



Aberdeenshire's Council Housing Stock

ENERGY EFFICIENCY COMMITMENT

2006



Energy certificate

Building Energy Performance	
Certificate in accordance with: SAP 2005, IHSMP 2005, IHSBM 2005	
Excellent	AA (0 to -1)
A	A (0 to 15)
B	B (16 to 30)
C	C (31 to 45)
D	D (46 to 60)
E	E (61 to 80)
F	F (81 to 100)
Very Poor	G (100+)

Carbon Dioxide Emissions
The number refers to the calculated carbon dioxide emissions in ten per cent carbon dioxide per annum.
Main heating fuel - Heating Oil/Gas/Electric/UPS Ventilation
Renewable energy source None Electricity
Carbon Dioxide is a greenhouse gas which contributes
Least Carbon Dioxide emissions from buildings be



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Foreword

It's hard to believe that we are one of the richest nations in the world and yet we suffer from cold homes, high healthcare costs due to cold-related illnesses, excessive winter deaths and houses in poor repair. All of these are indicators of poor energy efficiency within the home. Expensive heating costs can lead to fuel poverty for the occupants and disproportionate carbon dioxide emitted into the environment.

This document demonstrates Aberdeenshire Council's commitment to improve energy efficiency of Aberdeenshire Council's housing stock and increase awareness of these issues, so far as practical by 2015 (Scottish Housing Quality Standard deadline) and beyond.

There is high level of ownership and responsibility for this Commitment within the Council at Committee and Corporate Management Team level. This is demonstrated by the Council giving its backing to fighting the effects by signing up to the Scottish Climate Change Declaration. In addition, we will ensure that the Energy Efficiency Commitment remains at the heart of our Corporate Plan and Local Housing Strategy.

Our target assists the Government's own commitment to reduce carbon dioxide emissions by providing a greener, more energy efficient environment for the tenants of Aberdeenshire. The Government is committed to reducing the UK's CO₂ footprint by 60% by 2050. The recent Stern report has forecast disastrous consequences to the environment and the world's economy if nothing is done now to reduce greenhouse gases emitted to the atmosphere through the use of fuel. 40% of the UK's CO₂ produced is produced from household energy. This underlines the great need for Aberdeenshire Council to achieve the balance between eradicating fuel poverty and to improve the energy efficiency of its housing stock.

Our Commitment has been developed with close reference to existing expert guidance on this subject.

It is the intention that this Commitment will build on existing partnerships and act as a catalyst for others to ensure a more sustainable approach to the improvement of energy efficiency in Aberdeenshire Council's council housing stock.

I would like to thank those who have been involved in the development and production of this Commitment, and encourage them and our partners in the knowledge that Aberdeenshire Council is entirely devoted to the implication of the commitment and the fight to improve energy efficiency in our area.



A. Robertson

Councillor Anne Robertson
Chair of Social Work and Housing Committee
Aberdeenshire Council

EXECUTIVE SUMMARY

Background

The Aberdeenshire Energy Efficiency Commitment was developed as a point of reference and a basis for improving energy efficiency of Aberdeenshire Council's housing stock.

The Scottish House Condition Survey (2002) identified that despite the relative success of improvements in the social housing sector in the last 10-15 years, there remains plenty of scope for further action. There is also increased awareness of the need to improve energy efficiency to address issues such as : Climate Change, CO₂ and Greenhouse Gas Emissions, Sustainable Developments and Fuel Poverty

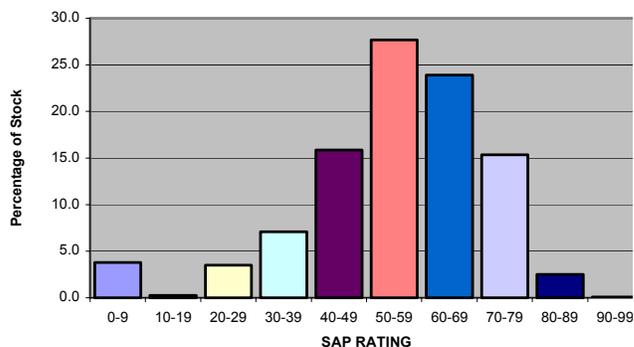
The Government is committed to reducing CO₂ emissions in the UK by 60% by the year 2050 and ensuring that every home is adequately and affordably heated. It is therefore important that we promote energy awareness and to improve the energy efficiency of Aberdeenshire Council's housing stock.

Housing Energy Audit

An energy audit of the stock was under taken in 1999/2000. The assessment generated a condition database that is continuously updated with all stock improvements. A baseline has been established and the values are used to monitor the progress.

Aberdeenshire Council uses the Standard Assessment Procedure (SAP) rating as a key performance indicator. The rating uses a scale of 0-100 where 0 is very poor and 100 is very energy efficient. Stock profiles can be constructed and displayed graphically identifying potential areas where resources should be allocated and where energy efficiency improvement measures are required as a priority.

Aberdeenshire Stock SAP Banding Breakdown 2006/2007



Aberdeenshire Fuel Use Break Down 2006

Electricity	No of Stock	6086
	Ave SAP Rating	49
Gas Mains	No of Stock	5894
	Ave SAP Rating	60
Oil	No of Stock	277
	Ave SAP Rating	60
Solid Fuel	No of Stock	1396
	Ave SAP Rating	53

Eradicating Fuel Poverty

What is fuel poverty?

The general definition of fuel poverty is “the inability to afford to adequately heat the home ”In the Scottish Executive Fuel Poverty Statement (2002) a household is deemed to be in fuel poverty if, “in order to maintain a satisfactory heating regime, it would be required to spend more than 10% of its income (including Housing Benefit or Income Support for Mortgage Interest) on all household fuel use”.

Causes fuel poverty

- Low income;
- Poor energy efficiency of and use in the home;
- The size of the property (particularly if under-occupied);
- The price of fuel or the inability to access cheaper fuel.

Eradicating Fuel Poverty

To eradicate fuel poverty mechanisms need to be developed which address the causes of fuel poverty including:

- Tenants’ income levels;
- The energy efficiency of the property;
- Hard to treat homes;
- Tenants’ awareness and understanding of energy efficiency;
- The price of fuel;
- Financing energy efficiency measures;
- Allocation of homes to provide affordable warmth.
- Identifying the most sustainable, appropriate and cost economical forms of heating in the property.

Energy Matrix

Awareness of Energy Efficiency, the SHQS and fuel poverty issues facing Aberdeenshire tenancies amongst housing staff was assessed using an Energy Matrix tool. This established the baseline position and assisted with creating an action plan for improvements within the Energy Efficiency Commitment.

The Matrix helps to:

- Identify key action areas;
- Compare with best practice;
- Identify a route towards achieving best practice;
- Display progress in development and implementation;
- Assist with regular review;
- Identify areas in which progress is being made or areas of weakness where action is required;
- Illustrate the quality and progress of the strategy

Energy Training

Training Housing staff in energy efficiency is a fundamental building block of the energy efficiency commitment. The training needs of staff will vary depending on the scope of energy efficiency work that they will be expected to undertake. In order to ensure that the needs of tenants and staff are met, a commitment to energy training is required to address:

- The need for a designated training officer;
- Provision of basic energy awareness training for all staff;
- Implementation of a training programme for people involved in the delivery of energy advice;
- Energy commitment workshops for housing managers;
- Delivery of energy efficiency training for technical staff;
- The need for refresher courses;
- Overview of energy technologies for households.

Integrating Energy Efficiency

Energy efficiency improvements can be incorporated into broader housing repair and improvement programmes. This includes:

- Identifying and prioritising dwellings for energy work;
- Improvement packages;
- Integrating energy work with cyclical maintenance and repairs;
- Integrating energy work into improvement programmes
- Dedicated energy programmes
- Combining different types of energy programmes
- Including energy work in tenant consultation

Energy efficiency improvements to these dwellings are much more effective than the same improvements applied to dwellings that are already more energy efficient. It will also deliver a bigger increase in the energy rating of the property, which in turn will contribute more significantly to raising the average energy rating of the housing stock. Dwellings with poor energy ratings are to be prioritised for energy efficiency improvements. Some dwellings are technically more difficult and more expensive to improve than others.

Tenants should be consulted about proposed improvements in energy efficiency. Unlike other types of improvements (e.g. new kitchens and bathrooms), energy work can deliver measurable benefits to tenants in the form of reduced fuel costs and more affordable warmth.

Integrating Renewable & Innovative Technology

Renewable energy technologies provide energy that has much lower or even no carbon dioxide emissions when compared to traditional fossil fuels.

The overwhelming benefit of renewable energy technologies is the reduced impact they have on the global environment. Renewables supply heat and electricity with greatly reduced carbon emissions.

Renewable and innovative technologies being installed are:

- Solar water heating;
- Solar photovoltaics (PV);
- Wind;
- Wood fuelled boilers;
- Ground source heat pumps;
- Air source heat pumps.
- Water source heat pumps

Renewable energy technologies now represent a viable alternative to traditional forms of energy production in the home. Whilst their initial cost is still currently high, they have the potential to reduce energy costs in the long term and can deliver a wide range of benefits: affordable warmth, reduced environmental impact, increased asset value and demand for the property.

Community Heating and Combined Heat and Power

A community heating scheme provides heat from a central source to more than one building, dwelling or customer. Community heating is an alternative to providing individual heating systems to each dwelling. A scheme consists of a central heat source (e.g. boilers in a boiler house), a heat distribution network and installations within dwellings (radiators and controls).

A major advantage of community heating is that heat can be supplied to the system from a range of sources including:

- boilers using conventional fuels or renewable fuels
- heat from power generation combined heat & power (CHP)
- renewable heat sources such as solar or heat pumps;
- Waste heat from industrial processes.

Sources of Funding

Funding will be obtained from grants and finance schemes available to assist with energy efficiency measures and to reduce fuel poverty for example: Affordable Warmth Funding, EEC and Warm Deal

Effective planning and good management can help Housing make best use of internal resources and maximise our access to external funding sources.

Hard to Treat Homes

“Hard to Treat Homes” are those that cannot accommodate ‘standard’ energy efficiency measures. They may include:

- Homes that are off the mains gas network.
- Homes with no loft space.
- Homes with granite or sandstone walls.
- Non-traditional construction.

Opportunities for improving “Hard to Treat Homes” are best undertaken as part of a long-term improvement programme. Aberdeenshire Council will also consider how to best utilise its repair and maintenance policy to improve “Hard to Treat Homes”.

“Hard to Treat Homes” tend to be more expensive to improve than other properties. Aberdeenshire Council must determine whether the aim of the energy efficiency commitment, given budget restrictions is to improve as many homes as possible or to attempt to ensure an improvement in energy efficiency across the whole stock and to seek a balance of all construction types.

Measures and technologies that may be applicable to improve “Hard to Treat Homes” include:

- Oil-fired condensing boilers
- Internal wall insulation
- External wall insulation
- Heat pumps
- Solid fuel cassettes
- Wood-fired boilers
- Solar water heating
- Solar photovoltaic panels
- Heat recovery ventilation
- Combined heat and power (CHP)
- High performance glazing

The Scottish Housing Quality Standard

The Scottish Housing Quality Standard (SHQS) aims to ensure that all social housing in Scotland meets a defined standard of decency by 2015. This section explains:

- The energy efficiency requirements of the SHQS;
- How to assess the compliance of individual homes with those requirements;
- How to assess the stock-level implications, including costs, of meeting the energy efficiency requirements of the SHQS;
- How to identify opportunities to improve the overall energy efficiency of the housing stock when making improvements to meet the standard;
- The importance of adopting a planned approach to energy efficiency.

There are five requirements of the SHQS, one of which is that homes must be energy efficient. This requirement aims to ensure that homes are warm and free from condensation and dampness at an affordable cost. To comply with the standard, homes must have an energy efficient heating system and effective insulation.

Dealing with Dampness, Condensation and Mould

Following the stock condition survey in 1999/2000, dampness and condensation was identified as an issue in 8.2% of Aberdeenshire Council's housing stock.

Dampness problems can encourage the growth of mould and mites increasing the risk of respiratory illness as well as having the potential to damage the structure and fabric of the building.

In order to improve the living environment and eradicate dampness within Aberdeenshire Council's Housing Stock, an action plan will be created that targets most affected house types as a priority

Objectives

A comprehensive action plan has been established to drive forward the key objectives of the Energy Efficiency Commitment. This will be the key method by which progress will be maintained and evaluated

INTRODUCTION

1. Introduction

There is scope for improving the energy efficiency of Aberdeenshire's Council housing. There is an increasing awareness of the need to improve energy efficiency in order to address the issues of climate change, affordable warmth, sustainable development and fuel poverty. This Commitment has been structured around eleven key action areas.

2. The Purpose of this Commitment

- To promote and support improvements in the energy efficiency of Aberdeenshire Council's housing leading to a reduction in greenhouse gas emissions and a reduction in the incidence of fuel poverty.
- To promote "ownership" of energy efficiency improvement programmes.
- To provide technical staff in housing with up-to-date guides on techniques for promoting and improving energy efficiency in collaboration with partner organisations and tenants.
- To provide up-to-date information on sources of funding, assistance and further guidance.

3. The Context of the Commitment

The Scottish House Condition Survey (2002) provides a breakdown of housing in Scotland, with 38% of people in Scotland living in homes rented from local authorities, housing associations or private landlords.

Just over half a million people in Scotland (24%) rent from a local authority or other public sector landlord. The average energy efficiency of public sector and housing association stock is better than that of the owner occupied sector. This is despite owner-occupiers having the direct incentive of reducing their own fuel bills through energy efficiency. It demonstrates that some public sector landlords are already adopting a strategic approach to organising energy efficiency programmes, accessing funding support and obtaining bulk discount prices from contractors.

40 per cent of the total UK CO₂ emissions come from household energy use. In Scotland almost 50 percent of dwellings are heating using electricity which is expensive and not energy efficient.

The average energy efficiency of private rented housing is significantly worse than other managed housing and owner occupied stock. Despite the relative success of improvements in the social housing sector in the last 10-15 years,

there remains plenty of scope for further action. There is also an increasing awareness of the need to improve energy efficiency to address the issues of climate change, affordable warmth and sustainable development. The managed housing sector has an important role to play in achieving the UK Government's targets of reducing carbon emissions by 60 per cent by 2050 and ensuring that every home is adequately and affordably heated. Improved energy efficiency can also contribute to a number of other national and local strategies and standards including:

- The UK **Climate Change** Programme;
<http://www.defra.gov.uk/ENVIRONMENT/climatechange/uk/ukccp/pdf/ukccp06-all.pdf>
- **The Scottish Fuel Poverty Statement** which requires fuel poverty in Scotland to be eradicated, as far as reasonably possible, by 2016;
<http://www.scotland.gov.uk/Publications/2002/08/15258/9951>
- **The Home Energy Conservation Act 1995 (HECA)**, which requires local authorities to produce local HECA strategies and report on progress;
<http://www.defra.gov.uk/environment/energy/heca95/intro.htm>
- **The Scottish Housing Quality Standard** which defines what is acceptable good quality housing for all housing to reach by 2015;
http://www.communitiesscotland.gov.uk/stellent/groups/public/documents/webpages/cs_007224.pdf
- The Housing Scotland Act (2001), which requires **Local Housing Strategies** to include a local fuel poverty strategy.
<http://www.aberdeenshire.gov.uk/councilhousing/reports/strategy.asp>
- Aberdeenshire Council's **Fuel Poverty Strategy**
[http://arcadia/intranet/h&swhousingcms.nsf/0/c1e4624b9ed1cd21802570360046c027/\\$FILE/Fuel%20Poverty%20Strategy.pdf](http://arcadia/intranet/h&swhousingcms.nsf/0/c1e4624b9ed1cd21802570360046c027/$FILE/Fuel%20Poverty%20Strategy.pdf)

4. The Commitment

As mentioned earlier, the Commitment is structured around eleven key action areas:

- Housing Energy Audit
- Eradicating Fuel Poverty
- Energy Matrix
- Energy Training
- Integrating energy efficiency
- Integrating renewable and innovative technology
- Community heating and CHP
- Sources of funding
- Hard to treat homes
- The Scottish Housing Quality Standard (SHQS)

- Dealing with condensation dampness and mould

These are discussed in detail over the following pages.

HOUSING ENERGY AUDIT

1. Introduction

- 1.1 An essential step in the development of Aberdeenshire's Council Housing Energy Commitment was to establish a baseline position of the energy efficiency of the stock. An energy audit was undertaken in 1999/2000 of all the Council stock. The assessment generated an energy database, which is continuously updated with all stock improvements. The baseline values established at that time, are now used to monitor the progress of this strategy, the Scottish Housing Quality Standard (SHQS) Delivery Plan, Fuel Poverty Strategy and the Home Energy Conservation Act (HECA). It clearly demonstrates what has already been achieved and makes the case for additional investment to improve energy efficiency.

2. Housing Stock Assessment

- 2.1 There are four key stages in the development and implementation the housing energy Commitment:
- Establish the base position.
 - Model the effect of improvement measures across the stock.
 - Detailed evaluation of property types to establish which energy efficiency measures are cost-effective. Helping to define and prioritise energy efficiency improvement work.
 - Regular updating is essential to ensure robust data is maintained to monitor progress.
- 2.2 The importance of having up-to-date information on the energy efficiency of the stock will increase with the implementation of the EU Directive on the Energy Performance of Buildings in 2006/7. From 2008, the proposed Scottish implementation date, this will require an energy report to be provided to tenants whenever a property is let or sold via Right to Buy.

