Projects Plus. The Housing Associations involved are:

- Cheshire Peaks & Plains: external wall insulation of two tower blocks in Macclesfield.
- Chester District Housing Trust: external wall insulation of 399 homes in six tower blocks in Chester.
- Golden Gates Housing: 203 solar hot water systems in Warrington.
- Warrington Housing Association: 57 solar hot water systems in Warrington.
- Weaver Vale Housing Trust: 122 solar hot water systems for off-gas properties in Cheshire.
- Wulvern Housing: external insulation of 60 hard-to-treat homes in Crewe.

Total budget: £7.2 million. ERDF contribution £3.6 million.

Cumbria Cohesion

The Cumbria Cohesion project involves three Housing Associations, with Cumbria County Council acting as the Accountable Body and the University of Cumbria managing the evaluation. The Housing Associations involved are:

- Impact Housing: external or internal wall insulation in 34 homes and 22 renewable energy systems (biomass and PV).
- Home Group: external wall insulation in 670 homes.
- Westfield Housing: 24 renewable energy systems (solar hot water, solar PV and air source heat pumps).

The project also specifically aimed to support at least 12 local businesses, get over 20 people into employment, training or education and set up a Learning Network around energy efficient retrofit of homes.

Total budget: £7.5 million. ERDF contribution £3.7 million.

GMESH - Greater Manchester Energy Smart Homes

The GMESH project involves three Housing Associations and is managed by Oldham MBC on behalf of AGMA/Low Carbon Hub. The Housing Associations involved are:

- Eastlands Housing: insulating 3 tower blocks in East Manchester, Bickerdyke, Worsley and Platt Courts.
- Northwards Housing: insulating 708 1960's homes in north Manchester.
- New Charter Housing: installing a biomass boiler and solar hot water in a Tameside Grade 2 listed mill converted into 160 flats.

Total budget: £10 million. ERDF contribution £5 million.

REECH - Renewables & Energy Efficiency in Community Housing (Merseyside)

REECH is the largest of the four projects involving five housing associations. Sefton Council is the accountable body and related studies have been conducted during the project by the Energy Saving Trust (EST). Liverpool John Moores University is researching behaviour change. The Housing Associations involved are:

- Helena Housing: External wall insulation and a mix of gas saving boilers, air tightness measures, solar hot water and LED lighting to 449 homes in St Helens and 270 homes in Newton-le-Willows.
- Plus Dane: external wall insulation to 94 homes in Toxteth and Runcorn, and solar hot water systems for 43 homes in Everton and Litherland.
- Villages Housing: External wall insulation to 774 homes in Knowsley.
- Arena: triple glazing for 70 homes in Knowsley and Wirral.
- Regenda: a mix of insulation and other measures for 44 homes in St Helens, Wirral and Liverpool.

REECH has set up explicit targets with the delivery partners around local businesses, skills and supply chain, community engagement and behaviour change, outside of the ERDF contract.

Total budget: £15.6 million. ERDF contribution £7.8 million.

2.2 Project Changes

Over the course of the programme, a number of changes were made and some of the individual projects did not proceed under the ERDF programme. For example:

- CARE: biomass district heating schemes were replaced with mechanical ventilation and heat recovery systems
- Cumbria Cohesion: the hydro scheme has been replaced by a number of renewable technologies on individual homes
- GMESH is piloting a hybrid mix of internal and external wall insulation on terraced solid wall properties and external insulation for a solid walled multi storey block of flats. This replaces two proposed biomass heating schemes which did not go ahead under the ERDF funding.

In some cases projects were identified for ERDF funding at the start of the process but instead were or are expected to be delivered under other funding schemes. Examples of how the project development process has helped to attract alternative funding include:

- Stockport Homes biomass boilers: The future income of £1.8m from the Renewable Heat Incentive (RHI) was greater than the ERDF allocation of £617,000. The scheme was

withdrawn from the GMESH project and delivered separately by Stockport Homes which will be channelling some of the RHI receipts back into a low carbon scheme for its residents.

- First Choice Homes: Oldham St Mary's district heating biomass boiler was withdrawn from GMESH following the feasibility study, which showed that the capital costs were greater than previously predicted to secure the required carbon savings. This project is expected to go ahead: Oldham is hoping to agree a £16m investment from British Gas under the ECO scheme.
- Two REECH projects were withdrawn from the ERDF project but went ahead with CESP funding, leveraging in over £4 million into energy efficiency projects for Riverside and Wirral Partnership Homes.

3 Economic Benefits from the Projects

The region has seen an investment totalling over £40 million.

Experience gained in the projects has levered in well over £10 million for further work.

Over 50 businesses have been involved in the projects, 80% of which are based in the NW.

Over 200 construction staff have received training and accreditation gaining new skills and at least 20 apprenticeships have been created.

Smart procurement processes made a significant contribution to the growth of local jobs.

3.1 Supporting the Local Supply Chain

All four projects aimed to support jobs in the local low carbon economy, kick-start the immature market for the technologies and assist local firms to develop the capacity to supply it. To a large extent they have succeeded.

Some of the projects are collating information on the location of contractors and value of work done by them.

- **REECH** has compiled a database of contractors which shows that over 75% of Keepmoat's sub-contractors are based in the Liverpool City Region, but only 40% of the contract value went to these firms. However, several of the major sub-contractors are either based or have regional offices elsewhere in the four LEP areas.
- 90% of the subcontractors to **Cumbria Cohesion** are based within Cumbria, although the major works contract for external wall insulation went to a company based in Bolton.
- The major contactors for **GMESH** are based in Sheffield, Manchester, Warrington and Preston.
- Only one of the three main contractors for **CARE** is based in the local area, with other significant suppliers being based in Wolverhampton, Stoke and Preston.

This is not complete information and does not fully account for the use of the local supply chain to deliver contracts won by companies outside of the local area. It has not been possible to analyse the value of the materials component sourced locally (e.g. a solar PV system may be installed by a local contractor but it is highly likely that the panels will be sourced from outside the UK). The larger firms interviewed suggested that for major construction projects, around 80% of the work would be carried out by local subcontractors.

The Primary Contractors are predominantly large construction firms, only some of which are based in the :

- Seddon, Bolton (Cumbria Cohesion)
- Keepmoat Bramall, Doncaster, with NW offices (CARE & REECH)
- Lawtech, Kent, with NW offices (CARE)
- Rowlinsons, Macclesfield (CARE)
- HT Forrest, Preston (CARE, GMESH & REECH)
- Rothwell Plumbing Services, Wigan (REECH)
- Henry Boot Construction, Sheffield with NW offices (GMESH)
- Belfry Group Ltd, Warrington (GMESH)

While the majority of sub-contractors are based in the local area, the largest value sub-contracts were for external wall insulation (EWI) and mainly went to companies based outside the four LEP areas, e.g.

- ECL, Rugby
- Repex Ltd, East Sussex
- Transcast, Glasgow
- Burrows Home Comfort, Wolverhampton

However, many of the larger businesses have offices within the LEP areas, and most have sourced their labour locally for the construction element of the projects, e.g. Keepmoat have offices in Widnes, Speke, and Manchester; Henry Boot Construction in Ardwick, Manchester; Repex in Warrington.

Other significant value sub-contracts were for scaffolding, the majority of which was sourced locally, e.g.

- Speedy Scaffolding, Barrow
- QED Scaffolding, St Helens
- Titan Scaffolding, Wirral

A list of contractors (where the information was available), together with their location, is given in Appendix 1.

3.2 Job Creation within the Supply Chain

There is no exact information on the number of jobs created or safeguarded by the four projects, and each used different methods to give an initial estimate of what could be achieved. However, examples of jobs created have been collected in interviews with some of the contractors, and this, combined with intelligence from other research sources can provide an estimate of the numbers of jobs created or supported by the projects.

Because of the ERDF contractual and reporting requirements for providing evidence of jobs (name, address, NI number) and the complexity of sub-contracts in the supply chain for construction projects, three of the projects did not attempt to claim direct job creation. **Cumbria Cohesion** is the only project with an ERDF target to “*enable 20+ people to secure access to employment, training or education in Cumbria and in the Northwest*”. Their two main contractors have already employed at least that number as a direct result of the project.

On the basis of the evidence from a limited number of contractors set out in Appendix 2, it is reported that a significant number of jobs have been created or safeguarded as a result of the projects; at least 200 and possibly around 400. However, counting jobs is not an exact science, and an alternative assessment can be made from research carried out for other organisations.

In its EU structural funds briefing The National Housing Federation quotes government figures (2009/10) as showing that **every £1m investment in home refurbishment supports 17 jobs**, while every new home built equates to at least 1.25 jobs created or maintained.

In “How Many Jobs? A Survey of the Employment Effects of Investment in Energy Efficiency of Buildings”¹ the Energy Efficiency Industrial Forum states that: “on average, we can expect that investing € 1 million in upgrading the energy efficiency of our building stock will create 19

¹ www.euroace.org/MediaPublications/PublicationsReports.aspx

new direct jobs in the construction sector and that the vast majority of these jobs will be local and non-transferable". This is equivalent to **22 jobs per £1 million**.

The Primary Contractor, Keepmoat, referred to Construction & Housing Yorkshire's method for targeting the social outcomes of construction projects which they feel best reflect their experience of investment in construction. The Leeds City Region Green Deal project (working on a minimum of 12,000 dwellings with an estimated investment of £60m over the next three years) has the following target Key Performance Indicators:

- Educational visits/workshops – 12
- Apprentices – 35
- Total employment – 374
- New employment – 355
- Leeds City Region employment – 284
- Local employment – 71
- Work experience – 200 weeks

This gives a much lower figure of **6 jobs per £1million**, although some work under Green Deal is less time-intensive than that involved in the ERDF projects, which is predominantly external wall insulation.

From these sources and the interview evidence, a broad range of jobs created can be estimated. **On the basis of the above, the £40 million invested across the four LEP areas social housing through the ERDF funding could have resulted in between 240 and 880 jobs.** Information from some of the major contractors suggests that at least 80% of the labour for the projects has been sourced from within the LEPs.

However, this is clearly an issue in which the reporting requirements for ERDF conflict with a more realistic view of the economic impact of the projects. The nature of construction contracts, often involving numerous sub-contractors and short duration, makes it very difficult to meet the ERDF definition of jobs created. It will therefore be necessary in future projects to develop a method that captures the true levels of job creation whilst also providing adequate evidence for ERDF. This could include monitoring person-days on the job and where these people live, to demonstrate equivalent full-time jobs.

It is worth noting that these jobs are in a sector with huge potential to grow, which increases the likelihood that employees trained during this programme will find long-term employment that makes use of their skills:

- There are 7 million private homes and 1.7 million social housing homes in England that were built before 1944², most of which are classed as hard-to-treat for energy efficiency, and a further 9 million homes built before 1980, when energy performance started to become part of the Building Regulations.
- Over 300,000 "Wimpey No-fines" homes were built as social housing in the 1940s and 50s³, which can benefit from the technologies proven in these projects.
- **Liverpool City Region** has identified the low carbon economy as one of four key growth sectors. The Low Carbon Economy Action Plan identified 150,000 dwellings in the social rented sector in Liverpool City Region and suggested that 'while significant efforts have and are being made to improve their energy efficiency, huge opportunities remain in this sector.'

