North Tyneside Council
Report to Cabinet
Date: 10 December 2012

ITEM 6(d)

Title: Council Housing Green Fund

Portfolio(s):	**Housing Transport and the Environment**	**Cabinet Member(s):**	**Councillor Paul Mason Councillor Ed Hodson**

Report from Directorate: **Community Services**

Report Author: **David Foster, Property Services Manager, North Tyneside Homes** **Tel: 0191 6437801**

Wards affected: **All**

PART 1

1.1 Purpose:

The purpose of the report is to give further consideration to the applications of the council housing "Green Fund" following a motion agreed by Full Council on 25 October 2012 which stated: "This Council notes that Cabinet has recently considered a report on the use of the "Green Fund" and approved the proposals and recommendations to install Voltage Optimisers. This Council therefore requests that the Cabinet reconsider their decision in light of the evidence available and then to submit a report to full Council for consultation, prior to any contracts being entered into, whether this technology is good value for money and will deliver meaningful energy savings for tenants.''

1.2 Recommendation(s):

It is recommended that Cabinet:

(a) Re-affirm its decision of 8 October 2012 to install Voltage Optimisers in Council homes that have not directly benefited from the provision of solar panels, as described in this report, within the resources available from the Council Housing "Green Fund";

(b) Refer the report to Council as requested in the Council motion agreed on 25 October 2012.

1.3 Forward Plan:

This report appears on the Forward Plan for the period 14 November 2012 – 13 March 2013 (published on 14 November 2012).

1.4 Council Plan and Policy Framework

This report supports the Council's objectives of reducing fuel poverty and the level of carbon emissions (CO2).

1.5 Information:

Background

1.5.1 At Cabinet on 8 October 2012 it was agreed that voltage optimisers be fitted in 468 council homes through till March 2014 utilising resources made available from the "Green Fund" at a cost of £234k.

1.5.2 Following the motion agreed by Council on 25 October 2012 detailed at paragraph 1.1, Cabinet has been asked to reconsider its decision in light of the evidence available and consider whether this technology is good value for money and will deliver meaningful energy savings for tenants.

1.5.3 Over recent years the Council has invested significant monies in bringing homes up to the Decent Homes Standard and in increasing the energy efficiency of the Council's homes. A range of initiatives and projects have been delivered including the installation of cavity wall insulation, loft insulation, high efficiency condensing boilers and PVCu double glazed windows and doors. Targeted improvements such as external insulation to some of our blocks of flats and external insulation to our non-traditional 'Orlit' properties at North Shields and Shiremoor have also been delivered.

1.5.4 The Council has worked successfully with Warmzone over recent years carrying out energy efficiency measurers such as cavity wall and loft insulation. In the last year alone 216 properties benefited from cavity wall Insulation and 113 properties benefited from loft insulation top up works

1.5.5 These low cost and efficient measures have improved the energy efficiency of the Council's homes. The energy efficiency of our homes is measured using the Government's Standard Assessment Process (SAP) which has increased the SAP rating for North Tyneside's Council homes from 67 to 71.4 (between 2008 and 2012), placing North Tyneside in the top quartile of all local authorities for the energy efficiency of its homes. Further consideration of 'hard to treat' properties and properties constructed with solid walls are considered as part of our on-going Asset Management Strategy, with works being developed and commissioned where funding opportunities may arise.

1.5.6 This report provides an appraisal of the costs and benefits of the full range of available technologies to improve the energy efficiency of our Council homes

Option Appraisal

1.5.7 The market in the area of renewable technologies is developing at significant pace and changes in Government policy are opening up new opportunities to expand their use. Despite this the cost of installing many new technologies is still uneconomical across large numbers of homes as the capital cost remains high compared to the financial and carbon savings generated.

1.5.8 In conjunction with our partners E.ON Energy and North Tyneside Warmzone, we have discussed and reviewed some products that are suitable for installation within our homes which are both cost effective to install across large number of properties and provide energy savings for tenants.

1.5.9 With this in mind six potential options have been identified for consideration. Detail of the cost and benefit of each technology in set out in Appendix 1.

1.5.10 In respect of each of the six options, the table below provides a summary of the initial capital cost compared to the savings made to allow a top level cost v benefit (£ spent compared to £ saved) assessment:

Technology	Estimated Capital Cost (per property)	Estimated Energy Savings p.a.	Earliest Pay back (years)	Life Expectancy of Technology
Air Source Heat Pumps	£6k - £10k	£100 - £130 Carbon – 30kg – 800kg	46	20 years
Ground Source Heat Pumps	£9k - £17k	£0 - £130 Carbon – 350kg – 800kg	69	20 years
Solar Thermal	£4.5k	£55 Carbon – 230kg	81	25 years
Wind	£2k (1kw system)	£115 Carbon – 950kg	17	25 years
Voltage Optimisation	£400-£500	£80 - £100 Carbon – 183kg	4	25 years
Gas Savers	£700	£63 Carbon – 700kg	11	15 years

Source: British Gas and BAXI Boilers UK

1.5.11 Following consideration of the varying technologies, their estimated cost and level of energy savings, it is clear that Voltage Optimisation is the most suitable option at this time, when comparing the capital costs against energy savings (per £ spent compared to per £ saved), and it is for this reason that this was recommended to Cabinet on 8th October 2012.

1.5.12 While the effectiveness of Voltage Optimisers in a domestic setting has been questioned, for instance, in the background information to the motion which was considered by Council on 25 October, the bulk of evidence suggests they are currently the most appropriate option. In arriving at this conclusion we have considered advice from a range of reputable sources as set out within section 1.10 of this report.

1.5.13 Electricity typically comes into your home at a voltage of 245V. Many appliances have been designed to work at lower voltages and in some cases performance may even be improved as well as extending the appliance lifetime. The Voltage Optimiser technology needs no change in lifestyle or behaviour to provide the level of savings identified.

1.5.14 Voltage Optimiser technology can produce a saving in electric bills but this depends on the type of electric equipment used in homes. Some electrical appliances are voltage dependent e.g. P.C's, Incandescent lighting, Fluorescent lamps, Motors such as those in fridges, freezers, vacuum cleaners, hairdryers, washers, tumble dryers, etc. that provide savings. Those appliances which are non-voltage dependent would not produce a saving, such as heating, kettles and some lighting e.g. LED's.

1.5.15 There is already a significant and developing market for the installation of domestic voltage optimisers. In the absence of proven technology and demonstrable outcomes these organisations would quickly become discredited and fail, which is not the case.

1.5.16 The renewable technology and energy saving market is developing rapidly with the cost of technologies becoming more cost effective as research and development continues. It is therefore likely that capital costs will change and additional options and solutions will become available in the future. Officers will continue to review suitable products in the market place and identify and progress other alternative solutions as appropriate.

1.5.17 It is proposed that those homes with the highest concentrations of fuel poverty will be targeted first, subject to any technical considerations relating to the installations as identified in the Technical Limitations identified in Appendix 1.

1.6 Decision options:

The following decision options are available for consideration by Cabinet:

Option 1

To agree the proposals of this report and recommendations as set out in section 1.2 of this report.

Option 2

Not agree the proposals as set out in section 1.2 of this report.

Option 3

To refer the matter back to officers for further consideration of any specific issue(s).

1.7 Reasons for recommended option:

1.7.1 The installation of Voltage Optimisers is considered to provide the most cost effective solution at this time. It is clear that Voltage Optimisation is the most suitable product when comparing the capital costs against energy savings (per £ spent compared to per £ saved), and it is for this reason that this option should be pursued.

1.7.2 If other technologies were chosen the capital costs would be significantly higher meaning a smaller number of tenants could benefit from the installed technology.

1.7.3 Should Cabinet agree the recommendations, it is envisaged that during 2012/13 Voltage Optimisers could be installed in 334 homes, with around 134 further homes benefiting in future years using current “Green Fund” finance.

1.8 Contact officers:

Ian Conway, Head of North Tyneside Homes, tel. (0191) 6437501
David Foster, Senior Manager Property Services, tel. (0191) 6437801
Alison Campbell, Finance Business Manager, tel. (0191) 643 7038

1.9 Appendices:

Appendix 1:– Energy Saving Technology – Cost and Benefit Review

1.10 Background information:

1.10.1 The following background papers/information have been used in the compilation of this report have been uploaded on the intranet under Cabinet Background Reports:

(1) Report to Cabinet – Installation of Solar Photovoltaic Panels, 11 July 2011

(2) Report to Cabinet – Council Housing Green Fund, 8 October 2012.