3. Establishing Energy Efficiency Indicators

3.1 Energy Audit

- 3.1.1 The first stage in any stock energy assessment is to establish the current level of the stock. This can be done in three ways:
- Identify the number of houses of each type and undertake an energy rating survey of at least one property of each type.

- Undertake a sample survey on the energy characteristics of the stock.
- Establish an energy database with an energy rating for every dwelling in the stock.

3.1.2 Aberdeenshire Council undertook the third option, using a survey at Enhanced NHER level Zero (See item 4.2) to determine the energy efficiency of 100% of the stock. Housing management are now gradually improving the date held through to surveys to NHER Level One by 2010

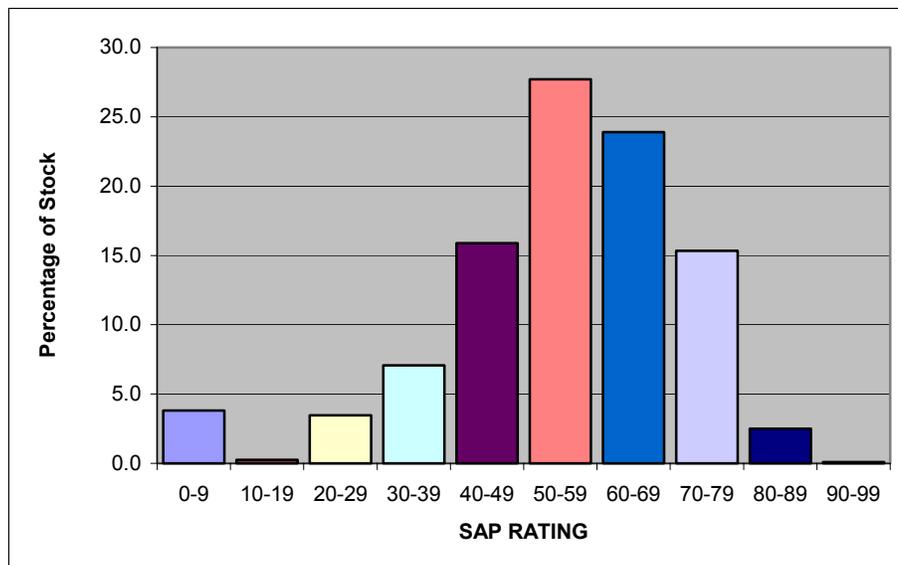
4. Energy Audit Database

4.1 The Energy database contains a unique record for every dwelling, with details of its energy efficiency characteristics, including ratings. The database can be used to prepare energy profiles of the whole housing stock as well as to examine details of individual dwellings.

4.2 Surveys on their own will help to establish overall performance indicators and monitor progress, but are not as effective as a database at supporting the implementation of an improvement programme. The Energy database also provides reliable data on rare features and is much easier to keep up-to-date.

5. Stock Profiles

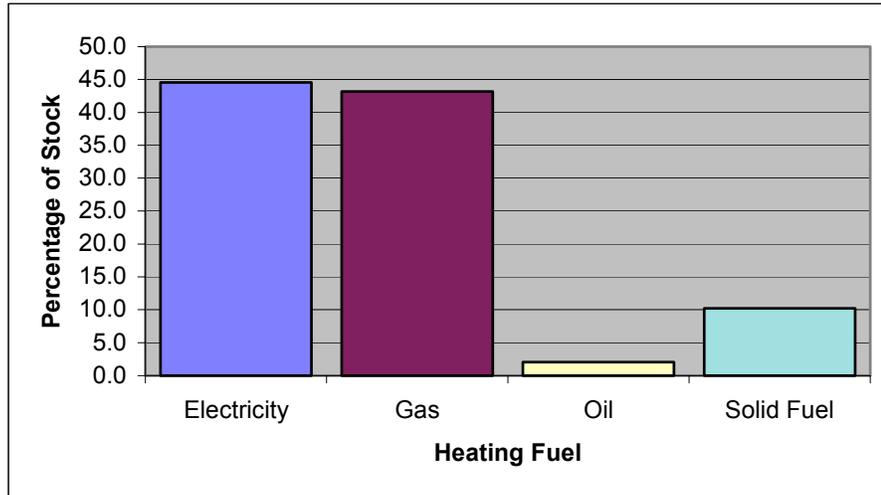
5.1 Housing stock profiles can be used as graphical representations of the numbers of properties in an area with different levels of energy efficiency. They provide an immediate visual indication of overall performance.



This profile shows that the majority of this housing stock has a Standard Assessment Procedure (SAP) rating of around SAP 50. It also shows a large

percentage of the housing stock does not at present achieve an acceptable SAP rating.

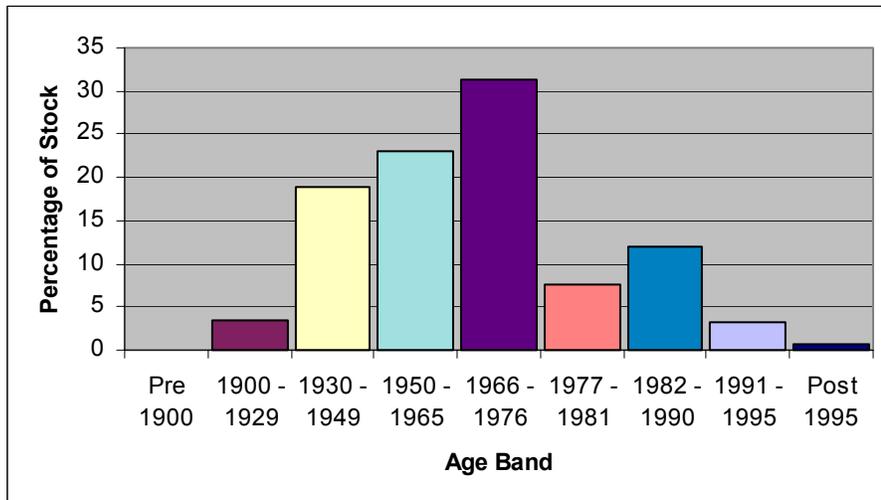
The profile below depicts the break down of primary heating fuel across the stock. Due to the large number of rural properties within Aberdeenshire Council, there is a high number of dwellings with electricity as their main heating fuel. Electricity does not produce a high SAP rating.



Electricity	No of Stock	6086
	Ave SAP Rating	49
Gas Mains	No of Stock	5894
	Ave SAP Rating	60
Oil	No of Stock	277
	Ave SAP Rating	60
Solid Fuel	No of Stock	1396
	Ave SAP Rating	53

The table opposite is based on information from June 2006. Electricity shown to have an average SAP rating of SAP 49 compared to Gas which achieves SAP 60

The majority of the stock has been built prior to the 1980's when the building regulations enforced dwellings to be more energy efficient. SAP ratings prior to this date tend to be lower due to less insulation or thermal building qualities



6. Detailed Surveys

- 6.1 The property types in most need of improvement (those with the worst energy rating) had been identified, using the energy survey 1999/2000. To help evaluate and compare the costs and benefits of alternative improvement measures more detailed energy surveys are required. This will then permit an improvement programme to be defined, which contributes towards the Energy Commitment objectives.
- 6.2 Comparisons of alternative improvement measures will use whole life costing, that is, take into account all capital, running, and replacement costs discounted back to current values.
- 6.3 Detailed energy surveys provide more precise results for the properties concerned, enabling important features that will affect the stock improvement programme to be taken into account. For example, identifying different types of wall construction within a dwelling help assess the cost, potential energy savings and any practicalities related to energy efficiency improvement work.
- 6.4 The issues below are to be assessed for the Shire and reported here:
- Estimate numbers of dwellings that do not meet certain standards
 - Provide energy ratings, CO₂ emission and fuel cost estimates on priority property types – Annually Aberdeenshire Council's Housing stock emits over 86,000 tonnes of CO₂ which is over 6.3 tonnes per property.
 - Identify priority property types for improvement

7. Performance Indicators

- 7.1 These are measurable statistics used to assess the energy efficiency, to set targets for improvements and to monitor progress towards those targets. They can be classified into two types: strategic and operational.
- 7.2 Strategic performance indicators
Show the energy efficiency of the housing stock as a whole.
- 7.2.1 Energy ratings
An energy rating is a measure of the energy efficiency of a dwelling under standard occupancy conditions, designed to allow comparison on a common basis.
- Standard Assessment Procedure (SAP)
Compares the energy efficiency of homes on the same basis regardless of their location in the country. Based on the estimated annual cost of heating and hot water per square metre and is expressed on a scale of 1 to 120 (with 120 being the most efficient). This will change with the implementation of SAP 2005 (scheduled 2007) reverting to a scale of 1-100; higher ratings are

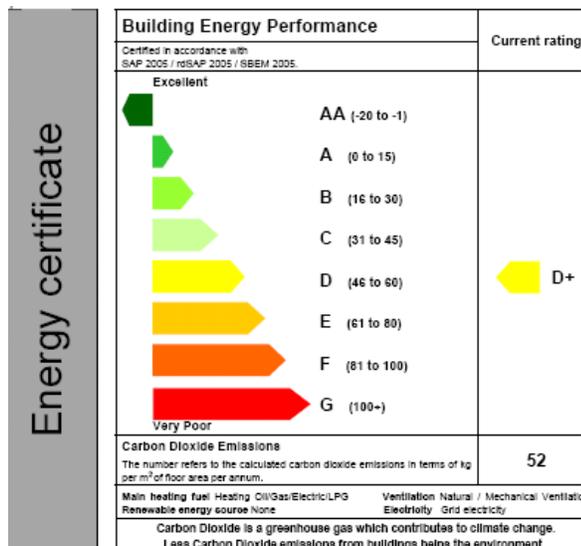
possible for properties that produce more energy than they use, returning the surplus to the national grid.

- **National Home Energy Rating (NHER)**
Operates on a scale of 1-10 (10 is the most efficient). It also enables the comparison of the energy efficiency of homes, but it takes into account the location of the property. A home in Banff that is identical to one in Berwick will have a lower NHER because the heating costs are higher (due to the colder, wetter and windier climate).

The NHER is based on total fuel costs per square metre (i.e. the costs of cooking, lights and appliances are included, as well as heating and hot water).

	SAP	NHER
Scottish (SHCS 2002)	46.5	4.5
Aberdeenshire (Energy Audit Database – Level Zero – March 2006)	54.5	3.9

- **European Energy Rating**
Many products within the home have an energy rating. Washing machines, fridge-freezers and dishwashers are graded from A+ to G and focuses on CO₂ emissions. It is proposed that this is replicated to dwellings. This proposal is currently out to consultation and Aberdeenshire Council are expecting feedback in December.



7.2.2 Estimated carbon dioxide emissions

The estimated carbon dioxide emissions from housing stock are arguably the most important performance indicator in the context of global environmental issues, particularly in terms of HECA. The HECA report estimates a 16.4% improvement in energy efficiency from 1997 up to 2005. Aberdeenshire Council is likely to achieve this target. However, CO₂ emissions can be reduced simply by changing the main heating fuel, so are not an indicator of improved energy efficiency.

7.2.3 Estimated fuel costs

The estimated fuel costs can be measured either for particular property types or as an average across the stock. They are a useful indicator for reporting to tenants and can also be compared to household incomes for assessments of fuel poverty. Aberdeenshire Council is investigating the opportunities for linking energy efficiency to rent, as a measure to help eradicate fuel poverty by 2016.

7.3 Operational performance indicators

7.3.1 Relate to the extent to which properties have had energy efficiency measures installed. These indicators have a more direct bearing on day-to-day housing management activities. Examples have included:

- Installation of Double Glazing
- Cavity walls insulated
- Solid walls insulated
- Loft insulation installed
- New heating systems installed.

8. **Energy Information Commitment**

8.1 An energy information commitment will help assess the energy efficiency of the stock on an ongoing basis and ensure that data is continually improved and updated.

8.2 Stock assessment is an essential component of an energy commitment and forms one component of the Housing Energy Management Matrix (see section 5).

Objective 1: To ensure the continued validity of the Energy Database, surveys of 100% of the stock will be undertaken by 2010 at Level One.

Outcome: Will provide a robust, independently validated and comprehensive Energy Database compliant with the EU Directive on Energy Labelling of Buildings and permit the development of an Affordable Warmth Policy linked to rents.

ERADICATING FUEL POVERTY

1. Introduction

- 1.1 To ensure that every tenant has a warm, comfortable and affordable home the Housing Service is committed to eradicating fuel poverty by 2016. The benefits will be tenants that are financially better off and have improved health, and that homes will be easier to let, have increased asset value, with lower management and maintenance costs. This Energy Commitment and, in particular this section, have strong links with Aberdeenshire's Fuel Poverty Strategy 2005
www.aberdeenshire.gov.uk/councilhousing/reports/fuel_poverty.asp

2. Fuel Poverty in Scotland

2.1 What is fuel poverty?

- 2.1.1 The general definition of fuel poverty is "the inability to afford to adequately heat the home" In the Scottish Executive Fuel Poverty Statement (2002) a household is deemed to be in fuel poverty if, "in order to maintain a satisfactory heating regime, it would be required to spend more than 10% of its income (including Housing Benefit or Income Support for Mortgage Interest) on all household fuel use".

2.2 What causes fuel poverty?

Fuel poverty is caused by several related factors:

- Low income;
- Poor energy efficiency of and use in the home;
- The size of the property (particularly if under-occupied);
- The price of fuel or the inability to access cheaper fuel.

2.3 The effects of fuel poverty

- 2.3.1 If a household in fuel poverty tries to maintain a satisfactory heating regime, it will find itself in fuel debt. If a household in fuel poverty tries to minimise its fuel bills, the home will be inadequately heated. The effects on the home will be:
- Condensation, dampness and mould growth;
 - Increased levels of dust mites;
 - Deterioration of the property;
 - Increased maintenance and repair costs;

- Reduction of the asset value of the property.

The householders are then likely to suffer from:

- Cold-related illnesses eg. hypothermia
- Increased rates of asthma, respiratory illnesses and allergies
- Stress and anxiety
- Financial pressure or debt

2.4 The extent of fuel poverty in Scotland

2.4.1 Communities Scotland, in the Scottish House Condition Survey (2002), estimated a steady drop in fuel poverty figures since 1996 primarily due to cheaper fuel prices following deregulation of the energy market and increases in disposable income. The number of fuel poor households was estimated to fall from 738,000 households in 1996 to 286,000 in 2002. The majority of households in fuel poverty live in the owner occupied sector and those living in extreme fuel poverty were found to be single persons living in rural areas with houses built prior to 1983.

2.4.2 The most vulnerable groups are the elderly and those with young children. However, following the sharp rise in fuel prices in 2005/06 the numbers in fuel poverty will have dramatically increased.

3. **What is affordable warmth?**

By eradicating fuel poverty, households will be able to achieve affordable warmth.

Benefits of eradicating fuel poverty		
	Landlords	Tenants
Investment in energy efficiency	<ul style="list-style-type: none"> • Lower maintenance costs • Reduced repairs • Increased asset value • Meet key housing standards 	<ul style="list-style-type: none"> • Reduced fuel bills • Improved comfort
Income maximisation	<ul style="list-style-type: none"> • Reduced rent arrears 	<ul style="list-style-type: none"> • Reduced debt • Increased household income

Lower fuel bills	<ul style="list-style-type: none"> • Lower turnover • Reduced rent arrears 	<ul style="list-style-type: none"> • Increased disposable income
Warmer homes	<ul style="list-style-type: none"> • Increased customer satisfaction 	<ul style="list-style-type: none"> • Improved health • Improved comfort

4. How to deliver affordable warmth

Aberdeenshire Council needs to take three key actions to ensure tenants can achieve affordable warmth:

- Identify those at risk of being in fuel poverty;
- Eradicate fuel poverty by addressing the issues that cause it;
- Monitor the proportion of Aberdeenshire tenant households who are in fuel poverty
- Identifying the most sustainable and cost effective method of providing heat in the property

4.1 Households in fuel poverty

It is not easy to identify whether a household is suffering from fuel poverty. Information is needed on:

- The energy efficiency of the home
- The income level of the household
- How tenants use their homes and pay for fuel

There are two distinct but complementary approaches to identifying households in fuel poverty:

- assessing specific houses;
- looking at more general indicators of fuel poverty.

4.2 Specific

4.2.1 Would involve visiting each household to assess the household income and fuel running costs, then calculate the running costs as a percentage of income.

4.2.2 To help prioritise households, a referral system with front line staff that can identify symptoms of fuel poverty during their visits could be established.

4.2.3 Utilise the Energy database containing details of the energy efficiency characteristics of all the stock, to prioritise/target areas most likely.

4.2.4 Combine the energy information with housing benefit data and use this to estimate the level of fuel poverty in specific households. This approach is

cheaper but less accurate than collecting data at specific household level. It is particularly useful when trying to identify geographical areas to focus more detailed attention upon.

4.3 General indicators

General indicators can be used to locate geographical areas or dwellings that are likely to contain fuel poor households. These properties can then be targeted for general promotion or for home visits. As measuring fuel poverty is so difficult, it is useful to look at *general indicators* of fuel poverty including:

- The energy rating of the property – SAP/NHER
- The income level of the occupants;
- Receipt of benefits;
- Fuel Poverty Map (all tenures).

4.3.1 Energy rating of the property

The energy rating of the property indicates how energy efficient the property is; it does not provide details of the income level of the occupant or how they use and pay for fuel. However, properties with very low energy ratings are more likely to have occupants in fuel poverty than those with very high-energy ratings.

4.3.2 Income of the occupants

The UK Government produces figures on average earnings and incomes; these are available from the National Statistics Office.