² English Housing Survey

³ Source: The Concrete Society

- **Greater Manchester** authorities are in the process of developing public - private sector partnerships to maximise ECO investment into the region, and encourage Green Deal take up. A 4-year programme of area-based schemes, is expected to safeguard and upskill at least 1,000 jobs and catalyse training and job creation opportunities.

3.3 Training & Skills in Supply Chain Companies

The ERDF funding has enabled the installation of relatively new technologies on a scale not seen before across the LEP areas. As such there has been a large demand for new skills, particularly in the installation of external wall insulation (EWI), but also to a lesser extent for renewable energy technologies. Primary contractors such as Keepmoat have engaged their secondary contractors through awareness events, and have supported their own staff as well as suppliers and the Housing Associations with training and accreditation.

- **Thextons** in Wirral have trained 145 staff to become accredited installers of Alsecco, Alumasc and Knauf EWI products, and employed the first eight EWI apprentices. They have worked with local skills provider CNS to develop a training package and built a bungalow in the CNS building for the application of EWI by trainees.
- **Keepmoat Bramall** and **Knauf** staff supervised and certified training in EWI for **Helena Partnerships'** Direct Labour Organisation, **Property Care**. Training opportunities on site were also made available free of charge for two other SMEs to increase their skills and capacity.
- **JPL** have trained all 26 tradespeople to NVQ level in external wall insulation and taken on an EWI apprentice. However, they found that the local college didn't meet their needs and found a more suitable course in the North East.
- **Holdcrofts** delivered free on site training to **Weaver Vale Housing Trust's** five diagnostic gas engineers which enabled the engineers to properly explain the control of the systems to tenants.
- **Forrest Green**, contractors to two of the projects, set up a renewable technologies training academy at their Bolton office and **Golden Gates Housing** has used it to get their staff MCS⁴ accredited so that they can install their own systems.
- **Villages Housing** have ensured that their maintenance staff have been trained on systems to ensure they can carry out maintenance and repairs in future without affecting warranties.
- **Parex**, the supplier of insulation materials to Cumbria Cohesion, provided training and equipment to Lakes College, so that it could offer NVQ courses in external wall insulation.
- **Seddon** worked with Lakes College to develop their external wall insulation training and put their four trainees through this.
- 14 Fusion 21 apprenticeships have been created under REECH with **Keepmoat Bramall**.
- The CARE project supported by Cheshire East Council and the contractor **Burrows Home Comfort** employed four local residents who were Not in Education, Employment or Training. As a result of the training scheme one was employed by a local company, two moved onto college courses and one was offered full time employment with Burrows Home Comfort.
- **Impact Housing** led the GreenWays to Work programme in parallel with the ERDF housing improvements, which was funded through the Innovation Transnationality and Mainstreaming (ITM) Programme and European Social Fund (ESF). This programme developed and provided various levels of training for the construction industry, Housing Association staff and residents, to raise awareness of energy issues, develop supplier capacity and support residents into work.

⁴ MCS – Microgeneration Certification Scheme

Training has been a key success of this programme, particularly in external wall insulation and renewable energy installation techniques. Previous evidence from small businesses suggested that few training courses were provided by colleges or equipment manufacturers, as there was limited demand. The size of contracts awarded under ERDF, and the emphasis on generating local jobs, has given the training providers the confidence to develop and run suitable courses.

3.4 Impact of Procurement Processes on Local Jobs and Skills

Procurement processes have been used to great effect to promote the use of local businesses and labour in construction projects. Housing Associations, with their social aims and ability to deliver large-scale projects, are in a good position to develop and test these. Specifying local jobs within the contract supports the use of local labour and sub-contractors, and can be used to help develop and deliver local training and skills.

Four procurement methods were used:

- Appointment of highest scoring main supplier on existing frameworks: most REECH projects used Fusion 21, Northwards Homes Phase 1 (GMESH) used Procure Plus, Cheshire District Housing Trust (CARE) used a contractor from the British Gas CESP Framework for Phase 1.
- Mini-competitions run within existing frameworks: Cumbria Cohesion used Procure Plus, Northwards Homes (phase 2 – 6) (GMESH) used Procure Plus, Plus Dane and Arena Housing (REECH) used Fusion 21.
- OJEU tenders let directly by housing provider: Eastlands Homes (GMESH), Chester District Housing Trust (CARE).
- Tender let directly by housing provider: New Charter Homes (GMESH) for biomass and solar hot water project at Cavendish Mill, Weaver Vale Housing Trust (CARE) for solar hot water, and renewable energy schemes for Cumbria Cohesion.

Procurement for Cumbria Cohesion and REECH through existing frameworks showed that a well-designed framework which is OJEU and ERDF compliant can support local small businesses and local jobs. For multi-million pound contracts, local firms may not have the capacity to bid for the whole contract or as lead contractor. Supplier engagement events and splitting out materials from installation within tenders enabled local businesses to win part of the work. Larger firms can be encouraged to support this through their contracts. Examples of how the procurement processes worked are set out in Appendix 3.

3.5 Building Capacity in Housing Associations to Increase Demand

One of the benefits of the programme has been to increase the capacity of the Housing Associations to invest in further energy improvements to their stock, creating a market for the local supply companies. This capacity includes a better understanding of the suitability of different energy technologies for their building stock, and equally importantly, the capability to deliver large-scale projects with EU or ECO funding.

From all the Housing Associations interviewed, at least £10 million of additional investment in energy measures is confirmed as a result of experience gained through the ERDF projects. Further investment is expected to be developed with ECO funding.

Wulvern Housing

Wulvern has 946 hard-to-treat homes. Following their experience working on 60 homes under the CARE Project, they have bid for and received an ECO-Go Early offer of £2.2m to improve 400 of them. They will then look at ways to finance similar work on the remaining homes over the following two years.

They have also sourced funding for further renewable energy and insulation measures:

£84,000 from RHI to install 34 Air Source Heat Pumps

£121,600 from RHPP to install 40 Air Source Heat Pumps

£214,000 CESP funding to externally insulate 26 properties

£550,000 CESP funding to externally insulate a further 64 properties.

Weaver Vale Housing Trust

Building on their experience of installing solar thermal panels, and particularly lessons learnt on how to help residents make the best use of the technology, WVHT has just installed their first 13 domestic solar photovoltaic systems in the Northwich area.

Golden Gates Housing Trust

GGHT has been shortlisted for the 2013 Pioneer Award from the Renewable Energy Association for their work on renewable energy, which includes the 228 solar thermal systems installed under the CARE programme, and 623 solar PV systems, financed through the Feed in Tariff. GGHT has gained MCS accreditation for its in-house team and has created 3 extra jobs.

Plus Dane Merseyside

Plus Dane have used the project to pilot installing EWI in different types of properties to get fully funded ECO for 350 houses and to work with Liverpool City Council's planning department on a more streamlined planning application approach to the properties.

The Housing Associations have also developed further knowledge and skills to help them attract more funding and deliver large-scale complex projects effectively.

- **Villages Housing** have become more aware of the value of their carbon savings and can use this to get the best market rate for their schemes.
- **Home Housing Group** stated that the project has given them a track record in ERDF funding which would support future applications as the Accountable Body.
- **Impact Housing** is looking at a large-scale biomass and waste heat district heating scheme, using the experience gained in this project.
- **Plus Dane Merseyside** and **Liverpool City Council** have gained a much greater understanding of the planning implications of external wall insulation, and have managed to develop a more streamlined procedure for planning applications, reducing the time and cost involved.

Staff within the Housing Associations and Local Authorities have gained a considerable body of knowledge during this process, some of which is at risk of being lost at the end of the programme.

- **Northwards Housing** provided behavioural change advice to residents to enable them to get the maximum benefit from insulation and energy efficiency measures. 16 members of staff have completed their City & Guilds Level 3 Award in behavioural change in 2012.
- **Impact Housing** partnered the ERDF programme with the ESF-funded Greenways to Work initiative to provide training for staff and tenants to become Energy Efficiency Advisers, Community Energy Champions and external wall insulation installers.
- **Chester District Housing Trust** has employed a temporary Resident Liaison Officer, Assistant to Heating Engineer, Assistant Plumber and through Fusion21 a shared Maintenance Operative apprentice.

3.6 Building Demand in Private Housing

Whilst the ERDF funding has only benefited social housing, the projects have helped to grow demand for similar measures from private householders, particularly in areas where private and social housing are interspersed. This has mainly been for external wall insulation, where there is a very visible improvement to the look of the building, and the benefits are discussed among neighbours. The Housing Associations and contractors have been pro-active in finding funding solutions for these private householders.

- **Plus Dane Merseyside** found solutions for owner occupiers living amongst housing association properties so that whole streets or blocks of homes could be treated with EWI, ensuring a better look for the street, avoiding a pepperpot effect with gaps in insulation on individual houses. This was provided free of charge for owner occupiers, using CESP or Plus Dane funding (outside of the ERDF project).
- **Northwards Housing** in Greater Manchester also offered external insulation and energy conservation works to private owners on estates where schemes were taking place and learned that it is a lengthy process to sign-up owners to the scheme. The owners were offered CESP/CERT grants and a loan against the property to fund the works, rather than ERDF support.
- **JPL Plastering** in Cumbria is getting requests for external wall insulation from home owners in Workington that have seen the improvement made to Cumbria Cohesion properties. They are putting together a funding package for private sector householders, possibly involving Green Deal and ECO.

While CESP and CERT funding is no longer available, it is possible that similar solutions may be found in future from other funding sources. Further information on other funding sources is available in Appendix 7.

3.7 Economic Impact of Energy Improvements for Tenants

As yet there is only anecdotal evidence of energy savings, and more detail will emerge over the next year.

- Within the REECH project residents are reporting that they have had to use the heating much less or not at all where they have had EWI.
- At Cavendish Mill, where **New Charter** installed a biomass boiler district heating system, to replace individual 17 year old night storage heaters, residents have reported that they are delighted, and that their heating is not only cheaper to run, but they can control it.
- One **Northward Housing** tenant commented: "I'm happy with the insulation and I don't need to use the heating as much. The property is much warmer"
- One **Chester District Housing Trust's** residents group has been monitoring their energy use before and after the insulation was installed and are reporting a 30% saving in energy bills.
- Some **Eastlands Housing** tenants were reported to be paying £40 a week heating bills due to ill-fitting windows and poor insulation, but now claim that they "have not had to put the heating on in the coldest of springs."

If the predicted CO₂ savings are achieved, as referred to in Section 4, this would result in savings for tenants on their energy bills, which together could amount to between £1.2 million - £1.8 million per year⁵. However, as discussed in Section 4, a proportion of this cost saving will not be realised, as most tenants are expected to improve comfort levels in their homes.

⁵ The energy use resulting in one tonne of CO₂ emissions costs between £150 - £220 (at 2013 prices) depending on the fuel saved (electricity, gas, oil etc).

Other benefits for tenants cannot yet be quantified in economic terms but the improvements will contribute to reductions in healthcare costs and improvements in community cohesion – for some projects the visible improvement to the area has been the most-reported feedback from tenants.