(3) Housing Asset Management Strategy - Quality Sustainable Homes 2010-2015.

(4) The Carbon Management Strategy.
http://www.northtyneside.gov.uk/pls/portal/NTC_PSCM.PSCM_Web.download?p_ID=517317

(5) The Climate Change Strategy.
http://www.northtyneside.gov.uk/pls/portal/NTC_PSCM.PSCM_Web.download?p_ID=523509

(6) Department of Climate Change - Which energy efficiency improvements qualify for Green Deal Finance, June 2012-11-21
http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/green-deal/5504-which-energy-efficiency-improvements-qualify-for-g.pdf

(7) Energy Saving Trust – Generating Energy
http://www.energysavingtrust.org.uk/Generating-energy/Choosing-a-renewable-technology

(8) British Gas – Voltage Optimisation Presentation

(9) British Gas – Voltage Optimisation – Cut your energy bills without changing your lifestyle.

(10) British Gas – Voltage Optimisation - Case Study

(11) British Gas – Voltage Optimisation - Savings Graph

(12) Low Carbon Housing Retrofit – Transforming homes from G to A

(13) VPhase Voltage Optimisation – Case Study
http://www.vphase.co.uk/reviews/great-places-housing-group

(14) EA Technology Consulting – Energy Saving Trial Report – Domestic Voltage Optimisation Device
http://www.ofgem.gov.uk/Sustainability/Environment/EnergyEff/Documents1/Energy%20Saving%20Trial%20Report%20for%20the%20VPhase%20VX1.pdf

(15) Carbon Trust – Voltage Management
http://www.carbontrust.com/media/77191/ctg045.pdf

(16) Siemens - Top 10 energy saving options
http://www.industry.siemens.co.uk/home/uk/en/aboutus/Documents/Top10_energy_saving%20options_0911UK.pdf

(17) Procurement for Housing – Domestic Voltage Optimisation a growing market
http://www.procurementforhousing.co.uk/news/194/108/Domestic_voltage_optimisation_a_growing_market

PART 2 – COMPLIANCE WITH PRINCIPLES OF DECISION MAKING

2.1 Finance and other resources

2.1.1 The initial up-front payment under the Solar PV contract of £0.150m was received from the provider as part of the contract negotiations, with the HRA receiving an annual income of £0.067m per annum in arrears as part of the agreement for use of the roof space thereafter. The proportion of income for the first year will be £16,800 based on the date the Solar PV arrays were registered. As they have not been installed for a full 12 month period, this will result in a budget of £0.167m in 2012-13 and an annual income of £0.067m thereafter. Over the term of the agreement the Council will receive £1.825m including the annual payment and initial up-front payment. The annual payment is index linked and guaranteed for the full period of 25 years on all installations.

2.1.2 The annual income could be affected through "Right to Buy" sales as some properties may be sold with Solar PV arrays installed and the Council may no longer be eligible to receive this income. This could affect the level of income moving forward and reduce the number of improvements we can complete should there be a increase in sales.

2.1.3 An additional 'risk pot' of £0.225m (paid in lieu of the parent company guarantee) is held to meet the cost of any compensation the Council may be required to pay E.ON for the removal of Solar PV arrays prior to the end of the contract.

2.1.4 All monies generated through the Solar PV contract will be used to deliver further energy efficiency measures to our housing stock.

2.1.5 The estimated savings from the installation of Voltage Optimisers will be in the order of £80 - £100 per annum per property and a carbon saving of 183kg, which gives an overall energy saving in the order of £2,000 - £2,500 per tenant over the 25 year life of the product and a carbon saving of 4.5t over the lifetime.

2.2 Legal

2.2.1. The installation of Voltage Optimisers or other energy saving equipment will be funded through the income received from the Solar PV contract and will be deemed as a landlord improvement with all repair, servicing and maintenance requirements being the responsibility of the Council.

2.2.2. Any procurement to obtain the Voltage Optimisers will be undertaken in compliance with all relevant EU/UK procurement requirements and the Council's Contract Standing Orders and Financial Regulations.

2.3 Consultation/community engagement

The following consultation has been undertaken.

2.3.1 <u>Internal Consultation</u>

Consultation has been undertaken with the Cabinet Member for Housing, and with the Cabinet Member for Transport and the Environment through the Environmental Theme Board.

