
HRA Energy Strategy

Brighton & Hove
City Council
Housing Revenue
Account

Alex Fox, November 2017



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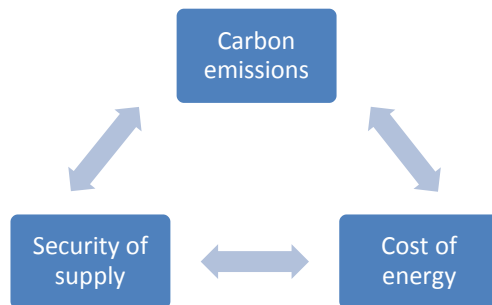
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Draft

Executive Summary

The principle challenge concerning energy is known as the 'Energy Trilemma', which refers to: Carbon emissions; Security of supply; and the Cost of energy.



Energy Efficiency is the solution, any such measure positively impacts all three issues (in general).

As a result, energy efficiency measures will need to be more deeply integrated into our property management and potentially even lead the way.

This strategy takes stock of council housing energy efficiency performance; outlines what needs to happen in the future; and offers potential opportunities to meet those needs. It sets out a twofold approach based on research (summarised in the Key Findings & detailed in the appendices) and sound energy efficiency principles. This provides the basis of options for our residents and housing leaders to make choices about how we can modernise and be more energy efficient.

Aims & Objectives

The focus of energy efficiency in the domestic sector is often on the issue of fuel poverty. The HRA Energy Strategy will prioritise energy efficiency solutions with the **aim of mitigating fuel poverty**. As noted above, a direct consequence of tackling this aim will also improve Security of Supply and Reduce Carbon Emissions, thereby positively impacting the 'Energy Trilemma' within our sector.

The causes of fuel poverty are attributed to:

- (Low) household income;
- (Poor) energy efficiency of the dwelling;
- (High) cost of energy.

There has been good work to date by the Property & Investment Team and the energy efficiency of the HRA stock is reasonably good, for now. Our national Carbon emissions reduction targets are slipping; the infrastructure is ageing; and the trend for cost is upwards, hence pressure on change is mounting. The HRA is also suffering its own financial pressure, primarily on rental income, and this inhibits our ability to deliver change and improvement. We also need to be up-to-speed with the transformation that the energy sector is set to undergo through the 2020's, due to the introduction of digital services and the ongoing changes to supply and service delivery.

Household income is under separate remit and not in scope of this strategy. In light of this, the **HRA Energy Strategy recommends a twofold approach be adopted** in order to tackle the energy efficiency of buildings and the impact of energy costs:

Approach 1. **Technical Energy Efficiency** – this will aim for compliance with legislation such as the Fuel Poverty regulations via repairs & maintenance; construction and infrastructure works & projects.

Approach 2. **Lifestyle Energy Efficiency** – this will aim to mitigate the impacts of the cost of energy through access to fair pricing and energy saving advice.

There are duties to deliver on technical energy efficiency, but not lifestyle schemes. This means as compliance targets loom, priority will need to be on technical measures. For instance, one of the greatest challenges will be the decarbonisation of heat – this can only be achieved by changing the fabric of buildings and the way energy is supplied to them.

Adoption of these approaches is encapsulated by the following **objectives**:

1. HRA Asset Management & finance colleagues to incorporate energy efficiency risks and opportunities into business planning;
2. Any new repairs and maintenance contracts are to incorporate and/or enable opportunities to increase technical compliance;
3. Technical Major Projects to be developed holistically, in-keeping with long-term asset business plan for the particular stock. Projects could potentially be cross-directorate, through officer and/or external partnerships; as solutions may include energy generation and the deployment of a Special Purpose Vehicle;
4. Continue to support and develop Lifestyle home energy efficiency projects & schemes where they are value for money. Links with wider council financial inclusion work-streams also to be supported;
5. Work towards home energy efficiency advice (services, contacts, referrals etc.) to be fully incorporated into current and any developing council communications, as a permanent fixture, again where value for money;
6. Work with residents to incorporate their priorities on energy efficiency performance wherever possible.

Opportunities

Most opportunities are complex and in some cases will not be delivered exclusively by/to the HRA, but those key to delivery include:

- Utilising existing and ensuring new service contracts have a focus on energy;
- Lifestyle schemes focusing on behaviour, such as the EU-funded SHINE project;

- Heat network development (i.e. decarbonising heat and potentially providing price protection to the most vulnerable), most likely in collaboration with city regeneration;
- Capital works projects e.g. External Wall Insulation;
- Deploying heat pumps (i.e. decarbonising heat) where cost effective;
- Energy generation, including solar PV on an individual basis and/or a shared scale; &
- Potential whole house retrofit models e.g. a European model, or a revamped Green Deal.

There is a lot to do, but also a lot happening – prioritisation will be key; as will sound business planning, in order to make informed decisions.

Next Steps

- The HRA will **commission a report** into EPC and Carbon data to aid the delivery of this strategy by providing: energy & carbon trajectories (science-based targets); assessment of opportunities and their impacts; cost assessments of potential measures and schemes to determine value for money. An internal data audit will need to be carried out beforehand.
- This will enable effective risk management, through further business planning, working closely with Property & Investment Asset Management and Finance colleagues to **establish a Delivery Plan** that ensures we spend in the right way.
- **Continue the communication strategy** that has been in place. The focus being resident engagement; seeking the views of council leadership; with the aim of the strategy being agreed at the Housing & New Homes Committee of January 2017.
 - Governance for monitoring & steering the delivery of the energy strategy is a consideration for all.
 - Other communications services to incorporate energy efficiency support and advice for residents; and potentially all employees and citizens.

Timing

Relevant deadlines and periods are as follows:

- Hard target of 31st December 2030 for the Fuel Poverty regulations;
- Carbon budgets: 1-3 on track; 4 (2023-27) and 5 (2028-2032) off track;
- Procurement of new repairs and maintenance contracts by April 2020;
- Next phase of HRA 3yr budgeting cycle is April 2018 – March 2021.

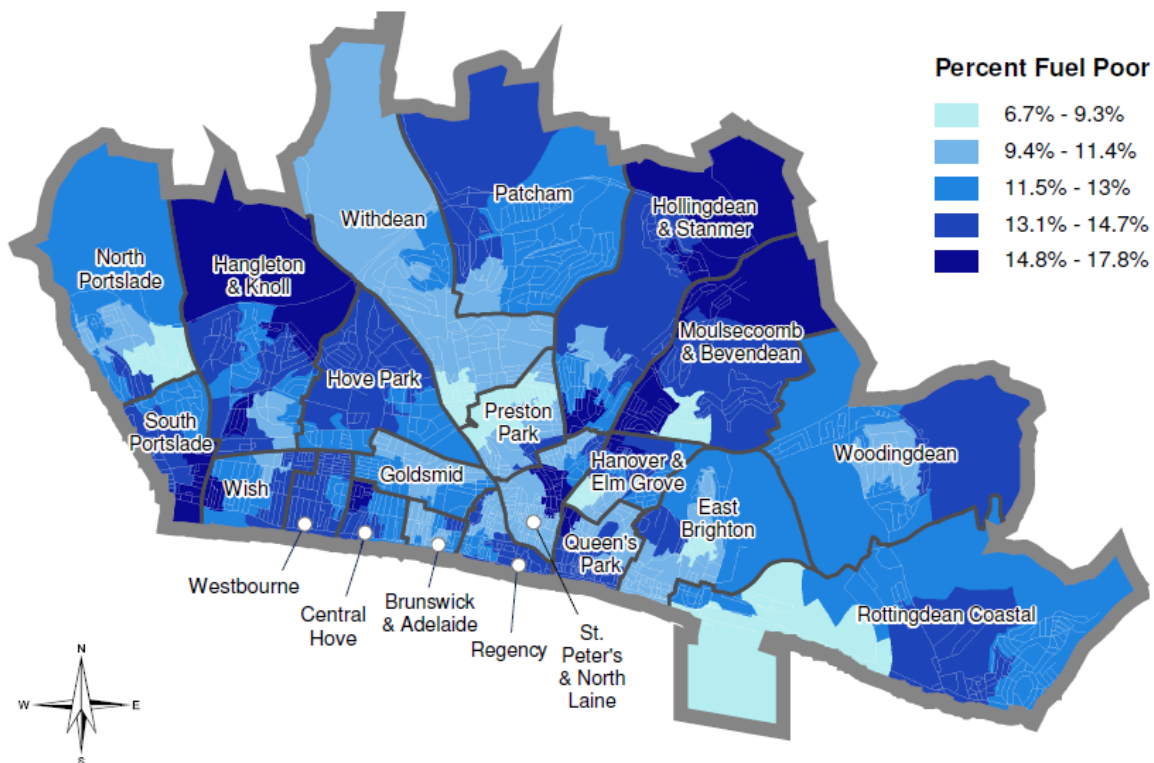
Key Findings

- Drivers for energy efficiency (these are expanded upon in Appendix B):
 - Keeping costs down
 - Reducing Carbon emissions
 - Improving health & wellbeing
 - Improving housing quality
 - Greater energy security
 - Safeguarding against volatile energy prices
 - Saving operational costs for the HRA
 - National policy
 - Local policy
 - Cross-sector benefits
 - Digital services
 - Return on investment from generation.
- Domestic Carbon emissions are the largest of the three main sectors in the city at 40% (30% transport & 30% business)
- The HRA comprises nearly 10% of all tenures in the city and is the largest housing provider:
 - It comprises ageing stock – 75% was built before 1970, including 2,600 homes built pre-1945
- The Decent Homes Standard was met 100% (before 31st December 2013); and the average energy efficiency rating for homes is in Band D
- The Fuel Poverty (England) Regulations 2014 state that households deemed to be in fuel poverty must have an EPC C-rated property by 2030
- Energy efficiency ratings of HRA stock, as at June 2016:

Energy Efficiency Rating	EPC Band	Flats (7191)	Houses (4348)	%
Very energy efficient - lower running costs (92-100) A	A	None	1	0.01
(81-91) B	B	7	81	0.76
(69-80) C	C	5178	376	48.13
(55-68) D	D	1837	2034	33.55
(39-54) E	E	168	1464	14.14
(21-38) F	F	1	392	3.41
(1-20) G Not energy efficient - higher running costs	G	None	None	0.00

- This shows that 51% of all stock would not meet the Fuel Poverty regulations
- It also shows that nearly 90% of the house archetypes will fall short
- The Annual Fuel Poverty Statistics Report (2015) estimated that in 2013, 2.35 million households in England were in fuel poverty, representing approximately 10.4% of all households in England. In the South East region fuel poverty was estimated to affect 8.1% of households and in Brighton &

Hove the figure was estimated to be 11.9% (14,863 households), higher than both the national and regional averages. In England, the average fuel poverty gap in 2013 was £374. There are no figures available for the average fuel poverty gap in Brighton & Hove. The map below shows the estimated distribution of fuel poor households in Brighton & Hove. However, caution should be exercised when viewing fuel poverty statistics relating to a geographical area smaller than local authority (see note below).