- **Chester District Housing Trust:** “The work has had a positive impact on tenants – it looks much a better place to live and blends in with the new developments.”
- **Cheshire Peaks and Plains.** “Customer satisfaction is very good. The work has had some impact on tenant behaviour; they’re tending to keep the flats a bit warmer. No-one has yet commented that their energy bills have come down but feedback is that the buildings look much better.”
- The **Northwards Homes** behaviour change programme tackles how residents can reduce condensation and damp.
- **Plus Dane** is installing solid wall insulation in areas of extreme deprivation where many tenants have health problems. They expect the programme will influence this and are monitoring self-reported impacts on the health and well-being.
- **Helena Housing:** has installed positive ventilation systems for tenants, many of whom are ex-miners and suffer respiratory conditions. These tenants report that the air seems fresher and their breathing conditions have improved.

The Marmot Review 2011⁶ into the health impacts of cold homes and fuel poverty showed that these contribute to, amongst other things, increased hospital admissions for children, increased mental health issues for adolescents and physical and mental health problems in older people. It concluded that *“Improving the energy efficiency of the existing housing stock is a long-term, sustainable way of ensuring multiple gains, including environmental, health and social gains”*.

3.8 Strong Partnerships for Future Projects

Four partnerships were formed to deliver the projects and have grown in strength through the shared experience of working on similar technologies, finding the best way to involve tenants and the shared challenges of managing an ERDF funded project. Many of the partners expect to continue to work together beyond the end of this programme and some are already developing future joint projects.

- The lessons learned in REECH from combining ERDF schemes with CERT/CESP and ECO will be carried forward into the next European programme (which is due to commence in January 2014) and into contract negotiations with the ‘Big Six’ energy companies on ECO contracts, being led by Project Viridis. Many of REECH’s delivery partners (local authorities and Housing Associations) are Project Viridis members.
- The Cumbria Cohesion partners work together on a regular basis and have also built up good links with the local college and University. The local suppliers also felt it had helped them build up relationships with potential buyers. The project has had a lot of local publicity and this has also contributed to a greater pride in the area.
- The CARE partners have used the networking opportunities, contacts and support to develop further projects within their own organisations and are working together to develop a Green Deal/ECO programme.

The role of the project co-ordinator must not be under-estimated. A central resource to manage the reporting requirements, manage financial claims, liaise with project funders and share information between partners has been essential to the success of these projects.

⁶ <http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review>

Some of these roles currently sit within Local Authorities and are likely to be lost at the end of the project, dispersing the expertise to manage such large projects. Several of the larger Housing Associations will be in a position in future to act as the Accountable Body now that they have a track record of successfully managing an ERDF project. However, it would be useful to capture the co-ordinators' learning before the projects are over, to share with the Housing Associations.

3.9 Learning on Economic Development

1. Energy improvements to social housing deliver jobs and skills in the local economy which are likely to be between 6 and 22 jobs per £1 million, depending on the nature of the work. For these four projects, that is equivalent to between 240 and 880 jobs.
2. The nature of the work in large-scale insulation projects leads contractors to employ local workers for delivery, even if the company is based outside the area.
3. Procurement procedures can determine whether a project supports local businesses.
4. Including local job and training targets in contracts with suppliers, and requiring them to report on this, raises the profile of the value of the work to the local economy and makes it easier to track.
5. Projects can maximise opportunities for local companies by holding supplier engagement events to introduce the main contractor to local companies, give them an opportunity to learn more about the project and how procurement is carried out.
6. Training in external wall insulation has been critical to the success of all four projects, and there is now a greater pool of skilled labour available in companies across the LEPs able to take on future work.
7. Supply companies are very involved in delivering appropriate training and may be better placed to respond to training needs than educational establishments alone.
8. The experience gained on the ERDF projects has enabled the Housing Associations to plan further large-scale energy improvements, including projects funded through ECO.
9. Energy improvements deliver multiple benefits for householders including cost savings that can further support the local economy, and health benefits that can support higher levels of economic activity.
10. Partnerships to deliver large-scale projects require time and resources to manage, but generate additional value from sharing experiences and building the capacity to develop and manage further projects.
11. The experience gained by the project co-ordinators in managing large EU-funded programmes should be captured to support future projects.
12. Due to the nature of the work, which involves a large number of sub-contractors with short contracts, it is difficult to meet the ERDF reporting requirements to document the number of jobs created. It will therefore be beneficial to develop a method that captures the true level of job creation whilst also providing evidence for ERDF. This could include monitoring person-days on the job and where these people live.

4 Environmental Impact and CO₂ Savings

By the end of the programme, the four projects are planning to have installed energy efficiency or renewable energy technologies in over 5,000 homes.

4.1 Expected CO₂ Savings

A key output from all four projects is a reduction in CO₂ emissions. This is calculated from a set of assumptions concerning the likely energy savings, translated into CO₂ savings using a standard set of conversion factors.

For the purposes of the ERDF claims, CO₂ savings are being assessed using the method developed by the Energy Saving Trust in conjunction with the NWDA, which assigns a nominal annual and lifetime CO₂ saving for each technology, as given in the table below. This methodology was developed over 5 years ago and the figures are now considered out of date by the EST⁷. In particular, this does not take into account individual building types, for example, assigning the same savings for EWI to a flat in a tower block and a 3-bedroom semi, and making no allowance for the previous heating fuel. For some of the newer technologies with limited long-term evidence, the savings are now considered overstated (e.g. for air source heat pumps, mechanical ventilation and heat recovery and solar hot water, where the experience has shown that savings are heavily dependent on the state of the property and the tenant's behaviour).

Table 4.1 CO₂ Savings Calculation Base Data

Intervention Type	Annual CO₂ saving per measure (tonnes)	Lifetime (years)
External wall insulation	1.934	30
Internal wall insulation	1.829	30
Air source heat pumps	0.989	40
Solar PV	0.916	25
Mechanical ventilation/heat recovery	0.699	20
Triple glazing	0.424	20
Gas saver boilers	0.349	12
Solar hot water	0.26	25
Passive input ventilation	0.081	20
LED lighting	0.041	12.5

Figures for the biomass boilers have been estimated based on information from the projects. No CO₂ savings have been claimed for the voltage optimisers as little information is available on their impact in domestic uses.

On this basis, the CO₂ savings expected from the projects amount to over 8,000 tonnes per year, or over 28,000 tonnes over the project period (3.3 years), approximately 18% of the target savings for the Operational Programme. These are the current estimates, and the final figures may change slightly by the end of the projects.

⁷ As the Energy Saving Trust can no longer provide the same level of support free of charge, more recent developments in their methodology are not publicly available.

The annual CO₂ savings are equivalent to 1.7 tonnes per household. The average CO₂ emissions resulting from energy use in homes in the of England is 4.6 tonnes per household⁸. While this might suggest each home would save about one-third of their energy use, the difficulties in measuring baseline and final energy usage as described later mean that this assumption cannot be made for all the homes involved.

The calculated CO₂ savings are shown below against the measures installed, as annual savings and over the project period. External wall insulation contributed the largest CO₂ savings as it was installed in over 4,000 homes (see table 4.4 below).

Table 4.2 Annual and Project CO₂ Savings from the Energy Measures (tCO₂)

	CARE	Cumbria Cohesion	GMESH	REECH	Total
External wall insulation	1,238	1,354	1,756	3,765	8,113
Biomass district heating	-	-	220	-	220
Mechanical ventilation/heat recovery	102	-	-	16	118
Solar hot water	99	5	-	11	115
Biomass boiler	-	60	-	-	60
Passive input ventilation	-	-	-	36	36
Triple glazing	-	-	-	30	30
Solar PV	-	14	-	-	14
Internal wall insulation	-	7	-	-	7
LED lighting	-	-	-	13	13
Air source heat pumps	-	2	-	1	3
Gas saver boilers	-	-	-	1	1
Total Annual CO₂ savings	1,439	1,442	1,976	3,873	8,730
Total Project CO₂ Savings	4,749	4,758	6,521	12,781	28,809

The measures installed will continue to generate CO₂ savings over the lifetime of the technologies, which could amount to over 250,000 tonnes, as shown below.

Table 4.3 Lifetime CO₂ Savings from the Energy Measures (tCO₂)

	CARE	Cumbria Cohesion	GMESH	REECH	Total
External wall insulation	37,133	40,614	52,682	112,965	243,394
Biomass district heating	-	-	3,300	-	3,300
Mechanical ventilation/heat recovery	2,041	-	-	322	2,363
Solar hot water	2,483	124	-	280	2,886
Biomass boiler	-	720	-	-	720
Passive input ventilation	-	-	-	718	718
Triple glazing	-	-	-	594	594
Solar PV	-	344	-	-	344
Internal wall insulation	-	219	-	-	219
LED lighting	-	-	-	161	161
Air source heat pumps	-	79	-	40	119
Gas saver boilers	-	-	-	8	8
Total Lifetime CO₂ savings	41,657	42,100	55,982	115,086	254,825

⁸ Census data on household population and Local Authority Carbon Dioxide Emissions dataset 2011: <https://www.gov.uk/government/publications/local-authority-emissions-estimates>.

4.2 Increasing Comfort and Affordability

A proportion of the nominal energy savings will be taken as increased comfort, and this is expected to be relatively high among residents in fuel poverty. Anecdotal evidence from tenants reports a mix of reduced energy bills and feeling warmer. At present there is no data available for these projects to compare actual energy savings with those predicted, but studies in other areas have shown a range of results.

The **Gentoo Group**⁹ in Sunderland monitored 139 tenants' energy use and bills before and after installation of a number of measures: solar hot water, A-rated condensing combination boilers, energy efficient showers, double glazing and solid wall insulation. They found that the savings were a lot lower than the predicted amounts of £272 per year (19%) and 26% carbon savings – actually achieving average annual savings of £105 (12%) and 18% carbon savings. This was due to a combination of things:

- Tenants using less energy than had been assumed prior to the improvements: many couldn't afford to heat their homes fully.
- Tenants increasing the warmth of their homes and continuing to spend the same amount on energy: those using the least energy beforehand saw the lowest levels of savings.
- Poor assumptions within the software used to assess energy savings (SAP): for example homes had fewer occupants than predicted by the SAP calculations, people were more likely to be in during the day, and the efficiency of the previous heating system was underestimated.

The **Centre for Sustainable Energy** evaluated the impact of solid wall insulation installed in 11 private homes in fuel poverty, in Bath & NE Somerset¹⁰. Although too early to give definitive figures, the initial findings showed a wide range in actual energy savings, dependent on the pre-installation behaviour of the residents.

"The data suggests that, for most participants, actual energy consumption before measures was much lower than the modeled estimated level of energy consumption needed to adequately heat their home. This is consistent with participants' reported experience of struggling to maintain satisfactory levels of warmth over the winter period. Where households are under-heating, there is increased likelihood that benefits of insulation measures will be taken as comfort."

One key finding of this research is that most householders in under-insulated homes use less energy than models predict, so the available savings will also be less than predicted. In the Gentoo research, initial home energy CO₂ emissions were between 25% and 65% lower than predicted. Actual carbon savings after the work were 741kg per home compared with the 1,826 kg predicted, i.e. only 41% of the predicted total saving.