2.3.2 <u>External Consultation/Engagement</u>

A range of discussions have been held with E.ON Energy, Kier North Tyneside and North Tyneside Warmzone through the Environmental Theme Board and other forums.

Consultation has taken place through tenants' Service Development Groups advising of the potential opportunity to install future energy saving technologies and that further work was progressing in this area.

Tenants considered that it was desirable that any monies received by the Council in connection with Council homes be directed towards undertaking further energy efficiency measures for those tenants who do not directly benefit from the installation of solar panels. They also considered that those areas suffering from the highest levels of fuel poverty should be given priority for any energy savings measures.

Detailed discussions with potential partners would progress during the procurement process to ensure that the Council secures the most economically advantageous provision which addresses the relevant legal, technical, social, environmental and financial considerations.

2.3.3 Further consultation

Further presentations and information will be delivered to our tenants through Service Development Groups on the chosen technology and associated benefits.

A future edition of Housing Matters will include an article on our chosen technology and associated benefits.

Detailed consultation will be undertaken with tenants before any work will progress in our tenants' homes.

2.4 Human rights

There are no human rights implications directly arising from this report.

2.5 Equalities and diversity

There are no equalities and diversity implications directly arising from this report. Not all homes would be able to have a Voltage Optimiser but this is as a result of technical constraints only.

2.6 Risk management

All properties would be surveyed in advance of installing any energy saving technologies to ensure there suitability.

2.7 Crime and disorder

There are no crime and disorder implications directly arising from this report.

2.8 Environment and sustainability

This project has the potential to significantly reduce North Tyneside's carbon footprint by reducing carbon emissions of a home by up to 4.5 tonnes over the lifetime of the product and reduce electricity usage for tenants of around 8.7% per annum.

PART 3 - SIGN OFF

• Strategic Director(s)	**X**
• Mayor/Cabinet Member(s)	**X**
• Chief Finance Officer	**X**
• Monitoring Officer	**X**
• Strategic Manager, Policy & Partnerships	**X**
• Chief Executive	**X**

a) Air Source Heat Pump

How do Air Source Heat Pumps work:

Air source heat pumps absorb heat from outside air. This heat can then be used to heat radiators and hot water in the home.

An air source heat pump extracts heat from outside air in the same way that a fridge extracts heat from its inside. It can get heat from the air even when temperature is as low as -15 Celsius. Heat pumps do have some impact on the environment as they need electricity to run, but the heat they extract is constantly being renewed naturally. Heat from the air is absorbed at a low temperature into a fluid, then passes through a compressor where its temperature is increased and transfers its higher temperature heat to the heating and hot water circuits of the house.

Unlike gas boilers, heat pumps deliver heat at lower temperatures over much longer periods. During the winter they may need to be on constantly to heat the properties efficiently. The radiators won't feel as hot to the touch as they might do when you are using a gas boiler.

Cost of Installations:

Installing a typical system costs between £6,000 to £10,000. Running costs will vary depending on a number of factors including the size of the property, how well insulated it is, what room temperatures tenants aim to achieve.

The system will pay for itself much more quickly if it is replacing an electric or solid fuel heating system.

Combining the installation with other building work can reduce the cost of installing the system.

Estimated Savings:

How much saved will depend on what system is used now, as well as what you are replacing it with (more efficient with underfloor heating). Electricity consumption is likely to increase as the heat pump is powered by electricity but is likely to make a saving on the gas it will be saving.

The likely savings made every year when replacing an existing heating system in an average 3 bedroom house semi-detached homes will be:

Existing system		**Air source heat pump performing at 220%**	**Air source heat pump performing at 300%**
Gas	£/year	-£100	£130
	Carbon dioxide/year	-30kg	800kg
Electric	£/year	£380	£610
	Carbon dioxide/year	4,440kg	5,270kg
Solid	£/year	£100	£330
	Carbon dioxide/year	4,580kg	5,410kg

