Tackling fuel poverty through renewable heat

A real life renewable retrofit blueprint

Follow Trent & Dove Housing's journey to combat fuel poverty through retrofit heating upgrades featuring ground source heat pumps.

Discover a project blueprint and off-the-shelf package that you can use to improve your housing stock, with the reassurance of a proven and well defined fast track programme and support network.

Key Points:

- Ground source heat pump solutions
- Guided process
- Project in practice
- Tenant experience

Hear how Trent & Dove Housing's pioneering project reduces tenant fuel bills & generates a long term income to cover its costs



Brought to you by:







In association with:







THE CASE FOR GROUND SOURCE HEAT PUMPS

Real-life Renewable Retrofit Blueprint

As Chairman of the National Housing Federation, and through my work advising Government on Planning Policy, I have a long standing interest in renewable energy, and how we cut the cost of heating for rural communities.

Heating costs are a problem for us all, but place special pressure on off gas rural communities and those in affordable housing who are generally on very low incomes. Until now most affordable housing providers have struggled to finance the upfront installation costs generally associated with ground source heat pumps, even though maintenance costs, and of course tenant fuel bills, are very low.

Kensa's micro ground source heat network solution transforms the economics - a solution perfectly fitted to affordable housing in rural areas; demonstrated perfectly in the ambitious programme completed by Trent & Dove Housing.

The combination of the Non Domestic Renewable Heat Incentive (RHI), the revisions to ECO (in the case of retrofit), and Kensa's new smaller Shoebox heat pump in each property linked to a micro ground source heat network, equates to a heating upgrade solution that should be embraced by social housing providers to cut fuel poverty and get paid to do it.



Lord Taylor NATIONAL HOUSING FEDERATION

As Director of Property Services at Trent & Dove But here is a solution. Housing in Staffordshire, I have a passionate desire in renewable energy, and how we slash the cost of heating and supply of hot water for off-gas, and vulnerable residents. The supply of affordable heating and hot water are a problem for us all, but more so for the residents groups we have been targeting.

Those resident groups in affordable housing who are generally on very low incomes struggle to heat their homes adequately and they suffer the consequences. Until now most affordable housing providers have not been able to afford the up front capital costs associated with ground source heat pumps, even though maintenance costs, and of course residents energy bills are significantly reduced.

Trent & Dove's work with Kensa's in the installation of ground source heat pumps transforms the economics – a solution perfectly fitted to affordable housing in rural areas; demonstrated perfectly in the ambitious programme completed in May 2015. The combination of the Renewable Heat Incentive (RHI) and ECO funding makes the financial case for undertaking this work

Steve states that this method of installation of new technologies should be embraced by the social housing sector to reduce fuel poverty, reduce excess winter deaths, increase the well-being of residents and, make a surplus in the process.



Steve Grocock TRENT & DOVE HOUSING

Brought to you by:







In association with:









Introduction

With the aim of significantly reducing resident energy bills in light of the growing fuel poverty and excess winter deaths crisis, Trent & Dove Housing has recently completed the very successful installation of ground source heat pumps in 133 of its rural, electrically heated homes.

Trent & Dove manages approximately 5500 properties across East Staffordshire and South Derbyshire. 3750 homes are located in Burton on Trent, 800 are in Uttoxeter, a further 900 are scattered throughout the villages of East Staffordshire and 50 are in neighbouring South Derbyshire.

As an organisation Trent & Dove is committed to providing tenants with homes which are comfortable, warm and energy efficient. However, a large proportion of their properties – in particular those in more rural areas – are without access to gas and are predominantly heated by electric night storage heaters.

In spring 2014, Trent & Dove approached Kensa to consider the feasibility of installing ground source heat pumps across its entire portfolio of electrically heated homes. Their express aim was to significantly reduce resident energy bills and the impacts of under heated accommodation on both long term building maintenance and mitigation of increasing excess (and by definition avoidable) winter mortality.

Predominantly bungalows and sheltered accommodation units occupied by elderly and vulnerable residents, the properties had benefitted from recent insulation upgrade measures but remained on Trent & Dove's "hard to treat" list and were in need of further measures to reduce resident heating bills.