On the basis of the Gentoo research, it is possible that actual annual CO₂ savings from the projects could be as low as 3,500 tonnes. Some further evidence will be available at the end of the monitoring programmes, which will give a clearer picture of savings in specific cases.

⁹ "Retrofit Reality – a dissemination report by Gentoo: Part 3"

¹⁰ "Evaluation of solid wall insulation in fuel poor households" Interim report to eaga Charitable Trust, October 2011 www.cse.org.uk/pdf/solid-wall_insulation_in_fuel_poor_households_in_the_private_sector.pdf

4.3 Monitoring Energy Savings and Behaviour

Actual energy and CO₂ savings are being monitored in some but not all of the projects, and most suffer from a lack of wide-scale pre-installation energy consumption data. Several of the Housing Associations commented that this is difficult to collect. Whilst project plans can be developed in advance, until the funding is confirmed they are never sure exactly which properties will be improved, and at that stage it is too late to start to monitor pre-installation energy use. They therefore rely on those long-term tenants that have kept energy use records over a period and are willing to share that data.

The introduction of smart metering as part of a retrofit programme will allow future projects to build up a bank of evidence on energy consumption practices in upgraded properties. However, unless the metering is installed at least one full heating season prior to the energy improvements, there will still be a problem gathering baseline data, and this will still rely on tenants own records. Previous experience has shown that attempting to gather historical records from the utility companies for individual residents is problematic, although area-based domestic energy consumption figures can be provided.

Each of the projects is carrying out different types of monitoring, covering both technical and behavioural measures. By the end of 2014 a small body of evidence will be available on the impacts of different technologies and approaches. Some of the evaluation projects are detailed in Appendix 4.

4.4 Measures Installed

The 17 Housing Associations will collectively install over 6,000 measures in over 5,000 homes. *(These figures are the best estimates as the projects had not fully completed at the time of drafting this report.)*

Table 4.4 Measures Installed and Homes Improved by Project

	CARE	Cumbria Cohesion	GMESH	REECH	Total
External wall insulation	640	700	908	1947	4195
Biomass district heating	0	0	1	0	1
Mechanical ventilation/heat recovery	146	0	0	23	169
Solar hot water	382	19	0	43	444
Biomass boiler	0	10	0	0	10
Passive input ventilation	0	0	0	443	443
Triple glazing	0	0	0	70	70
Solar PV	0	15	0	0	15
Internal wall insulation	0	4	0	0	4
LED lighting	0	0	0	314	314
Air source heat pumps	0	2	0	1	3
Gas saver boilers	0	0	0	2	2
Voltage optimisers	0	0	0	418	418
Total Measures	1168	750	909	3261	6088
Homes Improved	1168	735	1068	2060	5031

Note that some homes had more than one measure installed and one measure (biomass district heating) serves several homes.

4.4.1 External Wall Insulation (EWI)

The largest single technology installed is external wall insulation.

CARE

- Cheshire District Housing Trust: 399 homes in 3 tower blocks in Blacon and 3 blocks in Chester.
- Cheshire Peaks & Plains: 181 homes in 2 tower blocks, Range & Pennine Courts, Macclesfield.
- Wulvern Housing: 60 solid brick and concrete wall homes in south Cheshire.

Cumbria Cohesion

- Home Housing Group: 670 homes, in Workington, Maryport, Cleator Moor and rural villages.
- Impact Housing: 30 homes, mainly in Workington.
- Impact Housing: also did internal wall insulation in 4 homes.

GMESH

- Eastlands Housing: 3 tower blocks in East Manchester, Bickerdyke, Worsley and Platt Courts.
- Northwards Housing: 780 1960's "no-fines" homes in north Manchester.

REECH

- Helena Homes: 449 homes in Four Acre Green, St Helens and 270 homes in Newton-le-Willows.
- Villages Housing Association: 742 homes on the Stockbridge Village Estate, Knowsley, including 'no fines concrete' premises.
- Plus Dane: 60 pre-cast concrete homes in Castlefields, Runcorn which were built between 1950 and 1965, and 34 pre-1919 houses in Toxteth, Liverpool.
- Regenda: 44 low rise properties in St Helens, Wirral and Liverpool (a mix of external and internal insulation).

The overall results have been very successful with both the Housing Associations and tenants, although several projects experienced technical difficulties and issues with planning. External work on energy measures is invasive and involves scaffolding, moving aerials, satellite dishes and decorative items like window boxes or hanging baskets, as well as the stages of insulation being applied. Involving residents at an early stage and through the process of energy upgrades is important to get high levels of uptake and to deliver the project smoothly.

Costs for EWI have ranged between £5-20,000 per home, depending on the type of building and extent of additional or preparatory work required. This gives a cost per tonne CO₂ saved over the lifetime of the technology (based on the EST CO₂ savings calculations) of between £84 and £340.

Case studies of EWI are set out in Appendix 5.

4.4.2 Solar hot water (SHW)

Seven housing associations installed solar water heating systems

- Golden Gates Housing: 203 systems
- Warrington Housing Association: 57 systems
- Weaver Vale Housing Trust: 122 systems
- Plus Dane: 26 systems in Bootle and 17 systems in Everton
- Helena Housing: 2 systems

- New Charter Housing: an 80kW system on Cavendish Mill, a converted Grade 2 listed cotton mill in Tameside
- Westfield Housing: 19 systems

Costs for solar hot water have ranged between £2,500 – £8,000 per system: the wide range reflects the differences in properties treated and ancillary works needed on the heating system and storage tank. This gives a cost per tonne CO₂ saved over the lifetime of the technology (based on the EST CO₂ savings calculations) of between £380 and £1,250.

The experience of solar hot water has been mixed:

Golden Gates found it worked well when installed alongside other heating system improvements. They worked with equipment supplier Worcester to design a smaller cylinder so that the systems could fit into properties that were previously thought not suitable due to lack of space. Every household also receives a visit from an energy efficiency adviser to make sure they understand how best to manage the system.

Weaver Vale Housing Association has 150 rural properties that are off the gas grid. They found that tenants were concerned about the amount of space the systems would take up, especially in their smaller houses, so have sourced smaller cylinders. They have had some issues with new residents moving in and not understanding the system so introduced an information sheet to assist the residents to make the most of the panels, and try to visit to explain how the system works.

Helena Homes installed solar hot water alongside external wall insulation and a range of other measures. They have had maintenance issues with the SHW systems and have found that the “fabric first” approach yields much better savings.

Westfield Housing installed SHW in 19 bungalows for residents over 55, which previously used electric immersion heaters. They found that the residents’ hot water usage was actually quite low, and for some of the year they still needed to top up with electric heating using the more expensive day rate, so the savings achieved are only expected to be between £30-40 per year.

4.4.3 Ventilation Systems

Cheshire Peaks and Plains (CARE) are planning to install Mechanical Ventilation Heat Recovery (MVHR) in 146 homes, focussing on elderly people living in bungalows. The aim is to improve air quality and reduce damp in the properties, and the systems will be installed alongside work to improve the air-tightness of the buildings.

Regenda (REECH) will be installing MVHR in a number of low-rise buildings that are also receiving insulation.

Helena Housing and **Plus Dane (REECH)** have installed Passive Input Ventilation Systems to homes that have also received external wall insulation and improved air-tightness.

4.4.4 Air source heat pumps (ASHP)

Very few ASHP systems have been installed under the ERDF element of this programme, and with mixed results, but a number of the Housing Associations wished to share their experience of the technology. One of the key lessons is that, as with the ventilation systems, they are only suitable in homes with high levels of air-tightness.

Helena Housing installed ASHPs in a few bungalows with electric heating, in combination with external wall insulation and air-tightness improvements, and were pleasantly surprised to see the impact these have had in reducing tenants’ energy bills.

Wulvern Housing installed ASHPs in homes with electric heating (funded outside the ERDF project). They had some negative responses to these from tenants before installation and several refused to have them. The reaction has been better post-installation, especially where they are combined with PV generation, but they have had some issues with controls.

Westfield Housing installed an ASHP in combination with solar hot water in a sandstone end-terrace, previously heated with electric storage heaters and an open fire. The tenant's daily energy bills rose from £2.50 to £8, due to a combination of poor air-tightness, complicated and badly-managed controls and running the system on the more expensive day-rate electricity. Westfield have had regular maintenance problems with both systems they installed.

4.4.5 Biomass boilers and district heating

Four biomass district heating schemes were planned in the original ERDF bids, but only one of these has gone ahead with ERDF funding.

New Charter Housing Trust installed a wood pellet community heating scheme with gas back up in Cavendish Mill, to replace electric storage heaters in the 160 flats. Without the ERDF funding element they would have installed a gas-fired system in order to meet Decent Homes standards.

The system installed is an Eco-Pod supplied by Belfry in Warrington. New Charter had previously installed a similar system in a tower block in Hyde and achieved over 50% CO₂ savings and significant cost savings for tenants. A local firm, Plevin, has won the contract to supply 100 tonnes of wood pellets per year.

The Cavendish Mill project has made the finals of the Greenbuild Awards in the Domestic Retrofit category.

Impact Housing installed four individual pellet boilers in rural homes previously heated by oil, LPG or electricity. One of the additional benefits noticed is that some of the older tenants, who had been brought up with coal heating, like being able to see how much fuel is being used.

The cost per tonne of CO₂ savings for individual biomass boilers is difficult to assess on such a small sample, but for the larger district heat scheme equates to around £600/tCO₂.

4.5 Tenant Engagement

Tenant involvement has been critical to the success of the schemes, and is at the heart of the ethos of the Housing Associations. Even so, many reported that the project has improved the ways they work with tenants, and some have trained tenants to deliver energy awareness and to act as community energy champions themselves. However, this level of tenant engagement is time-intensive, and needs to be factored into the cost of the project.

The reasons for tenant involvement were:

- At the planning stage of the project – to get tenants to agree to certain measures being installed, to plan the design or make colour choices and discuss the works.
- Ongoing liaison and support to tenants during the works.
- After measures have been installed, to provide energy awareness and information on how to get the best from the technologies installed.
- Evaluation prior and post works to measure energy savings made, and the contribution of the project to health and wellbeing.

Many of the housing associations reported that they had not been able to conduct in-depth analysis of energy use and expenditure on energy by residents before the project, so were reliant on people keeping their bills, or remaining aware of how much they spent on their pre-payment meters. All the housing associations conducted tenant engagement, and some engaged with private owner occupiers as part of schemes to offer EWI to adjoining properties.

The outcomes from the tenant engagement are set out in Appendix 6.