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Source: Department of Energy and Climate Change (2015) Sub-regional fuel poverty levels, England, 2013. Note: estimates of fuel poverty are robust at local authority level, but are not robust at very low level geographies. Estimates of fuel poverty at Lower Super Output Area (LSOA) should be treated with caution. The estimates should only be used to describe general trends and identify areas of particularly high or low fuel poverty. They should not be used to identify trends over time within an LSOA, or to compare LSOA's with similar fuel poverty levels.

- For the HRA, energy efficiency measures installed to-date are very respectable, but going forward they could be considered as low impact
- Under a Technical Approach to energy, a building can be considered in three components:
 - Fabric (walls, floors, roofs, openings)
 - Heat and hot water (generation) supply
 - Power (generation)
- To have lasting impact on efficiency:
 - Fabric needs extensive insulation and a good degree of air tightness (but must still ventilate)

- Heat and hot water must be from efficient conversion, or come from sustainable conversion sources such as heat pumps and solar – the ambition needs to be for fully decarbonised supply (long term)
 - Power must come from efficient, decarbonised & Smart grids; and also be ‘decentrally’ supplied, e.g. solar and storage
- Significant, or high impact measures are needed – like External Wall Insulation (EWI). These works can only be delivered effectively when all tenures receive the measures, e.g. in high rise flat blocks. Projects deploying EWI have been funded by capital works budgets (short term, non-cyclical and high value major works).
- The HRA has budgetary pressures, principally from:
 - Securing rental income
 - Scale of works needed
 - Future costs of repairs and improvements
 - Central government costs
 - These factors indicate the need for a shift in approach to deliver lasting change – energy generation and economies of scale are likely to underpin delivery; realistically, going beyond the boundary of the HRA to do so.
- Energy has undergone significant change over the last decade, principally with the decommissioning of older fossil fuel generation and the increase in renewables. The intermittency of renewable energy generation is pushing a change in the way the nations supply is operated and digitalisation has entered the mix. There is set to be significant operational and consumer transformation in the energy sector over the next decade – balancing supply & demand will be managed via Big Data; Clouds; the Internet of Things; Smart homes & Smart grids that operate on micro (peer-to-peer) and macro (international) scales
 - Some of this will be good, but there is potential risk where consumers that are already marginalised by lack of internet access and effective use, are further marginalised by not having the ability to manage their energy consumption (& therefore cost) to the fullest advantage that others may have
 - Nearly a third of HRA tenants have reported not having access to the internet
- The governments Clean Growth Strategy states a number of areas affecting housing will be reported on in 2018 (& will shape policy):
 - Building Regulations – for both new & existing properties; how this affects the councils new build in respect to both zero carbon homes and decarbonising heat could be important, e.g. future-proofing new build for the installation of zero Carbon heating systems
 - Energy efficiency ratings (EPCs) – there could be a new social housing standard; current targets might change

- There is an “ambition” for all housing to be Band C by 2035 – major energy efficiency schemes (e.g. post-Green Deal) will need to be created to do this; there is also an aim for Private Rented Sector housing to be Band C by 2030. There is currently a consultation underway on the Green Deal
- Acknowledgement that (in all likely scenarios) heat for homes will need to be fully decarbonised by 2050 and this is one of the biggest challenges of all – the HRA has various heating issues; the role of gas will have to be managed carefully, but opportunities to decarbonise heat will need to be investigated
- Recommendations from the industry-led ‘Each Home Counts’ (Bonfield Review) are to be implemented, e.g.: assessing the impact of measures previously delivered (under the Energy Company Obligation for example); quality marks for home energy technology; competency schemes; & codes of conduct for installers
- Cost of Energy Review (Dieter Helm) – at the time of writing it is too early to discern the impact of this report; it is very challenging, primarily for government and the national grid/s, but may hold important steer on subsequent ways to address fuel poverty, amongst other issues
- Local Planning Policy (e.g. City Plan Parts 1&2) will play a significant role in setting direction and affecting change; potentially as a source for collaborations and linking with regeneration and economic development, e.g. making the most of Development Areas by ensuring sound investment in energy infrastructure.

Appendix A – Overview of the Energy Sector - Housing

Sector	Domestic	
Trilemma	CO2 - 40% emissions (BHCC)	Ageing buildings; decarbonising heat
	Cost	Fuel poverty; future digitalised systems
	Security	'Keeping the lights on'; grid capacity
Solution	Energy Efficiency is solution to Energy Trilemma	
Disruptors	Decentralisation - Decarbonisation - Digitalisation	
National Composition	System Operator - District Supply Operators - Local Operators	
Local composition (Operators)	Smart Grids (connected homes, businesses & transport) & Energy Networks (balanced Heat, Power & Cooling)	
Vision	Renewable supply of power	
	Decarbonisation of heat	
	Technical	
	Retrofit of ageing stock	Individually
		Collectively
	New build	Zero Carbon (or future-proofed)
	<i>Reducing demand</i>	
	SAP/Science-based targets	
	<i>Supply & demand</i>	
	Generation – Demand Side Response & Smart Grids	
	Lifestyle	
	Smart homes	Community schemes
	Switching	Bulk-buy
Social tariffs	Surplus generation	

Energy Efficiency in Housing

An energy efficient household is twofold: it means using less energy & having clean supply. A lot of our energy traditionally comes from burning fossil fuels like gas and coal that release Carbon into the atmosphere and this is known to contribute to the Global Warming phenomenon¹. A more immediate problem for households is how much energy we use and how much it costs. Changing the way we produce energy and reducing demand helps bring down that cost, as well as Carbon emissions. In the home we use energy in three main ways:

¹ <https://www.gov.uk/government/topics/climate-change>

1. **space heating** e.g. electric storage heaters and gas boilers with radiators;
2. **hot water heating** e.g. immersion cylinders and also direct from gas boilers, and;
3. **power** e.g. electricity supplied via the national grid.

A traditional energy efficient home is one that is insulated (but well-ventilated) to stop heat escaping unnecessarily; has an insulated hot water tank, or uses instantaneous hot water heating from a gas boiler; and is also run by the household in efficient ways. This last point refers to ways that we can change our behaviour to use less energy for heating; and things we can do about the power-use in our homes to save energy.

Modern homes and those of the future, however, will be highly insulated and have quite different ways of providing space & hot water heating and power. Many readers will know about the recent HRA Solar panel programme and lots of other work the council has been doing in recent years (see Appendix C). In response to the three areas listed above, energy efficiency will mean:

1. increased levels of insulation, so that less heat is lost; meaning less energy is used for heat and therefore, less cost incurred;
2. modern heating systems often combine water heating. This will come from heat pumps and heat networks, though this may start soon it won't be commonplace for 10-20 years;
3. renewable energy from wind and solar at both national and local points and possibly new, digital ways of trading energy for lowest cost.

Appendix B – Housing Energy Efficiency Drivers

The Energy Strategy has focused on fuel poverty, however, it should be noted that the impacts and benefits of greater energy efficiency extend to many other important issues – not least of all; the energy trilemma.

HRA

The following section begins with nine core drivers for the HRA. Three more follow that are more complex, but as will be seen, they could hold the key to bringing about effective change.

1. To keep costs down

Energy is a basic need; it is perhaps not as prominent as shelter, food and water, but it is – as a developed country – unacceptable that people should struggle to pay for it, or even have to consider doing without it. This struggle is known as fuel poverty and there are three contributing factors when finding it hard to keep up with energy bills:

- (Low) household income;
- (Poor) energy efficiency of the dwelling;
- (High) cost of energy.

As the manager of the HRA, this strategy is about acting on the second & third contributory factors – making homes energy efficient & supporting services to help mitigate fuel poverty. This will be achieved alongside the Asset Management Strategy and more broadly, other local policies such as the Fuel Poverty & Affordable Warmth Strategy (more below).