Ground source heat pumps were identified as an ideal way of significantly reducing resident energy bills, providing a more robust and technically elegant solution than other options, such as air source heat pumps. The innovative "micro ground source heat network" solution proposed by Kensa provided the Trent & Dove with the opportunity to offset the capital installation costs with a subsidy through the Energy Company Obligation (ECO) and a profitable, long term income stream generated through the Government's Renewable Heat Incentive (RHI) scheme.

This document is aimed at providing likeminded housing associations, with quantities of off gas heated homes, with a blue print for tackling heating upgrades using efficient and sustainable ground source heat pump technology. It covers the approaches taken by Trent & Dove, how risks were identified and pro-actively addressed, project funding and finally direct feedback on the project outcomes and learnings.

Brought to you by:





In association with:











Project objectives

- Address fuel poverty issues in electrically heated, off gas grid housing stock, with the aim to reduced resident energy bills by 50%;
- Improve tenant health and wellbeing in hard to treat / under heated properties;
- Secure a 20 year income stream for Trent & Dove through the Non Domestic Renewable Heat Incentive (RHI);
- Secure support funding through the Energy Company Obligation (ECO);
- Complete the project by the end of April 2015 (four months from project commencement date);
- Minimise exposure to VAT and other tax implications;
- Provide a blue print for dealing with "high churn" general needs properties suffering from heating related issues.

Project outcomes

- 133 semi-detached electrically heated bungalows (off-gas)
- Fitted with a ground source heat pump and new wet central heating system
- Cost = £1.8 million
- Only 5% VAT payable on the whole project
- Total income = £2.3 million through the RHI and ECO
- Tenants savings per annum = £350 £750
- Tenant satisfaction...? Off the scale!
- Reduced excess winter deaths

Project statistics

- 10km of drilling
- 32km of pipe work
- 20 installations per week at peak
- Heat pump installed every 4 hours
- Over 600 storage heaters removed
- Potential tenant running cost reduction = £62,000 per year

Ground Source Heat Pump Benefits

1. Trent & Dove's decision to use ground source heat pumps

A paramount objective of the project was to reduce resident energy bills, which have continued to increase year on year as a result of ongoing rises in energy prices.

Resident feedback clearly indicated that the night storage heater systems were unpopular. They were expensive to run, difficult to control and have a direct link to increased tenant turnover in many of the properties, an issue which Trent & Dove felt could be dealt with by the installation of more efficient, lower cost heating solutions.

Running cost savings

By taking advantage of the free, renewable energy stored in the ground, ground source heat pumps are a proven technology, able to reduce heating and hot water costs by as much as 50% when compared with electric heating.

This is not only as a result of the improved efficiency (every 1kWh of electrical consumption produces around 3kWh of heat), but also because the systems are fully controllable, allowing tenants to operate their heating in line with their own needs, while removing completely the over heating / under heating syndrome typically associated with off peak electric heating systems.

Better still, switching from an off peak to a standard rate electricity tariff - which is far better suited to a ground source heat pump system - also resulted in additional savings for general, day time household electricity consumption.

Lower heating bills also means residents are able to adequately heat their entire property, reducing long term building maintenance issues such as damp. This in turn leads to lower tenant turnover in properties where ground source heat pumps are deployed, while residents also benefit from higher levels of disposable income, potentially reducing the problem of rent arrears.

Maintenance, durability and longevity

A key advantage of ground source technology is that its inherent durability means that whole life ownership costs are low. Typically installed inside the dwellings themselves (floor mounted within the airing cupboard) and therefore not exposed to the external elements in the same way as, for instance, air source heat pumps, the Kensa ground source heat pumps are expected to operate efficiently for at least 20 years.

Importantly, the associated borehole array will continue to serve the property for up to 100 years, so even if the heat pump itself has to be replaced, the ground array can be reused.

Maintenance costs are low, there is no mandatory annual safety inspection and preventative maintenance is minimal, limited mainly to a bi-annual inspection of the ground array heat transfer fluid. Maintenance of the heating system is otherwise no different to conventional central heating.

Brought to you by:



In association with:











Incentives

Trent & Dove has previous experience with other renewable technologies, including air source heat pumps.

While the technological benefits of ground source heat pumps compared to air source heat pumps were appreciated, including the very clear benefit of continually low running costs throughout the coldest parts of the heating season delivered by ground source and the mitigation of concerns regarding noise and general longevity, a key influencing factor in the decision to move forwards with ground source centred on the funding support options available.