4.6 Learning on Environmental Impact

1. Insulation (the fabric-first approach) delivers the most cost effective energy savings and also supports the largest number of jobs. External wall insulation can improve the look of an area and how tenants feel about where they live, as well as providing energy savings.
2. Even external work on energy measures is invasive. Involving residents at an early stage and through the process of energy upgrades is important to get high levels of uptake and to deliver the project smoothly.
3. Personal contact with tenants is essential for any new energy system that involves controls, and appears to be necessary for fabric first measures like external wall insulation in order to make the best of potential energy savings for the residents and to avoid problems with damp or condensation.
4. The methodology used for calculating energy and CO₂ savings does not reflect the reality of the properties and tenants involved in these projects. Evidence from other projects working with social housing tenants suggests that the predicted CO₂ savings are overstated by the methodology. In the early stages of future projects, consideration needs to be given to how to estimate expected savings, as actual data will continue to be hard to come by. There is a small body of evidence on the complex interaction between the installation of energy measures and residents behaviour, and the latest research in these areas must be taken into account in designing future schemes. A limited amount of learning on actual energy savings will be produced by these four projects.
5. Pre-installation monitoring is difficult as part of a time-limited project such as funded by ERDF, but a reasonable comparison between pre- and post-installation energy use can be achieved where residents already keep their energy bills. Investment in smart metering as part of a project may assist this, but the issue of data confidentiality and the difficulty in retrieving private historical data from the utility companies will remain. However, lack of baseline data should not be a barrier to taking action to improve the building fabric.

5 Finance

ERDF was matched by Energy Company Obligations to finance energy efficiency in housing (CERT, CESP & ECO), Housing Associations own funds and staff time from Local Authorities.

The contractual and reporting requirements within ERDF were found to be particularly challenging.

ERDF has filled the gap between the ending of CERT & CESP and the start of ECO which has allowed work to continue and jobs to be retained.

In the short term ECO is the most readily available source of funds for similar projects by Housing Associations.

For the future ERDF can be a useful resource but the experience of these projects highlights the need to fully understand the implications for the organisation at the outset.

It has been possible to combine ERDF and ESF funding to maximise impacts, but this is complex and has only been done in one project (Cumbria Cohesion).

Green Deal on its own is unlikely to be a useful finance mechanism for Housing Associations although it may provide some kind of top up finance for projects that are not covered by other sources of funding.

5.1 Match Funding for the Projects

The four projects covered by this review were 50% funded by the ERDF. The remaining 50% was provided through a mixture of the Social Housing Provider's own capital reserves, CESP (Community Energy Saving Programme) and CERT (Carbon Emissions Reduction Target). Some ongoing schemes are now being matched by ECO (Energy Company Obligation), which replaces CESP and CERT. In all the projects match funding was also contributed by local authorities, in varying levels, mainly for project administration and management costs. Details of the various match funding schemes are given in Appendix 7.

Cumbria Cohesion had already received funding from ESF & ITM for the GreenWays to Work Programme which separately supported their training, skills development and collaboration with Lakes College and the University of Cumbria.

The Housing Associations are now working on matching ERDF funds with ECO.

The GMESH project by **Northwards Homes** for 24 terraced homes and 70 flats in a block, Liverton Court, will be match funded by ECO.

Liverpool Mutual Homes have an ECO scheme to provide EWI on 591 homes, while **Plus Dane** have 167 homes in Castlefield which will qualify for an element of ECO, possibly to be topped up with ERDF funding if it is available.

The **Oldham St Mary's** replacement biomass boiler and heat network is being discussed as an ECO scheme with British Gas.

Housing Associations have managed their different funding sources effectively, and have been able to maximise the impact of their ERDF funding.

GMESH's partner **Northwards Homes** used £1.92m ERDF funding for EWI in 780 homes, matched with £1.3m mainly from CESP. Where CESP did not apply to homes on the estate (due to the edge of a geographic area) CERT was used to fill the gaps. Northwards capital funding programme made up the remainder of the match. They also used CESP or CERT funding and a special loan from Manchester City Council, to provide works to 42 privately owned homes.

5.2 Funding Issues

EU funding has the potential to bring investment into local areas, creating economic and environmental benefit. Administering it can be complicated even with careful planning and project co-ordination and building on the experience of previous projects.

Eligibility

Bringing together finance from two different schemes is complex since each project will have different funding criteria. This can be related to geographic areas (community based schemes), measures that can be installed, or types of people targeted. Project managers need to be clear which measures are related to which funding source, and may need to exclude some from the project for different funders.

There can be changes to eligibility during the course of a project, which can cause confusion and can mean projects have to be withdrawn. During the course of the ERDF programme a decision was made that Feed In Tariff and Renewable Heat Incentive payments could not be claimed by projects that had received public grants. Projects that could receive RHI had to sign agreements that the income would not be claimed, e.g. for Plus Dane's two solar hot water schemes. Stockport Homes (GMESH) pulled out of the ERDF funding at this time since their RHI income was worth more than the ERDF grant element. South Lakes Housing (Cumbria Cohesion) pulled out of the project as soon as it became clear they would not be able to claim FITs which they had included in the business plan for their PV scheme.

Many of the homes improved in the ERDF projects were in areas eligible for CESP, so some Housing Associations were able to use this. Cumbria Cohesion would not have gone ahead without the CESP match.

Different opinions were received from NWDA/CLG by projects in the early stages of project development on whether CESP/CERT could be used as match. This led to some schemes going ahead without ERDF funding, or timescales being limited which reduced the ability to focus on local benefits through the procurement process.

Minimising disruption/maximising value

Disruption caused to residents by works on their home has to be managed carefully. Consultation and ongoing communication with residents is carried out before, during and after works. It is also more cost effective to carry out as many works on the homes as possible at one time, for example, repairing a roof while scaffolding is up for EWI purposes. This means that funding for particular measures has to be used in tandem with other works funded from other grant sources or through a rolling capital investment or repair/replacement programme. However, careful accounting is needed to ensure that the different elements can be separated for grant claims.

Different funding periods and deadlines

Where different funders have different deadlines, projects will need to ensure the completion of relevant funded components of the project for that deadline. This can create problems as two

funding contracts are negotiated for works on one scheme, with different targets and different end dates.

This can also affect procurement processes which need to be compliant with all potential funders requirements but may need to be put in place for one funding source before match funding is confirmed from another source.

The ERDF project period originally ended in December 2013 (although some have extensions to June 2014), while the CESP and CERT funding ended in December 2012. Housing Associations had to complete installation of CESP measures by the end of December 2012. Where delays in contract agreement or approval of schemes occurred, this caused difficulties for projects with CESP or CERT funding, in meeting the earlier deadlines of those schemes. Housing providers are aware that future match funding with ECO, which has a deadline of March 2015 may also experience similar difficulties as the new EU Structural Funds period is 2014 – 2020. If there is a six month or longer period of project development before contracts are signed, it is possible that the opportunity to match ECO with EU funding may be missed.

It must also be remembered for projects of this type, the weather is a factor. EWI can only be installed in certain conditions, delays are caused by rain and cold, and even heat. The optimum time to install it is in Spring/Summer/Autumn and not in the winter, and contractual delays may mean this window is missed. For schemes that require planning permission, funding delays can be further compounded by delays in planning, meaning that schemes cannot be installed in time to qualify for funding.

The **REECH** project took a total of 18 months from Expression of Interest to approval and finally signing the contract. During this time some of the identified projects for REECH were taken over by CESP offers.

Other projects identified relied on CESP for match funding, and delays to the project development put a lot of pressure on the timeline for measures to be installed and pushed projects into the wetter winter period, when external wall insulation cannot be applied. This affected Plus Dane's Castlefields Hard to Treat project whereby properties had been boarded, but not all of them had received a base coat by the CESP deadline. Therefore not all the CESP funding could be claimed, and this is being addressed to ensure the funding gap is filled.

Cash flow and risk

ERDF funds can only be paid after submission of evidence of expenditure and assessment of the claim. This can take at least six months from the point of expenditure and if there are any queries or issues with the claim, it will take longer. This level of exposure is difficult for providers as it causes cash flow issues to the organisation which may not be included in their business plans. This issue alone has caused several of the Housing Associations to question whether they would seek ERDF funding again.

After an unsatisfactory audit ERDF can claw back funds which have already been spent on schemes. Contractually, ERDF funding places limits on the sale (under right to buy) or remortgage of properties treated under ERDF funded schemes.

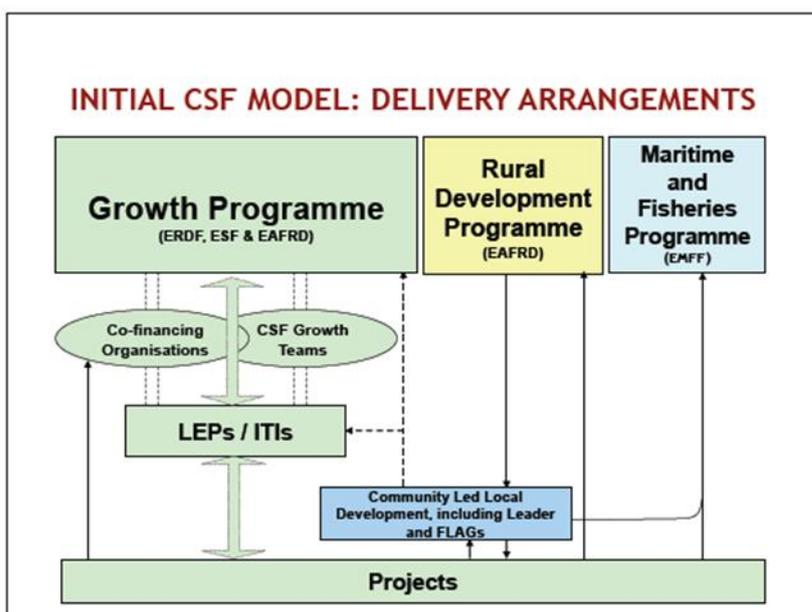
The cumulative impact of these administrative and contractual issues is complex, and there was a consensus among the Housing Associations questioned that this administrative cost is worth it for bids above £500,000, but was not tenable for smaller amounts.

5.3 Future EU Structural Funds and Match Funding

The latest proposals for the EU Cohesion Policy framework for 2014-2020 emphasise the importance of place-based (i.e. local) approaches to investment. The thematic objectives include:

- Low-carbon economy (20% of funds ringfenced)
- Innovation, research and technological development
- Support for small businesses
- Skills
- Employment
- Social inclusion

There is also a drive for better coordination and integration between EU programmes to enable a more coherent use of funds and more transparent, efficient and simplified delivery systems for beneficiaries. The Rural Development (EAFRD), and Maritime and Fisheries Funds (EMFF) will be aligned under the umbrella of the Common Strategic Framework (CSF).



Future ERDF funding will be notionally allocated to LEPs but coordinated by a central government body. Under the current funding period this body is DCLG (and DWP for ESF funding).

LEPs' Investment Strategies submitted to government this autumn have to outline their priorities for EU structural funds. These could include Thematic Objective 4, Low Carbon Activities including "support for activities that realise and enhance the job-creation capacity of the low carbon sector (in particular via new skills needs, company growth and domestic retrofit).

These strategies will take into account LEP plans for funding schemes under the English Growth Programme which include Growing Places and City Deals. LEPs are encouraged to work with each other to achieve economies of scale and to exploit synergies (e.g. in a shared supply chain)¹¹.

¹¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/190880/13-747an-structural-and-investment-fund-strategies-preliminary-guidance-to-leps-technical-annex.pdf

Liverpool City Region and Greater Manchester have both already put in place low carbon economic strategies and begun looking at how construction, including energy efficiency and renewable energy, and low carbon technologies can benefit the local economies.