2. To reduce Carbon emissions and prevent climate change

Carbon emissions lead to global warming and global warming leads to climate change.² Lowering emissions is a huge priority for the vast majority of countries of the world: the UK plays its part (and it may be said, has been instrumental in driving wider commitment); Brighton & Hove must play its part and Housing also has a duty. In fact, it's predominantly the housing stock in Brighton & Hove that contributes the most amount of Carbon emissions of any sector in the city.³ Government figures from 2015:

Sector	kt CO ₂ carbon emissions estimate
Industry & Commercial	293.6
Domestic (i.e. Housing)	406.5
Transport	306.0
Total	1006.2*

*Rounding issues

² <https://www.theccc.org.uk/tackling-climate-change/>

³ <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2015>

Nationally, domestic emissions are approximately 27%; as per the table above, for Brighton and Hove we have just over 40%. This does suggest that if any sector in the city should have a focus on energy efficiency, then it should be Housing.

Impacts of climate change⁴ are tracked by the Intergovernmental Panel on Climate Change:

“[...] the term impacts is used primarily to refer to the effects on natural and human systems of extreme weather and climate events and of climate change. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system”.

3. To improve health & well-being

There has been a lot of research⁵ recently into the affects that a home with poor energy efficiency has on the people who live in it, but the impacts are quite obvious:

- a. if it costs a lot of money for heating, hot water and power, then that means people will have less money for food, clothes, travel and other essentials; &
- b. if a home is cold, damp and draughty, then people get ill and can't work or enjoy themselves and this affects their well-being.

As was seen with the recent Warmth for Wellbeing programme in the city, a key partner (and resource) was Public Health. As is noted in the local policy section below, the link between poor energy efficiency in the home and costs to the NHS is now well-established. The Joint Strategic Needs Assessment⁶ also includes reporting on excess winter deaths, which sometimes are in part down to poor energy efficiency.

Fuel Poverty Regulations

These first three drivers are the principal reasons for the following national legislation. The Fuel Poverty (England) Regulations 2014 states:

Objective for addressing fuel poverty: England

2.—(1) The objective in paragraph (2) is set for the purposes of section 1A of the Warm Homes and Energy Conservation Act 2000.

(2) The objective for addressing the situation of persons in England who live in fuel poverty is to ensure that as many as is reasonably practicable of the homes in which such persons live have a minimum energy efficiency rating of Band C as determined by the Fuel Poverty Energy Efficiency Rating Methodology (dated 17th July 2014)(1).

(3) The objective in paragraph (2) is to be achieved by 31st December 2030.

⁴ <http://www.ipcc.ch/report/ar5/wg2/>

⁵ The Marmot Review, leading to Public Health England Heatwave Plan for England & NICE Guidelines. Building studies conducted by all major institutions, BRE, RICS, CIBSE & CIOB and Government policy, including regulation, below.

⁶ <http://www.bhconnected.org.uk/sites/bhconnected/files/6.4.2%20Fuel%20poverty%20FINAL.pdf>

There are two immediate things to understand about this regulation:

- i. there is a definition of fuel poverty⁷, as follows:

Under the Low Income High Costs definition, a household is considered to be fuel poor if:

- *they have required fuel costs that are above average (the national median level)*
- *were they to spend that amount, they would be left with a residual income below the official poverty line.*

In simple terms the English Housing Survey 2013: Energy efficiency of English housing report⁸, surveyed and interviewed homes & householders and identified average fuel (energy) costs and their income. What the above definition means is that if your energy costs are above the average for the type of home you live in (a flat; a house; its size; number of bedrooms; etc.); and by paying your energy bills you are left below the poverty line; then you are in fuel poverty.

- ii. The second thing to understand is that homes & other buildings have energy efficiency ratings⁹. Minimum Energy Efficiency Standards use the Energy Performance of Buildings (EPB) Regulations and the 2008 Climate Change Act, to define the energy efficiency of a building.

Energy Performance of Buildings Regulations

In order to make energy efficiency improvements you need to know the energy efficiency of a building in its current state. The EPB Regulations set out the need for Energy Performance Certificates (EPCs – this term is used a lot for energy efficiency) when a building is constructed, sold, or rented. Guidance for which is provided by the Department for Communities & Local Government¹⁰. For **residential buildings**, a Domestic Energy Assessor is needed to carry out a building survey which identifies all the major energy-related components of the building. This includes walls, roofs, floors, openings; but also the age; whether improvements have been made; and the type of space and water heating systems that are present. The certificate then provides a simple summary and a scale for the energy efficiency of that building:

⁷ <https://www.gov.uk/government/collections/fuel-poverty-statistics>

⁸ <https://www.gov.uk/government/statistics/english-housing-survey-2013-energy-efficiency-of-english-housing-report>

⁹ <http://www.legislation.gov.uk/ukxi/2012/3118/contents/made>

¹⁰ <https://www.gov.uk/government/publications/energy-performance-certificates-for-the-construction-sale-and-let-of-dwellings>

Energy Performance Certificate (EPC)



17 Any Street, District, Any Town, B5 5XX

Dwelling type: Detached house
 Date of assessment: 15 August 2011
 Date of certificate: 12 December 2011

Reference number: 0000-0000-0000-0000-0000
 Type of assessment: RdSAP, existing dwelling
 Total floor area: 165 m²

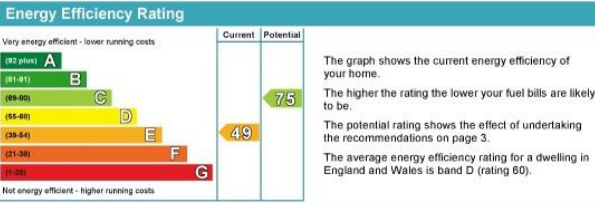
Use this document to:

- Compare current ratings of properties to see which properties are more energy efficient
- Find out how you can save energy and money by installing improvement measures

Estimated energy costs of dwelling for 3 years	£5,367
Over 3 years you could save	£2,763

Estimated energy costs of this home			
	Current costs	Potential costs	Potential future savings
Lighting	£375 over 3 years	£207 over 3 years	
Heating	£4,443 over 3 years	£2,067 over 3 years	
Hot water	£549 over 3 years	£330 over 3 years	
Totals	£5,367	£2,604	

These figures show how much the average household would spend in this property for heating, lighting and hot water. This excludes energy use for running appliances like TVs, computers and cookers, and any electricity generated by microgeneration.



Top actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years	Available with Green Deal
1 Increase loft insulation to 270 mm	£100 - £350	£141	✓
2 Cavity wall insulation	£500 - £1,500	£537	✓
3 Draughtproofing	£80 - £120	£78	✓

See page 3 for a full list of recommendations for this property.

When the Green Deal launches, it may allow you to make your home warmer and cheaper to run at no up-front cost. To find out more, contact the Green Deal Advice Service on 0800 XXX XXX or visit www.greendealadvice.org

The example above can be found [here](#) on DCLG's website (please note this is issued in 2012 and the Green Deal has been discontinued).

The EPC provides the energy efficiency rating of that building on a number basis from 1 to 100 (higher being more energy efficient); and also puts the numbers into bands A to G and these are the bands referred to in the Fuel Poverty Regulations. As noted above, you need to know the performance of a property in order to identify improvements – so the EPC also recommends possible measures (works) that will improve the energy efficiency rating of the building. However, the measures are not always so straightforward and it can be very complicated to make improvements to existing homes. Appendix D presents improvement measures in more detail. It is also important to note at this stage that the 'typical' consumer costs quoted on EPCs are not from the people and the bills for that property. They are taken from national averages and can vary greatly.

Alongside the Energy Efficiency Rating there is an Environmental Impact (CO₂/Carbon) Rating. The survey to produce the EPC also results in an estimated calculation of the Carbon emissions for that property. This is a very important piece

of data for the council to measure locally to understand our emissions; and nationally to monitor how we are progressing against national targets¹¹ for emissions reduction.

4. To improve housing quality

Measures that improve the energy efficiency of property often also improve their overall quality. For example, external wall insulation can also reduce condensation in the property by preventing cold bridging; and improve the external appearance of some properties & neighbourhoods. All energy efficiency measures would be undertaken on the basis that there is no detriment to the buildings, in terms of the occupancy standard they provide and the economic value they bring. Indeed, energy efficiency improvements are known to raise the value of the property.¹²

5. For greater energy security

Nationally we face potential short-falls in energy supply that may lead to black-outs.¹³ As well as the inconvenience to our day-to-day activities, this can cause disruption to essential services. Traditionally this is dealt with at grid-level, but with increasingly different technical services coming on to the grid, such as renewables, the problem is now being considered more holistically – energy is said to be undergoing a transformation. Flexibility¹⁴ through Storage, Demand Side Response and Balancing Services are modern concepts and services that if integrated and managed properly should shape a more secure future. This even comes down to the household level where homes might have solar power and battery storage, for example. In any event, as with safe-guarding against energy price rises, greater energy efficiency at the demand end is also known to relieve pressure on the energy system.

6. To safe-guard against increasing energy prices

Like most commodities, electricity and gas are set to cost more in the future¹⁵. This is clearly linked to ‘saving energy’, but it is worth special. It is not possible to predict future energy prices with any great certainty, though there are indexing tables that provide best estimates and are important modelling tools in assessing the effectiveness of potential changes. However, the trends for decades, as with most commodities, are that energy prices will continue to rise. Also, there is a continued trend of increasing demand (28% from 2015 to 2040 in world energy consumption¹⁶),

¹¹ Committee on Climate Change: <https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/carbon-budgets-and-targets/>

¹² The Clean Growth Strategy indicates consulting on potential Green Mortgages and favourable stamp duty for more energy efficient homes.

¹³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65643/7101-energy-security-strategy.pdf - 2012 policy.

¹⁴ <https://www.ofgem.gov.uk/electricity/retail-market/market-review-and-reform/smarter-markets-programme/electricity-system-flexibility>

¹⁵ <http://researchbriefings.files.parliament.uk/documents/SN04153/SN04153.pdf> - note the summary states energy efficiency measures are ‘the most reliable way for consumers to reduce their energy bills in the medium and longer term’.