The Renewable Heat Incentive (RHI), a Government backed scheme aimed at promoting the uptake of renewable heating technologies, provides a long term income for system owners, including social landlords, for the renewable heat generated by installations.

There are two streams within the RHI. The Domestic stream provides a guaranteed income over 7 years, however, regardless of technology, is not especially well suited to the needs of the social housing sector as the scheme relies on a combination of the tariff income and the fuel cost saving contribution to provide a return on investment. This is unhelpful in the social housing environment, where the landlord does not receive the fuel bill saving element. The Non Domestic RHI however is also able to support residential district heating systems. Kensa recommended a unique approach using ground source heat pumps to provide Trent & Dove with a lower capital cost installation and more profitable, long term income stream by using this stream of the RHI.

By installing an individual ground source heat pump in each dwelling, yet allowing multiple heat pumps to share a common ground array, "micro ground source heat networks" meet the definitions laid down by Ofgem and DECC of "district heating". This provides eligibility for the more attractive Non Domestic stream of the RHI, generating a return to the landlord based on metered heat consumption over 20 years.

In addition, the system architecture is also recognised as a measure able to attract Energy Company Obligation (ECO) funding, which provides a capital subsidy towards the system investment costs. This is based on CO₂ savings, so is ideal where electric heating is being displaced.

The combination of these two funding streams therefore provided a strong business case on which Trent & Dove could make both a strategic and commercial decision.

	Domestic RHI	Non Domestic RHI
Coverage	Individual domestic properties	Residential district (2 or more properties)
Includes retrofit	Yes	Yes
Includes new build	No	Yes
Tariff payment	7 years	20 years
Heat measurement	Deemed	Metered
Paid on	"Renewable" heat only	All heat
Tariff rates	Modest - requires combination with fuel cost saving to produce payback	Attractive - GSHP rates recently doubled
Can be used in conjunction with ECO	No	Yes*
Total expected RHI income based on typical 8,000kWh / yr home>	£8,019**	£17,183

Micro ground source heat network

2. Ground source heat pumps - the ideal alternative to traditional heating

Kensa's innovative "micro ground source heat network" approach allows social landlords to realise the full potential of ground source heat pumps in both new builds and existing housing stock and is particularly idea for heating system upgrades in groups of off gas grid and rural housing stock.

Regulations, 2014).

Featuring an individual Kensa Shoebox heat pump installed within each dwelling, the ground source heat pumps in two or more homes are linked to a communal borehole ground array. Each heat pump serves a new, low temperature radiator based central heating system and hot water cylinder, while conventional central heating controls operate the system.

The "heat network" is created by linking multiple properties to a communal ground array, designed to deliver an efficient, reliable and durable source of heat for the life of the property.

Crucially, this approach is recognised by DECC and OFGEM as meeting the definitions of district heating, meaning both new build and retrofit installations are able to access generous payments for 20 years through the Non Domestic Renewable Heat Incentive. Systems replacing electric heating in existing housing stock are also able to tap into capital subsidy support through the Energy Company Obligation.

Kensa's solution also overcomes the drawbacks of traditional "central plant" district heating systems, as efficiency is not compromised by heat loss in the distribution pipework. There is no need to meter and apportion energy bills between dwellings, thus avoiding the need to comply with recent regulations in this area (Heat Network (Metering and Billing) By utilising a communal ground array, overall drilling costs can be reduced, more flexibility on the location and layout of boreholes can be offered and an overall more robust system architecture delivered than if individual boreholes for each property were to be provided.

Brought to you by:

















1. Micro

Under DECC's guidelines, as few as two properties linked together with a common ground array can be considered a heat network (or district) system, qualifying for the Non Domestic RHI.

2. Cost-effective

Reduced drilling costs due to a smaller number of deeper boreholes.

Q

8

10

3. Robust

Communal nature of the array enhances design robustness, reducing risk of the ground being exhausted as "diversity" can be provided across the array.

4. Flexible

Boreholes can be positioned flexibly across the site, as there is no specific requirement for a borehole within the curtilage of each plot.

5. Scalable

The district nature allows installations to take place in line with project stages.

6. Compliance

Exempt from Heat Network (metering & billing) Regulations 2014.

7. Controllable

Featuring an individual heat pump in every property, tenants have absolute control over their own comfort levels and energy costs.