LEPs can propose to bring together strategies for ERDF-type funding with ESF funding, which supports skills development. This was successfully achieved by the Cumbria Cohesion project.

Possible future match funding sources

EU Structural Funds will continue to need 50% match funding.

Housing Associations say that they already borrow against their assets to a great degree and it is inevitable that they will continue to be able to access funds to improve their building stock. Indeed, some, such as Northwards Homes, have strategies that include private owner occupiers in neighbourhoods where they are making improvements to social housing owned stock as a means to tackle fuel poverty.

However, the measures that are being installed are expensive. To continue to achieve the scale and quality of energy efficiency improvements, all the Housing Associations interviewed felt that continued grant funding was essential. This was particularly the case in areas where housing is low value, which limits the amount of finance that can be borrowed against it.

The most important future match will be **ECO**. Just as the ERDF funding has helped bridge a gap between CESP and CERT, it is likely its next phase will bridge a gap between ECO and whatever comes through from government policy to replace or renew ECO in March 2015.

Attractive ECO offers are being made to housing providers that provide the largest carbon savings to the energy companies. Carbon Saving Community Obligation ECO offers will be coming forward for areas of deprivation, often where many of the housing providers are based. The Carbon Saving Obligation ECO will be applicable for housing stock that is hard to treat, such as solid wall housing, which requires internal insulation or EWI.

As the housing stock that best meets the criteria for ECO is treated, there will be further ECO offers that require additional funding to enable them to happen, either because they are in smaller numbers, or more widely distributed, or very expensive to treat. At this stage it is likely ERDF funding will have an important role as match funding.

All the Housing Associations that were interviewed stated that they still have large numbers of stock that needs treating with energy efficiency measures, including EWI.

There is a concern that the government may alter the ECO scheme if the funding allocation is spent quickly. (This was the case with FITs which caused a crash in the solar PV market). As was the case for CESP and CERT funding, it would seem that local areas able to package up large numbers of homes that qualify for ECO and can be treated with energy efficiency measures on a large scale will attract ECO deals more rapidly than smaller, fragmented schemes. LEP areas that have a plan for housing and an understanding of what types of housing will qualify for ECO will be well placed to negotiate good deals with the energy companies.

Project Viridis in the Liverpool City Region is already working on this, bringing together housing providers and local authorities with LEP support. Providers see Project Viridis as the body that can negotiate good deals on ECO with the energy providers and that can coordinate funding streams, procurement and support local jobs and skills development, ideally creating a steady pipeline of work for the supply chain.

The Low Carbon Hub, within AGMA is coordinating investment packages into construction in the City Region. It plans to establish a Green Deal and ECO Delivery Partnership bringing together Green Deal providers, energy companies and housing companies.

Leeds City Region has a Green Deal Project starting in April 2014 with the aim of treating 12,000 homes, creating 600 jobs and bringing in £60m in the City Region.

Green Deal

Green Deal has been established by the government as the cornerstone of a national low carbon retrofit programme for buildings. It allows energy consumers (private owners, private landlords, social rented and businesses) to pay for energy efficiency improvements through their energy bill. However, it must meet the Golden Rule – the package of energy efficiency measures must create annual energy savings that are more than the annual charge attached to the energy bill and the repayment period cannot exceed the expected lifetime of the installed measures.

Where the measures are very expensive and will not meet the golden rule, for example, in hard to treat buildings, the Carbon Saving Obligation ECO may provide additional funding.

Most of the Housing Associations interviewed consider the Green Deal as unsuitable for their tenants for two reasons, and this means it is unlikely that Green Deal will be a viable funding match for future ERDF funds.

- People who are fuel poor (including those who live in social housing) will take the majority of the theoretical saving as increased comfort. They are therefore likely to use less energy in the first place than the scheme predicts, so will not make the savings that Green Deal intends and the Golden Rule will not work.
- Their tenants should not be paying 7% interest on energy efficiency measures, which is the interest rate they would be paying through their energy bill for the Green Deal loan.

Some housing providers have found a way to use Green Deal to their residents' combined with their own capital investment funding and ECO. Northwards Housing are investigating this for future projects to be able to offer measures more widely across streets and estates. Wulvern Housing mentioned they may look at this approach combined with the Renewable Heat Incentive to fund air source heat pumps in suitable off-gas grid properties.

Gentoo Green Deal model¹²

Gentoo carried out a pilot Green Deal scheme in Sunderland to test their tenants' willingness to take up energy savings measures that incurred a cost for them. In a survey of 600 residents, 88% said they would be willing to pay for energy efficiency improvements. Gentoo targeted homes that needed their G-rated boilers replacing, (which had been included in Gentoo's existing investment plan), and gave them the opportunity to have double glazing and, in suitable properties, PV systems. The scheme uses a combination of investment plan funding, CESP and a customer charge, which works out at £1.06 per week on average, (the maximum charge being £1.59 per week). 80% of customers consulted took up the offer for the bundle of measures.

Green Investment Bank

The Green Investment Bank was set up by the UK Government with £3 billion to invest in sustainable projects. The priority areas for funding are:

¹² Gentoo: The Energy Saving Bundle Report - www.gentoo-group.com/gentoo-group/our-documents-and-policies/planet-documents-and-policies/being-greener-as-a-business/722/

- Offshore Wind
- Green Deal
- Non-domestic Energy Efficiency
- Waste

Its only involvement in housing retrofit is through the Green Deal, as discussed above.

European Investment Bank

The European Investment Bank (EIB) is already committed to financing energy efficiency and renewables in the social housing sector to the tune of £400m through The Housing Finance Corporation (an independent, specialist, not-for-profit organisation that makes loans to regulated Housing Associations). The scheme was over-subscribed but runs until December 2016. There are ongoing discussions for more finance with EIB. Should these be successful there may be a possibility of housing associations based in the of England accessing this finance in future (none are accessing it under the current programme).

Finance Instruments

Finance instruments or revolving funds can be established to leverage in greater amounts of investment and to support a wider number of projects. There are several such EU funds, including Jessica (Joint European Support for Sustainable Investment in City Areas), which has brought in £12m EIB support for energy efficiency retrofit in London through the Greater London Authority. The government has identified a role for financial instruments in the guidance issued to LEPs for their investment strategies.

Proposed Social Housing retrofit Financial Instrument (EIB and National Housing Federation (NHF))

The National Housing Federation has produced a Briefing for LEPs and is currently conducting an engagement process with the LEPs to discuss a proposal for *EU structural funds 2014 – 2020: opportunities for LEPs to invest in green economy through retrofitting social housing* which it produced in May 2013. The NHF jointly with the European Investment Bank is proposing a financial instrument using EU Structural Funds to finance energy efficiency improvement in social housing. This is included in guidance to LEPs issued by BIS with domestic retrofit being identified as one of the priorities.

This would be an 'opt in' model which would create an overarching lead fund at a national level with EU funding invested from LEP allocations with project delivery at LEP level. The model could be funded by both ERDF and ESF programmes. Match investment from the European Investment Bank would enable an additional 10% EU Structural Funds allocation to be made for the financial instrument. This would enable housing associations to use a combination of grant and loan (at a favourable rate) to be repaid either by the resident (green deal type repayment) or through housing association funds. Importantly, it would be supported by a financial intermediary experienced with working with housing associations, and would handle reporting and administration, taking the headache out of this side. The offer is currently a generic one, inviting LEPs to sign up to achieve economies of scale and better terms with the EIB.

The NHF are also looking at another financial instrument with Cabinet Office which would support social enterprise, possibly supporting Direct Labour Organisations that spring from housing associations in expanding and delivering ongoing maintenance and repair services and helping to escalate entrepreneurial routes to employment.

For more information on the National Housing Federation proposal contact Arno Schmickler, International Affairs, National Housing Federation, arno.schmickler@housing.org.uk Tel: 0207 067 1034

The briefing can be found in full on the NHF website:

<http://www.housing.org.uk/publications/browse/eu-structural-funds-2014-2020>

5.4 Learning on Funding

1. European funding is difficult to manage and perceived to be risky for the Housing Associations, but it provides important investment to trial new approaches to energy efficiency and renewable energy generation for housing providers, and brings in investment to the LEP areas.
2. Matching funding from different sources with different deadlines and payment timescales can create a level of exposure which is difficult for providers to manage. These issues need to be fully understood by applicants before bidding for funding. They will also need to ensure that they have undertaken a risk assessment to determine whether timescales for delivery are achievable and that their procurement processes are compliant.
3. Experienced and well-resourced project managers to coordinate and manage the ERDF process are essential to make the most effective use of ERDF funds for future large-scale housing energy improvements
4. Energy measures are expensive and continued grant funding is essential in areas where housing is low value, limiting the amount of finance that can be borrowed against it.
5. ECO is the most important funding source in the short term and the Housing Associations are working hard to attract as much of this as possible.
6. The Housing Associations routinely use their own funds for improvements to their properties: by combining these with additional sources of funding such as ERDF or ECO, they can invest in enhanced energy efficiency and renewables, maximising the improvements that can be made in one intervention and enabling them to trial new technologies or approaches on different property types.
7. Some LEPs may be working on a Green Deal Strategy for their local areas, but Green Deal loans on their own are unlikely to be a useful finance mechanism for Housing Providers, although they may be used in conjunction with other funds in certain circumstances.
8. LEP areas that have an understanding of what types of housing will qualify for ECO and EU funding, and have developed investment-ready packages of energy measures will be best placed to negotiate good deals with the energy companies and future ERDF support.
9. Peaks and troughs in demand caused by funding schemes coming to an end before follow on schemes are available, reduce confidence in the market and limit expansion of companies in the supply chain.

6 Summary and Recommendations

These four projects have provided a massive learning experience for the Housing Associations, contractors and other organisations involved. They have also delivered benefits in terms of jobs created, skills developed, energy and CO₂ savings and the capacity to deliver further schemes.

In the short term, ECO will be able to support the installation of further energy efficiency improvements in both social and privately-owned housing. However, the opportunity to attract further EU funding should not be missed. At the same time the difficulties faced by these four projects should not be ignored and the lessons should be incorporated into the design of future funding bids and programmes.

In order to ensure that the local benefits of housing improvements are maximised, and local areas are able to attract as much external finance as possible, LEPs should consider the following recommendations.

1. Make housing energy efficiency a priority in investment plans: LEP areas that have an understanding of what types of housing will qualify for ECO and EU funding, and have developed investment-ready packages of energy measures will be best placed to negotiate good ECO deals with the energy companies and future ERDF support.
2. Insulation delivers the most cost effective energy savings and also supports the largest number of jobs. Future projects should include insulation of hard-to-treat properties as a key priority and not simply focus on innovative technologies.
3. Ensure residents and community-wide engagement/communication is a core part of any project relating to energy efficiency and renewable energy in housing.
4. Ensure procurement frameworks and contracts contain clauses to support the use of local labour and the development of local skills.
5. Support or facilitate the development of partnerships to attract future investment in housing energy improvements.
6. Support the sharing of lessons learnt by the partners and project co-ordinators involved in these four ERDF projects.
7. Support the development of more robust methods of capturing data on job creation and CO₂ savings.
8. Ensure that project developers fully understand funding requirements before bidding and undertake a risk assessment to ensure timescales are achievable and procurement processes are compliant.

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Cumbria Cohesion

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John Lear: Managing Director, JPL

GMESH

Dave Catherall: Project Manager
Claire Hopkins: Head of Investments and Strategic Asset Management, Northwards Housing
Martin Taylor: Project Officer, Eastlands Homes
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REECH

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Frank Egerton: Project Manager
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David Kemp: Sustainability Manager, Procure Plus
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Rob Wolfe: Project Director, Construction & Housing Yorkshire

Appendix 1: Project Contractors

Contractor	Location
CARE	
Holdcroft Heating and Gas Fitting Ltd	Stoke
Lawtech	Kent
Keepmoat Bramall	Doncaster
Burrows Home Comfort	Wolverhampton
Solarcrest	Macclesfield
Rowlinsons	Macclesfield
Forrest Green	Preston

Cumbria Cohesion

Seddons Ltd	Bolton
JPL Plastering	Penrith
Speedy Scaffolding	Barrow
LoveSolar	Penrith
Eco green energy company	Carlisle
EcologicLiving	Carlisle
Artic Air	Whitehaven
Solway Renewable Energy	Wigton
Thomas Armstrong Ltd	Maryport
Mossom and Sydney Ltd	Maryport
Elliott Johnson Ltd	Tyne & Wear
Wolseley Group	Leamington Spa
Parex Ltd	Warwickshire

REECH

Keepmoat Bramhall	Doncaster
Transcast	Glasgow
Repex Ltd.	East Sussex/Warrington
QED Scaffolding	St Helens
UK Environmental & Asbestos Solutions	Sefton
Radial Electrical	Knowsley
Aspect Plumbing & Heating	Knowsley
Claire Fabrications	Wirral
A&M Insulation	St Helens
Titan Scaffolding Services	Wirral
S&H Construction	Knowsley
Helena PropertyCare	St Helens
Thextons	Wirral
Richmond Roofing Single Ply Ltd.	Co Durham
Modern Hygiene	Knowsley
Datum Construction	St Helens
AFM	
Harte and Co	St Helens
Ecovis	Sefton
Bladen Electrical Ltd	Oldham
DAS Systems	Bolton
W. Coulsons & Sons	Wirral

Winvid Development	Sefton
EPC Joinery	Wirral
Paramount	Liverpool
Altrad NSG Ltd.	Deeside
Alumasc Interiors	St Helens
Beaver 84	Widnes
HT Forrest	Preston
Lockwood	Bootle
Mercer Brothers Ltd.	Bolton
Roger Haydock & Co Ltd	Sefton
Rothwell Plumbing Services	Wigan
WSR Recycling	Widnes

GMESH

Henry Boot	Sheffield
Forrest	Preston
Belfry	Warrington
Manchester Working	Manchester

Appendix 2: Evidence on Jobs from Contractors

JPL Plastering Contractors Ltd, Penrith

JPL is a family business that won the contract to provide external wall insulation for the Cumbria Cohesion project. They have subsequently employed 17 people, including one apprentice, and are hoping to continue to employ them beyond the end of the contract. The project has given them a lot of exposure and helping them to develop new business in the private sector as well as forming relationships with the Housing Associations.

“It’s been very good for business. We’re over the moon with it” – John Lear, Managing Director

Seddon Construction, Bolton

Seddon is a large family business that won the primary contract for the Cumbrian external wall insulation. They have taken on 5 local people for this contract, including 4 trainees, and expect to be able to retain them at the end of the project. To meet the requirement to create local jobs, they held an Open Day for subcontractors, which attracted about 35 Cumbrian businesses, and around 80% of the project value has been delivered by these local firms.

John Lancaster, National Operations Manager for Housing Refurbishment, commented that the requirement to use and train local labour has become typical for this type of contract and something they do regularly.

Henry Boot Construction Ltd, Derbyshire, with a Manchester office

Henry Boot were the primary contractor for the refurbishment of the Eastlands tower blocks in Manchester. 145 people were employed on this project, both off-site and on-site, 67 of whom live in Greater Manchester. Due to the multicultural make-up of the area, multi-lingual liaison officers were provided to support the community.

Thextons, Birkenhead

Thextons is a chartered building company: in business for 12 years, it originally specialised in plastering and dry lining and double glazing. It has worked for Keepmoat since its beginnings. In 2012 Simon Thexton, MD and owner attended a ‘Meet the Buyer’ event run by REECH to raise awareness of the opportunities for local companies, and a REECH/Keepmoat event on external wall insulation. He hasn’t looked back since, and the company has expanded by 400%, rising from 90 to over 200 employees.

Managing the rate of work is important to consolidate local jobs and local skills, and being able to tender for work as a primary contractor would enable Thextons to source supplies more locally and to centralise distribution in future.

Thextons will be delivering EWI for ECO projects and have expansion plans for the future.

Titan Scaffolding Services Ltd, Birkenhead

Titan Scaffolding provides services across the construction industry and was heavily involved in cavity wall insulation until the end of the CESP/CERT funding and in Solar PV until the Feed In Tariff changes. Titan provided scaffolding to several REECH EWI projects and has seen an opportunity in ECO to provide an all-in-one package to Housing Associations, so has set up a new company in partnership with another provider – Titan Advanced Insulation Ltd. The REECH project has provided a bridge between funding schemes with a contract of around £200,000 which has enabled Titan to keep staff in employment, as well as providing other short-term jobs. Titan’s experience through the REECH project has consolidated its skills to provide EWI services under ECO, including fixing alarm boxes and satellite dishes as well as liaising with residents.

Appendix 3: Procurement Activities and Processes

The **Cumbria Cohesion** project very clearly wanted to develop opportunities for businesses within Cumbria, and used the procurement process to try to do that. Using the Procure Plus Framework they ran two mini-competitions – one for installers and one for materials. This took under four weeks.

They also ran a number of “Meet the Buyer” events to inform local firms about the programme, with the aim of encouraging them to develop partnerships to tender for the main contract. Unfortunately no local firms bid for this, and the contract went to Seddon in Bolton. However, the provision of jobs and training for local people was emphasised in the tender process and accounted for 30% of the evaluation marks. Seddon confirmed that they have created 5 new local jobs and around 80% of the value of their contract has been sub-contracted to Cumbria businesses.

Integrated Services (part of the Wolseley Group) won the contract to supply all of the materials for the scheme, rather than products being delivered from multiple sources. To support this they have opened a dedicated store in Workington which employs a local workforce, so that products can be delivered to site daily as needed.

Cumbria Cohesion Material Procurement Briefing Note included the following:

The requirements of the ERDF, which is part funding this work, mean that the following outputs must be delivered;

- *The supply chain of companies in Cumbria is supported and stimulated, in particular at least 12 Cumbrian businesses are supported; and*
- *Jobs are created and safeguarded in Cumbria.*

Please identify how your company will contribute to the delivery of these outputs in Cumbria.

GMESH: Eastlands Housing OJEU tender asked contractors the following:

Training and local labour

How they would support local labour and training in this project. Provide supporting evidence where possible of their previous experience in providing opportunities for local people of all backgrounds to be employed and trained, including apprentices

The Eastlands contract was won by Sheffield based Henry Boot Construction Ltd, which has Manchester offices. Henry Boot provides monthly KPI reports, including numbers of people assigned to the job, number of staff employed from the Greater Manchester area, from the local area, number of women, trainees etc.

Fusion 21 ‘Alliance Installation Framework’ & REECH Meet the Buyer Events

Fusion21 provide a collective procurement service on behalf of a number of Housing Associations, and this existing framework provided a transparent and OJEU compliant way to get project delivery on site quickly. Contractors on the Framework are a mixture of national and regional contractors. The REECH team held an initial ‘Meet the Framework’ event where each contractor on the framework had an opportunity to meet with the REECH team, Fusion 21 and the RSLs to understand more about the project.

A Meet the Buyer event was held to introduce existing Tier 1 Fusion 21 Framework contractors to local companies to explore possible future sub-contracting opportunities. The contractors held one-to-one meetings with prospective suppliers to outline their company’s buying process, and the kind of goods and services likely to be required in delivering framework contracts. Businesses

were given the opportunity to describe their products and services and were able to ask questions about the pre-qualification/tendering process.

The 40 companies attending the event were also offered business support assistance.

Procure Plus Frameworks

Procure Plus is a consortium of housing providers across and beyond the of England which manages EU compliant procurement for its frameworks and supports and promotes locally based and SME suppliers, training and job creation schemes and community benefit. www.procure-plus.com

Procure Plus has a successful track record of enabling SMEs and NW based companies to win contracts within an OJEU compliant process.

97 contractors are on Procure Plus frameworks for variety of goods and services related to repairs and maintenance budgets. There are 23 SMEs and 9 non-SME contractors based in the NW who won work including Forrest Green and Seddon.

In 2012-13 £88.7 million was contracted through Procure Plus, 75% of which was with NW companies (£36.7m with SMEs and £30.1m with larger companies).

The Procure Plus framework which has targets in place for contractors to support 2 trainees per £1m spend, supported and monitored by the Procure Plus team means that social benefit is maximised

Appendix 4: Monitoring Activities

The **University of Cumbria** is carrying out two pieces of research for Cumbria Cohesion:

- detailed monitoring of the physical performance of 4 properties, including air-tightness, humidity levels, heat loss, energy use to provide a cost-benefit analysis of the measures installed
- an evaluation of the behavioural response of residents in the improved properties, looking at their perception of the benefits of the programme, changes in lifestyle and changes in energy costs.

Results will be available in early 2014.

Cheshire Peaks and Plains Housing is planning two pieces of evaluation:

- customer satisfaction and behaviour changes among tenants in the insulated tower blocks
- a full 12-month monitoring of the 4 bungalows retrofit with a range of different measures

The report will be available in 2014.

Wulvern Housing is working with Energy Projects Plus and MMU on their Knowledge Transfer Programme to evaluate the project and is looking at:

- Innovative ways to engage with large numbers of tenants
- Actual energy savings achieved across a sample of properties
- The impact of combining technologies e.g. EWI, ASHP, solar thermal, PV

The report will be produced in 2014 but they will be sharing interim findings.

Golden Gates Housing Trust is monitoring 5 solar hot water systems remotely and their energy efficiency officers are also monitoring tenants fuel bills.

They will share the results when they have 12 months data (probably autumn 2013)

Chester District Housing Trust residents group has been monitoring energy use before and after the installation of external wall insulation in their tower block. They are currently reporting a 30% saving in energy bills.

Northwards Homes are monitoring residents' energy bills on a 3, 6 and 9 month basis as part of their behaviour change programme. The results are not yet available.

Plus Dane Merseyside have conducted pre and post works surveys for both their EWI schemes, seeking very detailed information on energy expenditure, and how homes affect residents' health and mood, income levels and employment status. The findings will be available in summer 2014.

Helena Partnerships have been working with the National Federation of Tenant Management Organisations (NFTMO) on a study of insulation installed with energy advice and without energy advice which has highlighted the importance of engaging with residents' engagement a to maximise the energy savings. This report has not yet been published but will be publicly available.

REECH is undertaking two related studies: EST has carried out surveys of low carbon economy businesses in Liverpool City Region and will be calculating final outcomes and outputs, and Liverpool John Moores University is undertaking a behavioural change study.