It may be possible to gain information from tenants about their income when their tenancy starts. This information could be used in relation to estimate running costs for the property to see if the prospective tenant can achieve affordable warmth.

4.3.3 The Fuel Poverty Map

The aim is to identify geographical areas that are likely to have high numbers in fuel poverty and establish a map. The Scottish Fuel Poverty Indicator (FPI) has been developed to combine census data with data from the Scottish House Condition Survey (2002) to predict levels of fuel poverty at ward level. The FPI can help to design and target area-based programmes and to monitor and evaluate any schemes that have been delivered. This work has been done for Aberdeenshire and is now being further broken down to census output area across all tenures, this will allow areas to be targeted.

5. Eradicating Fuel Poverty

To eradicate fuel poverty mechanisms need to be developed which address the causes of fuel poverty including:

- Tenants' income levels;
- The energy efficiency of the property;
- Hard to treat homes; (Energy Efficiency Strategy Section 10)
- Tenants' awareness and understanding of energy efficiency;
- The price of fuel;
- Financing energy efficiency measures;
- Allocation of homes to provide affordable warmth.
- Identifying the most sustainable, appropriate and cost economical forms of heating in the property.

5.1 Tenants' income levels

- 5.1.1 By definition, those suffering from fuel poverty are on low incomes. Aberdeenshire Council are addressing low incomes by helping to ensure that tenants are aware of and receiving the benefits to which they are entitled. It is proposed that a range of resources be investigated and schemes established that address fuel debt, provide information about fuel running costs and inform tenants about switching suppliers.

5.2 The energy efficiency of the property

- 5.2.1 The most effective way of ensuring a household obtains affordable warmth is to minimise the amount they need to spend on heating, hot water and running electrical appliances. This means improving the fabric of the building to minimise the heat loss, ensuring that there is an efficient heating system with appropriate controls, installing low energy light bulbs and providing low energy appliances. Aberdeenshire Council proposes to:
- Prioritise energy improvements;
 - Establish energy and affordable warmth targets and standards for improvements to the stock;
 - Review repairs and maintenance specifications and schedules;
 - Incorporate sustainable technologies.
 - Affordable Warmth Policy linked to Rent Setting

5.3 Tackling hard to treat homes

5.3.1 Hard to treat homes (HTTHs) are defined as those dwellings that cannot accommodate typical energy efficiency measures offered under schemes such as the Warm Deal. Examples of homes which are labelled hard to treat include:

- Homes with solid walls;
- Homes of non-traditional construction (i.e. Anchor, Cruden, No-fires, etc);
- Homes that are off the mains gas network;
- Homes with no loft space;

5.3.2 Partnerships between local authorities and housing associations

There may be opportunities for Aberdeenshire Council to form partnerships with local housing associations to their mutual benefit in managing social housing stock and dealing with HTTHs. Such opportunities might include collaboration on the following:

- Bulk buying of improvement measures and technologies to make them more affordable, particularly the less common ones;
- Standardisation of leasing agreements for 'removable' measures such as boilers;
- Disseminating experience of pilot projects such as those funded by EU programmes (Thermie, SAVE, etc.);
- Sharing knowledge and experience of new and emerging improvement technologies;
- Training of staff in awareness of new technologies;
- Provision of energy advice for tenants.

5.3.3 Improvement measures for hard to treat properties

Measures and technologies which may be suitable for HTTHs may include:

- Gas-fired condensing boilers;
- Oil-fired condensing boilers;
- Internal insulation of external walls;
- External insulation of external walls;
- Heat pumps;
- Solid fuel cassettes;
- Wood-fired boilers;
- Solar water heating;
- Photovoltaic panels for electricity generation;
- Wind Power
- Heat recovery ventilation;
- Combined heat and power (CHP);
- High performance glazing;
- Community heating.

5.4 Funding

- (See Energy Efficiency Commitment Section 9)

5.5. Tenants' awareness and understanding of energy efficiency

- (See Energy Efficiency Commitment Section 6)

5.6 Allocation of homes to provide affordable warmth

5.6.1 We can help to prevent fuel poverty in our stock by trying to avoid allocating large or energy inefficient homes to tenants who will not be able to afford to heat them adequately.

We can also:

- incorporate an affordable warmth survey into our void procedure;
- Identify the anticipated fuel costs and the minimum income needed to afford them;
- Combine this information with an energy survey of the property.

6. **Monitoring fuel poverty**

6.1 In order to ensure that fuel poverty is being reduced, the current level of fuel poverty should be established. The indicators described above are the most practical way of establishing levels of fuel poverty and measuring changes over time. The Scottish House Condition Survey provides levels of fuel poverty broken down into local authority areas.

6.2 Research shows the average NHER rating of a housing stock is a useful indicator for tracking progress in tackling fuel poverty, that is, as the average NHER rating rises, fuel poverty falls. The table below suggests other performance indicators that can be used to monitor fuel poverty.

Element	Key Performance Indicator
Energy efficiency	Annual change in average SAP / NHER Number of properties with a SAP < 50 brought above 60
Householder knowledge of controls and payment methods	Number of tenants provided with energy advice handbooks Number of tenants receiving face to face advice in the home
Combined Income / Energy Efficiency Measure	Percentage of disposable income required to achieve comfortable temperatures throughout the house AWI Affordable Warmth Index

7. Developing an affordable warmth policy

7.1 Aberdeenshire Council is considering a comprehensive affordable warmth policy and action plan which links with the Business Plan and our investment strategy in the Standard Delivery Plan to meet the Scottish Housing Quality Standard by 2015.

8. Scottish legislative and policy obligations

8.1 The Scottish Fuel Poverty Statement, required by the Housing (Scotland) Act 2001, has an overall objective of ensuring that people are not living in fuel poverty in Scotland by November 2016, so far as reasonably practicable.

8.2 The Housing (Scotland) Act 2001 places an obligation on local authorities in Scotland to produce strategies which “ensure, so far as is reasonably practicable, that persons do not live in fuel poverty”.

8.3 The Home Energy Conservation Act (1995) (HECA) requires Scottish local authorities to have a housing strategy that will improve the energy efficiency of their housing of all tenures. They are required to report on the actions they have taken to tackle energy efficiency every two years. Currently the 2005 update is being prepared.

8.4 The current Building Regulations (Part J) require landlords to provide higher levels of energy efficiency in both new and adaptations to existing homes.

8.5 The Scottish Housing Quality Standard (SHQS) defines what constitutes acceptable good quality housing. The SHQS applies across all housing tenures and the Scottish Executive encourages local authorities to use it to monitor the condition of private housing and to ensure that fuel poverty is tackled as a key priority. Local authorities and other registered social landlords have until 2015 to meet the standard in their own stock. The Scottish House Condition Survey 2002 estimates around 70 per cent of Scotland’s social housing falls beneath the standard, although many houses miss it only marginally. In broad terms, to meet the SHQS a house must be:

- Above the tolerable standard which is the absolute minimum standard that a house must meet;
- Free from serious disrepair such as major roof, dampness or structural problems; energy efficient so it must have effective insulation and central heating;
- Provided with kitchen and bathroom fittings that are in a good and safe condition;
- Safe and secure, for example it must have a smoke detector, secure doors and safe electrical and gas systems.

Objective 2: To eradicate fuel poverty in Aberdeenshire’s Council housing stock by making stock fuel poverty proof by 2016

Outcome: Established procedures to install the most efficient heating system available, to insulate fully all dwellings and to advise tenants on how to use their heating efficiently to reduce fuel bills.

ENERGY MATRIX

1. Purpose

- 1.1 Awareness of Energy Efficiency, the SHQS and fuel poverty issues facing Aberdeenshire tenancies amongst housing staff was assessed using an Energy Matrix tool. This established the baseline position and assisted with creating an action plan for improvements within the Energy Efficiency Commitment.

2. Background

- 2.1 The Scottish Housing Quality Standard (SHQS) is a big issue facing all social landlords in the UK. A key objective of the standard targets housing and energy efficiency. It is important that we establish where Aberdeenshire Council stands at present and plan how to meet the standard by no later than 2015 and to set targets for beyond the SHQS.

3. Proposals

- 3.1 The Housing Energy Management Matrix is a powerful tool for assessing the scope of the Energy Commitment and for reviewing its progress.

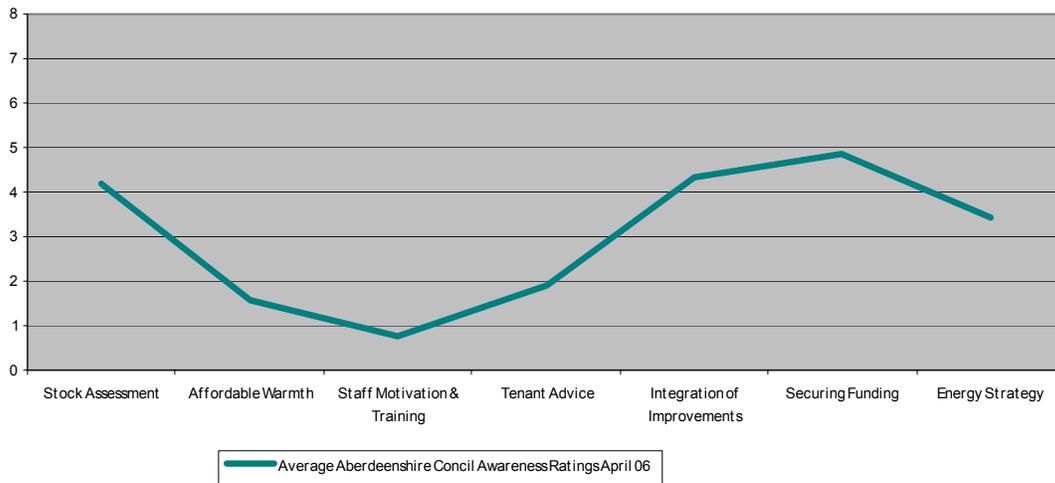
3.1.1 The Matrix helps to:

- Identify key action areas;
- Compare with best practice;
- Identify a route towards achieving best practice;
- Display progress in development and implementation;
- Assist with regular review;
- Identify areas in which progress is being made or areas of weakness where action is required;
- Illustrate the quality and progress of the strategy to senior managers, partner organisations, funding bodies and tenants.

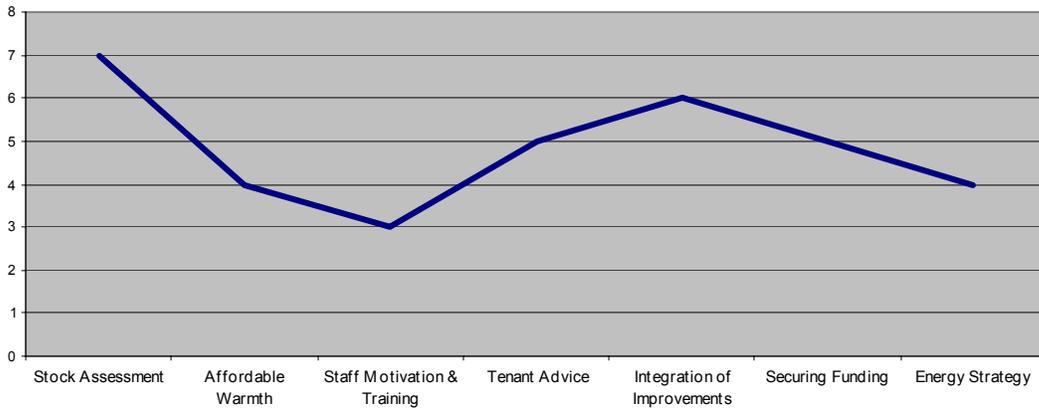
4. Levels of Progress

- 4.1.1 Each of the above action areas are assessed and points are allocated given the level of performance achieved to date. At the initial stages, it is predicted that low scores will be gained and after steps are taken following the implementation of the commitment, a steady improvement should be achieved. Targets have been commitment set. See charts below.

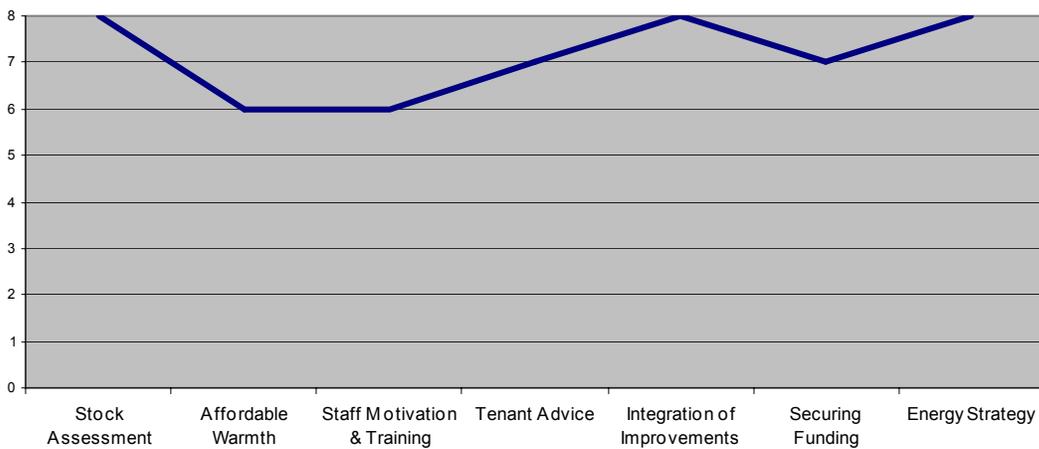
Aberdeenshire Council Matrix 2006



Targeted Matrix 2010



Targeted Matrix 2015



5.2 The graphs above project the levels of awareness over a period of time. They show the progress and identify where resources should be focused in order to improve understanding by given milestones.

ENERGY TRAINING

1. Introduction

1.1 Training Housing staff in energy efficiency is a fundamental building block of the Energy Efficiency Commitment. The training needs of staff will vary depending on the scope of energy efficiency work that they will be expected to undertake. In order to ensure that the needs of tenants and staff are met, a commitment to energy training is required to address:

- The need for a designated training officer;
- Provision of basic energy awareness training for all staff;
- Implementation of a training programme for people involved in the delivery of energy advice;
- Energy commitment workshops for housing managers;
- Delivery of energy efficiency training for technical staff;
- The need for refresher courses;
- Overview of energy technologies for households.

2. The need for a designated training officer

2.1 Designation of a member of our staff as an energy efficiency training officer would ensure that everyone receives the training and support required to carry out their energy efficiency remit and receives refresher courses and updates.

3. Provision of basic energy awareness training for all staff

3.1 Everyone in Housing would benefit from training sessions on basic energy awareness. Such sessions are very effective in raising energy awareness, generating enthusiasm and commitment to energy efficiency reflecting Aberdeenshire Councils commitment to energy efficiency.

3.2 After attending training, the majority of staff are likely to put some of the key messages into practice in their own home. Once they can see how easy it is to save energy, save money and increase their own comfort levels, they will be enthusiastic about implementing the Energy Efficiency Commitment and disseminating what they have learnt to others.

3.3 In-house Aberdeenshire Council has trained key members of staff to varying levels of energy awareness:

Dave Thomson	NHER Plan Assessor	1994
Niall Beattie	NHER Site Assessor	2004
Jim Will	City and Guilds	2005

4. Implementation of an energy advice training programme

4.1 Staff providing energy advice as part of their everyday duties

4.1.1 Energy advice should be accurate and consistent; wrong advice is worse than no advice at all. Therefore, it is vital that staff delivering energy advice are adequately trained. It is also important to ensure that as many front line staff as possible are able to provide energy advice; this means that more tenants will receive advice in a cost-effective manner. All staff that come into contact with tenants in their homes should receive training in energy advice.

4.1.2 The priority is to develop and implement a training programme to enable all staff to give energy advice. The level of training provided will depend on the individual being trained and the resources available.

4.2 Dedicated home energy advisors

4.2.1 All staff carrying out detailed home energy advice visits should obtain appropriate qualifications.

4.2.2 To ensure a consistent approach, they should also receive training about:

- Key areas of energy advice to be covered at each visit;
- Heating controls to be demonstrated;
- Energy advice information to be left with the tenant
- The checklists to be used at each visit;
- Any forms that need to be completed by the advisor and the tenant;
- The procedures to minimise risk for the lone home energy advisor;
- Where to refer the tenant for more help and information.

4.3 Staff providing face to face energy advice outside the home

4.3.1 The level of training required will depend on the level of advice given. Reception staff, for example, will probably need only basic energy advice training and will need to know where to refer tenants for further advice and information.

4.4 Staff providing energy advice in non-face to face situations

4.4.1 If staff are making referrals, they should attend a basic energy awareness session and receive training on where to refer tenants for help and information.

4.4.2 Staff providing detailed advice over the telephone should be suitably qualified. They should also receive training on:

- Key areas of energy advice that can be covered;
- Energy advice information which they can send to the tenant;
- The forms to be completed to record advice given;
- The collection of energy data;
- Where to refer the tenant for more help and information.

4.5 Tenants as neighbourhood energy advisors

4.5.1 Aberdeenshire Council can make face to face energy advice available to tenants in their homes by training those tenants who are most active in the community to give effective advice themselves. People are often more open to advice from their peers rather than from “experts” or “officials”. This approach is particularly effective during the installation of new heating

4.6 Training the trainers to deliver energy awareness courses

4.6.1 We may want to consider training certain members of staff to train others in basic energy awareness or to provide refresher courses

5. Energy commitment workshops for housing managers

5.1 Housing managers have a key role to play in the implementation of the housing energy commitment. It is important that they understand the aims and objectives of the strategy and are involved in setting targets for implementation and actively promote and support the key objectives of the commitment. To ensure this, development workshops could be established to enable housing managers to “own” the energy commitment and ensure Housing meets these objectives.