8. Sustainable

A Kensa ground source heat pump provides 100% of the properties heating and domestic hot water.

9. Compatible

Works with radiators or underfloor heating.

10.Planning exempt

Meet permitted development rights criteria.

Project Summary

3. The properties

Trent & Dove addressed the heating systems in a total of 133 one and two bedroom semi-detached and terraced bungalows.

Many of the properties lie in rural locations away from the gas grid in small villages in Staffordshire and Derbyshire.

All were previously heated by outdated, inefficient night storage heater systems, universally disliked by the residents.

Properties had undergone basic energy efficiency upgrades over recent years, including cavity and loft insulation and glazing improvements.

The project spanned 15 different sites, although crucially each site had clusters of adjoining bungalows that were close enough to one another to be able to share a common borehole ground array. In many instances, two adjoined bungalows share a single borehole, approximately 120 – 150m deep.



Brought to you by:

In association with:













4. The residents

Occupiers of the bungalows were typically older, more vulnerable residents, many of whom were sensitive to cold and damp and therefore had a need for more affordable heating systems.

This also meant that the installation process needed to be speedy, efficient and as stress-free as possible for the residents.

While some residents were initially concerned about the potential disruption and upheaval, the proactive and collaborative approach between Trent & Dove and Kensa during the tenant liaison phase meant that sign up rates were in excess of 95%.

Each resident was visited individually and given the opportunity to ask questions about the technology and the process. First class communications materials produced jointly between Kensa and Trent & Dove proved vitally important in ensuring every resident was fully engaged.

While the drilling of the boreholes caused minimal disruption – and indeed generated a great deal of interest among the residents – the installation of new heating systems inside the properties meant that temporary heaters were needed during the 2 - 3 day period of the fit out.



"The storage heaters were fine up to a point, but come 6pm in the winter we had to use an electric fire, which meant we had big electric bills. The letter saying we were going to have a ground source heat pump came just prior to Christmas – and it was the best Christmas present we had that year! It was brilliant! - Mr & Mrs Carter, Trent & Dove Housing tenants

Project Delivery Partners

5. Kensa Contracting

Kensa's dedicated delivery arm, Kensa Contracting, was entrusted with delivering the project, in liaison with the Trent & Dove Housing asset management team.

Kensa acted as principal contractor, taking responsibility for all aspects of the project delivery, including all MCS related design and specification work. Kensa sub-contracted specialist drilling and ground works contractors, Geo Drill Ltd and also the plumbing and heating contractor, J Tomlinson Ltd, who are Trent & Dove's framework planned and responsive maintenance contractor for heating.

Kensa assigned two full time project managers to the contract, who between them oversaw every element of the programme on the 15 individual sites, from tenant liaison, to external works to plumbing, heat pump installation and commissioning/hand over.

Part of Kensa's responsibility within the programme was also to deliver ECO funding and provide support in submitting successful bids to Ofgem for the Non Domestic Renewable Heat Incentive.

6. Encraft Ltd

Trent & Dove also chose to engage the services of specialist renewables consultants Encraft, with whom there was a long standing relationship based on previous energy efficiency and renewables projects. Encraft provided third party verification of Kensa's design work and oversaw the quality of Kensa's installation work, both in terms of borehole drilling/external works as well as the internal fit out of the heating systems by J Tomlinson.

7. J. Tomlinson Ltd

J. Tomlinson has a long standing relationship with Trent & Dove Housing and is currently the incumbent framework contractor providing planned and responsive maintenance work to all of Trent & Doves gas heated properties.

Within the scope of this project, J. Tomlinson was subcontracted by Kensa to provide all the necessary plumbing and heating work within the property, including removal of night storage heaters, installation of new radiator systems and hot water cylinders, and installation, connection and set to work of the ground source heat pumps themselves.

J. Tomlinson had previously retained its relationship with Trent

& Dove through a successful OJEU bid and although working under sub-contract to Kensa in this instance, was able to provide the heating system installations at the framework rates agreed with Trent & Dove.

Crucially, J. Tomlinson will also be responsible for ongoing maintenance of the systems and so has direct experience of what is installed and how the systems operate. All too often, social housing providers fail to consider the long term support and maintenance issues that need to be covered. These are best dealt with by providing the experience and know-how to an organisations preferred contractor as part of the installation process.