Appendix 5: External Wall Insulation Examples

Plus Dane Liverpool 8

For this scheme, internal insulation was initially considered a better approach, to preserve the look of the buildings (Victorian terraces). However, after consultation, the tenants chose external insulation as far easier and less disruptive, even though they did not really want the external look of the homes to change. *“Our hearts were saying internal insulation but our heads were saying external”.*

Planning consent for EWI has been very challenging in some local authority areas. Although the Victorian red brick terraces were of little architectural interest, the planning department required a dark pigment like brickwork, and there were issues with detailing (stone sills were required and brick arch had to be picked out) which added to cost and time. A planning application was required for each cluster, and a single house with owner occupiers on either side had to have its own planning application: 19 separate applications were needed for just 35 properties, 34 of which were funded by REECH/ERDF. Plus Dane also had to deal with issues with mixed ownership. They helped owner-occupiers in rows of terraces to receive grants so that the work could be carried out on all the homes in a row (an offer taken up by all the owner-occupiers).

“We learned that EWI really works from a technical perspective. It is also creating a demand; more and more people are asking when their homes can be done. Some people are not even having to switch on their heating and also found the house did not overheat, but stayed a cool temperature in hot sun.”



Northwards Housing

Northwards have installed EWI to 780 homes built in the 1960s using a system of “no-fines” concrete, to bringing the insulation up to current Building Regulations requirements. The system chosen was a rigid phenolic insulation board, covered with a decorative and weather-proof coating of either silicone render or pebble dash. While the energy savings look to be substantial, they have some concerns about future maintenance, as the insulation seems to promote algal growth on the outside of the building, and they may look into alternatives for future projects. Weather is a big factor in the render system, as it can only be applied in certain conditions (not too cold, hot or wet) and delays in decisions from the funders meant that the timescale for the project was not ideal.

To minimise overall disruption to the tenants, other energy efficiency measures were installed at the same time: loft insulation, double glazing, new boilers and energy efficient external doors.



Photo: Northwards Housing

Cheshire Peaks & Plains

CPP over-clad two 16 storey 1960s tower blocks in Macclesfield using bi-directional pearlescent 'Rock Clad Chameleon Cladding Panels' which change the appearance of the building in different lights. The system uses a framework which is fitted to the building walls to hold the insulating core material in place. It is sealed with a special insulating cladding which ensures air circulation within to prevent both the build-up of condensation and heat loss. They also added brise-soleil to the roof of the building to prevent over-heating in the summer and deflect heat from the low sun onto the building in winter. Windows were replaced at the same time and followed a programme of internal improvements to give a complete overhaul to the buildings.

Carl Newby from CPP commented: *"The architect (Pozzoni), consultant (Tweeds) and contractor (Rowlinsons) were really involved in the project from the start and understood how critical the ERDF reporting was to the funding, and well-organised support from the CARE team made the process easier."*

The project has been shortlisted in the Residential Category at the RICS Awards 2013 and was shortlisted in the RICS Awards 2012 in the Regeneration Category.



Photo: Rowlinsons

Wulvern Housing started using 120mm polystyrene EWI, but found that the thickness of the insulation meant extra work was needed around windows. They trialled 80mm phenolic board and 80mm mineral wool and settled on the latter as it gives better sound-proofing for no additional cost.

The properties are in a nature conservation site in the West End of Crewe, which is home to one of the largest colonies in Britain of endangered swifts. Wulvern installed special nesting boxes to ensure that their habitat was retained, and provided new nest sites. In July 2012 Wulvern were awarded a gold Green Apple Award for this project.

Cumbria Cohesion treated a mix of brick and render semis and bungalows in Workington, Maryport and Cleator Moor, that were built in the 1950s. Many homes are on exposed sites and were suffering water ingress where the cavity wall insulation had failed and required extensive remedial work. While the results have been very well-received by tenants, the cost per house increased by around 50% beyond the original estimates as extra work was needed to remove the old insulation and replace failing wall ties, and moving pipework and other fittings was more labour-intensive than predicted.



Photo: Impact Housing

Appendix 6: Tenant Engagement Activities

Energy Projects Plus surveyed residents across four of the **CARE** projects prior to the work being carried out, to find out what their concerns were. Most of these related to worries about noise, disruption and how to use the technologies, rather than the impact on their energy bills. EPP will be re-surveying the residents 12 months after the installation to gather their views on how the process worked and what effect it has had on their behaviour and energy use. They will be producing a report with recommendations at the end of 2013.

Cheshire District Housing Trust reported that the process has been a learning experience for the tenants as well as the Housing Association, and for Phase 2 the residents group has been involved in decisions about the technologies as well as the process.

Cheshire Peaks and Plains held regular tenant meetings to get input into the design of the cladding project and throughout the project.

Lee Smith, Neighbourhood Investment Manager, **Wulvern Housing**, said that visiting every house and spending half an hour with the residents means they get much better response to the work and reduces calls to customer services later.

Villages Housing trained tenants as community energy champions, helping residents to control heat in homes. They found that energy efficiency measures do not work if tenants are not provided with advice on making the savings. They also worked more widely across the community on energy advice, producing a curriculum-linked board game on energy advice for local schools.

Helena Partnerships are finalising a study project with the National Federation of Tenant Management Organisations (NFTMO) which examines the results of insulation installed without energy advice and with energy advice. Preliminary findings are that energy advice makes a big impact on the amount of energy saved.

Plus Dane have conducted a lot of engagement and consultation with residents and sessions with contractors, Halton Borough Council, and neighbourhood officers prior to EWI works being installed. They used a pre-installation questionnaire, which asked about residents' health and wellbeing, employment status and energy use. They will repeat the survey after a year and report on the energy and financial savings made. Plus Dane's Liverpool 8 survey showed that most people saw themselves as being responsible for changing their own energy use (rather than the housing association, energy companies or local authority) and the majority saw energy saving as important.

Eastlands Homes in Manchester have linked their residents to the Greater Manchester wide initiative on Carbon Literacy which provides a day's worth of training leading to the award of a Manchester Carbon Literacy Certificate. The training covers climate change and how we can reduce our impact on greenhouse gases, how to get help and how to motivate others to take action.

Northwards Homes are delivering energy use and behavioural advice to all residents, delivered by 16 officers who obtained a City & Guilds Level 3 qualification in behavioural change in 2012. This enables people to make the most of the measures installed in their homes.

Appendix 7: Funding Available for Energy Improvements

Housing Associations have been able to draw in external finance for energy efficiency improvements for many years. Over the course of these projects these included the following.

ERDF

This was the first time that ERDF funding had been available for use in social housing. An amendment was made in 2009 to allow all Member States to spend up to 4% of their total ERDF allocation on energy efficiency improvements and renewable energy in existing housing, in order to support social cohesion and to stimulate the private sector during a major recession.

Funding bids had to show:

- how they can progress and stimulate market developments in new, developing and innovative technologies;
- support for low carbon technologies to generate energy from multiple sources;
- a whole house solution to overcoming barriers to energy efficiency;
- showcasing in social housing domestic settings, to encourage SMEs to learn from the findings;
- behaviour change from the inhabitants of the dwellings;
- the delivery of economic growth, and a measured change in CO₂ emissions through energy usage reduction.

Basic measures such as low cost loft and cavity wall insulation and replacement boilers were not funded by the ERDF Programme because they were covered by other mainstream programmes.

Targets for the projects were CO₂ saved, number of technology types installed (from a list of approved measures qualifying for ERDF funding support), and jobs created.

CESP

The Community Energy Saving Programme (CESP) required gas and electricity suppliers and electricity generators to deliver energy saving measures to domestic consumers in specific low income areas of Great Britain. It provided incentives for the installation of solid wall insulation, renewable heat generation technologies, micro combined heat and power and replacement of G-rated boilers, and took a whole house approach, allowing for more than one measure in a home. Eligibility for CESP was determined by the income of an area – homes in the Lower Super Output Areas with the lowest 10% income as defined in the Indices of Multiple Deprivation.

CESP could be matched against ERDF. The CESP Programme ended on 31st December 2012.

CERT

The Carbon Emissions Reduction Target was also a requirement on energy suppliers to generate carbon savings through funding energy efficiency measures in housing, and was available to all householders including social housing providers. The scheme predominantly financed loft and cavity wall insulation, boiler upgrades and energy efficient lightbulbs. The energy companies were obliged to provide 40% of the carbon savings from the “priority group” of householders over 70 or receiving certain benefits. A flexibility mechanism provided incentives to install internal and external wall insulation in solid walled properties on and off the gas grid.

CERT could be matched against ERDF.

The CERT Programme was scheduled to finish in 2011 but was extended until December 2012.

ECO

The Energy Company Obligation is a new version of the schemes under which energy suppliers will continue to be obliged to improve the energy efficiency of buildings. The total value of ECO will be approximately £1.3 billion per year. Three types of ECO assistance exist:

- **Carbon Saving Community Obligation:** This provides insulation measures to households in specified areas of low income. It also makes sure that 15% of each supplier's obligation is used to upgrade more hard-to-reach low-income households in rural areas.
- **Affordable Warmth Obligation:** This provides heating and insulation measures to consumers living in private tenure properties that receive particular means-tested benefits. This obligation supports low-income consumers that are vulnerable to the impact of living in cold homes, including the elderly, disabled and families. *(This element is not available to housing associations)*
- **Carbon Saving Obligation:** This covers the installation of measures like solid wall and hard-to-treat cavity wall insulation, which ordinarily can't be financed solely through the Green Deal.

Like CESP and CERT, ECO can be matched against ERDF. Several Go-Early ECO schemes have been funded as pilots, and ECO schemes are currently being negotiated between housing providers and energy companies.

The current ECO scheme ends on 31 March 2015.

FITS and RHI

The Feed-In Tariff and Renewable Heat Incentive are government backed incentives that provide a payment for the generation of renewable electricity (FITs) and heat (RHI) for smaller scale installations. This income is designed to give a standard return on investment from investment in the technologies. FITs and RHI cannot be claimed on technologies installed using public funding. So housing associations had to choose between 50% upfront capital from ERDF or a long term income from FITs/RHI. In reality, the value of FITs & RHI is better for some technologies than others.

About Quantum

Quantum Strategy & Technology Limited has internal quality procedures which are registered with Certified Quality Systems Limited as compliant with BS EN ISO 9001 (Registration No: GB2002499). All work conducted by Quantum and its subcontractors is carried out in accordance with these in-house procedures and documentation systems.

For more information contact
Quantum Strategy & Technology
Halton Mill
Mill Lane
Halton, Lancaster
Lancashire
LA2 6ND
Tel (Office): +44 (0) 161 924 2388
Tel (Mobile): +44 (0)7870 193053
Fax: +44 (0) 161 924 2389
Email: gill.fenna@quantumst.co.uk

About ESTA

The Environmental Sustainability Technical Assistance (ESTA) project is funded by the Environment Agency (EA) and ERDF to support the five North West LEP areas to embed environmental sustainability into their economic development priorities and work streams; it runs from April 2012 to December 2014.

For more information visit
www.enworks.com/ESTA-intro



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