6. Delivery of energy efficiency training for technical staff

6.1 Technical staff are likely to benefit from formal training in housing energy efficiency. This training will provide them with a comprehensive understanding of the principles of energy efficiency.

7. Refresher courses

- 7.1 A system will be put in place to ensure that staff and tenants attend refresher courses and receive updates. This will help to reinforce the material learnt in the initial training course and make sure that they are aware of any new information (e.g. new grant schemes).

Objective 3: To raise awareness of Energy Efficiency issues for staff and tenants by providing Energy Training to all staff and 50 tenants by 2009 and giving Energy Advice to X tenants in their own homes by 2010

Outcome: Staff and tenants aware of best practice and how to ensure affordable warmth for all.

INTEGRATING ENERGY EFFICIENCY

1. Introduction

1.1 This chapter explores how energy efficiency improvements can be incorporated into broader housing repair and improvement programmes. It includes:

- Identifying and prioritising dwellings for energy work;
- Improvement packages;
- Integrating energy work with cyclical maintenance and repairs;
- Integrating energy work into improvement programmes
- Dedicated energy programmes
- Combining different types of energy programmes
- Including energy work in tenant consultation.

1.2 Aberdeenshire Council has well-established repair and improvement programmes. Financed from revenue budgets (for repairs and maintenance) and from capital budgets (for improvements). Resources are limited, so energy efficiency improvements must compete with other work for inclusion and prioritisation.

1.3 Improvement programmes are also influenced by tenants' wishes, so all proposed energy work is included in tenant consultation.

2. Identifying and prioritising dwellings for energy work

2.1 In any housing stock, the dwellings most in need of energy work are those that are the least energy efficient.

2.2 Energy efficiency improvements to these dwellings are much more effective than the same improvements applied to dwellings that are already more energy efficient. It will also deliver a bigger increase in the energy rating of the property, which in turn will contribute more significantly to raising the average energy rating of the housing stock. Dwellings with poor energy ratings are to be prioritised for energy efficiency improvements.

2.3 Some dwellings are technically more difficult and more expensive to improve than others. These include some types of pre-fabricated dwellings and those classified as "hard to treat". Hard to treat dwellings include those which do not have wall cavities that can be insulated and those that are not connected to the

Mains gas network. Where it is necessary to bring dwellings up to the Scottish Housing Quality Standard, hard to treat dwellings will require more investment than others.

- 2.4 As resources are limited, it may be appropriate to prioritise those dwellings where improvements can deliver “quick wins” in terms of moving towards fuel poverty proofing and increasing the overall performance of the housing stock. However, hard to treat dwellings need to be included in medium-term programmes.
- 2.5 Where dwellings meet the criteria for external funding, or could benefit from economics of scale, they should be brought forward in the improvement programme so that the opportunity of funding the work is not missed. It is essential to remain very flexible and to develop a good understanding of funding schemes to do this.

3. Improvement packages

3.1 Integrated improvement packages

Improvements to existing dwellings should ideally be specified in “integrated packages”. An integrated package should include:

3.1.1 Insulation

Insulation reduces heat loss, improves thermal comfort and reduces the risk of surface condensation. Aberdeenshire Council have committed to ensuring that all cavity walls are insulated and that all lofts are insulated to a minimum of 300mm by 2010.

3.1.2 Reduced infiltration

Reducing infiltration of air through the building fabric reduces heat loss and improves comfort. External doors, windows and loft hatches should be draught-proofed.

3.1.3 Controlled ventilation

Controlled ventilation improves air-quality and reduces condensation risk by removing moist air. Every room should have controllable, draught free ventilation (e.g. trickle ventilators).

The Council is committed to ensuring that all opportunities to save energy are maximised, and is keen to investigate the potential of installing individual and whole house heat recovery systems.

3.1.4 Heating and hot water systems

Choice of fuel can have a significant impact on fuel costs and on carbon dioxide emissions. Insulation and air-tightness should be improved before new heating systems are installed, in order to ensure that a suitably sized system can be installed. Individual gas-fired central heating systems should incorporate high efficiency condensing boilers and good controls. In well-insulated dwellings the

largest thermal load may be the hot water, not the space heating, so combination boilers may need to be considered.

3.1.5 Energy efficient lighting and appliances

Energy efficient lighting using fluorescent and compact fluorescent lamps and the use of energy efficient 'A-rated' domestic appliances, as a minimum standard, can significantly reduce running costs and carbon dioxide emissions. Aberdeenshire Council in partnership with an utility company will offer all its tenants the opportunity to purchase A rated appliances at preferential rates. Energy efficient lamps are particularly effective in the rooms where the lights are used most often, Aberdeenshire Council will consider moving to installing at rewiring programmes, fitments that only take energy efficient lighting.

3.1.6 New and renewable energy systems

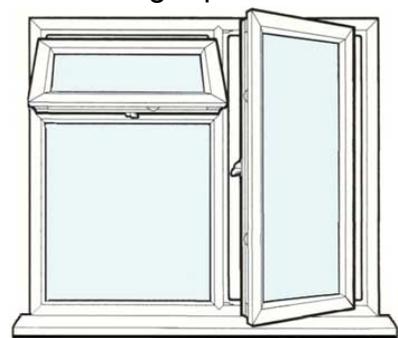
The use of combined heat and power (CHP) and renewable energy technologies such as solar hot water and photovoltaics (PV) can significantly reduce fuel costs and carbon dioxide emissions. However, capital costs can be high and payback periods lengthy, but grant funding is often available which may make installation economically viable.

3.2 Single improvement measures

Single measures installed in isolation may be appropriate in certain situations. It may be that the other measures in a package are already in place or are scheduled for installation in the near future. It may also be that the benefits of a measure are clearly proven and that an opportunity is simply too good to miss. However, single measures installed in isolation may not provide much benefit to tenants. New heating systems installed in uninsulated homes often go unused as tenants cannot afford to run them. Insulation installed in homes with inadequate heating controls may lead to over-heating. Double-glazing installed in homes without adequate ventilation may increase the likelihood of condensation and mould growth.

3.3 Whole house approach

It is not sensible to install an A-rated condensing boiler if there is significant heat loss due to a lack of loft insulation so Aberdeenshire Council have adopted a whole house approach when improving energy efficiency of its housing stock. When a property is in need of a new heating system, the insulation measures will be brought up to the Aberdeenshire standard, which includes 300mm loft insulation, cavity fill, double glazing, windows and doors draught-proofed.



3.4 Evaluating the cost effectiveness of improvement options

Evaluation of the cost effectiveness of the improvement options is essential to ensure that the chosen specification represents the best value for money. Where improvements to streets or villages are proposed, it is not necessary to evaluate improvement options for every dwelling. Analysis should focus on the “worst case” example of each thermally distinct dwelling type. Once a specification has been identified for these examples, it can be “scaled up” to establish the overall cost and effect.

4. **Integrating energy work into improvement programmes**

Many types of improvements are best carried out as part of a comprehensive refurbishment project. These improvements include:

- Provision of floor insulation;
- Internal insulation/dry lining of walls;
- Installation of a new heating system;
- Installation of whole-house mechanical ventilation with heat recovery.

Comprehensive refurbishment projects are usually focused on streets or a building type and form part of long-term programmes involving capital investment and/or external grant funding. Refurbishment projects will always include a well-balanced “integrated” package of energy efficiency improvements, combined with tailored energy advice to tenants. External funding may be available for improvements in energy efficiency and broader funding programmes may require energy work to be included.

5. **Dedicated energy programmes**

- 5.1 Dedicated energy programmes involve the installation of individual energy measures separately from any other repair, maintenance or refurbishment work. The great advantage of a dedicated energy programme is that it enables energy measures to be installed quickly in dwellings that would not otherwise be treated.
- 5.2 An effective dedicated energy programme must be supported by its own budget. The energy measures involved are usually relatively inexpensive, so budgets do not have to be large.
- 5.3 Aberdeenshire Council is presently piloting a “Cosy Homes” project which will offer advice, benefit health checks and installation of energy efficient measures to households in a specific area, regardless of tenure. Should this approach be affective, it will be expanded to cover all Aberdeenshire.

6. Combining different types of energy programmes
 - 6.1 A “best practice” approach for improving energy efficiency in Aberdeenshire will combine both types of energy programme:
 - An integrated programme in which energy work is combined with comprehensive refurbishment;
 - A dedicated programme to ensure that energy work is carried out on very inefficient dwellings that may not otherwise be improved.
 - 6.2 Combining both types of programme in this way requires careful planning and budgeting, and the balance of programmes will need to remain flexible in the light of available resources and progress made. Progress of implementation work should be reviewed on a regular basis as part of the overall housing energy commitment.
7. **Tenant consultation**
 - 7.1 Tenants should be consulted about proposed improvements in energy efficiency. Unlike other types of improvements (e.g. new kitchens and bathrooms), energy work can deliver measurable benefits to tenants in the form of reduced fuel costs and more affordable warmth.
 - 7.2 The estimated “before and after” fuel costs should be explained to tenants so that they can express an informed preference. If the benefits of energy efficiency are clearly explained, tenants will usually seek their inclusion in improvement packages. Some are also interested in the wider effects of improvements, such as the reduction in carbon dioxide emissions.
 - 7.3 The general public are becoming more aware of the environmental impact of using non-finite resources for domestic purposes. Many more people are now recycling materials used in household consumables such as glass bottles plastic containers and newspapers.
 - 7.4 Some Council tenants may wish to go one stage further in doing ‘their bit’ for the environment and reduce CO₂ emissions. In order to make a difference in Aberdeenshire and given that there is no great financial incentives as yet, tenants may be willing to pay extra rent if the renewable energy cost savings would counter balance the costs to install and maintain the system.
 - 7.5 Tenant Consultation would be very important as ‘economies of scale’ would result in greater savings to the tenant. It should be noted that cost savings on renewables may be low today, but with advances in technology and fuel prices continuing to rise the savings should become even greater.

Objective 4: Harmonised Specification to involve the Energy Efficiency measures can be incorporated into all stock improvements by 2008

Outcome: Ensures that the most efficient and cost effective measures are applied whilst upgrading the stock across Aberdeenshire

INTEGRATING RENEWABLE & INNOVATIVE TECHNOLOGY

1. Introduction

1.1 Renewable energy technologies provide energy that has much lower or even no carbon dioxide emissions when compared to traditional fossil fuels.

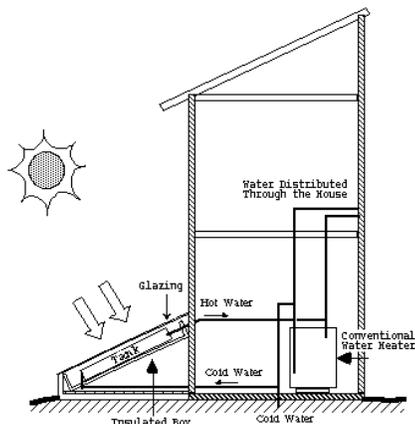
The overwhelming benefit of renewable energy technologies is the reduced impact they have on the global environment. Renewables supply heat and electricity with greatly reduced carbon emissions.

This chapter outlines the range of renewable energy technologies that are available, how and where they can be used and how they work. It covers:

- Solar water heating;
- Solar photovoltaics (PV);
- Wind;
- Wood fuelled boilers;
- Ground source heat pumps;
- Air source heat pumps.
- Water source heat pumps

2. The Technologies

2.1 Solar water heating



2.1.1 Solar water heating is the heating of water by the sun. To date the EST has awarded 183 grants for solar thermal systems across Scotland, 116 of which were installed prior to March 2005. They can be as simple as a radiator painted black and located on a roof. There are two main types of commercially available system. These are:

- Flat plate collectors
- Evacuated tube collectors.

Both systems operate under the same principles. Water, containing antifreeze, is pumped through the solar panel and heated by the sun. The heated water is then pumped into the dwelling and through a heating coil in a cylinder. This hot water can either be used as the main hot water for the dwelling or as a pre-heated water feed for water heated by a boiler. Flat plate collectors consist of panels with a black pipe arranged over a black surface, usually snaking to increase heat transfer. The pipes are protected by a glass panel. Evacuated tubes are slightly more complicated, but use the same principle. They consist of a series of evacuated glass heat tubes grouped together. They are more efficient than flat plate collectors but are more expensive initially and may not justify the extra cost. Solar water heating can contribute around 50 per cent of the hot water demand for a dwelling. This figure can vary greatly depending on occupancy factors (e.g. if the occupants bathe in the morning, the contribution will be lower than if they bathe in the evening). Educating occupants is the key to ensuring the success of solar water heating. Providing visual displays on controls is one method. These display a sun when the hot water is being provided by the solar water system and encourage residents to use hot water at the most efficient times.

- 2.1.2 Solar water heating is suitable across the whole of Scotland. Systems require a similar maintenance regime to conventional boiler systems and, as such, an annual service can be carried out at the same time as an annual boiler service. There are few or no running costs associated with solar water heating and there are no carbon dioxide emissions.

2.2 Solar photovoltaics (PV)



- 2.2.1 PV uses light from the sun to generate electricity. Even in cloudy, northern latitudes, PV panels can generate power to meet all, or part of, the electricity demand of a building.
- 2.2.2 PV is a flexible building material. It can be used for roofs, curtain walls and decorative screens and can directly replace conventional materials in the building fabric. These products can serve the same structural and weather protection purposes as their traditional alternatives, as well as offering the benefit of power generation.

- 2.2.3 Where a roof is programmed for replacement, consideration of renewable technology should be given. This could be a great opportunity to use PV as a roof finish and electricity generator at a cost saving.
- 2.2.4 PV currently has high capital costs (hence the long payback period) but requires no maintenance, has no running costs and produces no carbon dioxide emissions. PV has limited application in Scotland with short winter daylight hours – solar thermal is definitely viable though.

2.3. Wind power



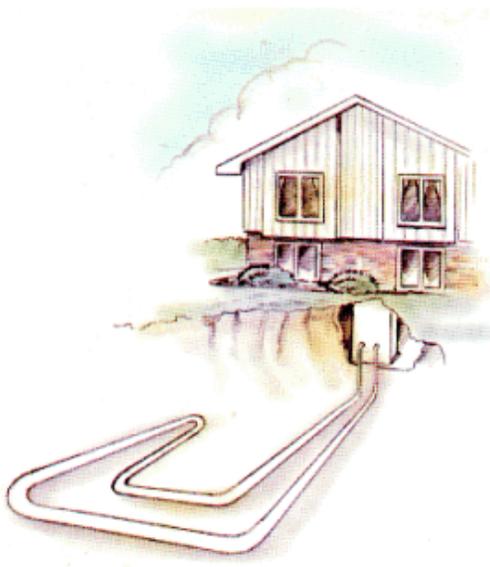
- 2.3.1 Wind power is electricity generated from the wind, using a wind turbine. Turbines could be operated by an energy supply company or as an independent resource. Standard turbines are not always suitable for dense urban environments. However, to combat the problems associated with utilising wind power in urban areas, 'building integrated turbines' are currently being developed and tested as an urban alternative to larger turbines. This type of turbine can be installed on or near buildings.
- 2.3.2 Wind turbines require some servicing. This can be included within the initial purchase or servicing agreements. There are no other running costs and no carbon dioxide emissions, but their high initial purchase price leads to a medium-term payback period.

2.4 Wood fuelled boilers



- 2.4.1 Wood fuels are considered to be “carbon neutral”. Although carbon dioxide is released when fuel is burned, it is the same as the carbon dioxide absorbed while it is growing, so no additional carbon is released into the atmosphere. Wood fuel can be derived from forest management operations or specifically farmed biomass crops such as willow. In general, wood fuel can be used as an alternative fuel where a boiler based heating system is installed. Fuel costs will be dependent on availability of local supply. There are two main types of wood fuels for domestic heating systems: wood chips and wood pellets. Wood boilers are particularly appropriate in areas without mains gas but good levels of tree cover.
- 2.4.2 Maintenance implications are dependent on whether the fuel used is wood chips or wood pellets; all wood fuel boilers, however, will require ash removal which may not be appropriate for elderly or disabled users.
- 2.4.3 Wood fuel boilers generally have high maintenance costs for a number of reasons. The feed systems for wood chip fuel may become blocked. Ash has to be removed from the burner at regular intervals, and this may prove difficult for elderly or disabled users. A modern pellet boiler only requires ashing every 6 months however. Where a communal boiler is used, there will be maintenance issues such as ash removal which would not be applicable with a gas boiler. Fuel costs are highly dependent on the local availability of fuels. This is particularly relevant with wood pellets, however a sawmill in Aboyne and another in Laurencekirk plan to set up production in the near future.

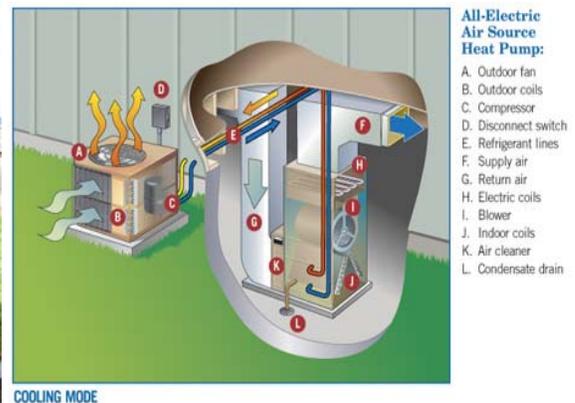
2.5 Ground source heat pumps



- 2.5.1 Ground source heat pumps work by transferring the heat from the earth to a building by means of a heat exchanger. This heat can then be used for space heating and hot water.

- 2.5.2 Boilers create heat by burning a fuel, typically gas. With a heat pump system, there is no need to create heat, hence no need for combustion. Instead, the Earth's natural heat is collected through a series of pipes (called a loop) installed below the surface of the ground. Fluid circulating in the tubes carries this heat to the home. An indoor system then uses electricity to concentrate the Earth's energy and release it at a higher temperature. This produces hot water which is pumped around the house as with a conventional boiler system.
- 2.5.3 The system works on the principle that the temperature a few feet below the ground remains relatively constant throughout the year, even though the outdoor temperature may fluctuate greatly. At a depth of approximately six feet, the temperature of soil in most of the world's regions remains stable between 7°C and 21°C.
- 2.5.4 Ground source heat pumps are slightly higher in price than conventional boiler systems but have lower running costs and have lower carbon dioxide emissions.

2.6 Air source heat pumps



This works in a similar fashion to ground source. It is located outside with a silent-running fan which draws in the outside air, and this heat is transferred to the heat pump's refrigeration circuit. The heat pump converts this into hot water, which heats the house and domestic hot water. There is no need for boring or digging. It can be connected to the existing heating system and provides both heat and hot water.

3. Maintenance, running costs, emissions and payback of the technologies

3.1 The table below illustrates each of the renewable technologies compared to a conventional gas-fired boiler system.

Technologies	Maintenance	Running Costs	Carbon Dioxide Emissions	Payback Period (approx)
Solar Water Heating	Medium	Very low	Very low	Dependent on hot water use 5-10 years
PV	Low	Very low	Very low	>25years

Wind	Medium	Low	Very low	Dependent on size. 5->25 years
Wood Fuel Boilers	High	Medium-high	Very low (net CO ₂)	5-10 years
Ground Source Heat Pumps	Medium	Medium	Medium-low	5-10 years

4. The technologies and where to use them

4.1 Selecting renewable technologies on the basis of housing density

4.1.1 The following table illustrates the appropriateness of each of the technologies based on the nature of the housing stock. This is by no means definitive and should be used only as a guide to which technologies might be investigated further. It also demonstrates that all are likely to be “Very Good” in Aberdeenshire’s “off mains gas” network areas. (48 Communities throughout Aberdeenshire are without mains gas.)

Housing Type		High density urban	Low density urban	Distributed sub-urban	Rural
Technology	Solar Water Heating	Sometimes	Very Good	Very Good	Very Good
	PV	Usually	Usually	Usually	Very Good
	Wind	Inappropriate	Sometimes	Sometimes	Very Good
	Wood Fuelled Boilers	Sometimes	Usually	Usually	Very Good
	Ground Source Heat Pumps	Inappropriate	Sometimes	Usually	Very Good

High density urban: flats >3 storeys

Low density urban: houses or low rise flats grouped together in large estates

Distributed suburban: houses or low-rise flats distributed over a wide area interspersed with other properties (i.e. not owned by the Housing Organisation)

Rural: Small clusters of dwellings grouped together but housing stock distributed over a large rural area.

5. How to develop renewable energy technology

5.1 The development and deployment of renewable energy is broadly similar, regardless of which technology is being considered. Renewable energy helps to achieve objectives including affordable warmth, asset management and sustainable development.

5.2 The use of renewable energy technology should be combined with improvements to the energy efficiency of homes. This will significantly increase its effectiveness. The following is a step-by-step approach to adopting renewable technologies:

Step 1: Assess the potential for renewable technology

- Identify possible sites and the technology to be used. Different technologies lend themselves to different types of buildings and sites;
- Work out costs and obtain quotations;
- Consider the use of specialist consultants who can help with technical aspects and with grant applications.

Step 2: Consult with tenants and contractors

Step 3: Develop specification for technology including the energy efficiency of the properties

Step 4: Assess the investment required

- Evaluate the benefits to residents;
- Establish what budget is available;
- Identify government and other grants which can be accessed;
- Examine the potential for Scottish Renewable Obligation Certificates.

Step 5: Discuss the proposals with planning and apply for planning permission

Step 6: Implement the scheme

5.3 Aberdeenshire Council have commissioned Atkins to compile a feasibility study to determine the suitability for renewable energy within the Housing Stock. It is hoped that this will provide rule of thumb scenarios of when, where, what and how to integrate energy efficiency into dwellings whilst being value for money and fitting in with existing capital improvement programmes.

6. Conclusions

Renewable energy technologies now represent a viable alternative to traditional forms of energy production in the home. Whilst their initial cost is still currently high, they have the potential to reduce energy costs in the long term and can

deliver a wide range of benefits: affordable warmth, reduced environmental impact, increased asset value and demand for the property.

Objective 5: To integrate Pilot Projects for Renewable Technology

Outcome: With analysis into cost savings and reduced emissions, the suitability of the renewable technology can be examined, with a view to applying the measures to a larger percentage of the stock.

COMMUNITY HEATING AND COMBINED HEAT AND POWER

1. Introduction

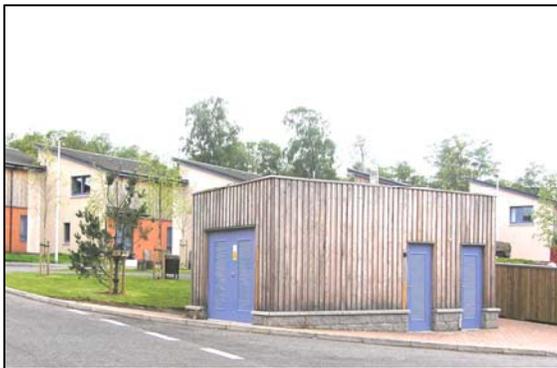
1.1 A community heating scheme provides heat from a central source to more than one building, dwelling or customer. Community heating is an alternative to providing individual heating systems to each dwelling. A scheme consists of a central heat source (e.g. boilers in a boiler house), a heat distribution network and installations within dwellings (radiators and controls).

1.2 Community heating reduces fuel costs for tenants and cuts carbon dioxide emissions. In many cases, it will be the lowest whole life cost option for heating provision.

A major advantage of community heating is that heat can be supplied to the system from a range of sources including:

- boilers using conventional fuels or renewable fuels
- heat from power generation combined heat & power (CHP) including energy from waste
- renewable heat sources such as solar or heat pumps;
- waste heat from industrial processes.

1.3 The use of combined heat and power (CHP) with community heating can lead to greater benefits. CHP recovers and uses the heat produced when electricity is generated and can achieve an overall energy efficiency of over 85%. It is the most efficient way of using fossil fuels and can also be fuelled by renewables or waste. CHP can provide heat to a community heating network and also reduce the costs of electricity (we could use the electricity produced on site or sell it to customers over a private wire network) or back to the national grid.



2. The benefits of community heating

- Reduced heating costs for tenants leading to more affordable warmth and reduced risk of condensation and mould growth;
- Reduced electricity costs (if community heating is used with combined heat and power (CHP)) for tenants;
- Reduced space taken up by a heating system in each dwelling since the boiler and hot water cylinder are replaced by a compact unit;
- Reduced costs for landlords, since there is no need to access every dwelling for boiler servicing and annual safety checks;
-
- More reliable and as simple to control as individual heating systems;
- Flexibility to use a variety of heat sources;
- Greater overall energy efficiency and therefore reduced carbon dioxide emissions (particularly if CHP or renewable fuels are used);
- Significantly lower life cycle costs compared to individual heating systems (the up-front costs are likely to be higher but are usually reduced by the use of private finance).

Barriers to community heating	Overcome by
High capital cost, especially where new heat mains and or a boiler house are required.	Use of revenue from heat (and electricity if CHP plant used) to attract private finance. Inclusion of reduced maintenance costs in whole life costings.
Tenant perceptions, especially where they have direct experience of poorly designed and controlled systems in the past.	Ensuring that tenants are aware of the reliability and efficiency of modern systems, including controls and metering/charging procedures.
In mixed tenure situations, difficult getting agreement from all householders to proceed at the same time.	Installing heat mains with tap-off points that facilitate later connection to the system for those reluctant to proceed initially.
Lack of experience (and expertise) in managing community heating in housing management organisations.	Use of specialist contractors to operate and manage the system.

3. Technical characteristics of community heating

3.1 Heat sources

- 3.1.1 Community heating can make use of a wide number of heat sources and these can potentially be changed according to availability and price. Better efficiencies and greater security of supply by the use of multiple boilers could also be achieved.
- 3.1.2 Environmental and cost benefits can be obtained by the use of “waste heat”, often a by-product of electricity generation or industrial processes, or by the use of renewable energy sources.
- 3.1.3 There may also be scope for “energy linking”, that is, the joining up of community heating schemes on adjacent sites. This can provide additional, mutual back-up for heat sources and better utilisation of heating plant and is especially effective where the schemes have different patterns of heat use. With this in mind, it can be advantageous to supply a range of domestic and non-domestic customers (e.g. a school with higher heat demand during the day and housing with a higher demand in the evening).

3.2 Heat distribution network

- 3.2.1 A distribution network transfers the heat (usually as hot water) from its source to the individual dwellings that are connected to the system.
- 3.2.2 For a system that serves a single building, the heat network may simply consist of a pump and conventional valves and insulated pipes similar to those used in an individual central heating system. For schemes that serve a number of buildings, larger “heat mains ” are used (usually with variable speed pumps which reduce pumping energy costs).

4. Combined Heat and Power (CHP)

- 4.1 CHP plant can achieve better overall efficiency in the generation of heat and electricity than conventional heating systems and electricity generated from fossil fuel power stations. Most power stations simply throw away the heat produced when they generate electricity, so that even large modern gas fired power stations are less than 40% efficient.
- 4.2 CHP systems convert between a quarter and a third of their fuel input into electricity and at the same time produce heat that can be immediately used on site or distributed through a community heating network. CHP is around 85% efficient.

4.3 CHP leads to significant reductions in carbon dioxide emissions. An expansion in the use of CHP, especially in urban areas, is likely to form an important part of the national and regional responses to the 2003 UK Energy White Paper.

5. The use of new and renewable fuels

5.1 Mains gas is the most common fuel currently used for community heating and combined heat and power (CHP). Even greater environmental benefits can be gained from the use of fuels from waste materials, renewable fuels such as energy crops and hydrogen in fuel cells.

5.2 Municipal and other wastes

5.2.1 There are a number of large community heating systems with CHP fired by either the combustion of municipal waste or by landfill gas.

There are also examples of smaller systems that burn either wood chips produced from old pallets or wood waste produced from forestry operations. Most of these systems have been in the non-domestic sector (particularly in schools), but their use in the housing sector is increasing.

Waste materials such as farm slurries or food wastes can be used to produce biogas (through a process called anaerobic digestion), which in turn can be used to fire heating or CHP plant.

5.3 Renewable energy sources

5.3.1 Some renewable energy sources can be used to directly supply heat. Solar thermal energy can also be used to supplement the heat supply to a community heating network, through the use of solar collectors and an inter-seasonal heat store.

5.3.2 It is likely that the most significant source of renewable fuel for community heating and CHP will be biomass fuel from energy crops. Energy crops are grown specifically for use as fuel for combustion and include short rotation coppice and miscanthus. A significant uptake of this technology is envisaged as part of achieving the Government's target of reducing carbon dioxide emissions by 60% by 2050. At this stage, however, there is not yet an established system for the production and distribution of energy crops, there is a need to identify a robust and reasonably local supply of fuel.

5.4 Hydrogen

5.4.1 Hydrogen can be used in fuel cells to provide CHP. They typically use the chemical reaction between hydrogen and oxygen to produce electricity, with water as the only by-product. There are no carbon dioxide emissions from this process; however, there may be emissions associated with the production of the hydrogen fuel.

5.4.2 Fuel cells can provide electrical efficiencies of over 60%. If the heat from the chemical processes is recovered and used, then overall efficiencies can be over 90%. Fuel cells have potential for both large scale and micro CHP. It is particularly suited to situations where demand for electricity is double the demand for heat. In the housing sector, these are likely to include sheltered housing and very well insulated dwellings.

6. Project appraisal and implementation

6.1 Evaluation of potential schemes

6.1.1 The up-front capital cost of a community heating system is likely to be higher than that for individual heating systems but the benefits of lower operational costs will often compensate for this over the lifetime of the system.

6.1.2 The best way to evaluate the economics of community heating is to use whole life costing. Current guidance suggests a twenty-five year lifetime and a 3.5% discount rate. The viability of a community heating scheme will depend on a number of factors, including:

In summary, community heating is worth considering:

Where

- there is high density housing;
- mains gas cannot be used;
- homes are difficult to insulate cost effectively;
- there is potential for linking to other community heating systems;
- heat can also be sold to neighbouring non-domestic premises;
- electricity generated by CHP can be sold directly to customers.

When

- Heating systems need to be upgraded or replaced;
- New homes are being built.

6.2 Tenant consultation

6.2.1 This is an essential aspect of the appraisal of community heating schemes, especially where tenants have not had community heating before. The co-operation of the tenants will be required during the installation works and to avoid delays and save management time, ensure tenants have a full understanding of what will happen, including the benefits of the new system. Consultation with tenants should include:

- sitting of central plant;
- choice of controls and other equipment in their homes;

- the charging system and alternative methods of payment;
- procedures for dealing with any faults.

6.3 Implementation and operation of community heating and CHP

6.3.1 Development, installation and operation of community heating systems are specialist tasks that are unlikely to be within the scope of staff employed by most housing management organisations. The support of consultants is likely to be needed for option appraisal, design of the system, tenant consultation, management of the installation work and the preparation of contracts for fuel purchase, sale of energy and maintenance of the system.

7. **Future**

7.1 In the medium to long term, community heating plant fired by biofuels will become the best option for heating housing estates consisting of blocks of flats or terraced housing. Such systems will have zero carbon dioxide emissions and, at some point, biofuels will probably become cheaper than mains gas.

7.2 The conversion to community heating across our housing stock is not something that can be done quickly. Development of a commitment to gradually move away from individual heating to community heating in high density estates should be considered. In the short term, these will probably be gas-fired systems – it is relatively easy to convert to a different source of heat once a community heating system is established.

The following steps are required:

- classify the housing stock by built form and heating system in order to identify the dwellings where **community heating** may be an option;
- identify the age and condition of heating systems in dwellings to establish when opportunities for the most cost effective switch to **community heating** will occur;
- assess potential risks with the dwellings or estates where **community heating** may be an option (e.g. lack of space for central plant, potential difficulties with planning permissions). None of these problems are insurmountable, but may increase costs;
- assess potential opportunities arising from the locations (e.g. neighbouring sources of heat, **energy linking** opportunities, potential customers for heat and electricity).
- Ensure that new build homes can be retrofitted with alternative forms of heating with minimal modification.
- identify potential sources of funding, both for feasibility work and for capital equipment/installation;
- identify a site for a pilot installation to gain experience of the planning, technical and logistical aspects of implementation;

- review and confirm in the light of experience with the pilot scheme.

Objective 6: By 2008 commission research into the potential to incorporate CHP in Aberdeenshire Council Stock.

Outcome: Understanding of the potential opportunities and installation of first CHP system.

SOURCES OF FUNDING

1. Introduction

- 1.1 This chapter identifies potential sources of funding for improving the energy efficiency. It concentrates on UK-wide and Scottish funding sources, although European funding should not be ruled out (INTERREG).

It aims to cover all of the different sources of funding for energy efficiency measures, including our own resources, third party private finance and the most significant grant programmes, available as at March 2005.

Maximising financial support for a project is likely to entail working in partnership with other public or private sector organisations. Some of these organisations may have wider objectives than energy efficiency, for example, regeneration.

2. Maximising the benefits of funding

- 2.1 Effective planning and good management can help Housing make best use of internal resources and maximise our access to external funding sources. We should consider:
- integrating energy efficiency with other improvements.
 - identifying the funding sources that are most appropriate for Aberdeenshire Councils improvement measures.
 - increasing knowledge of the housing stock.
 - flexibility in assigning budgets to schemes.
 - use of whole life costing.
 - consultation with tenants on how investment in the housing stock should be prioritised.
 - participation with other social landlords.

3. Sources of funding

3.1 Affordable Warmth

- 3.1.1 Adopting an affordable warmth strategy can assist in making the case for using rent revenue to improve energy efficiency beyond minimum standards.

It is generally considered difficult to increase rents following energy efficiency improvement measures, apart from the provision of central heating for the first

time. A few housing organisations have experimented with linking rent levels to the energy efficiency of their properties. This could be based on the energy ratings calculated for each property's "rent points" as discussed in EU directive on Energy labelling of buildings, which proposes using energy ratings on properties such as that on domestic appliances. These A-G bands could each be linked to rent points and added to the criteria in the existing rent setting policy. However, fuel cost savings depend on a number of factors: the floor area of the properties, the lifestyle of the occupants, the order in which measures are applied. Even if there are no actual savings to the Council, especially if rental income remains unchanged, there are still significant benefits from investing in energy efficiency measures. These include:

- reduced maintenance costs, especially where condensation problems are reduced.
- reduced management costs (e.g. fewer complaints from tenants);
- fewer voids and faster re-letting of vacant properties;
- enhanced protection of stock asset value

The ability to demonstrate that Aberdeenshire Council is a good landlord, especially where tenants have affordable warmth, enhances our reputation and builds staff morale.

3.2 Third party finance

The main route to obtaining third party finance for energy schemes is through direct private sector investment in a company.

3.2.1 Joint venture companies

A number of local authorities have established joint venture companies to provide energy services. Joint venture companies are often based around community heating and CHP schemes.

3.2.2 Bank/Project finance

If you are developing a community heating scheme, you can raise bank or project finance based on the potential revenues from the sale of heat and electricity. This means that community heating may not require more capital up-front than other options

3.3 Central Heating Programme and Warm Deal

3.3.1 Central Heating Programme

The Scottish Executive's Central Heating Programme was set up in 2001 with the aim of providing efficient central heating, insulation and energy efficiency advice, to local authority and housing association housing and to assist pensioners in the private sector.

According to the Scottish Executive's annual report 2003-2004 the over 60s saved an average of £470 in their annual fuel bills and local authority and housing association tenants saved on average £249 per annum.

Aberdeenshire Council was unable to benefit from this incentive as its properties had full central heating prior to 2001

3.3.2 The Warm Deal

The Warm Deal provides an insulation grant of up to £500 to people in receipt of certain state benefits. A smaller grant of up to £125 is available to those over 60 not in receipt of state benefits.

3.3.3 Local Authority Warm Deal

Communities Scotland has recently announced (May 2006) a return to their position where local authorities receive a direct grant to provide insulation measures to their own properties. Aberdeenshire Council aims to use this funding to install energy efficiency measures in 300 properties in 06/07 and 08/09.

3.4 Energy Efficiency Commitment (EEC)

- 3.4.1 EEC is currently the largest source of external funding for energy efficiency measures available to the housing management sector. It can be particularly useful when wishing to accelerate an energy efficiency programme, such as installing loft insulation in all of our properties by 2010.

3.5 Community Energy

- 3.5.1 The Community Energy Programme (CEP) offers grant funding, advice and information to support the installation, refurbishment or expansion of community heating schemes.

During the last period of funding, up to January 2005, £50 million was made available to support community heating projects. The Scottish Executive, through EST, supplied additional resources to promote the CEP in Scotland which resulted in approximately 40% of the UK fund being award to 27 Scottish projects.

3.6 Renewable energy

- 3.6.1 There are currently two schemes providing grants for renewable energy measures.

The Solar Grants scheme provides support for solar photovoltaic (PV) systems. It operates across the UK. Grants are available for 60 per cent of costs for public sector organisations. The Scottish Community and Housholder Renewables Initiative (SCHRI) is funded by the Scottish Executive and managed jointly by the Energy Saving Trust and Highlands and Islands Enterprise (HIE). SCHRI

provides grants, advice and support to the development and installation of community and household renewable projects in Scotland.

3.7 Innovation programme

3.7.1 The Innovation programme provides grants to partnerships (which must include at least one local authority or housing association) for innovative projects that will reduce carbon dioxide emissions. Grants are available for feasibility studies (up to £10,000) and the implementation of schemes (up to £90,000). Grants are also now available for replication projects.

3.8 Other potential funding sources

3.8.1 There are a number of other sources of funding with broader social or regeneration objectives that may be used for energy efficiency improvements.

These include:

Lottery Fund

Landfill Tax fund

Health Care Trusts – particularly for affordable warmth projects where health benefits are likely

The European Union.

4. **Sources of funding for local authorities**

4.1 Prudential Borrowing Regime for Local Authority Housing Capital Finance

4.1.1 The introduction of the prudential borrowing regime and the abolition of the requirement to set aside a proportion of capital receipts to repay debt has allowed local authorities with a solid financial position to increase borrowing for investment. The Scottish Executive advises that there has also been a significant increase in resources for housing support services, from around £50 million to over £400 million, allowing a major development of services for older people, the disabled and the homeless.

4.2 Private Finance Initiative (PFI)

4.2.1 The PFI is designed to allow private sector companies to manage services and facilities previously provided by the public sector, with risks transferred to the private sector as a result. With respect to energy efficiency, PFI is most likely to be applicable to the provision of large-scale energy services and community heating schemes.

Objective 7: To identify financial incentives available and to use this to spread energy efficiency measures over a greater number of dwellings.

Outcome: More energy efficiency measures are carried out, resulting in fuel poverty being reduced throughout Aberdeenshire, global CO₂ emissions being reduced and tenants will benefit from costs savings.

HARD TO TREAT HOMES

1. Introduction

- 1.1 “Hard to Treat Homes” are those that cannot accommodate ‘standard’ energy efficiency measures. They may include:
- Homes that are off the mains gas network.
 - Homes with no loft space.
 - Homes in a state of disrepair.
 - High-rise blocks.
 - Homes with solid walls.
 - Any other homes where for technical or practical reasons, standard energy efficiency measures (eg cavity wall insulation, condensing gas boilers) cannot be fitted.

2. Background

“Hard to Treat Homes” tend to have high heating bills, therefore families who would otherwise cope relatively well in a more energy efficient home could find themselves in fuel poverty. (The general definition of fuel poverty is “the inability to afford to adequately heat the home”.) – See Eradicating Fuel Poverty Section 3. Tackling fuel poverty is a high priority for the UK Government; the UK Fuel Poverty Strategy aims to eliminate fuel poverty in vulnerable households by 2010. There is a clear consensus that targets will not be met without addressing “Hard to Treat Homes”.

2.1 Consequences

Inadequate heating can be harmful for both occupants and the fabric of the dwelling. Properties affected tend to be more prone to moisture related problems such as condensation and rising damp. The main problems are as follows:

- Damp conditions, made worse by inadequate heating, result in mould growth on cold surfaces and increased risk of dry rot and attack from wood boring insects - leading to high long-term maintenance costs.
- Furnishings and possessions can suffer damage from mould or insect attack - requiring more frequent replacement and increasing financial pressures for those in fuel poverty.
- Cold, damp living conditions have an adverse effect on health, including chest, joint, and mental health problems (anxiety and depression) and eczema.

3. Housing Considerations

- 3.1 Opportunities for improving “Hard to Treat Homes” are best undertaken as part of a long-term improvement programme. Aberdeenshire Council will also consider how to best utilise its repair and maintenance policy to improve “Hard to Treat Homes”.
- 3.2 “Hard to Treat Homes” tend to be more expensive to improve than other properties. Aberdeenshire Council must determine whether the aim of the Energy Efficiency Commitment, given budget restrictions is to improve as many homes as possible or to attempt to ensure an improvement in energy efficiency across the whole stock and to seek a balance of all construction types.

4. Partnerships

- 4.1 There are many opportunities for partnerships between local authorities and housing associations, which will provide mutual benefits when managing the stock. Such opportunities might include: share experience, technical expertise, to provide better advice to tenants as well as the advantage of increased financial powers when funding technology of pilot projects and best practice. The Housing Service has met with RSL’s that operate within Aberdeenshire and has support to establish and Energy Efficiency Group.

5. Energy efficiency measures and technologies

- 5.1 When refurbishing “Hard to Treat Homes”, it is important to adopt a ‘whole house’ approach and to exploit all the available improvement opportunities. Consider:
1. Reducing the demand for space heating and hot water.
 2. Employing an efficient form of heating (using an inexpensive fuel).
 3. Installing efficient lights and appliances.
 4. Using renewable forms of energy.

Measures and technologies that are particularly applicable to “Hard to Treat Homes” include:

- Gas-fired condensing boilers
- Oil-fired condensing boilers
- Internal wall insulation
- External wall insulation
- Heat pumps
- Solid fuel cassettes
- Wood-fired boilers
- Solar water heating
- Solar photovoltaic panels for electricity generation
- Heat recovery ventilation
- Combined heat and power (CHP)
- High performance glazing

Investment in very efficient gas-fired (or oil-fired) boilers alongside appropriate insulation measures should provide affordable warmth for many households. It is important not to overlook the benefits of a proper ventilation strategy. A failure to introduce controlled ventilation can cancel out many of the benefits of heating and insulation improvements, particularly if the refurbished property has been draught-stripped.

7. Properties off the gas network

Consider the following options for properties that are not connected to the mains gas network:

- Transco states that in the UK 1.7 million households are close enough to the network to connect for a standard charge of £330.
- Independent gas transporters can also provide connections and should be considered for settlements off the gas network.
- Upgrading from a conventional to a condensing oil-fired boiler may be more cost effective than installing other individual energy efficiency measures.
- Wood-fired boilers or solid-fuel cassettes may be suitable in rural locations.

8. Planning

- 8.1 Improvement measures such as external wall insulation and solar water heating often involve changing the external appearance of a building. If so, planning permission will usually be required.

Objective 8: Ensure the energy efficiency of all hard to treat homes is improved by increasing the SAP ratings to a minimum of 50 by 2015.

Outcome: Reduce fuel poverty in the best energy efficient dwellings in the stock.

THE SCOTTISH HOUSING QUALITY STANDARD

1. Introduction

1.1 The Scottish Housing Quality Standard (SHQS) aims to ensure that all social housing in Scotland meets a defined standard of decency by 2015. This section explains:

- The energy efficiency requirements of the SHQS;
- How to assess the compliance of individual homes with those requirements;
- How to assess the stock-level implications, including costs, of meeting the energy efficiency requirements of the SHQS;
- How to identify opportunities to improve the overall energy efficiency of the housing stock when making improvements to meet the standard;
- The importance of adopting a planned approach to energy efficiency.

2. Scottish Housing Quality Standard

2.1 There are five requirements of the SHQS, one of which is that homes must be energy efficient. This requirement aims to ensure that homes are warm and free from condensation and dampness at an affordable cost. To comply with the standard, homes must have an energy efficient heating system and effective insulation.

2.2 Heating

Efficient heating is defined as a full house heating system that has an acceptable energy rating. The energy rating needs to be a minimum National Home Energy Rating (NHER) of 6.0 or a minimum SAP rating of 50 for mains gas heated properties and NHER of 6.0 or SAP of 60 for all other fuels.

Aberdeenshire Councils' Approach:

Full House Central Heating

When heating systems are due to be replaced, Aberdeenshire Council has committed to install in each property the most efficient, economically viable boilers, available at that time. At present this takes the form of installing Condensing Gas Boilers that are Seasonal Efficiency Database United Kingdom (SEDBUK) 'A' rated in all properties where mains gas exists within the settlement. (Where mains gas does not exist but at present a wet system is installed, Condensing Oil Boilers are to be fitted. Where a wet system does not exist an electric storage/panel heating system will be installed, until such time as a more effective electrical heating system is proved in the market place.

2.3 Insulation

SHQS defines effective insulation as:

- Cavity wall insulation (where feasible)
- Loft insulation of at least 100 millimetres (Aberdeenshire have committed to 300mm in all suitable properties by 2010)
- Insulation of hot water cylinders and hot water pipes

3.0 SHQS Compliance

3.1 Considerable work has been undertaken to inform proposals for the future in respect of energy efficiency measures. The Council has used the existing 100% Energy Audit Database at NHER Level 0, enhanced to determine the actions to be taken at each individual property.

3.1.1 As NHER Level 0 is only accurate to +/- 5 SAP, the ratings provided from the Energy Audit have been rounded to the nearest 10 to allow comparisons between the 'what if' scenarios set out below. Which resulted in the following approach:

- Determine those that pass the required SAP ratings (50 for Gas heating systems and 60 for all others)
- For those that fail apply the insulation measures, as discussed above, for those that still fail
- Apply the best possible heating system (if it requires to be replaced within the SHQS period), for those that still fail
- Determine which ones will pass when their heating is due to be replaced but is outside the SHQS period;
- This leaves the properties which are considered to be hard to treat. This group of electrically heated properties will form the focus of attention in determining suitability for external insulation, innovative technology and other research.

3.2 **SHQS and fuel poverty**

Achieving the Energy Efficiencies identified in the SHQS will not always be sufficient to ensure that homes will provide affordable warmth for their occupants or eliminate the risk of dampness in a property. In order to meet the targets in the Scottish Executive's Fuel Poverty Strategy, it is likely that a higher standard will be required and the minimum standards set in the SHQS are likely to increase overtime. Aberdeenshire Council have produced a 'Fuel Poverty Strategy' that sets out to eliminate fuel poverty by 2016. More information can be found at Chapter 3.

4. Assessing the stock-level implications of meeting the SHQS

Any properties that fail to meet the SHQS need to be included in programmes to install new heating systems, loft insulation and/or cavity wall insulation before 2015.

4.1 Stock assessment

Stock assessment entailed the collation and analysis of detailed stock information to identify the properties that fail to meet the standard (or will fail by 2015 because of ageing heating systems). The development of the housing stock energy database permits individual properties requiring improvements to be identified and progress towards achieving the standard can be monitored.

4.2 Cost estimation

Once the required improvements had been identified, the total cost of these improvements was estimated so that financial resources are secured in the 30 year Business Plan.

In terms of capital costs, the cheapest heating option is likely to be electric storage heaters (Total Heating with Total Control) – However, this option will result in high fuel costs for tenants and high carbon dioxide emissions and low energy efficiency ratings. Therefore, electric heating is unlikely to contribute to the achievement of SHQS targets. Again, there is the risk that higher standards after 2015 (or even between 2005 – 2015 should standards increase) will be more difficult to meet for homes heated by electricity. It would be false economy to go for the cheapest capital cost option.

The heating issues considered have been:

- The availability of mains gas;
- Capital costs;
- Maintenance costs;
- Future replacement costs;
- Sustainability issues;
- The eradication of fuel poverty;
- Energy efficiency improvements.

Heating options considered has not been restricted to conventional gas central heating – a “Renewable/Innovative Technology Group” has been established to investigate other similarly efficient heating systems, eg community heating and ground source heat pumps and potential applications in Aberdeenshire.

For homes that fail to meet the standard, a package of improvements has been defined and costed. Installing modern high efficiency boilers [SEDBUK “A” rated] and heating controls to achieve improved energy ratings. Adopting a whole

house approach which incorporates loft insulation (up to 300mm) and draught proofing to windows and doors however, many of the homes that continue to fail to meet the standard are in areas where the gas mains cannot be economically extended and therefore are likely to have electric or solid fuel heating and are in properties of either non-traditional or stone (granite/sandstone) construction.

Consideration has been given to providing internal or external wall insulation or the insulation of flat roofs and sloping ceilings, especially if other refurbishment work is likely to be required, however due to the high cost and planning constraints of external insulation and disruption of internal insulation, both are considered impractical.

4.3 Investment programme

4.3.1 Loft, cavity wall and hot water cylinder insulation should be installed as quickly as funds allow, since costs may be lower for larger contracts and there are likely to be capital cost reductions on heating systems installed after insulation.

4.3.2 A programme of heating system improvements should prioritise those homes with the most expensive-to-run heating systems and those where the maintenance costs are high (eg, due to persistent condensation dampness). The age of heating systems will also need to be taken into account.

5. **Opportunities for improving overall energy efficiency**

5.1 Aberdeenshire Council has other obligations in addition to meeting the SHQS. These include the eradication of fuel poverty for tenants. Meeting the SHQS will not necessarily eradicate fuel poverty for all tenants.

The Housing Service are adopting an approach to make all its homes “fuel poverty proof” by the setting of an energy rating target. To allow an assessment of the energy efficiency measures that will meet the targets across the whole stock, the assessment must answer:

- What options will we have for supplying heat, hot water and electric power for our homes in (say) 2020?
- Which options are robust against rising fuel prices and uncertain availability?
- What are our preferred options?
- How much will it cost?

Objective 9: To ensure that all of Aberdeenshire Council's Housing Stock meets the Energy Efficiency Standards as set out in the SHQS by 2015.

Outcome: Fuel poverty will be greatly reduced as improved SAP ratings is a requirement of SHQS. Housing Stock will be modernised.

DEALING WITH DAMPNESS, CONDENSATION AND MOULD

1. Introduction

- 1.1 Condensation, dampness and subsequent mould growth are a potential source of problems for Aberdeenshire Council's housing stock. In addition to being unsightly and damaging decorations it can also seriously affect the fabric of the building and the health of the occupants. This can lead to complaints and potentially absorb a significant proportion of the repair and maintenance resources.
- 1.2 Due to the effects of dampness and condensation on the building and occupants Aberdeenshire Council plans to eradicate all moderate and severe dampness and condensation by 2008/09. This will ensure that all of the housing stock meets the standards set out in the Scottish Housing Quality Standard (SHQS) by 2015. Surveys will be carried out in-house, which will identify different condensation and dampness problems and develop and implement appropriate technical solutions both long and short term.

2. Stock Condition Survey 1999/2000

- 2.1 Following the stock condition survey in 1999/2000, dampness and condensation was identified as an issue in 8.2% of Aberdeenshire Council's housing stock.
- 2.2 Dampness problems can encourage the growth of mould and mites increasing the risk of respiratory illness as well as having the potential to damage the structure and fabric of the building.

3. Update 2006

- 3.1 Aberdeenshire Council, in September 2005, undertook postal surveys to determine from the initial stock condition surveys which properties had continuing dampness and condensation problems. The postal surveys were required to update the stock condition database as many properties no longer suffered from dampness or condensation due to the capital works undertaken over the last 6 years, which included heating upgrades, roofing and insulation works, replacement doors and windows, etc. Following these surveys it was discovered that the percentage of properties suffering from dampness or condensation had fallen from 8.23% to 3.17%, 1316 to 444 properties

4. Stock Condition Database (Omega)

The database produced reports for properties with dampness and condensation incorporating the building characteristics such as construction, age, built form, size, type of heating system, type of windows etc. The purpose of this is to determine what type of properties are the most affected and determine if any patterns occur within the housing stock.

5. Results and Analysis

A detailed analysis of the results can be found in Aberdeenshire Council's "Dampness and Condensation Report 2006", which has been summarised in items 6 and 7.

6. Dampness

6.1 Rising Damp

6.1.1 Rising damp is relatively rare in modern homes, but more common in older properties, particularly those with solid stone or brick external walls, which do not always have a damp-proof course. Ground floors may be laid directly on to earth, meaning that there is no damp proof membrane. Moisture from the ground under and around a building rises up within external or internal walls made of permeable or absorbent building materials (e.g. brickwork, stone or plaster). Internal plaster finishes become saturated with moisture, leading to mould growth, the deterioration of the finish and eventually deterioration of the fabric of the wall itself. This form of dampness is due to either an absent or defective damp proof course.

6.1.2 Affected Properties

Rising damp is fairly uncommon within the Council's housing stock with only 15 properties affected, 8 of which are cavity construction and 7 solid wall construction.

6.2 Penetrating Damp

6.2.1 Penetrating damp is the term applied to the movement of moisture through the fabric of a building, from the outside to the inside, over a period of time. It usually occurs at a relatively high level through external walls or roofs and is almost always the result of defective construction.

6.2.2 Affected Properties

This form of dampness is the second most problematic affecting 102 properties across Aberdeenshire Council's housing stock.

7. Condensation

7.1 Interstitial Condensation

7.1.1 Interstitial condensation occurs when warm, moist air from inside a building penetrates into a wall, roof or floor construction and meets a cold surface. This causes the air to cool, lowering its capacity to carry moisture, and resulting in condensation on the cold surface. In time, the condensation can cause rotting of timber or corrosion of metal components. Structural damage may occur and it is likely to be invisible to the occupants of the building.

7.1.2 Affected Properties

The number of properties affected by this type of condensation will be investigated further through site investigations.

7.2 Surface Condensation

7.2.1 Surface condensation can arise from thermal bridging of insulation or from the under-heating of poorly insulated and/or poorly ventilated properties. The under-heating of properties is closely linked with fuel poverty (see Chapter 4).

Surface condensation in housing leads to:

- mould growth;
- the deterioration of building finishes and fabric;
- health problems for occupants;
- increased complaints from tenants;
- increased maintenance and management costs;
- an increased number of unfit and void properties.

7.3 Thermal Bridging

7.3.1 Thermal bridging is sometimes known as “cold bridging”. It occurs when the insulation layer within a wall or roof is interrupted by another material or is reduced in thickness (usually at corners or junctions).

7.3.2 The thinner area of insulation leads to greater heat loss through that part of the wall or roof and thus a locally reduced internal surface temperature. When the warm, moist air inside the property comes into contact with the cooler surface, it is chilled and less able to carry moisture. This results in surface condensation.

7.4 Under-Heating

7.4.1 When a home is not properly heated, the internal surface temperatures of the external walls and roof can be very low, particularly if the building is not adequately insulated. When the warm moist air circulating within the property

comes into contact with the cold surfaces, it is chilled and less able to carry moisture. This results in surface condensation.

- 7.4.2 The problem of under-heating is often exacerbated by poor ventilation. Moisture is put into the air inside the home by the residents' cooking and bathing, drying clothes and simply just breathing increasing the risk of surface condensation.
- 7.4.3 Moisture can be readily removed from the air (i.e. by extractor fans in kitchens and bathrooms or flues on heating appliances).
- 7.4.4 There are ways of eliminating surface condensation by measures applied to the property itself (see Dampness and Condensation Report 2006). Another approach is to install a new efficient and controllable central heating system, usually with the aim of providing whole-house heating at a lower cost to the tenant. However, this measure in isolation may fail because inadequate insulation could prevent the tenant from being able to afford to heat their home properly (see Section 3, Fuel Poverty).

(Ways of avoiding dampness can be found in Aberdeenshire Council's Dampness and Condensation Report 2006)

8. Where we go from Here

- 8.1 In order to improve the living environment and eradicate dampness within Aberdeenshire Council's Housing Stock, an action plan will be created that targets most affected house types as a priority

Objective 10: To identify and eradicate all dampness within Aberdeenshire Council's Housing Stock by 2008

Outcome: Improve the living environment of tenants who suffer from dampness within their house. To educate tenants on how best to use their heating systems to give cost effective heat and minimise risk of dampness.

ACTION PLAN

COMMITMENT THEME 1	HOUSING ENERGY AUDIT
Commitment Objective 1	To ensure the continued validity of the Stock Condition Database, we will carry out 100% of condition surveys by 2010 at Level One
Outcome	Will provide a robust, independently validated and comprehensive Energy Database compliant with the EU Directive on Energy Labelling of Buildings and permit the development of an Affordable Warmth Policy linked to rents.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
1.1	Develop and implement the housing stock assessment procedures	1	Establish Baseline	Technical Officer	April 2007	Staff time	Baseline established
		2	Model the effect of improvement measures across the stock	Technical Officer	Ongoing	Staff time	More efficient stock
		3	Identify the number of houses of each type and undertake an energy rating survey of at least one property of each type	Technical Officer	April 2010	Staff time	Detailed energy reports and ratings
		4	Detailed evaluation of property types to establish which energy improvement measures are cost effective	Technical Officer	April 2011	Staff time	Report on property types
		5	Regular updating of	Technical			

			energy data in stock by carrying out X no of surveys at HHER Level 1.	Officer			
		6	Periodically carry out comparisons of alternative improvement measures	SIOG	Annual	Staff time; Finance	Alternative improvements adopted by house type
		7	Using average estimated fuel costs for property types, compare against household incomes to make assessments for fuel poverty.	Fuel Poverty Group	Annual	Staff time	Values set by property types

COMMITMENT THEME 2	ERADICATING FUEL POVERTY
Commitment Objective 2	To eradicate fuel poverty in Aberdeenshire's Council housing stock by making stock fuel poverty proof by 2016
Outcome	Established procedures to install the most efficient heating system available, to insulate fully all dwellings and to educate tenants on how to use their heating efficiently to reduce fuel bills.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
2.1	To deliver affordable warmth to tenants in Aberdeenshire Council's Housing Stock	8	Identify those at risk of being in fuel poverty	Fuel Poverty Strategy Group	2009	Staff time	Fuel poverty proof properties
		9	Monitor the level of fuel poverty in the stock	Fuel Poverty Strategy Group	Sept 2007	Staff time	Levels established annually
2.2	Develop specific indicators to identify households in fuel poverty	10	Establish a referral system with frontline staff identifying symptoms of fuel poverty during visits	Fuel Poverty Strategy Group	April 2008	Staff time; Finance (training)	Referral system in operation and number of referrals monitored
		11	Utilise the energy database to prioritise areas most at risk.	Technical Officer	Sept 2008	Staff time	At risk areas identified
		12	Combine data from database with housing benefit data to determine levels of Fuel Poverty	Fuel Poverty Strategy Group	Sept 2007	Staff time	Levels established

2.3	Develop general indicators to identify households in fuel poverty.	13	Identify geographical areas that are likely to contain fuel poor households	Fuel Poverty Strategy Group	Sept 2007	Staff time	Map established
		14	Create an Aberdeenshire fuel poverty map across all tenures at post code level.	Fuel Poverty Strategy Group	Sept 2007	Staff time	Map established
2.4	Address issues causing fuel poverty	15	Ensure that tenants are aware of benefits that they are entitled	Benefits	?	?	Publicity campaign
		16	Identify anticipated fuel costs and the minimum income needed to afford them	Technical Officer/SCARF	April 2008	Time	Levels set
		17	Prioritise energy improvements	HRA Capital Group	Sept 2008	Time	Priority table agreed
		18	Establish energy and affordable warmth targets	SIOG/SCARF/FOG	April 2008	Time	Targets established
		19	Establish standards for improvements to the stock.	SIOG	April 2009	Time	Standard approved
		20	Review repairs and maintenance specifications	SIOG/ROG	Annually	Time	Specification agreed
		21	Incorporate sustainable technologies into Stock Improvement Programme	SIOG	April 2010	Time; finances	Capital Programme in place
		22	Link Affordable Warmth Policy with Rent Setting	FOG/SIOG	April 2010	Time; finance	Affordable warmth policy in place

		23	Incorporate affordable warmth survey into voids procedure.	ROG/Voids Group	April 2009	Staff time	Survey implemented
2.5	Monitor Fuel Poverty through key performance indicators	24	Annually monitor the change in average SAP and the number of dwellings rising to above 60.	Technical Officer	April 2007	Staff time	Assessment – total number of properties that PPS Energy Standard in SHQS
		25	Monitor no of tenants provided with energy advice handbooks.	SIOG	April 2009	Staff time; Training; Finances	Handbooks issued
		26	Monitor no of tenants provided with face to face advice in the home.	EMOG	April 2009	Time	Advice given in home
		27	Monitor Affordable Warmth Index.	FOG (Douglas Newlands)/SIOG (Andrew Mackie)	April 2010	Time	

COMMITMENT THEME 3	ENERGY TRAINING
Commitment Objective 3	To raise awareness of Energy Efficiency Issues for staff and tenants by providing energy training to all housing staff and 50 tenants by 2009 and give energy advice to 1300 tenants in their own homes by 2010
Outcome	Staff and tenants aware of best practice and how to ensure affordable warmth for all.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
3.1	To provide housing staff and tenants with energy training and advice	28	Employ a designated training officer	HOMT (Douglas Newlands)	2009	Finances; Staff time	Officer employed
		29	Provide regular training sessions on energy awareness.	Fuel Poverty Strategy Group	Early 2009	Staff time; Finance	Training implemented
		30	Train front line staff to provide basic advice to tenants	Fuel Poverty Strategy Group	Early 2007	Staff time; Finance	Training implemented
		31	Implement a referrals procedure	Fuel Poverty Strategy Group	End 2007	Staff time	Referrals made
		32	Adopt a system to ensure staff and tenants attend refresher courses	Fuel Poverty Strategy Group	End 2009	Staff time	System in place. Course programme. Number of attendees.

COMMITMENT THEME 4	INTEGRATING ENERGY EFFICIENCY
Commitment Objective 4	Harmonised specification to involve the energy efficiency measures can be incorporated into all stock improvements by 2008
Outcome	Ensure a consistent approach to stock improvement works across Aberdeenshire.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
4.1	To identify and prioritise dwellings for energy work	33	Dwellings with poor SAP ratings to be prioritised.	SIOG/Technical Officer	April 2007	Time	Works implemented
		34	Hard to treat homes to be included in medium term programmes	SIOG/EMOG	April 2009	Time; Finance	Hard to Treat Homes identified and improvement needs established
		35	Ensure all cavity walls are insulated	SIOG	2010	Finance	Infra-red surveys of stock undertaken
		36	All lofts are insulated to a minimum of 300mm	Technical Officer	2010	Time; Finance	Lofts insulated
		37	At rewiring contracts, install fitments which only take energy efficient lighting	SIOG/ROG	2010	Time; Finance	Altered specification

COMMITMENT THEME 5	INTEGRATING RENEWABLE AND INNOVATIVE TECHNOLOGY
Commitment Objective 5	To integrate a Pilot Project for Renewable Technology
Outcome	With analysis into cost savings and reduced emissions, the suitability of the renewable technology can be examined, with a view to applying the measures to a larger percentage of the stock.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
5.1	Alter procedures to incorporate renewable technology in capital contracts	38	Consider the use of pv or solar water heating when roofs are due for replacement	SIOG	2010	Time; Finance; Technology	Installations
5.2	Assess the potential for renewable technology	39	Identify potential sites	SIOG Property Services	Ongoing	Time	Sites identified
		40	Assess the investment required and carry out feasibility study.	HRA Capital Group	2007	Time; Finance	Feasibility study commissioned

COMMITMENT THEME 6	COMMUNITY HEATING AND COMBINED HEAT AND POWER
Commitment Objective 6	By 2008 commission research into the potential to incorporate CHP in Aberdeenshire Council Stock.
Outcome	Understanding of the potential opportunities and installation of first CHP system.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
6.1	Commission research into CHP.	41	Assess where community heating may be an option	Technical Officer/SCARF	2009	Time	Sites identified
		42	Identify potential sources of funding for feasibility and installation	Technical Officer/SCARF	2009	Time	Funding identified
		43	Identify a suitable site for a pilot installation	Technical Officer/SIOG	2010	Time	Site identified
		44	Review schemes to confirm cost and energy savings	Technical Officer	2011	Time	Costs established

COMMITMENT THEME 7	SOURCES OF FUNDING
Commitment Objective 7	To identify financial incentives available and to use this to spread energy efficiency measures over a greater number of dwellings.
Outcome	More energy efficiency measures are carried out, resulting in fuel poverty being reduced throughout Aberdeenshire, global CO₂ emissions being reduced and tenants will benefit from costs savings.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
7.1	Investigate ways of maximising financial resources to improve efficiency of more dwellings.	45	Use Warm Deal grants to improve insulation measures in 300 properties in 06/07 and 07/08	Principal Officer	Annual	Time; Funding	Properties improved
		46	Identify partners to share costs of schemes to improve energy efficiency.	Principal Officer	Annual	Time	Partners established
		47	Identify grants available for innovative pilot projects.	Technical Officer/SCARF	Annual	Time	List of grants established
		48	Create large contracts to benefit from 'Economies of Scale'	Principal Officer	2009	Time	Contracts finalised

COMMITMENT THEME 8	HARD TO TREAT HOMES
Commitment Objective 8	Ensure the energy efficiency of all hard to treat homes is improved by increasing the SAP ratings to a minimum of 50 by 2015.
Outcome	Reduce fuel poverty in the best energy efficient dwellings in the stock.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
8.1	Identify measures to improve the SAP of Hard To Treat Homes (HTTH).	49	Identify all properties without mains gas which can be connected for a standard connection charge	Technical Officer/Scotia Gas Networks	April 2007	Time; Software	Properties identified
		50	Extend gas mains to settlements where it is proved to be economically viable	Technical Officer/Scotia Gas Networks	2011	Time; Funding	Extension installed
		51	Identify gas infill areas within settlements with mains gas	Technical Officer/Scotia Gas Networks	2007	Time	Infill sites identified
		52	Examine the potential for pilot projects in areas of HTTH	Technical Officer	2008	Time	Pilots identified

COMMITMENT THEME 9	SCOTTISH HOUSING QUALITY STANDARD
Commitment Objective 9	To ensure that all of Aberdeenshire Council's Housing Stock meets the Energy Efficiency Standards as set out in the SHQS by 2015.
Outcome	Fuel poverty will be greatly reduced as improved SAP ratings is a requirement of SHQS. Housing Stock will be modernised.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
9.1	Assess the housing stock to identify dwellings that will require to be improved in order to pass SHQS	53	Determine those that pass the required SAP ratings	Technical Officer	April 2007	Time	Properties identified
		54	Apply insulation measures to those that fail.	Principal Officer	2010	Time; Funding	Properties improved
		55	Apply the best heating where possible	EMOG	Ongoing	Time; Funding	Properties improved
		56	Assess stock to predict those that will pass before 2015	Technical Officer	April 2007	Time	Properties identified
		57	Identify HTTH and investigate ways of achieving SAP Targets	Policy Officer	April 2009	Time	Improvements identified

COMMITMENT THEME 10	DEALING WITH DAMPNESS, CONDENSATION AN MOULD
Commitment Objective 10	To identify and eradicate all dampness within Aberdeenshire Council's housing stock by 2008
Outcome	Improve the living environment of tenants who suffer from dampness within their house. To educate tenants on how best to use their heating systems to give cost effective heat and minimise risk of dampness.

Ref.	Operational Objective	Action No:	Action	Lead Partner/Officer	Target Timescale	Resources Required	Measure of Success
10.1	Create an action plan of improvement works.	58	Identify house types to be improved as a priority	Technical Officer	June 2007	Time	House types prioritised
		59	Implement a procedure for supplying tenants with information detailing how to best use their heating and to avoid dampness	Policy Officer	Sept 2007	Time	Advice in place

RESOURCES

Achieving the objectives and actions in the Energy Efficiency Commitment requires necessary resources being available. This section outlines the resource requirements, the available resources and the key gaps in resources.

Resource Requirements

Energy Efficiency Improvements

The Fuel Poverty in Scotland report, 1996, refers to an average property energy efficiency improvement cost of £1,750 per house. This figure is an average derived from the national profile of the fuel poor, the house type, tenure etc.

Given the number of properties in the council stock that fail the SHQS the total cost would likely be in excess of £17,500,00

Human Resources

In addition to resources required for improving the thermal efficiency of the housing stock there is an increasing need to dedicate further staff time to develop and monitor energy related funding applications and to co-ordinate and implement energy related projects. Estimated costs for an Energy Training Officer would be c. £38,000/annum and there will need to be substantial staff time for training and giving of advice.

Advice Services

Organisations that provide advice to households seeking to improve energy efficiency or maximise their income are critical to the success of this commitment. AEEAP has a specific remit to raise awareness and provide energy efficiency advice in Aberdeenshire. Annual costs are c. £68,000 of which approx 25% could be associated with Council Housing tenancies c. £17,000. In addition various voluntary organisations, will spend a proportion of their time on income Maximisation on advice. Aberdeenshire Council currently award c £160,000/ annum to organisations that form part of the Aberdeenshire Advice Services Network. Assuming that 30- 50% of the organisations' time is spent on income maximisation advice, then resource requirements for income maximisation will be in the region of £80,000 per annum of which 10% will be for council housing £8,000.