In association with:









8. Trent & Dove Housing project team

Central to the success of the project was the in house support provided by Trent & Dove's asset management and customer services team. Having no previous experience of ground source heat pump installations and being tasked with delivering such an ambitious programme within challenging timescales was a daunting task for the Trent & Dove team.

Technical Project Manager, Gary Hill, was appointed to oversee the project and provide direct liaison with Kensa on all technical/operational related matters. Regular site meetings between the Kensa team, Gary and Asset Manager Julie Steventon ensured that the project ran as smoothly as possible. Trent & Dove were always aware of any issues as they arose, allowing them to be dealt with quickly and efficiently.

A key element of the project was upfront tenant liaison, which was handled with the support of Trent & Dove's Tenant Liaison Officer, Amy Hicks. The excellent communications materials provided to the tenants ahead of the project and high level of ongoing resident engagement meant that sign up rates were in excess of 90%, while tenant satisfaction is 100%.

The key point here is that a project of this nature will not only stand or fall based on the quality of the contractors, but also on the clients attitude and approach to pro-actively assisting to remove obstacles and barriers to ensure a successful outcome all round.



Project Finances

Capital costs 9.

The overall capital investment (before ECO subsidy) required by Trent & Dove to carry out the installation in 133 properties was £1.8m. This included VAT at 5%, which needed to be considered, as Trent & Dove, like many other housing associations and charitable organisations, is unable to reclaim VAT.

On a per property basis, this equates to an investment cost of £13,500 per dwelling, which included:

- Provision of communal ground array and associated groundworks;
- Supply and installation of Kensa 6kW Shoebox ground source heat pumps and heat pump specific hot water cylinder;

- Supply and installation of a new, wet central heating system, including removal of old night storage heaters;
- Supply and installation of metering equipment in accordance with the requirements of the RHI;
- Full system design, commissioning, technical support and RHI/ECO compliance.

While Trent & Dove did not have specific plans or budget allocation within the installation period to replace heating in all 133 properties, this planned future cost is also included in the financial illustration, as at some point in the future, the electric heating systems would have required replacement of some sort or another, and was allowed for in Trent & Dove's long term asset management plan.



Brought to you by





encraft







RHI income

10. ECO funding

District heating systems are considered an eligible measure under the Energy Company Obligation. Through Kensa's relationship with EdF Energy, an ECO subsidy for each property could be provided.

The level of ECO funding varied from property to property,

based on the CO_2 savings reported by pre and post installation EPC's and which stream of ECO funding any given site or individual tenant was eligible for.

In total however, ECO funding was able to subsidise the overall project investment cost by approximately 20%.

11. RHI funding

Each "micro district" system is registered under the Non Domestic stream of the RHI, providing Trent & Dove with a 20 year income stream.

Payments are made quarterly, based on metered heat consumption. Kensa has provided facilities for Trent & Dove to remotely access meter readings, thus avoiding the need for site visits. The projected income from the installations over 20 years is £1.9m, this is based on residents using 90% of the heating and hot water energy estimated by the properties EPC. This could rise to £1.99m if 100% of the heating and hot water consumption projected by the EPC were to be consumed.

12. Project management costs

In addition to the core investment cost, Trent & Dove also chose to cover any uncertainty over technical risk by appointing Encraft as a project technical consultant to oversee the quality and technical competency of Kensa's design and installation work.

Crucially for the success of the project, Trent & Dove also ensured that its Asset Management team were fully engaged with the project from the outset, appointing a Technical Project Manager from with its own resources, as well as assigning key Tenant Liaison staff to support the project.

Trent & Dove Process

13. Predicted energy cost savings

A paramount objective of the project was to reduce resident energy bills.

Initial energy modelling of the properties suggested an average annual energy cost saving of £415 per year.

Subsequent modelling, based on confirmed data obtained from the Energy Performance Certificates indicates that savings will exceed initial projections:

- 1 bed bungalow: Expected annual saving: £497/yr
- 2 bed bungalow: Expected annual saving: £549/yr



Total heating and hot water costs

Brought to you by:





encraft

In association with:









14. Property selection

In total, Trent & Dove has approximately 450 off gas grid or electrically heated properties.

In identifying the properties most suitable for the ground source heat pump scheme, Trent & Dove undertook a full Asset Performance Evaluation exercise, to identify those properties with the highest heating costs and also those indicating higher than average tenant turnover as a result of heating related issues.