¹⁶ <https://www.eia.gov/outlooks/ieo/>

particularly for power. So, it is a reasonable assumption that without change, energy will cost more for homes and businesses.

Conversely, where homes and businesses are more energy efficient – protecting themselves against price rises – they can then spend less on energy, meaning there is potentially more to be spent and invested within the local economy.

7. To save operational costs for the HRA

As was indicated above by improving housing quality, the on-going maintenance of the HRA buildings can receive positive impact from energy efficiency measures: reducing maintenance & repairs costs and increasing the value of the asset. One area, for example, that could benefit is around damp and condensation, where remedial works can be costly – more energy efficient homes are less likely to suffer from damp and condensation; even excluding the works the operational costs of surveys, reports, calls and visits comprise a significant proportion. We could also make use of Smart technology that can let property management/repairs contractors know when there is a fault; let residents know automatically via mobile/internet; or help with damp claims information (e.g. inadequate use of heating).

In terms of the Asset Management Strategy 30 year business plan, on-going cyclical works programmes (like window and roof replacements; ‘external decorations’ works such as pointing etc.) could receive long-term financial advantages, if whole house retrofit models can prove effective. Some of the opportunities to be explored also offer gaining an income (e.g. heat networks, potential electric vehicle charging points etc.)

In any event, alongside asset and energy business planning, it will be important that all repairs and maintenance contracts enable works that improve energy efficiency, seek out revenue and drive down costs.

Policy

The following two drivers note where we must comply, but also where the council has potential influence to set the agenda.

8. National policy

Further to some of the existing policy mentioned above, central government has released its **Clean Growth Strategy**¹⁷. This crosses many sectors and has a specific section on ‘Improving Our Homes’. In addition to those captured by the Fuel Poverty regulations, there is a medium-term “aspiration [...] that as many homes as possible are improved to EPC Band C by 2035,¹⁸ where practical, cost-effective and affordable.” However, government acknowledges that, “Reducing demand for energy will not be enough on its own to meet our ambitions for homes. By 2050, we will also likely need to fully decarbonise how we heat our homes”. Indeed,

¹⁷ <https://www.gov.uk/government/publications/clean-growth-strategy>

¹⁸ This is an aspiration for all homes, the Fuel Poverty Regulations still stand as Band C by 2030.

“Decarbonising heat¹⁹ is our most difficult policy and technology challenge to meet our carbon targets”. As a result, government intends to continue with most policy as it currently stands; and will review and consult on many issues to increase home energy efficiency, reporting in 2018. A summary of the more relevant policy areas are as follows:

- Fuel Poverty Regulations (England) 2014 remain
- Energy Performance of Buildings review (i.e. EPCs) – where a new EPC standard for social housing may be considered
- Building Regulations review, including potential future-proofing new build for decarbonised heat supply
- Decarbonising heat; Low & Zero Carbon technologies are currently too expensive, groundwork for transition to be laid over current administration (including ambitions concerning grid)
- Smart Meters to continue deployment
- Boiler Plus standard released October 2017
- Energy Company Obligation order to continue potentially to 2028²⁰ - this is set to focus increasingly on fuel poverty
- Heat Network Investment Project to continue as planned.

9. Local policy

As well as national legislation there are also local policies that the HRA adheres to, to deliver the changes necessary and be more energy efficient. The most significant local policies that impact on the HRA and energy efficiency are as follows:

- HRA Energy Strategy – this document.
- [Housing Asset Management Strategy](#) – the primary building management strategy of stock with key objectives as follows:
 - Investing in Homes and neighbourhoods to provide safe, good quality housing and support services;
 - Supporting new housing supply;
 - Ensuring financial viability within the Tenancy Strategy.
- [Housing Strategy 2015](#) – the councils overarching strategy for housing across the city. Under Priority 2: Improving Housing Quality, a primary aim is for ‘Decent, warm and healthy homes’ and is reflected in the AMS and this Energy Strategy.
- City Plan²¹ Part 1 sets out the councils overarching Planning Policy for the city including the strategic objectives SO7 Contribute to a reduction in the ecological footprint of Brighton & Hove and champion the efficient use of natural resources and environmental sustainability. SO8 Ensure design and construction excellence in new and existing buildings in Brighton & Hove which responds positively to the challenges posed by local impacts of climate

¹⁹ Not just in homes, but all sectors where possible.

²⁰ This currently has limited effect on social housing, but is subject to change and is the government’s principle instrument for improving energy efficiency of homes.

²¹ <https://www.brighton-hove.gov.uk/content/planning/planning-policy/development-plans>

change, resource-efficiency, and delivers biodiversity and environmental objectives and improvements to accessible natural green space.

- City Plan Part 2. Work has begun on the remaining development sites and detailed planning policies. This will include further detailed work on energy.
- Brighton & Hove City Council Corporate Plan 2015-2019 The Way Ahead. Principles: Public accountability; Citizen focused; Increasing equality; Active citizenship. Service priorities: Economy, jobs & homes; Children & young people; Health & wellbeing; Community safety & resilience; Environmental sustainability (including energy).
- Corporate Property Strategy and Asset Management Plan 2014-2018. The corporate property objectives include to: Deliver value for money property services; reduce our environmental impact (including energy).
- Brighton & Hove and Lewes Downs Biosphere Management Strategy 2014-19. Aims include: to take positive action to reduce energy & water use and waste generation; encourage sustainable transport and local food production; develop new social and economic opportunities such as outdoor health, eco-tourism and low carbon industries.
- A Greater Brighton Energy Plan is expected to be developed by the end of 2018. This will review opportunities and barriers to affordable, secure energy, low carbon energy for the sub region, developing actions to ensure clean, Smart & sustainable growth.
- Brighton & Hove Renewable and Sustainable Energy Study (AECOM 2012) for the City²² - an early report focusing on local opportunities to provide decarbonisation pathways for the City.
- Brighton & Hove Strategic Housing Energy Study (AECOM 2012)²³ – based on the HRA, this is a high level extension of themes in the City-wide study. Certain aspects are out of date, but a number of the conclusions and recommendations remain valid.
- Fuel Poverty & Affordable Warmth Strategy²⁴ – Public Health strategy drawing on NICE²⁵ Guideline released in March 2015 entitled ‘Excess winter deaths and morbidity and the health risks associated with cold homes’, this strategy provides ‘recommendations on how to reduce the risk of death and ill health associated with cold homes.’ Further, a report by the Building Research Establishment, “estimated, conservatively, that the cost of cold and damp homes to the NHS is approximately £760 million per year”.²⁶

²² http://www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/downloads/ldf/BrightonandHove_Energy_Study_Jan2013.pdf

²³ The study was not taken through committee, but is available on request.

²⁴ <https://present.brighton-hove.gov.uk/mglIssueHistoryHome.aspx?lId=50429>

²⁵ <https://www.nice.org.uk/>

²⁶ P.73 Clean Growth Strategy 2017.

- City Sustainability Action Plan²⁷ – Completed in March 2017; this provided targets for energy efficiency in all buildings across the city, including the HRA. SAP reports continue to be submitted by Asset Management to Housing Committee via the Performance & Improvement Team within P&I.
- BHCC Air Quality Status Report 2017²⁸ – AQ is strongly linked to transport emissions and the emissions from the combustion processes involved. Property, including housing, creates additional emissions typically via heat generation (fossil fuel-based boilers). Generally, domestic boilers have and continue to improve their performance, commercial boilers such as those used in combined heat and power engines (including those used for heat networks) will have to be deployed in full accordance with AQ management.

Private Housing Sector

The councils Housing Strategy (2015) includes aims & objectives for all housing in the city (as above) and across many issues. It is known that the Private Rented Sector (PRS) in particular faces many challenges, including that of energy efficiency; and in terms of housing quality & affordable warmth. Indeed, there are also targets for the PRS to achieve that fall within the suggested timeframe of this strategy, as follows:

The minimum standard²⁹

- The minimum energy efficiency standard will be set at an E Energy Performance Certificate (EPC) rating for all eligible properties and new or renewed tenancies from April 2018. From April 2020, this standard will apply to all eligible properties including existing tenancies.
- As can be seen from the Clean Growth Strategy, there are and will be increasing pressures (& legislation) to also improve the performance of private homes.
- As with most cities, Brighton & Hove is comprised of mixed-tenure housing areas, but has a particularly high proportion of private rented housing.

Many of the HRAs flat blocks are mixed-tenure and we routinely carry out works that effect non-tenants. Some of the opportunities we have to improve energy efficiency in the stock will need to be delivered in similar ways and may extend to other archetypes as well. This could prove vital in tackling such an issue within the PRS.

10. Achieving change through joined up approaches

Hence, where opportunities arise, energy efficiency schemes that may also benefit housing outside of the HRA should be investigated – where they prove both financially viable and represent ways to achieve strategic benefits that wider policies seek (such as quality housing for all in the city). This could include schemes that deliver at scale, like heat networks, or large refurbishments, collective switching,

²⁷ This was completed in March 2017. A new strategy and monitoring & reporting policy is in development.

²⁸ <https://www.brighton-hove.gov.uk/content/environment/noise-and-pollution/air-quality>

²⁹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/401381/Dom_PRS_Energy_Efficiency_Regulations_-_Gov_Response_FINAL_04_02_15_.pdf

community energy etc. That is, it makes economic sense when deploying heat networks, for example, to connect as many consumers as possible in a finite (dense) location.

Low Carbon Economy

A low Carbon economy (LCE), or decarbonised economy is an economy based on low and zero Carbon emitting energy sources that therefore, has a minimal output of greenhouse gas (GHG) emissions. What this means is that buildings, premises, processes, transport, services, energy supply, consumer products etc. virtually all of our activities become low or zero Carbon, but remain viable and affordable.

11. Ensuring digital services for all

As has been mentioned, energy is a commodity and it is brought to us via infrastructure. Modernisation is happening in three key areas of infrastructure:

- Transport;
- Energy; &
- Digital.

This is where we are likely to see significant change and a transition over the next decade, or so, as digital services come into the mix along with increasing levels of renewables. Energy is already changing – from old analogue meters with dials, to digital Smart Meters³⁰ in the home with displays showing how much energy you're consuming and what it costs, in real-time. Also inside the home, our appliances are set to become Smart (like certain TVs) – appliances like fridges will be able to manage their energy consumption across the home; as they will be connected via the internet. A phrase some will have heard of is the Internet of Things (IoT). This is enabled by Big Data & Cloud-based storage – in relation to energy, this is information about where the energy has come from, how it transfers; who to, when and how much it cost. Data is also set to be used in building management³¹ – this is where information about temperature; humidity; CO₂ from people, is monitored and adjusted to keep the occupants content and energy management efficient. This can also be used to measure the effectiveness of works and/or upgrades to existing buildings.

Transport too, will undergo significant change. The government has legislated to ban the sale of petrol and diesel cars by 2040.³² This means most vehicles on the road will become powered by electricity and hydrogen. Subsequently, they will all also be digital entities and the batteries in Electric Vehicles will also interact with home energy management. These things add up to what are referred to as Smart

³⁰ Currently Smart Meters do not need access to the internet to transfer data, but use technology similar to mobile phones to communicate.

³¹ Brighton & Hove ICT dept. and Property & Investment are delivering an IoT Project looking at monitoring the building performance before & after works at Leach Court.

³² <https://www.gov.uk/government/news/plan-for-roadside-no2-concentrations-published>

Cities; and digital services will underpin them. And of course, all this 'digital' will also need power for itself. Although this seems futuristic and aspirational, there are major forces driving this change:

- Legislation – light at present, but Smart Meters,³³ for example, represent a 'data gateway' between the supply and the home. Policy will be needed to harness the advantages and ensure they're used for good;
- IoT – the ability of data to be used in so many aspects of our lives, for energy this will be unprecedented insight and control; &
- Commercial forces – new technology and digital services attract investment and create change.

For many this will happen seamlessly. However, there is risk in how this potentially affects a lot of residents. Energy and digital may well become so intertwined³⁴ that energy management in the home becomes increasingly compromised by any lack of access to the internet. The risk is brought to light in the Tenant Satisfaction Survey (2016) as it reported:

Have access to the internet? *Base: 829*

- Yes: 543 65.5%
- **No: 269 32.4%**
- N/R: 17 2.1%

Overall there is an increase in demand for online services, but the council still has to support access for some.³⁵ The Energy Saving Advice Service is set to become a digital-only platform under recommendations from the Bonfield Review (Each Home Counts).³⁶ The council is unlikely to be in a position to support digital energy services. 'Digital Energy' (beyond relatively simple switching services) could potentially become an unwelcome, additional complication for some, unless consumers are protected and internet capacity increased; as well as 'hands on' support for some.³⁷

12. Exploiting energy generation

Traditionally, energy has come from a centralised fossil-fuel based energy system. This has neither been energy efficient, or good for the environment. In recent years³⁸ there has been more emphasis on decentralised energy³⁹ (which can be a

³³ Also worth noting that the Heat Network Metering & Billings Regulations are driving heat metering for communal systems and heat networks – the HRA will have to deploy them.

³⁴ IoT, Big Data, power grid capacity; demand side response; & balancing services, new digital based business models and services. There is a question of how heat will fit into this – heat networks will; but individual heating will be more complicated (though the electrification for much of heat is set to be a factor of heat decarbonisation & the Boiler Plus standard are a move in the digital direction).

³⁵ For example, see Digital Brighton & Hove Spring 2017 Newsletter.

³⁶ As per the Clean Growth Strategy.

³⁷ The issue of internet service supply for the HRA is under ongoing investigation.

³⁸ Though organisations like the ADE have been around for 50 years: <https://www.theade.co.uk/>

more efficient way to generate energy than the traditional national system) and coal-fired power stations are being phased out. At the same time, renewable energy sources have been increasing which is a major factor for the change that is occurring. It helps to think of energy as two types, heat and power:

- Heat is complicated, in the UK it is most often generated ‘at source’, e.g. an average gas boiler in the home. Communal heating and heat networks, however, are a type of decentralised energy that are known to work well in the right areas of high heat density – they can also be from combined heat and power sources and renewable energy sources. Government and independent bodies⁴⁰ believe heat networks will provide around 20% of heat in the future, the rest is potentially to come from the electrification of heat (e.g. heat pumps) and/or the re-purposing of the gas grid (e.g. biogas and/or hydrogen in place of natural gas in the existing grid infrastructure).
- Power is also complicated, as above, the transition will not be an either/or situation between centralised and decentralised. There will be a combination of *central* nuclear, off-shore wind etc. and *decentral* microgeneration, Smart Grid, transport (EVs), storage and balancing technologies. All will be connected to the grid with a System Operator (national level), District Supply Operators (regional) and then Local Operators (municipal; community; business; individual) – in a highly digitised system that balances supply and demand.

The Local Operator level is one where many local authorities are taking on various roles: generation; interaction & control, along with incentivising & enabling community energy groups, businesses and prosumers. In times of increasing financial constraints on local authorities, energy generation and/or exploiting the market with innovative business models, represent ways for local authorities to deliver on their service objectives. Energy supply for the HRA should be considered within energy supply across the city where appropriate, i.e. where municipal action on monitoring, steering and being part of transition is undertaken – the HRA could add value. Further, where opportunity to act as a local generator arises, it is important to note that re-financing and exit strategies are options, whereas it would be difficult to enter established schemes at a later date. Opportunities that will be explored later make use of these ideas and can contribute to a low carbon economy in the city.

³⁹ <http://www.districtenergy.org/assets/pdfs/White-Papers/CommEnergyPlanningDevelopandDelivery2.pdf>

⁴⁰ Clean Growth Strategy, Committee on Climate Change, Frontier Economics, etc.

Appendix C – HRA Energy Efficiency Performance

The HRA has SAP⁴¹ data for its property (from surveys and from modelled estimates) including data on the heating systems installed. Energy efficiency has been a key area for investment for over a decade. Evidence shows that over this time a lot of improvement work has been achieved, but as demonstrated by the drivers, lots more will need to happen. One of the first things to do will be to get a clearer picture of the data we hold, and map the energy efficiency of the HRA, so we can plan ahead and better inform on improvements (see Next Steps).

The picture to date

We have a good track record. The average SAP rating of HRA property is 65.2 at end of June 2016 – which is in Band D (55-68). The average for England & Wales for a dwelling is 60 (also Band D). This is largely down to a history of upgrading the property (as noted in the AMS) with measures such as:

- Cavity wall insulation; loft insulation; double-glazing. Insulation was largely done in bulk programmes in the 1990's – including windows; which are now being upgraded again;
- Installing more efficient gas condensing boilers. From 2007 we have been installing “A-rated” condensing boilers;⁴²

Then there have been larger projects more recently too:

- Overcladding at Bristol Estate; and high rise blocks such as Essex Place, Warwick Mount, Kingfisher Court; Hereford Court, Wiltshire House;
- Solar PV – including new build, we now have around 400 arrays on the HRA;
- Upgrading lifts and switching to LED lighting systems that are more efficient.

All these things are also reducing the Carbon emissions of the HRA – estimates at end 2016 are that the HRA has reduced its emissions from 46,000tCO₂ per annum to 30,000tCO₂⁴³. Previously, the HRA received SAP and Carbon targets from the City Sustainability Action Plan and submitted its improvement on those targets on a six-monthly basis. This is still reported on via the Performance & Improvement Team. In light of the end of projects such as Bristol Estate, Solar PV and LED upgrades and the end of the CSAP; a more detailed assessment of the HRA's Carbon ‘footprint’ is required.

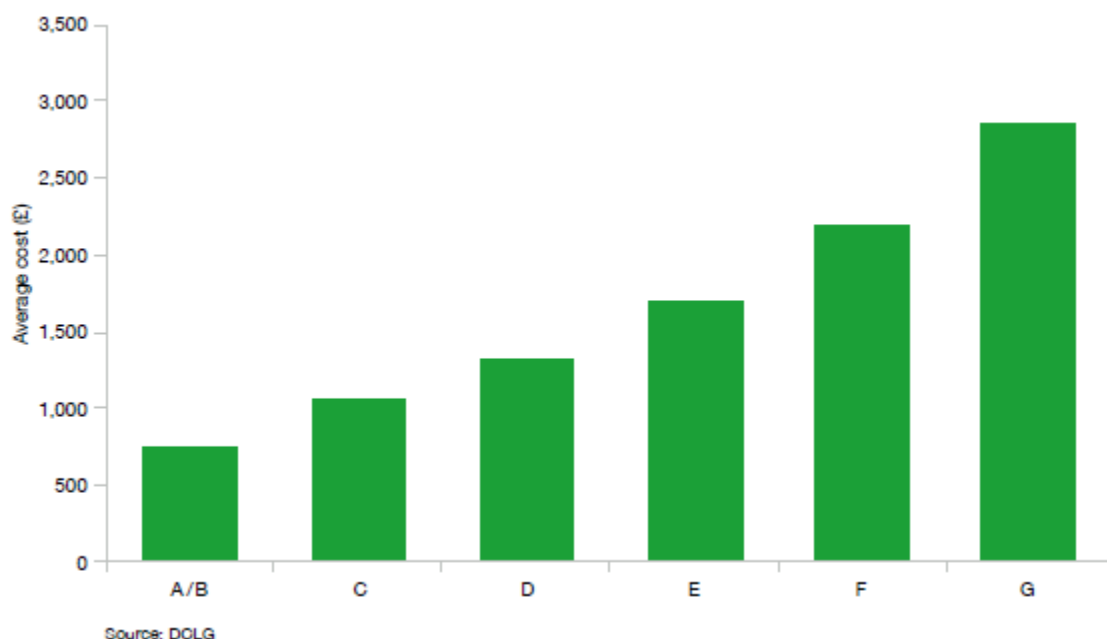
To illustrate the impact of SAP, or Energy Efficiency Bands on typical costs in the home, the following graph is taken from the Clean Growth Strategy (October 2017). The cost estimates are based on analysis by the Department for Business, Energy & Industrial Strategy:

⁴¹ Standard Assessment Procedure provides the data format for EPCs.