Training

Resources will be required to implement the actions relating to the training of Council and partner agency staff. It is anticipated that 120 staff will require basic energy training at around £50 each £6000. It is anticipated that an additional 5 training sessions per annum would be carried out at a cost of £500/ session i.e. £2,500/ year. Also the Housing Service is encouraging individuals who show an interest to further their energy efficiency education this will require an annual commitment of approx £10,000.

Information

Information resources will also be important if we are to ensure that actions are targeted and that monitoring and evaluation is effective.

Further development of the stock condition survey will be required to enhance the database from NHER level zero to NHER level 1 or the level required for the EU Directive on Energy Performance of buildings Directive following the outcome of the consultation from the Scottish Building Standards Agency due in the early new year. Estimated research costs are £30,000-£50,000.

The development of various energy Information advice leaflets will have to be developed for each of the various heating system installations to explain who to maximize its efficiency. Various other Energy Efficiency Awareness Raising leaflets and tenant events will be required. Total estimated cost would be £10,000/annum.

AVAILABLE RESOURCES

Public Housing, Energy Efficiency Improvements

All social housing providers have recently prepared their Delivery Plans to show how they will meet the Scottish Housing Quality Standard (SHQS) by 2015. The SHQS lays down a number of minimum standards in relation to the thermal efficiency of dwellings. £3,226,173 has been allocated from the HRA capital programme to fund energy efficiency improvements in Aberdeenshire Council stock.

HRA Revenue Budget has allocated £330,000 per annum from 2005 – 2010 to upgrade all stock to the Aberdeenshire Insulation Standard.

In recent years Aberdeenshire Council has received an annual allocation of Warm Deal (Council Stock) funding which amounted to £75,000 in 2004/2005. In partnership with SCARF and Buchan Insulation the funds have been used to install loft insulation in priority areas. This funding has now been altered and only provides funds for council housing this £35,000 has been awarded to Aberdeenshire Council. A programme utilizing this funding and that from the HRA Revenue budget, mentioned above, has been put in place.

Human Resources

At present the Council do not have a dedicated Housing Energy Officer. The remit for developing the Fuel Poverty Strategy and implementing Warm Deal, EEC and SCHRI grant programmes currently lies with the Housing and Social Work Service Strategic Development Officer (Housing Strategy) while HECA responsibilities and Private Sector Housing Grant co-ordination lie with the Planning & Environmental Services Specialist Officer (Housing & Pollution). The Housing and Social Work Principal Officer (SHQS) is also heavily involved in addressing energy efficiency issues within the Council's housing stock through the Councils SHQS Delivery Plan.

We appreciate the role that partner and voluntary organisations can play in assisting to deliver advice and information and in implementing grant programmes. In particular the assistance of SCARFs Local Energy Support Programme (LESP) Coordinator has proved invaluable in providing support to the Council and other housing providers in assisting with energy related projects. In particular the assistance of SCARFs Local Energy Support Programme (LESP) co-ordinator has proved invaluable in providing support to the council and other housing providers in assisting with energy related projects. However there is an increasing need to dedicate further staff time to develop and monitor energy related funding applications and to co-ordinate and implement energy related projects across tenure. The action plan shows that one of the most crucial resources required is the commitment of staff time from Aberdeenshire Council and the partner

agencies. As the Commitment progresses it is clear that increased dedication of staff to the purposes of this Strategy will be necessary if the objectives are to be achieved.

Training

Part of the funding for staff training required will be made through provision in the Housing and Social Work training budget. Other sources of funding to help reduce training costs will be investigated.

Advice Services

Aberdeenshire Councils HECA budget (c. £68,000/annum) contributes to the Aberdeenshire Energy Efficiency Advice Project (AEEAP). Aberdeenshire Council currently has an agreement with SCARF to provide a range of energy efficiency advice services in Aberdeenshire. These services are provided by SCARF through its Aberdeenshire Energy Efficiency Advice Project (AEEAP) in partnership with the Council. In terms of maximising income and providing advice on benefits, debt management etc. the Council has two full time equivalent members of staff who carry out Welfare Benefit checks for those who are in receipt of a care or support service. However voluntary organisations, which work under the umbrella of the Aberdeenshire Advice Services Network, are key players in delivering income maximisation advice. Resources for these voluntary organisations, in terms of recruiting and retaining volunteers, accessing funding, and poor quality premises can make it difficult for them to provide a comprehensive service. Resources available currently stand at c. £160,000 / annum. Unfortunately due to recent budget cuts the HECA budget can no longer fully meet this commitment and a contribution will be required from HRA to ensure the continued level of support remains.

MONITORING AND EVALUATION

1. Introduction

Monitoring and evaluation of the Energy Efficiency Commitment is a fundamental requirement and integral to its success.

2. Monitoring and Evaluation Methodology

2.1 Baseline

A combination of the Scottish House Condition Survey, The Aberdeenshire Private Sector Housing Condition Survey and the Fuel Poverty Indicator Research will provide a baseline for measuring our progress in eradicating fuel poverty in Aberdeenshire.

2.2 Mapping Existing Services

We intend to identify and monitor projects that contribute towards improving energy efficiency in Aberdeenshire.

2.3 Action Plan Review

The Action Plan lists the actions to be delivered and the measure of success (or target). Performance in relation to each of the actions outlined in this Commitment will be reviewed every 6 months, and the extent to which the strategic objectives are being met will be evaluated annually. This will form part of the annual Scottish Housing Quality Standard (SHQS) Delivery Plan updates to Social Work and Housing Committee and will be part of the SHQS milestone updates to Communities Scotland.

2.4 Development of the Monitoring and Evaluation Framework

Specific targets and indicators will be developed in the light of experience. Initially the main target will be to successfully deliver year 1 actions by April 2008

3. Reporting Framework

Aberdeenshire Council's Housing and Social Work Service Policy Team will be the partner with lead responsibility for monitoring the progress made in delivering the various targets and outcomes set out in this strategy. The Policy Team will be responsible for providing leadership, meeting annually with key partners to review, refocus and refresh the action plan; provide planning input to drive the development and implementation of any new projects and to provide an overview to the HOMT on an annual basis.

The Policy Team will compile an annual Monitoring and Evaluation Report to circulation to all stakeholders. The annual report will comprise:

- A matrix of the historic (2005), existing and planned position (2015)
- Feedback from any pilots that have been implemented.
- An action plan update.
- Proposals for the development or modification of the monitoring and evaluation framework, in light of experience.

4. Limiting Factors

We are fully committed to improving energy efficiency of the council housing stock, as far as practicable, by 2015.

However, we are aware of a number of issues which may form barriers to us doing this. We will continue to try to find solutions to these barriers, which are highlighted below:

- Human Resources – The Action Plan shows that one of the most crucial resources required is the commitment of staff time from Aberdeenshire Council and the partner agencies. As the policy progresses, it is clear that increased dedication of staff to the purposes of this policy will be necessary if the objectives are to be achieved.
- Funding – Limitations will arise due to:
 1. An overall fragmentation of grant funding. A single point of access to energy related grants, eg. Warm Deal, Central Heating Programme, would be welcome.
 2. A lack of standardised Scottish Executive funds for home based energy advice services.
 3. A lack of flexibility in existing grant
 4. Existing grant programmes are designed to tackle fuel poverty. However, a considerable number of Aberdeenshire Council houses are built in a way that does not allow for traditional insulation measures, and do not have access to mains gas (the least expensive heating fuel). Measures should be widened, and an average grant per household should be introduced. Measures suggested are:
 - Renewable energy measures including solar panels, micro wind, air source and ground source heat pumps and connections to existing community heating schemes
 - Continuation of existing eligible measures; eg. central heating systems, insulation, energy advice and a benefits check
 - The way in which people qualify should be reconsidered. Currently only passport benefits are taken into account. Funding

would be better targeted at eradicating fuel poverty if the following qualifications were added:

- Retain passport benefits, but introduce an “income ceiling” (such as that already in place for Working Tax Credit and Children’s Tax Credit), which will ensure that those households on a low income who are either not claiming benefit or who just miss out, qualify.
- Allow access to those referred by their GP or other defined health personnel, irrespective of income, if their house falls below an agreed energy rating (say NHER 7)

5. The wider measures detailed above should be available under EEC

- Fuel Prices – It is widely accepted that the price of fuel in the UK is likely to continue to rise in the future. This will result in people falling into fuel poverty, and will make it more difficult to remove those households already in it.
 - Aberdeenshire Council can do little to prevent fuel prices rising, but through our Energy Efficiency Commitment we will work in partnership to ensure that the residents of Aberdeenshire get access to the most effective ways of paying for their domestic fuel. We will also work to ensure that their homes are as energy efficient as possible, and that fuel bills are kept as low as possible by encouraging the use of renewable energy. vulnerable to being defined “in” and “out of fuel poverty” as a result of marginal changes in their circumstances.

GLOSSARY

Affordable Warmth	The ability to heat your home without incurring excessive fuel bills or developing a debt as a result.
Affordable warmth index (AWI)	The affordable warmth index provides a measure of affordable warmth on a scale of one to 140 with an index of more than 100 meaning that a property is affordable to heat.
Building Regulations – Part J	Part J of the Building Regulations contains the requirement that reasonable provision shall be made for the conservation of fuel and power in a building.
Central Heating Programme	The Scottish Executive's Central Heating Programme provides central heating, insulation and advice. It is available to all households in the private sector who lack central heating and where the householder or partner is aged 60 or over. For further information, visit the Energy Saving Trust's funding database
Climate change	A change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural variations in climate.
Climate changing gases	Gases in the Earth's atmosphere such as carbon dioxide, methane and CFCs which warm the atmosphere because they absorb some of the thermal radiation emitted from the earth's surface.
Combined heat and power (CHP)	A combined heat and power plant generates usable heat and power in a single process.
Communities Scotland	A Scottish Executive agency. Its role is to work with others to regenerate disadvantaged communities and promote better housing to help build a Scotland where everyone can enjoy a decent quality of life.
Community heating	Delivery of steam or hot water through a network of pipes to heat a number of buildings in a district.
Condensation	Beads or drops of water (and frequently frost in extremely cold weather) that accumulate on the inside of the exterior covering of a building, when warm, moisture-laden air from the interior reaches a point where the temperature no longer permits the air to sustain the moisture it holds.
Domestic Energy Efficiency Advice Code of Practice	The Domestic Energy Efficiency Advice Code of Practice provides a Good Practice standard for the whole of the energy efficiency advice industry – from advice specialists such as advice centres and energy suppliers, to those for whom advice is more marginal such as installers and retailers. It has been developed so that consumers can be assured of accurate and relevant energy efficiency advice and information.
Energy efficiency advice centre (EEAC)	The network of eight EEACs provide energy advice to the public and promote energy efficiency across Scotland.
Energy Efficiency Commitment (EEC)	An obligation placed on gas and electricity supply companies as a condition of their licence. EEC places targets for energy savings to be achieved (by energy supply companies) in domestic residences. This means the supply companies deliver schemes to encourage take up of insulation and efficient electrical items. Schemes are delivered by the company itself or in partnership with other organisations or local authorities. 50 per cent of the energy savings achieved under EEC must be in vulnerable households.
Energy ratings	An energy rating is a measure of the energy efficiency of a dwelling under standard occupancy conditions. It is designed to help you compare the energy efficiency of different homes on a common basis, much like the mileage per gallon figures used to compare the energy efficiency of cars.
Energy White Paper 2003	The UK Government's strategy for energy policy combining environmental, security of supply, social and competitiveness goals. Copies can be downloaded from the Department for Trade and Industry 6 website.

Energywatch	Energywatch is a statutory body representing the interests of gas and electricity consumers in the UK, and offers free help and advice to consumers.
Fuel debt	Where a householder is unable to pay their fuel bills and finds themselves in debt to their energy supplier. This can lead to creation of payment plans, disconnections or even court proceedings.
Fossil fuels	Coal, natural gas and fuels derived from petroleum are called fossil fuels because they were formed over long periods of time from ancient organic matter.
Fuel poverty	A fuel poor household is one which needs to spend more than 10 per cent of its income on all fuel use to heat its home to an adequate standard of warmth.
Fuel poverty indicator	The fuel poverty indicator combines census data with data from the Scottish House Condition Survey (2002) ¹ to
Hard to treat homes	Homes which cannot easily be improved using standard low cost energy efficiency measures. Common features are: older properties, solid wall construction, non-standard roof spaces, lack of connection to and /or distance from mains gas network, under-occupied homes.
Heating programmer	Each central heating system will have a programmer or time switch that will turn the heating and hot water on and off automatically at the times you decide.
Home Energy Conservation Act (HECA) 1995	The Act set Scottish local authorities with the responsibility of achieving substantial improvements in the energy efficiency of their housing stock. An improvement of 30 per cent over 10-15 years was initially set; however many local authorities have negotiated a lower percentage, with some as low as 9 per cent. Communities Scotland monitors the progress on targets set for the HECA on behalf of Scottish Ministers. Local authorities are required to produce progress reports every two years.
Housing stock profile	A graphical representation of the numbers of properties in a housing stock with different levels of energy efficiency. Stock profiles provide an immediate visual indication of overall performance.
Low energy light bulb	Compact Fluorescent Lamps (CFLs) are a modern type of light bulb that will fit into a standard light fitting. CFLs are often called low energy lamps because they use less energy than the traditional tungsten filament bulbs that they replace.
National Home Energy Rating (NHER)	The NHER operates on a scale of 1-10 (with 10 being the highest) and enables you to compare the energy efficiency of homes. The NHER is based on total fuel costs per square meter (ie the costs of cooking, lights and appliances are included, as well as heating and hot water). The NHER, unlike the SAP, also takes locality into account.
NHER	The National Home Energy Rating (NHER) operates on a scale of 1-10 (with 10 being the most efficient) and enables the comparison of the energy efficiency of homes. The NHER aims to produce accurate running costs by calculating total fuel costs per square metre (ie the costs of cooking, lights and appliances are included, as well as heating and hot water). The NHER, unlike the Standard Assessment Procedure (SAP) also takes locality into account.
Prepayment meters	Prepayment meters let householders pay for electricity as they use it with a fixed amount each week to cover the standing charge. Meters can also collect additional amounts each week to cover any debt owed to the electricity supplier. Prepayment meters are often used to help customers in fuel debt but are generally a more expensive way of buying fuel.
Renewable Energy	Energy production using natural resources in an inexhaustible manner.
SAP	The SAP energy rating compares the energy efficiency of different homes regardless of their location in the country. It is based on the estimated annual cost of heating and hot water per square metre and is expressed on a scale of 1 to 120 (with 120 being the highest). The 2005 version of SAP, introduced with the most recent changes to the Building Regulations in Scotland, will be employed in 2007; until then, the 2001 version of SAP will continue to be used.
Satisfactory heating regime	Taken to be 21°C in the living room and 18°C in the other occupied rooms for nine hours per day during the week and 16 hours at the weekends

Scottish community and householder renewables initiative	Provides grants in Scotland for a range of renewable energy technologies, including solar hot water systems, biomass heating systems, ground source heat pumps and small-scale wind and hydro systems.
Scottish House Condition Survey	Provides information on the changing condition and composition of the housing stock and the characteristics of the households living in different types of housing. The survey is a key tool used to measure the effectiveness of the Scottish Executive's housing policies.
Scottish Housing Quality Standard	The Scottish Housing Quality Standard (SHQS) defines what constitutes acceptable good quality housing. The SHQS applies across all housing tenures and the Scottish Executive encourages local authorities to use it to monitor the condition of private housing. Local authorities and other registered social landlords have until 2015 to meet the standard for their own stock.
Scottish Renewable Obligation Certificates	Under the Renewables Obligation, suppliers of electricity now have to buy a growing percentage of their power from renewable sources. To aid this, generators of renewable energy are issued with certificates for every unit of energy generated.
Solar photovoltaics (PV)	Thin silicone wafers that convert any light, not only sunlight, directly into electricity.
Solar water heating	Solar water heating is the heating of water from the sun.
Storage heater	Electric storage heaters are a less expensive way of using electricity to heat homes than fan heaters, oil filled radiators or radiant electric bar heaters, all of which use on-peak electricity. Storage heaters use electricity supplied at a cheaper night-time rate to store heat in special heat-retaining bricks. These then give out heat slowly and are designed to keep warm for the whole of the following day.
The Scottish Fuel Poverty Statement	The Scottish Fuel Poverty Statement was published by the Scottish Executive in 2002. Its overall objective is "to ensure, so far as reasonably practicable, that people are not living in fuel poverty in Scotland by November 2016".
Thermal comfort	Thermal comfort is the state where a person is entirely unaware of their surroundings neither considering the space is too hot or too cold.
Thermostatic Radiator Valves (TRVs)	Thermostatic radiator valves (TRVs) let you control the temperature of each room separately. The number on the valve corresponds to a specific air temperature. Once you have selected a number on the valve the thermostatic valve will maintain it.
Trickle ventilators	A small closable ventilator, which can provide minimum ventilation.
U-value	A U-value is a measurement of heat flow. The lower the U-value, the more slowly a material transfers heat in and out of your home.
Warm Deal	The Scottish Executive's Warm Deal programme provides grants for the installation of insulation measures for vulnerable households in receipt of certain state benefits. For further information, visit the Energy Saving Trust's funding database
Wave power	Power that can be generated in coastal locations from the ebb and flow of the tides.
Wind power	Energy from moving air which is converted to electricity, by using wind to turn electricity generators. Wind energy is pollution-free and renewable.
Wind turbines	Wind turbines convert the kinetic energy in wind into electrical energy. There are a number of different types of turbine, including building integrated turbines suitable for urban areas.