Sheltered properties with the most vulnerable residents were eventually identified as providing the most urgent need for action, principally as replacing expensive, inefficient night Residents in these properties also tend to have a higher annual heat demand than general needs housing due to typically higher average room temperature and occupancy levels. This also provides greater certainty of return from the RHI, which is based on metered heat consumption.

In selecting candidate sites for the project, Kensa provided analysis of underlying geological conditions, enabling the most suitable sites for the installation of ground source heat pumps to be identified.



storage heater systems would make the most difference to these tenants' lives. It would also provide the potential to positively impact the number of excess winter deaths among the association's most elderly and vulnerable tenants.

Trent & Dove Process

15. Procurement

The total project value of £1.8m would, under normal circumstances, have required Trent & Dove to conduct a tendered procurement exercise under its governance rules. However due to the unique nature of the project, a *special circumstances* clause within Trent & Dove's financial regulations was able to be used, avoiding the need for works to be tendered. This was justified on the basis that:

- Unique technical proposal (i.e. could other contractors reliably provide accurate and directly comparable costing and income returns for such a solution?);
- Ability of Kensa to bring ECO funding directly to the project, through its contract with EdF Energy;

- Trent & Dove Housing's incumbent, OJEU framework, plumbing and heating contractor, J Tomlinson Ltd, involved in the project delivery supply chain;
- Willingness of Kensa to underwrite specific commercial aspects of the project, to reduce project income risk from Trent & Dove Housing.

This allowed the project to be delivered under a fast track programme, aimed at completing the installations before the end of Trent & Dove's financial year.

16. Risk mitigation

Benchmarking

The average cost of £13,500 per dwelling (including VAT) was benchmarked against seven other social housing providers Kensa had previously worked with. These clients proved accommodating in sharing their previous experiences and assisting with the cost benchmarking exercise.

Part of this exercise also involved speaking with and visiting residents of these housing associations, allowing Trent & Dove to confidently underpin the energy cost savings Kensa predicted.

Minimising costs

Trent & Dove ensured two specific areas of cost were kept to a minimum.

Firstly, Trent & Dove insisted that its OJEU framework contracted plumbing and heating partner, J Tomlinson Ltd,

was contracted by Kensa to provide the internal heating system fit out. This ensured that this work was undertaken at the pre-agreed OJEU contract rates. J Tomlinson will also be responsible for providing long term maintenance of the ground source heat pump systems under the scope of their responsive maintenance framework agreement with Trent & Dove.

VAT was also an area of consideration for Trent & Dove, as its charitable status means that VAT cannot be reclaimed. HMRC guidance suggests that renewable technologies attract a 5% rate of VAT. Under the project's contractual agreement, Kensa agreed to underwrite that should circumstances change, Trent & Dove would not be exposed to any higher levels of VAT payment.

This provided a potential VAT saving to Trent & Dove of £270,000.

Brought to you by







In association with:







16. Risk mitigation (cont.)

Technical Risk

Trent & Dove had never installed ground source heat pumps before. In order to provide mitigation of technical risk within the project, Trent & Dove contracted Encraft Ltd as technical consultants to provide technical project oversight.

Under the scheme:

- Kensa was responsible for calculation of heat losses, borehole ground array specification and heating system design/specification;
- Encraft provided due diligence checks on all calculations and signed off each dwelling / ground array prior to installation;

- Encraft oversaw each element of the installation works, verifying that boreholes were drilled and systems installed in accordance with the agreed specifications;
- Each system was signed off by Encraft on completion

While Kensa held MCS responsibility for the project and ensured all design and installation work remained compliant with the prevailing industry standards, Encraft's involvement provided confidence to Trent & Dove that all technical elements were suitably scrutinised and subject to independent due diligence.

17. Providing certainty of income streams

While Kensa had previously installed ground source heat pump systems for many social housing providers, including a number of recent ground source heat network schemes, these were predominantly delivered under other grant funding initiatives, such as the Renewable Heat Premium Payment scheme or funded via an EST Ready for Retrofit initiative, which rendered the RHI ineligible.

Trent & Dove therefore required Kensa to provide certainty that the proposed scheme would be fully eligible for the Non Domestic RHI and ECO funding. As part of the contractual agreement with Trent & Dove, Kensa agreed to provide commercial guarantees that the installations would be registered with both schemes, thus reducing Trent & Dove's exposure to risk in this area.