⁴² This strategy will take into account the newly released [Boiler Plus](#) standard.

⁴³ See the Asset Management Strategy.

Average annual cost of energy in homes by energy efficiency rating, 2014.



It stands to reason, though it's not the complete economic picture, for a family that live in a band E, F or G property, that they are likely to experience fuel poverty; and if not now, it's increasingly likely that they could in the future, as costs of living rise (including energy prices).⁴⁴ Additionally, they could move from a higher rated property to a lower one.

The Decent Homes Standard was met 100% by the end of 2013. 'Decency' includes thermal comfort – but it is important to note that 'Decent' in this sense focuses on the technical *ability* of a dwelling to heat itself; *not the efficiency* and therefore cost and Carbon performance. So 'Decency' is not a good marker of energy efficiency.

New build property

Zero Carbon

Climate change and energy efficiency have become prominent, modern issues; consequently property that is newly built has to be much more energy efficient than was built in the past. However, even where new build homes reach EPC Band A rating, this does not necessarily mean zero Carbon. As it happens, most new build homes are coming through at Band B. Essentially, insulation and air tightness only get the building so far; to achieve zero Carbon the energy supplies need to (most likely) be from renewable sources.

⁴⁴ <https://www.gov.uk/government/statistics/annual-fuel-poverty-statistics-report-2017> Although prices have decreased to 2015, they have since increased with hikes announced by the Big Six at various times throughout 2017.

The Clean Growth Strategy and other independent publications⁴⁵ note that homes will most likely have to be heated using zero Carbon technologies by 2050. However, current national Planning policy and Building Regulations do not stipulate that new buildings must be 'zero Carbon', so there continues to be a need to plan carefully for new homes; how they could possibly be more energy efficient; and how they will be future-proofed, or made lower or zero Carbon in the future.⁴⁶ Planning policy is (largely) devolved to local government, so the council could initiate its own zero Carbon ambition, as the Greater London Authority⁴⁷ has done, for example.

It is probably a matter of time before a zero Carbon home new build standard is in place, but important to note now that homes (& existing buildings in general) represent one of the most challenging areas for energy efficiency because of their age and complexity in modernising them. This is particularly true for 'change of use' and 'conversions'.⁴⁸ Therefore, there is the risk of history repeating itself by building non-zero Carbon (& lower EPC-rated) homes now, only to have the same challenging and costly issue of retro-fit and upgrading in 5-10+ years time.⁴⁹

Neighbourhoods

New build (including commercial property where appropriate) can contribute and be integrated into the energy demand and supply of wider, area-based schemes, where feasible. For example, surrounding buildings could provide advantages by increasing economies of scale; be that City Plan Development Areas⁵⁰ and/or other economic development & regeneration.

As with energy generation, there can be Local Operator roles in neighbourhoods and communities that create opportunities to work in partnership with new development. This is commonly the way heat networks start, as the new development provides the means to contain an energy centre and the network expands from there. Large-scale solar may also represent opportunities for neighbourhoods to self-supply.

⁴⁵ Frontier Economics: <http://www.frontier-economics.com/news/frontier-report-proposes-programme-policies-deliver-energy-efficient-homes-uk/>

⁴⁶ Clean Growth Strategy states all properties will need to be heated by zero carbon supply by 2050, so for example, new build regulations may need to include future-proofing for LZC heat supply.

⁴⁷ <https://www.london.gov.uk/what-we-do/planning/planning-applications-and-decisions/pre-planning-application-meeting-service-0>

⁴⁸ This issue is being explored in development of the City Plan Part 2

⁴⁹ [Action 9: Raise the energy performance of new dwellings](#)

⁵⁰ Brighton and Hove City Plan: <https://www.brighton-hove.gov.uk/content/planning/planning-policy/city-plan-part-one>

What needs to happen

The HRA stock and energy asset database holds energy data for each home. The results as at the end of June 2016⁵¹ are shown below. For simplification, at this stage the table shows the number of HRA homes by flats and houses, and the Energy Efficiency band they are in:

Energy Efficiency Rating	EPC Band	Flats (7191)	Houses (4348)	%
Very energy efficient - lower running costs (92-100) A	A	None	1*	0.01
(81-91) B	B	7	81	0.76
(69-80) C	C	5178	376	48.13
(55-68) D	D	1837	2034	33.55
(39-54) E	E	168	1464	14.14
(21-38) F	F	1**	392	3.41
(1-20) G Not energy efficient - higher running costs	G	None	None	0.00

11,539 properties have been counted in total; there are corrections for data errors; leaseholders are not included. Maisonettes have been counted with flats (as the majority are within flat blocks). *Bexhill Road property (RTB buy-back; long void due to costs; exemplar refurbishment). **Under investigation (this may be a further data error).

It can be seen that approximately 49% of homes are Band C or above (pale green), but 51% of all homes are lower than Band C (pale red) and therefore, would not currently comply with the Fuel Poverty Regulations in 2030. It can also be seen that there is a slight spread between average to poor energy efficiency (D-G) and very little that could be regarded as highly energy efficient (A-B).

A high level assessment of the differences illustrated on the table is as follows:

- On the basis of the table 37.7% of the HRA is made up of houses and 62.3% are flats;
- Smaller properties have lower heat losses, e.g. flats have neighbours on many sides and often only one or two walls are exposed, compared to houses;
- Newer properties will be constructed with better levels of energy efficiency (most of our flats are newer than our houses);
- Flats also fair better because of recent significant Capital Projects; e.g. Bristol Estate & other flat blocks that have been overclad;
- These works (which include high levels of insulation) result in the flat properties comfortably being in Band C;
- Flats considered on their own – 72.01% are Band C or above;
- Whereas, houses considered on their own – 10.53% are Band C or above;

⁵¹ To be updated. Latest figures will not change assessment. Solar PV project ended (FIT reduction) and EWI projects have stalled (Planning issues/fire safety focus) – prior to June 2016.

- There are still a significant number of properties (c. 2250) that are electrically heated – a system known to be inefficient & expensive to run;
- Previous energy efficiency ‘low impact’ measures such as cavity wall insulation (CWI), double-glazing, loft insulation and gas condensing boilers (particularly for houses), have already had widespread deployment;
- Therefore, a reasonable assumption is that extensive projects will be required to improve the 51% of HRA properties that presently won’t meet the fuel poverty target. Further, nearly 90% of our houses will need ‘high impact’ energy efficiency measures beyond those they have received already.

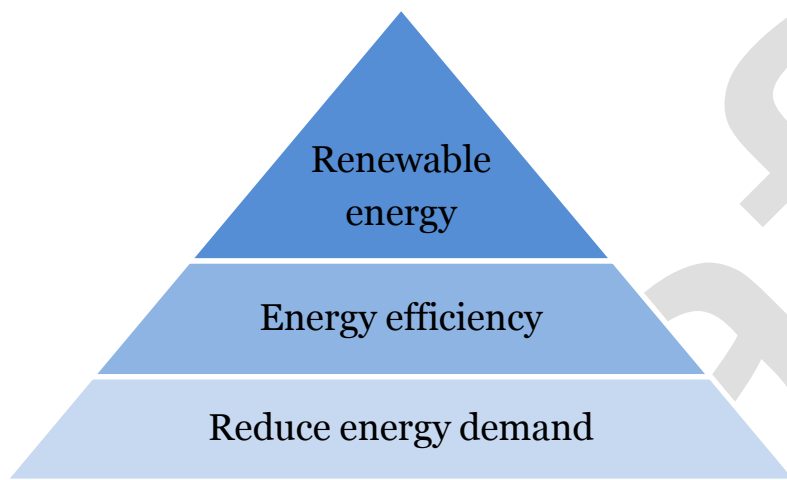
In order to improve the property and generate savings for residents, we must build upon past successes by investigating new opportunities & potential schemes – including innovative business models – to meet this challenge.

As above, it should be noted that energy efficiency improvements also bring added value through lower maintenance costs and higher quality assets; improved health and well-being; lower Carbon emissions & energy security; legislative compliance and many other benefits.

The picture here is for the HRA only. The size of the task required to achieve what will effectively be the future-proofing of the stock, indicate economies of scale will provide a means to deploying measures. Opportunities may well need to be linked to other housing tenures, city development and harnessing the energy transition – where the costs and benefits prove value for money.

Appendix D – Energy Efficiency Improvement Options

The track record for measures delivered by the Property & Investment Team is good, continued improvements now need to be planned for both legislative reasons and to deliver our residents' needs and priorities. The opportunities that follow are focused on technical solutions, as the priority must be to future-proof the stock – ultimately homes will be measured on their SAP scores (Bands G up to A) and Carbon emissions. These solutions should take account of traditional energy efficiency hierarchy⁵², but it must be noted that the changing landscape of policy and funding mean a more flexible and adaptable approach is going to be needed. The (traditional) 'be lean, be clean, be green' energy hierarchy:



The modern view of energy is that approaches can be taken in different order due to policy and economic viability. For example, it had been viable with the Feed in Tariff to deploy Solar PV without recourse to other measures for them to be economic and have impact.

1. Building Fabric

Building fabric refers to walls, floors, roofs and openings (windows & doors) – in energy efficiency terms this means their thermal performance; i.e. how much heat is lost through them. By upgrading these parts of a building (as with the cyclical window replacement programme) the amount of heat that escapes can be reduced. More traditional buildings are designed to for buoyancy and/or wind-driven natural ventilation. Some more modern buildings have mechanical, or forced, ventilation. In either case it is important to note that internal air is replaced and also that condensation (amongst other things) is removed through ventilation.

Reducing demand (energy used) results in not needing to spend as much money on bills. So walls (and floors) can have insulation added (internally, externally and within a cavity if they have one); roofs can have insulation installed in loft spaces & built into flat roof systems; windows and doors can be double-glazed; draughts can

⁵² https://en.wikipedia.org/wiki/Energy_hierarchy

be sealed (air tightness). Many of these measures have already been undertaken and apart from extensive external wall insulation, many of them are lower impact than needs to be deployed. Some options that may be available to help the HRA further reduce demand of the buildings are:

- Energiesprong ('Energy Leap'): this is an example of a whole-house refurbishment solution that has been developed in the Netherlands. A number of local authorities and large landlords across the country are exploring this model in the UK and the council is working with partners within the Coast to Capital LEP on a bid for funding from the European Union⁵³ to explore this locally. It represents a possible approach on all fronts of the energy hierarchy by delivering change at scale. This would need to be delivered cross-tenure and could provide significant regeneration to estates. It is not without significant challenges and development is likely to take approximately 5 years. More information can be found [here](#).
- Capital investment through our partnership contracts: in the past the HRA has been able to use funds for major projects that both ensure the longevity of property and also include energy efficiency improvements. The main examples of this are Bristol Estate, Essex Place & other high rise blocks of flats that have been overclad (protecting the concrete structure, the outer surface and also includes high levels of external wall insulation).
- Energy Company Obligation Order: known as ECO⁵⁴, this is a government scheme that enables funding and/or measures to be made available from large energy supply companies (e.g. British Gas, EDF, etc.) The HRA has received funding in the past for external wall insulation and continues to monitor the scheme. It has changed throughout its life and more changes continue. Its focus in the future is likely to still be on fuel poverty; but accessing funding is complicated⁵⁵. It is however, at the moment the government's main instrument for tackling fuel poverty, so we will continue to monitor it.

A further consideration when improving the thermal performance of building fabric is overheating⁵⁶ – careful design is required when undertaking substantial upgrades (and for 'new build' below). The issues are not caused solely by insulation though, ventilation (space heating & cooling) are equally as important.

⁵³ Until the UK leaves the EU it is business as usual with the EU; and successful applications will be honoured, as far as is known at the time of writing.

⁵⁴ <https://www.ofgem.gov.uk/environmental-programmes/eco>

⁵⁵

https://www.ofgem.gov.uk/system/files/docs/2017/03/170314_domestic_faqs_eco2t_final_version.pdf

⁵⁶ <https://www.cibse.org/getmedia/4a1e86ee-ea51-44ba-95fb-54f3165282cf/DECC-Overheating-guidance-document-19Jun2015.pdf.aspx>

2. Space & Water Heating

The table below shows the types of space heating and hot water heating systems that the HRA has:

Heating type	Flats	Houses
Electric	741	58
Gas	5469	4055
Communal (c. 30 systems)	842	n/a
Heat Network (2 systems)	243	n/a

Approximate, as per data held in Apex at November 2017

In 2016/17 K&T Heating were appointed the main gas contractor (5 years + 2). They are responsible for just over 10,000 properties with a gas supply. The contract represents key opportunities for improvements, such as:

- The effect of upgrading from a “D” to “A” rated gas appliance (not EPC) can save on average £105 per household;⁵⁷
- The current programme is for all properties with a gas supply to have “A-rated” council appliances, however;
- The new Boiler Plus standard has been released (October 2017) – M&E are already trailing compliant systems (supported by the Shine programme below) – if successful & affordable the new programme will be to the Boiler Plus standard;
- Through the service and access that K&T have we may be able to improve our contact with residents with regard to energy efficiency and fuel poverty (this will be explored in Next Steps);
- The contract is already being used to upgrade loft insulation;
- Communal boiler systems – K&T have ‘first opportunity’ to price for works which will include high energy efficiency hardware (boilers, lagging etc.) Where feasible, works will also include pre-heating water via installation of Solar Thermal Collectors⁵⁸.

The HRA has two heat networks, as per the table and further options, possibly together with new build and Development Areas, are being explored. Nettleton & Dudeney was successfully delivered in 2013 (these properties include heat meters, see below. Other studies have been conducted at Eastern Road (incorporating DA5) and Clarendon Road (DA6). North Whitehawk may also benefit from a heat network – the high rises already have communal heating and two blocks are also supplied from one plant room.

The Heat Network Metering & Billing Regulations⁵⁹ have come in to force and they have implications on the way heat is provided, monitored and charged. It provides

⁵⁷ Based on estimates provided by the Energy Saving Trust.

⁵⁸ The HRA has several Solar Thermal systems on Sheltered Housing blocks.

⁵⁹ <https://www.gov.uk/guidance/heat-networks>

definitions of communal systems and heat networks and the HRA is presently working on compliance. The drivers are similar to those of Smart Meters; engaging the consumer in their usage and providing data to operators in order to optimise efficient running of plant. It remains to be seen how Smart heat meters are deployed and interact with other Smart technology in the energy transformation.

As noted above, at the moment electrically heated dwellings are generally less efficient and more costly than gas to run, and possibly other solutions (e.g. renewable energy from heat pumps). Options and feasibility reports could be used to identify improvements or changes, as with the heat network studies above. Most 'pathways' for the decarbonisation of heat expect a massive increase in the uptake of heat pumps.

Thermal storage (similar to electricity) is likely to play an important role in the future. This will largely apply to heat networks and new & replacement communal systems; it can also be used as a source for cooling (via absorption chillers). So, as with many issues, longer term thinking should be adopted in order to meet changing needs and different situations.

3. Power

With any technical projects that go ahead, engagement with the District Network⁶⁰ Operator is crucial, e.g. for new build and district energy. The national grid is known to be struggling with capacity, and balancing supply & demand (due to age and the transformation energy is undergoing, e.g. intermittent generation from renewables). See section 11. Energy generation, above for more information.

Options for the HRA include:

- More renewables for self-generation. This might mean innovation such as large Solar PV systems that make clever use of the electricity generated. This can be through contracts; Private Wire & sub-metering; battery storage; and possibly 'blockchain grids'. The HRA is part of an application for (further) EU funding that could lead to some feasibility studies and pilots to prove the concept of some of these solutions. Result of the application will be known by end of 2017.
- Solar PV may be deployed where we know that only a small change in SAP score is needed to improve a properties rating to Band C for example, but this should be considered as part of a long-term solution.
- Solar PV farms, or other large-scale generation could be invested in by the HRA – with benefits then returned by way of a contract with a supplier.
- Power sales as part of Combined Heat & Power – heat networks are often deployed at first with CHP engines and the electricity revenue is often key to being able to economise the project.

⁶⁰ Evolving to District Supply Operator to reflect the changing role of balancing supply and demand.

- Bulk-buy of electricity. This is where an organisation makes an agreement with an energy supplier to purchase electricity for a large number of buildings in exchange for a cheaper price.
- 'White Label' supply. The council has engaged with a West Sussex County Council partnership to procure a White Label supply. Launching in December 2017, the Your Energy Sussex 'Sussex Tariff' which is a similar idea and HRA properties may be able to benefit.
- Collective switching (which can include gas supply), e.g. possibly working with local partners (similar to bulk-buy) to secure better prices.
- Smart Meters and more affordable key meters (K&T) and again, links with the Sussex Tariff and/or other potential void service providers.
- Greater use of technology to help residents and building managers manage buildings more efficiently; and reduce the potential for conditions where mould growth is possible within them.

4. Lifestyle

This is not strictly a technical solution, as those above, but it is important in making a difference. There are two factors to note: 1) that changes to our habits, even small ones, can and do make a difference to the amount of energy we use; and 2) technology is playing an increasing role in energy management, including in the home and we need to embrace this (e.g. Smart homes) to make the most of them.

Options for the HRA include:

- K&T Contract. Identifying issues such as cold homes on visits, which they currently do; but it might be possible to increase their interaction and support of residents (e.g. sign-post to services, as per Shine below).
- Making the most of self-generation, i.e. knowing how and when to make best use of Solar PV.
- SHINE bid. This will provide an energy advice service up to 2020/21. The HRA could build a larger project/programme from the impetus and learning this creates.
- Lifestyle support programmes and collaboration projects. Independent, or as per the SHINE bid above, partner with local energy groups such as BHSECo (see below) to design a support project for residents.
- Wider distribution of energy meters (e.g. Heat Network Metering & Billing Regulations) to inform residents on their energy use and to support positive impacts.

A note on new build

High level considerations for new housing, including HRA property:

- Where communal heating systems are used, as per the Clean Growth Strategy and local policy, they should be built ready to connect to heat networks and/or be designed for future zero Carbon supply in mind.

- New build properties do not have to be built to EPC A-rated standard. The build is based on Building Regulations Part L and Carbon emissions assessments and there isn't a zero Carbon requirement at present. New homes routinely do not meet band A, and it is difficult for Building Control and Planning to monitor standards post-construction.
 - Therefore, the risk of future potential retrofit costs should be noted.
- The council should consider business models that would enable such energy networks to be developed where they can deliver strategic drivers (economic growth; environmental, social & health benefits).
 - Therefore the council should identify assets that can host energy generation and assess their strategic position as part of potential networks that create greater economic and subsequent social benefit.
- Smart Meter implementation should be taking place during construction.
- Building Management Systems (BMS – these can be used to control heat and hot water) need to be aligned across HRA property so that they can be operated effectively. For example, any communal heating and/or heat network metering and billing services could be shared.
- Solar PV; in light of the section on 'Power' above – building more property means we are increasing the energy demand in the city; the systems installed for new homes need to be effective and/or take advantage of potential innovations that maximise their generation, e.g. storage to be designed in where appropriate.
- Future cooling needs of highly insulated property, for example care homes, need considering. As opposed to cold homes, over-heating can also be responsible for poor health. Should global (& local) temperatures increase, ventilation with increased cooling functionality will be needed and therefore, planned in advance.
- Some schemes (such as “Y-Pods”) may offer opportunities to innovate, including around energy efficiency.

A note on community energy

Essentially, “community energy⁶¹ covers aspects of collective action to reduce, purchase, manage and generate energy”. Community energy groups already exist in BHCC and some are quite prevalent⁶². Existing groups may be able to support the HRA around 'Lifestyle' schemes, but may also contribute to Technical Projects. There may be a role for our Area Panel (amongst other resident) groups in assessing interest and opportunities. For example, there may be a collective approach to using power generated from Solar PV. An interesting outcome of a

⁶¹ <https://www.gov.uk/guidance/community-energy>

⁶² Brighton Energy Coop, <http://www.brightonenergy.org.uk/> & Brighton & Hove Energy Services Company, <http://bhesco.co.uk/>

study⁶³ conducted alongside our Solar PV programme, was that tenants began to understand that not all of the electricity their systems generated got used; and they hoped that there could be ways of sharing it amongst other residents that hadn't been as fortunate.

Draft

⁶³ Research by the Sussex Energy Group, Science Policy Research Unit, University of Sussex (findings due).

Improvement Options Summary

The following (work in progress) table provides high level comments on the broad areas for improvement noted above

Option	Description	Energy Generation Level*	Generation Type	Impact	Comment	Decarbonise Heat	Meet Fuel Poverty Regs**
Business as usual	Low impact measures, e.g. CWI, double-glazing (that have been good in getting us so far)	Low	Limited Solar PV deployment (<1MW)	Low	As can be seen above, with little generation and constrained funds for high impact measures, this is very limited	No	No
Building fabric	High levels of insulation, most likely EWI (Whole house solution would also include generation, mainly through PV)	None	n/a	Medium	Fabric alone reduces consumption, particularly for heat, but this will eventually need to be zero carbon	By proxy – lowers demand which will be key; but is not applicable to the supply	Yes
Space & water heating	Continued deployment of high efficiency gas boilers	Immediate consumption only	At point	Low where gas switched for gas, medium/high where gas switched for electric (e.g. Heat Pumps)	Low Carbon heating alone in 'leaky' buildings, may have to be an option	Will need to transition from combustion processes to (most likely) electrification, such as Heat Pumps	No
Power	Mainly Solar PV solutions, but could also be energy networks, e.g. from heat &	High	Solar, heat & power (potentially cooling if needed)	Medium	Again, alone these measures do not get many SAP points, however, they	Yes (decentralised). 'Nationally' will be the energy supply for Heat	No

	power				provide economic benefits either directly or indirectly (e.g. 'free' energy, or invest-to-save)	Pumps	
Lifestyle	Projects such as Shine, switching services, 'low cost' tariffs.	None (though potential surplus from Sussex Tariff could go to community energy projects. This will require a lot of customers)	n/a	Medium	On its own has no impact on SAP. Can make personal difference, highest impacts when done with building measures	No	No

*Generation in this context means conversion in addition to immediate consumption. **As per current policy.

This table could be expanded upon in more detail – possibly through the procurement suggested under 'Next Steps'. For example, detailed analysis of SAP points per measures delivered on our stock.

Key points to note are:

- A combination of measures will be required to gain high impact;
- that unless a form of grant funding is received, then fabric upgrades are solely, and significant, cost;
- this is the same for space & water heating from conventional individual systems;
- power and heat generation can create returns on investment and help economise deployment of measures.

Appendix E – Funding for Energy Efficiency

As noted above, it is likely that larger projects will be required to make the improvements to the stock in order to meet energy efficiency standards and linked objectives. To establish value for money, the approach will need to be based on whole-life costs, instead of short-term availability.

On a life-cycle basis, generation provides cash-flow, whereas other measures are prolonged spend with zero return. Fiscal instruments (like the early days of ECO) can be useful, but they have been unpredictable; they rarely provide a foundation on which to base a business case. Generating energy and selling it is a stable supply & demand venture, could be viewed as an appropriate risk profile for a local authority.

Funding options for the HRA include:

- Funding via the HRA Capital investment programme. This sets out the estimated levels of funding for each type of project over 3/4 years. The programme aims to deliver the key priorities in the agreed Asset Management Strategy and to strike an optimum balance between investment in the current stock and new homes. The total level of investment available is dependent on a number of factors, including rental income levels and financing costs. Additionally, the housing and Planning Act sets out plans for a 'tariff' on higher value properties, the detail of which is currently unpublished;
- Renewable energy subsidies – the Feed in Tariff subsidy we receive for Solar PV is equity that is shared, FIT income is spread across HRA stock. Surplus can be forecast and used to contribute to other projects. The Renewable Heat Incentive is likely to play a considerable role in the deployment of heat pumps and other renewable technology in any future programmes;
- External funding – we have received funding from the EU, CESP and ECO before and will continue to monitor these and other opportunities, e.g. Heat Network Investment Project⁶⁴;
- Synergies with other works – this is where projects like Energiesprong become viable through economies of scale; and the scale can come from other groups of housing outside of the HRA;
- Partnership working – new gas contract with K&T and existing Mears partnership agreement can be used to explore the opportunities above where we already have a partner in place – but as is noted in the key objectives; new contracts will have to be flexible;
- Links to wider sustainability ambitions – will be mutually supported and may provide links to value for money expenditure;
- Invest to save – schemes such as lighting upgrades to LEDs, lifts, & PIRs represent slight increases in initial cost compared to business as usual (BAU),

⁶⁴ <https://www.gov.uk/government/publications/heat-networks-investment-project-hnip>

but in the long term they are cheaper to run and those savings improve on the BAU;

- Service approach – where we might have to stop, redesign, or commercialise services or schemes in order to prioritise or enable different approaches – this may lend itself to establishing an energy company to enable delivery. See ‘a note on and energy company’ below;
- As the 10 year Mears partnership draws to a close, any new HRA repairs & maintenance contract will have to take full account of this strategy and any wider council policy & objectives. It must be able to either provide delivery and/or enable the delivery of low-to-zero carbon homes through this next transformative period for energy.

The HRA must also consider the indirect costs and benefits concerning property management & maintenance as well as energy efficiency. In this regard, there are other key economic benefits that can also be added to, through potential schemes such as:

- K&T apprentices and jobs – e.g. the Mears Partnership has provided 100 apprenticeships;
- Offering to leaseholders – again the K&T contract could be used to offer services to other occupants and households, on a share-save basis.

A note on energy generation & companies

As highlighted throughout this strategy, the scale of schemes needed to fully deliver our objectives are likely to be considerable. It is also apparent that some complex and longer-term energy investment schemes, such as heat networks and wholesale fabric & energy supply schemes, often require a different approach to delivery, investment and ongoing management and maintenance. One model for this includes approaches that may sit alongside, but not within, the HRA, such as an energy company.

There are effectively two ways in which local authorities are making energy pay i. by generating and ii. by acting as traders & brokers; these approaches are not mutually exclusive. As it might be expected the [Greater London Authority](#) is well ahead with energy services, but other authorities such as [Bristol](#), [Nottingham](#) and recently [Devon](#) have also made great strides. Many other councils and RSLs have also taken up the energy efficiency agenda in various ways: [Portsmouth](#) have established their own tariff switching service; [Worthing Homes](#) created Relish a number of years ago; and [Amicus Horizon \(now Optivo\)](#) have led for several years in the south east with a number of schemes, both people and building focused. At least one London authority is now operating a wholly council-owned energy company, Enfield's [Energetik](#) – principally district heating; and Islington have their own White Label supply much the same as the Sussex Tariff, called [Angelic Energy](#).

A number of local authorities are also linking energy efficiency needs with housing needs. [Sutton](#) for example, have set up an opportunities company that sits above both a [housing company](#) and an [energy company](#). In fact, in [Gateshead](#) the energy agenda in certain respects led the way, linking in to regeneration and incorporating the council housing services and drive for new homes. [Crawley](#) has also been successful in the pilot round of the Heat Network Investment Project and are currently working up their commercialisation plans. Such holistic approaches are becoming common to the thinking of many local authorities.

We, the HRA and Brighton & Hove as a whole, find ourselves in a similar situation and utilise a shared approach to service delivery in other linked areas of our business. Significantly, a city-wide approach, through new build; the size of the HRA; Development Areas; neighbourhood plans; transport & the power needed for EVs, can potentially return greater benefit for Economic Development; Digital Services; Sustainability Services; Transport; Air Quality; Public Health and wellbeing.