A negative number means it could cost you more to run the heat pump than

the system you are replacing. Assumed average boiler efficiency for each fuel type; heat pumps produce more energy (as heat) than they use (as electricity), so their efficiency is more than 100%. It may be possible at some point in the future to receive payments or funding through the government's Renewable Heat Incentive (RHI). This scheme should be launched in Summer 2013.
Maintenance: The units need little maintenance and are deemed as a fit and forget technology, despite needing scheduled inspections. Heat pump systems typically come with a 10 year warranty and will operate for 20 years or more, however they do require regular scheduled maintenance. A detailed check by a professional installer every 3-5 years should be sufficient.
Technical Limitations: There will need to be plenty of space outside the property where a unit can be fitted to a wall or placed on the ground as it needs a good flow of air around it. Air source heat pumps can perform better with under floor heating systems or warm air heating than with radiator-based systems because of the lower water temperatures required. Since air source heat pumps work best when producing heat at a lower temperature than traditional boilers, it is essential that the property is fully insulated and draught-proofed for the heating system to be effective.
Planning Requirements: From 1 December 2012, air source heat pump systems will be classed as Permitted Development provided that they comply with certain criteria, including that there is no wind turbine at the property, the external unit is less than 0.6m3 in size, the unit is more than one metre from the edge of the boundary, it is not on a pitched roof and it complies with additional criteria if in conservation area.
Risk: As the Air Source Heat Pump is located externally there is a significant risk of damage and theft. The technical requirements around space on the external of the properties would make any scheme difficult to manage.

Source: Energy Saving Trust

b) Ground Source Heat Pumps

How do Ground Source Heat Pumps work: Ground source heat pumps use pipes which are buried in the garden to extract heat from the ground. This heat can then be used to heat radiators and hot water in your home. A ground source heat pump circulates a mixture of water and antifreeze around a loop of pipe – called a ground loop – which is buried in the garden. Heat from the ground is absorbed into the fluid and then passes through a

heat exchanger into the heat pump. The ground stays at a fairly constant temperature under the surface, so the heat pump can be used throughout the year – even in the middle of winter.

The length of the ground loop depends on the size of your home and the amount of heat you need. Longer loops can draw more heat from the ground, but need more space to be buried in. If space is limited, a vertical borehole can be drilled instead.

Unlike gas boilers, heat pumps deliver heat at lower temperatures over much longer periods. During the winter they may need to be on constantly to heat the properties efficiently. The radiators won't feel as hot to the touch as they might do when you are using a gas boiler.

Cost of Installations:

Installing a typical system costs between £9,000 to £17,000. Running costs will vary depending on a number of factors, including the size of the property, how well insulated it is, what room temperatures tenants aim to achieve.

The system will pay for itself much more quickly if it is replacing an electric or solid fuel heating system.

Combining the installation with other building work can reduce the cost of installing the system.

It may be possible at some point in the future to receive payments or funding through the government's Renewable Heat Incentive (RHI). This scheme should be launched in Summer 2013.

Estimated Savings:

How much saved will depend on what system is used now, as well as what you are replacing it with (more efficient with underfloor heating). Electricity consumption is likely to increase as the heat pump is powered by electricity but is likely to make a saving on the gas it will be saving.

The likely savings made every year when replacing an existing heating system in an average 3 bedroom house semi-detached homes will be:

Existing system	Unit	Ground source heat pump performing at 220%	Ground source heat pump performing at 300%
Gas	£/year	£0	£130
	Carbon dioxide/year	350kg	800kg
Electric	£/year	£480	£610
	Carbon dioxide/year	4,820kg	5,270kg
Solid	£/year	£200	£330
	Carbon dioxide/year	4,950kg	5,410kg

A negative number means it could cost you more to run the heat pump than the system you are replacing. Assumed average boiler efficiency for each fuel type; heat pumps produce more energy (as heat) than they use (as

electricity), so their efficiency is more than 100%.
Maintenance: The units need little maintenance and are deemed as a fit and forget technology, despite needing scheduled inspections. Heat pump systems typically come with a 10 year warranty and will operate for 20 years or more, however they do require regular scheduled maintenance. A detailed check by a professional installer every 3-5 years should be sufficient.
Technical Limitations: There will need to be some garden areas where the ground needs to be suitable for digging a trench or a borehole and accessible to excavating machinery. In addition there must be an internal space to install the heat pump. Air source heat pumps can perform better with under floor heating systems or warm air heating than with radiator-based systems because of the lower water temperatures required. Air Source Heat Pumps are usually easier to install than ground source as they don't need any trenches or drilling, but they are often less efficient than Ground Source Heat Pumps. Since Ground Source Heat Pumps work best when producing heat at a lower temperature than traditional boilers, it's essential that the property is insulated and draught-proofed for the heating system to be effective.
Planning Requirements: Ground Source Heat Pumps are generally allowed as Permitted Developments.
Risk: The technical requirements around sufficient space in garden areas would make any scheme difficult to manage.

Source: Energy Saving Trust

c) Solar Thermal

How does Solar Thermal work: Solar water heating systems use free heat from the sun to warm domestic hot water. A conventional boiler or immersion heater can be used to make the water hotter, or to provide hot water when solar energy is unavailable. Solar water heating systems use solar panels, fitted to the roof. These collect heat from the sun and use it to heat up water which is stored in a hot water cylinder. A boiler or immersion heater can be used as a back up to heat the water further to reach the temperature that tenants require. Sunlight is free, so once you have paid for the initial installation your hot water costs will be reduced
Cost of Installations: The cost of installing a typical solar water heating system is around £4,500. Savings are moderate - the system could provide most of your hot water in the summer, but much less during colder weather. Solar Thermal will operate for 25 years or more, however they do require

regular scheduled maintenance. It may be possible at some point in the future to receive payments or funding through the government's Renewable Heat Incentive (RHI). This scheme should be launched in Summer 2013.
Estimated Savings: Solar water heating systems can achieve savings on your energy bills. Based on the results of our recent field trial, typical savings from a well-installed and properly used system are £55 per year when replacing gas heating and £80 per year when replacing electric heating; however, savings will vary from user to user. Typical carbon savings are around 230kgCO_2/year when replacing gas and 510kgCO_2/year when replacing electric heating.
Maintenance: Maintenance costs for solar water heating systems are generally very low. Most solar water heating systems come with a five-year or ten-year warranty and require little maintenance. Once fitted your installer should leave written details of any maintenance checks that you can carry out from time to time, ensuring everything is working properly.
Technical Limitations: The system works all year around although a boiler or immersion heater will be required to heat the water further during the winter months. Larger solar panels can also be arranged to provide some contribution to heating your home as well. However, the amount of heat provided is generally very small and it is not normally considered worth while. You should have your system checked more thoroughly by an accredited installer every 3-7 years, or as specified by your installer. The other thing that your installer should check is the pump. In a well maintained system, pumps can last for ten years plus and usually cost around £90 to replace. The properties must have a south facing elevation, be free from shading, be structurally capable of taking the weight of the solar panels and the property must have a water cylinder to store hot water.
Planning Requirements: Solar Thermal Installations are generally allowed as Permitted Developments.
Risk: It must be highlighted that the majority of roofs suitable already have Solar Panels installed to generate electricity and formed part of the initial Solar scheme. There would be limited number of properties that could have this technology installed.

Source: Energy Saving Trust

d) Wind

How do Wind Turbines work:

Wind turbines harness the power of the wind and use it to generate electricity with small-scale wind turbines.. Forty percent of all the wind energy in Europe blows over the UK, making it an ideal country for domestic turbines (known as 'microwind' or 'small-wind' turbines). A typical system in an exposed site could easily generate more power than your lights and electrical appliances use.

Wind turbines use large blades to catch the wind. When the wind blows, the blades are forced round, driving a turbine which generates electricity. The stronger the wind, the more electricity produced.

Wind is free so once you have paid for the initial installation your electricity costs will be reduced and the electricity generated is green and doesn't release any harmful carbon dioxide or other pollutants.

Cost of Installations:

The cost of a system will depend on the size and the mounting method: building-mounted turbines cost less to install than pole-mounted ones. For equipment and installation, with VAT at 5%:

- a roof-mounted 1kW microwind system costs around £2,000
- a 2.5kW pole-mounted system costs around £15,000
- a 6kW pole-mounted system costs around £22,500.

Through Feed-in-Tariffs, there is the opportunity to receive income for the electricity generated even if you use it. The energy not used can be exported to the local grid - and get paid for that too.

Estimated Savings:

Building-mounted turbines tend to produce less electricity per kW than pole-mounted ones.

A 1kw building mounted turbine will cost around £2k, with an estimated saving of £115 per annum excluding maintenance. Estimated Carbon savings of 950kg per year.

A well-sited pole-mounted 2.5kW turbine will cost around £15k, with an estimated saving of £380 per annum excluding maintenance. Estimated Carbon savings of 2.6t per annum.

Maintenance:

Maintenance checks are necessary every few years, and will generally cost around £100 to £200 per year depending on turbine size. A well-maintained turbine should last more than 20 years, but you may need to replace the inverter at some stage during this time, at a cost of £1,000 to £2,000 for a large system.

Technical Limitations:

It may not be possible to install building or pole-mounted wind turbines due to the layout and construction of some of our properties without the reconfiguration of internal electrical installations.

Planning Requirements:

Both building and pole-mounted wind turbines are generally allowed as

Permitted Developments if delivered in accordance with the Microgeneration Certification Scheme Planning Standards.
Risk: Building and pole-mounted wind turbines are currently viewed as an unattractive addition to properties and not aesthetically pleasing to home owners and adjoining properties.

Source: Energy Saving Trust

e) Voltage Optimisers

How do Voltage Optimisers work: Voltage Optimisers have been used for a number of years in commercial buildings and until more recently it has not been cost effective to consider their installation in a residential setting. NTC are currently reaping the benefits of Voltage Optimisers throughout a number of its Public Buildings. Electricity typically comes into your home at a voltage of 245V. Many appliances have been designed to work at lower voltages and in some cases performance may even be improved as well as extending the appliance lifetime. The technology needs no change in lifestyle or behaviour to provide the level of savings identified. The technology can produce a saving in electric bills but this depends on the type of electric equipment used in homes. Some electrical appliances are voltage dependent e.g. P.C's, Incandescent lighting, Fluorescent lamps, Motors such as those in fridges, freezers, vacuum cleaners, hairdryers, washers, tumble dryers, etc that provide savings. Those appliances which are non voltage dependent would not produce a saving such as heating, kettles and some lighting e.g. LED's
Cost of Installations: Depending upon the specific Voltage Optimiser chosen, the cost of supply and installation is estimated to be between £400 and £500 and the expected life of the product is around 25 years and come with a minimum 5 year warranty.
Estimated Savings: By reducing the voltage down to 220v, the Voltage Optimisers provide an estimated saving of 9% on energy usage, however this will vary depend upon the electrical equipment used in the homes. Savings generated can range between £80 and £100 depending upon the type of electrical equipment used in the properties. The technology was trialled by Great Places Housing Group in Manchester on 2/3 bedroom terraced properties. Average electrical energy saving of 8.7% was achieved (range 8.5% to 8.9%). Average yearly CO savings of 183kg was achieved (range 160kg to 199kg) and can reduce the carbon emissions of a home by up to 4.5 tonnes over the lifetime of the product.
Maintenance: The units need little maintenance and are deemed as a fit and forget

technology. Any installation would be checked as part of any periodic electrical testing programme.
Technical Limitations: It may not be possible to install Voltage Optimisers in all homes due to available space and the positioning of existing electric meters and consumers units.
Planning Requirements: There are no planning implications.
Risk: It may not be possible to install Voltage Optimisers in all homes due to available space and savings will vary depending upon the type of electrical equipment used in our tenants homes.

Source: British Gas and Great Places Housing Group

f) Gas Savers

How do Gas Savers work: The Gas Saver captures and stores heat from the flue gases which would normally be lost through the boiler flue. The heat is recycled to preheat water coming into the boiler from the cold mains supply. Because it does not have to raise the temperature so much, the boiler uses significantly less gas to heat the water to the required temperature. This means lower energy bills and greater carbon savings. A “Gas Saver” is an innovative product that sits neatly between the heating boiler and flue.
Cost of Installations: Depending upon the manufacturer chosen, the cost of supply and installation is estimated to be around £700 per property and has a life expectancy of 15 years.
Estimated Savings: It is estimated that this can save up to 35% of the gas used to produce hot water annually and equates to an estimated saving of £63 on gas bills per annum.
Maintenance: The Gas Saver would need to be serviced as part of our annual gas safety check, this would increase the cost of servicing our boilers.
Technical Limitations: It may not be possible to install them in all homes due to the positioning of the existing boilers, the types of boilers and the location of existing flues.
Planning Requirements: There are no planning implications.
Risk: It may not be possible to install Gas Savers due to available space and the units may not be aesthetically pleasing within our tenants homes.

Source: British Gas and Baxi Boilers UK