In total, Kensa has registered approximately 60 ground source heat network installations with Ofgem under the Non Domestic RHI on behalf of Trent & Dove (a network constitutes two or more properties). These are the first installations of this type to be registered for the Non Domestic RHI scheme, and provide a clear blueprint with Ofgem for the technical submission for future installations of this nature.

Delivery & Process

Trent & Dove Housing's ground source installation programme was delivered within an ambitious four month timeframe starting on 7th January 2015.

Full design, tenant liaison, borehole drilling and installation of new wet heating systems and the heat pumps themselves were all completed by 30th April 2015, enabling Trent & Dove to account for the project within the prevailing financial year.

Step 1: Survey & Design



Kensa undertakes detailed site surveys and geological research to establish property heat loads and design the heat network borehole arrays. Spread over 15 sites, the design element took 1-2 weeks per site, including the detailed borehole design work. Kensa's designs were verified by Encraft to provide additional quality assurance.

1 - 2 weeks per site

Brought to you by:







In association with:









Step 2: Tenant liaison



Trent & Dove Housing and Kensa conduct face to face tenant liaison to introduce the benefits of ground source heat pump technology and answer questions about the installation process.

The vast majority of residents were hugely receptive, especially once they heard about the experiences of other Kensa customers.

1 day per site

Step 3: Ground inspection



The drilling operation is carefully planned and requires a considerable amount of equipment. A secure site compound is set up and residents kept fully informed of planned activities.

Drilling contractor Geo Drill Ltd ensures mess and disruption are minimised, keeping sites clear, clean and tidy at all times. Before drilling starts, a 1.2m deep inspection pit is dug to check the ground for any obstacles, such as drains or cables.

2 - 3 hours per borehole

Delivery & Process

Step 4: Borehole drilling



Borehole drilling is the first phase of work on site, before any other trades commence. Mobile drilling rigs drill vertical boreholes between 90—130m deep to create each micro ground source heat network, serving between two and five properties. Each borehole takes 1—2 days to drill but will last 100 years.

In total, 10km of boreholes were drilled and installed with

Brought to you by:







In association with:



32km of pipe!



At its peak, four sites were drilled simultaneously to achieve

1 - 2 days per borehole

the ambitious programme time frame.





Step 5: Trenching & headering



Geo Drill dig trenches from the boreholes and pipework is laid to connect the boreholes to individual heat pumps in each property. The turf is then carefully re-laid to ensure minimal disruption.

1 day per borehole

This photo was taken just four weeks after the groundworks were completed; there is hardly a visible sign that a drilling rig has been on the front lawn!

ST.

Flow and return pipework from the ground array runs into the property loft spaces via insulated pipework, discreetly concealed by plastic cladding.

AD.

Delivery & Process

Step 6: Internal plumbing



Once the external works are complete, installation of the new heating systems commence. At the project's peak, J. Tomlinson Ltd had eight active installation teams committed to the project. In just 2-3 days per property, the storage heaters were removed, new pipework, radiators, hot water

cylinder, and the Kensa ground source heat pump were installed. Residents frequently commented on the speed, cleanliness and

courtesy of J. Tomlinson staff. 2 - 3 days per property

Brought to you by:







In association with:

J.Tomlinson







Step 7: Heat Pump installation



Step 8: Electrical installation



Delivery & Process

Step 9: Commission



Step 10: Handover



J. Tomlinson ensures each ground source heat pump is quality-checked and hands over the ready-to-go systems with easy to use instructions and dedicated technical support. Encraft spot check system designs. Trent & Dove Housing inspect every installation.

1 hour per property

Brought to you by:







In association with:









Step 11: Customer satisfaction!



"There is no comparison between this system and the night storage heaters – this is 1000 times better. It is wonderful. The house feels warmer and you can control the temperature, which is terrific. It's brilliant, absolutely brilliant. I'm sure it's knocked years off my age!" - Mrs Carter



"This is the best heating I've ever seen – and the hot water is even better still. I'd recommend it to anybody, and it's not just me talking – I speak to neighbours and they've all said it is fabulous. Everybody I've spoken with has been terrifically pleased with it."

- Mr Rowe



Brought to you by:













Supported by:



In association with: