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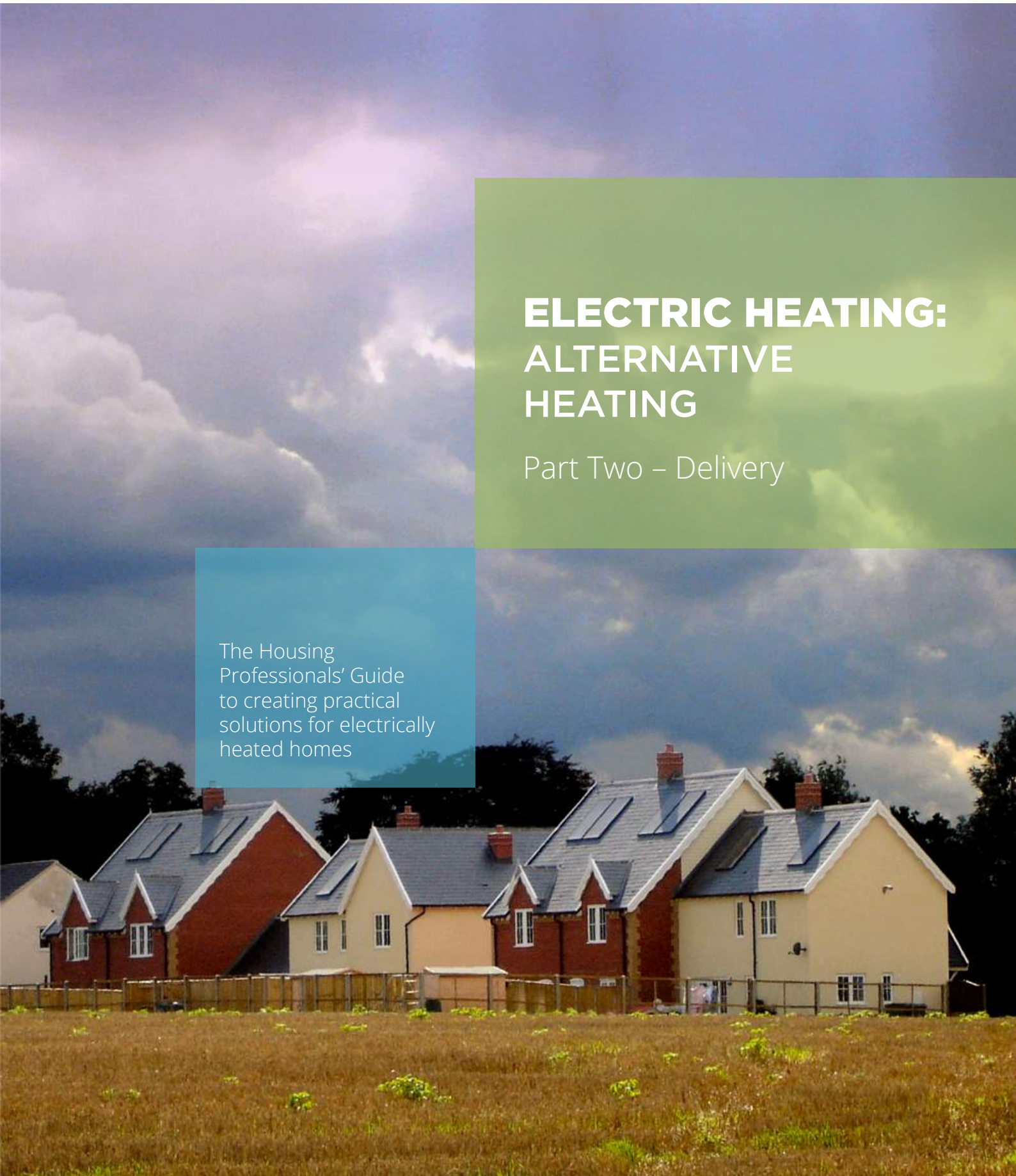

ELECTRIC HEATING: ALTERNATIVE HEATING

Part Two – Delivery

The Housing Professionals' Guide to creating practical solutions for electrically heated homes

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INTRODUCTION

This Guide is intended to provide detailed information so that you can build your approach and make key choices in dealing with electrically heated homes. It is supported by Part One and the assessment tool, both of which are available through the **Adecoe website**.

Electric heating was and is still being installed in homes for sound reasons, but it can present numerous problems for housing providers. With electricity prices rising, and other use and control issues coming to light, electric heating can lead to issues around affordability and ultimately resulting in customer complaints.

This project was instigated by The Guinness Partnership (TGP) because they recognised electric heating was a growing issue for them and the sector as a whole. TGP has led the sector on developing new sector wide approaches on a range of issues including communal heating and the EU directive on metering and billing.

The primary focus for this Guide is existing electrically heated properties, but the methodology can also be used where there is gas. It is intended to provide guidance for social housing professionals who are considering alternative heating options.

It is important that proper evaluation is carried out to achieve the best option. Defining the best option can be approached in different ways and with different metrics. How value is assessed is likely to affect the best option. The ever changing nature of grants and funding will also play a significant part in the best option at any given time.

The objectives for your organisation are as important as the energy evaluation of the scheme or programme in forming your choices for electrically heated homes. There is no one technical solution, they are all a means to achieving the final objectives, which might include: corporate energy targets; energy costs for customers; and capital or revenue costs. Being clear on your objectives at the start will help to ensure that you meet long term goals, as well as address the issues on a given site or scheme.

Within this Guide we provide the typical picture. It is based on the real world experience of social housing providers and installations, and it is supported by the tools to allow you to assess your own specific circumstances and issues.

We would like to thank all those who helped to inform this guide, in particular The Guinness Partnership who instigated the project. We would also like to thank other housing providers and organisations who contributed and special thanks also go to William Routh at Southern Housing Group.

USING THE GUIDE

This Guide helps housing professionals assess potential solutions for the problems often experienced with electrically heated homes. It is based on real experience of The Guinness Partnership and other housing providers and is composed of three main elements:

- **Part One -** The Housing Professionals' Guide to creating practical solutions to electrically heated homes
- **Part Two -** The Housing Professionals' Guide to delivering practical solutions to electrically heated homes
- **The Electric Heating Assessment Tool**

Part One is a general introduction and will help those readers who need a strategic overview of the issues and options.

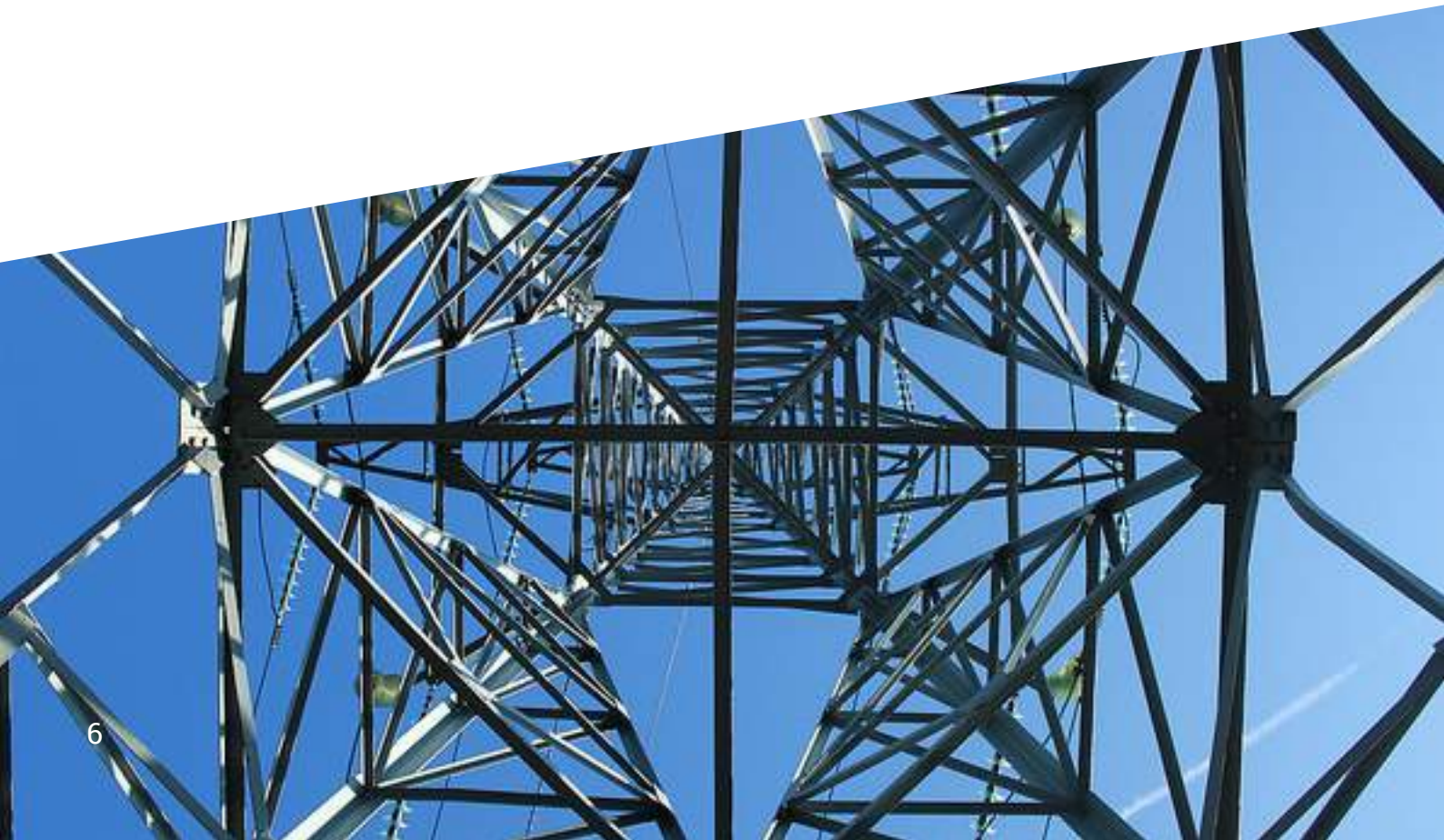
Part Two will help guide those that need to take action to address electrically heated properties and is supported by the use of the Assessment Tool for specific schemes.

Part One outlines the main issues around electric heating, how alternatives can be selected and how they can be applied.

Part Two looks at these issues in more depth so that housing professionals can assess and evaluate options for their organisation and their customers. It outlines in more detail what the options are, including heat pumps and solar, and explores their advantages and disadvantages.

The Evaluation Tool was developed to allow housing professionals to assess the options to meet their key objectives. These might include: capital and revenue cost; energy and carbon saving; and costs for customers.

Part One and the Assessment Tool are available through the Adecoe website.



HOW TO DELIVER ALTERNATIVE HEATING

The main issue for electric heating is that, by its nature, it consumes high cost, and carbon intensive, electricity. Some older systems can also be hard to control. This has the impact of:

- Potentially failing to meet internal SAP (Standard Assessment Procedure) energy rating targets, and possible future regulatory drivers.
- Potentially fails to deliver affordable warmth for tenants leading to financial pressures for tenants, impacting on arrears, let-ability, and complaints.

Residents also feel that electric heating is sometimes more difficult to control or does not provide the type of heating they are used to, or want to have now.

Identifying and delivering the best heating for electrically heated homes is not always easy and there is not always a simple right answer. The answer will depend on the individual site; what the key issues are; and how you choose to define and assess 'value'. Answers may change if you are dealing with flats or houses; the build type; and whether gas is available. The final choice will depend on whether you want to maximise customer savings, improve SAP ratings, minimise capital investment now or deliver the best whole life cost for customers and your organisation.

That is why you should always try to assess each site individually and ask yourself the question 'what do we want to achieve in changing the heating system'?
To help you make the assessment and then deliver the right option for your circumstances we have created the assessment tool. This should be used in conjunction with the guidance below. The Guide outlines the decision making process and the key advantages and disadvantages of the different options.

If the solution is not clear for your site and your issues – then get help. This could be internal or external. This is an area that many people in social housing are now coming to terms with, and not knowing exactly the right answer is inevitable sometimes. With the assessment tool and guidance you should be better equipped and informed to make these decisions.

For each heating option headline information is provided, together with a more comprehensive exploration and explanation of the issues, details and rationale behind these.

BUILDING YOUR APPROACH

Understanding the Standard Assessment Procedure (SAP)

SAP is the official methodology for assessing domestic energy efficiency. SAP is often used for internal targets and for regulations. Full SAP is used for new-build, and the Reduced data Standard Assessment Procedure (RdSAP) is used for existing homes. Full SAP & RdSAP can provide different results – and at times these can be highly significant.

Ideally SAP scores should come directly from assessments of the scheme and not another source such as stock databases or Energy Performance Certificates.

Evaluation methodology and drivers

The right option for a project will obviously depend upon site specific factors and costs. It will also depend upon project drivers and the evaluation methodology.
Typically, in this Guide, we refer to two approaches to evaluating the best option.

- Lowest installation cost to achieve the required SAP
- Lifetime customer saving per lifetime £ spent.

The first of these is used to meet short term pressures on budgets and will make the installation cost a primary consideration. Hence the lowest cost to achieve the required standard will be a typical metric used to choose the heating for a project.

However, assessing value over lifetime cost, as opposed to installation cost, can significantly change the best option. For example, gas systems tend to become more expensive than high heat retention night storage heaters (HHRNSH) over time, because of the impact of the annual maintenance cost and the shorter life of gas boilers.

Similarly ground source heat pumps have a high install cost, but current **Renewable Heat Incentive (RHI)** payments significantly reduce lifetime costs. In this Guide we generally refer to the 'customer £'s saved per £ of landlord lifetime cost'. This metric includes both the long term impact for the customer, as well as the long term cost to the landlord.

Understanding a project's drivers and the evaluation methodology will help in arriving at the right option for the project.

Setting a baseline – key considerations

Setting the baseline allows meaningful comparisons between alternative heating systems and combinations of heating systems. Typically the baseline will be the existing home and heating system.

Include all energy in the baseline
The SAP methodology focuses on energy for space heating, hot water and internal lighting. However, it is also important to include other electricity use such as cooking and appliances because it is part of the tenant's bill. This is particularly important when comparing systems that might use different tariffs, such as Economy7.

The percentage use of high heat retention night storage heaters
It is important to look at the detail of what is in place, and what the site specific application of the options involves. In practice also needs to be considered, not just the SAP score. For example will this 'lead heater' concept work in practice for tenants.

Include insulation work and programmed work if possible
Doing work such as loft insulation or cavity wall insulation (CWI) will make a cost effective improvement to SAP – and help tenants with improved comfort and affordable warmth.

Do this type of work as part of the project and make sure this is part of your evaluation calculations. Ensuring that measures like CWI or loft insulation are done might help to avoid the need for potentially much more challenging, and expensive, measures to achieve SAP targets. Controls such as thermostatic radiater valves (TRV's), programmers, thermostats, etc are also low cost measures that can help to push up SAP scores.

If other improvements are planned that will have an effect on the building's energy performance then try to make sure this is also part of the evaluation, for example window or door replacements.

Setting objectives and assessment criteria

A project's objectives will have a significant effect on what ends up being the best solution for the scheme or programme. The main objectives that this Guide considers are:

- Capital cost and any external funding including the **Renewable Heat Incentive**
- Revenue costs (maintenance)
- Corporate energy targets for SAP (and the cost of achieving them)
- Home energy costs

An option may be selected because it is the cheapest way to meet the minimum target – despite the fact that it does not necessarily provide the best long term value (because of the reality of short term budget pressures). The key point here is to be clear about the criteria and to fully understand the value – so that the right choice can be made from a fully informed position.

For example, photovoltaics can be done in some cases because they can provide a financial return. However, it might also be done to support a fuel poverty objective or as part of a wider improvement plan for tenants.

Getting additional support

The assessment of alternative heating options is not always simple and you may wish to consider getting internal or external expert assistance. This will help to ensure that all relevant aspects of the project are properly considered and that the decision making process is not skewed by hidden factors. This could be done in-house, or at a relatively low cost, especially in comparison with the impacts of making the wrong choice.

Furthermore an expert should be able to make intelligent comment on the foibles of SAP; practical 'real life' variations in the use of energy and technologies in practice; and the latest position on policy, grants and funding.

THE KEY CHOICES FOR YOUR HOMES

This next section will help inform you of the key choices available when dealing with electrically heated homes. It outlines the main types of electric heating, their main advantages and disadvantages and their impacts on your main goals such as capital or revenue costs.

It then outlines the main alternatives to electric heating including gas, heat pumps and the role that solar can play. It compares the alternatives as much as possible with the existing electric heating, so that you can begin to establish what your key choices will be.

These can then be assessed in detail for individual schemes and programs using the evaluation tool.

Electric heating

Example comparisons of different types of electric heating are provided below.
High heat retention (HHR) night storage heaters achieve higher SAP (Standard Assessment Procedure) scores than other storage heaters and 'direct acting' electric heating. These higher SAP scores can help to meet internal targets, and possible future regulatory requirements, and they should typically provide a better option for most tenants than other (on peak) forms of electric resistance heating.

Although HHR night storage heaters will typically have a higher installation cost than other types of electric heating, they will also typically be better value (using metrics such as '£'s spent per SAP point' or 'tenant saving per £ spent'). In some cases it may be possible to achieve a project's aims with a cheaper night storage heater option.

There are issues with HHR night storage heaters and these do need to be part of the thought process for choosing heating options.

• **The SAP rating of different types of electric heating**
Below is an illustrative table looking at the SAP scores and capital costs for various types of electric heating. This is based on a real, relatively modern, 2 bed semi-detached house.

There are many caveats and issues that could be debated around the detail of the number in any given box. However, the table does show the broad picture. Furthermore this broad picture is likely to be reflected for other house types, as well as specific sites too.

• **Typical SAP scores for electric heating**

2 bedroom semi-detached house	SAP	Cost per SAP point gained	Total energy cost.	Tenant annual saving	CAPEX	(Install) cost per (annual) tenant £ saved
Starting point	61		£1,239			
HHR Night Storage Heater	67	£783	£1,109	£103	£4,700	£36,15
Modern NSH	61	No gain	£1,239	£0	£4,400	No saving
Infrared Panel Heaters	41	Lower SAP	£1,798	-£559	£6,180	Cost to tenant
Convection Panels	41	Lower SAP	£1,798	-£559	£3,694	Cost to tenant

Because the HHR night storage heaters provide a significantly better SAP than other modern storage heaters, they can have a significantly higher installation cost and still provide better value when considering £'s spent per SAP point achieved, this would also apply if the evaluation metric used tenant savings.

Electric Heating – home energy bills
Because SAP points are based on costs, it is likely that looking at tenant bills rather than SAP points will broadly generate a similar result. However, at times it is worth understanding the detail behind SAP and the variations in domestic energy use by different households in practice.

Electric heating energy costs
In the example above, though HHR night storage heaters are more expensive than both 'standard' NSH and the panel systems – they provide better value because of the improved SAP score and tenants savings that they achieve.

- **The main problems with electric heating systems**

Storage Heaters - the main problem with storage heaters is that they 'leak' heat. This can mean that if you want heat late in the day you might effectively run out, and then resort to using 'Day Rate' energy – which is even more expensive than Standard Rate. To some extent customers need to guess how much heat they will need in advance.

Modern Storage Heaters - Modern storage heaters are an improvement over older ones because they have significantly better controls. This means they are better at taking the right amount of electricity, and at the latest part of the Economy7 night rate period.

High Heat Retention Night Storage Heater - HHR Night Storage Heaters have the additional benefit of better insulation, which reduces the leaking of heat. This means that more heat can be delivered at the time it is wanted. Reducing the use of on peak boosting. This also improves the potential for using these heaters in bedrooms.

On Peak - If tenants are using a high proportion of the Economy7 night rate tariff, then moving away from this is likely to increase bills.

Convector radiators - can have good controllability, are cheaper to install and are physically smaller, so easier to locate in existing homes with existing tenants. However they have increased running cost and will decrease SAP scores compared with other heating.

- **Infrared panels**

The Guinness Partnership ran some trials of infrared panel heaters. It is believd that this included some of the first installations of the brand in the UK. There have subsequently been many more installations in the sector. There appear to be some positive reports circulating. However there were significant problems in the TGP trial.

There is a legitimate question as to the applicability of 'steady state' heating in a social housing context. To date we have not seen strong data to evidence any savings from infrared panels. In a trial with The Guinness Partnership the infrared panels had issues with controls, had a high capital cost, resulted in lower SAP scores, and higher running costs for homes. TGP removed 3 systems (from a trial of c.22) due to escalating complaints from tenants.

Independent monitored data, in the social housing context, and/or recognition by BRE (for SAP) would help to establish the credentials of this technology for the sector.

- **Mains gas heating**

Typically, a modern gas central heating system will provide a significantly higher SAP rating than a HHR night storage heater system. It will be cheaper for tenants to run. Gas systems are also generally easier for tenants to use and respond quickly to the need for space heating and hot water.

The main issue in this context is the availability of a gas supply. This might be because properties are off the gas network, or because of a desire to keep gas out of a block of flats. Gas connection might still make overall sense even if it is expensive, because of the higher SAP scores and tenant savings that may be achievable.

However, they do have higher landlord revenue costs because of the ongoing maintenance and safety requirements. Gas connection might be free, there are sometimes funds available to pay for gas connection, and at times there is no chance of any gas connection, the position for a site under review needs to be established at that time.

- **Gas SAP assessment**

Below is an illustrative table that compares the SAP scores for HHR night storage heaters and gas central heating (this is based on a real property). The table illustrates the key point, that gas achieves a significantly higher SAP (and tenant saving) than HHR night storage heaters.

- **Typical SAP scores for electric heating**

2 bedroom semi-detached house	SAP	CAPEX	Cost per SAP point	TGP life cost	Lifetime tenant saving	Saving per lifetime £
Starting SAP (modern NSH)	61					
HHR Night Storage Heater	67	£5,000	£833	£6,500	£3,900	£0,60
Gas central heating	71	£5,000	£500	£11,500	£8,220	£0,70

From these numbers, it is clear that gas connection could be expensive, but could still provide value in comparison with HHR Night Storage Heaters.

In our example above, gas and HHR Night Storage Heaters have a similar installation cost. However gas has a higher maintenance cost and a shorter life than electric systems (15 years vs 30 years) according to the numbers typically used for key component accounting.

So, while gas has a much lower capital cost per SAP point gained, it is worth noting that the lifetime cost for landlords is higher for gas than HHR Night Storage Heaters.

- **The main problems with gas heating systems**
  - Annual maintenance of approximately £150 per year.
  - Gas safety and regulatory requirements, with legal and reputational risk
  - Shorter lifespan than electric heating although these will vary in reality, depending on the operational, management and cost accounting approach taken
  - Oversizing of systems - oversizing of boilers, which is very common, can lead to reduced efficiency in practice compared to SAP. This is less of an issue with modern boilers than with older boilers and SAP does now take account of the lower efficiency in warmer months.

Alternative heating options - heat pumps

Using SAP and with the current support of the renewable heat incentive there is a strong case on paper for heat pumps. A heat pump solution could be a better option than gas heating, however we would suggest that the place to consider heat pumps (at least in the first instance) is in off gas situations.

The case for heat pumps against HHR Night Storage Heaters is very strong and heat pumps should be considered where electric heating is being replaced.

However, there are issues that do need to be taken into account. Above all, gaining experience is important before heat pumps should be rolled out on a large scale. This could include the use of pilot projects, effective monitoring and comparison with existing heating systems, as well as tenant engagement and education.

- **Heat pump SAP assessment**

The table below is an example extract from the assessment tool, highlighting the potential for heat pumps.

Comparison between heat pumps, gas, and electric heating SAP scores

2 bedroom semi-detached house	SAP	CAPEX	Cost per SAP point	TGP life cost	Lifetime tenant saving	Saving per lifetime £
Starting SAP (modern NSH)	61					
HHR Night Storage Heater	67	£5,000	£833	£6,500	£3,900	£0,60
Ground Source Heat Pumps	76	£11,000	£733	£12,973	£13,020	£1,00
Air Source Heat Pump	73	£7,500	£625	£12,973	£13,020	£1,00
Gas central heating	71	£5,000	£500	£11,500	£8,220	£0,70

The key points to note from this table are that:

- Ground Source Heat Pumps provide a significantly better SAP score than even gas.
- Air Source Heat Pump is marginally better than gas central heating in SAP.
- Both types of heat pump are significantly better than HHR Night Storage Heater – in terms of the SAP scores that they achieve.
- Air Source Heat Pumps are likely to be more expensive than HHR Night Storage Heaters.
- Ground Source Heat Pumps are likely to be significantly more expensive than HHR Night Storage Heaters.
- Heat pumps will typically be lower maintenance than traditional gas systems, and they have significantly lower regulatory requirements and risk. However, there is not yet a fully mature and established supply chain, so in some cases it may not be as easy to realise the theoretically lower maintenance costs in practice. Annual maintenance checks are still recommended for heat pumps. The life expectancy of a GSHP is likely to be longer than that for a gas boiler (c.20 yrs). The boreholes should have a very long life (perhaps 100yrs), though the fuid in the boreholes should be checked annually, this is a simple pH test. ASHP's have higher maintenance needs, but some of these are relatively simple issues such as fan bearings and the need to keep the air flow free – such as checking that the unit is not blocked by leaves.
- The Renewable Heat Incentive (**RHI**) makes the overall (whole life) cost equation for heat pumps significantly more attractive.
  - In a recent social housing project (Trent & Dove 2015) the full cost of replacing night storage heaters with GSHP was £13,500 per bungalow. They have received £3,000 in ECO for each bungalow, and anticipate receiving a further (index linked) £14,400 per bungalow in non-domestic RHI over the next 20 years.
  - For a typical UK property the RHI payments for an ASHP might be in the region of £600 per annum (for 7 years). Actual payments will of course depend on the property details – as payments are typically 'deemed', based on the required EPC, and including a factor based on the seasonal performance factor (SPF).

The RHI is available for renewable technologies that generate heat. Both the **domestic** RHI and the **non** domestic RHI could be relevant! Details with regards to eligibility and rates are available from the ofgem website. There are a wide range of eligibility criteria and payments rates. The headlines are that the key technologies are ground & air source heat pumps, solar thermal and biomass. RHI is paid in annual payments over 7 or 20 years. In some circumstances RHI can contribute to a position whereby funding is greater than costs.

- **The issues with heat pumps**

There are four main areas to be aware of in relation to heat pumps.

The first of these is the higher installation cost. Where people in social housing have really engaged with heat pumps and looked at their pilot projects in depth, they have typically been able to drive down installation prices, making heat pumps more attractive.

There are practicalities with installation. These include the physical location for a borehole (for Ground Source Heat Pumps) and access to drill that borehole. Typically both Air Source Heat Pumps and Ground Source Heat Pumps are located externally – which requires a location and potentially aesthetic issues. Though it is worth noting that ground source heat pumps designed to be located internally are now available and growing in terms of market penetration. Air Source Heat Pumps can lead to noise complaints, even though these are often dismissed by environmental health when followed up.

As a relatively new technology, it is sometimes the case that heat pump installations have also included other new aspects – such as super intelligent controls and complex arrangements to store and move heat. This has sometimes lead to systems that nobody understands. The only additional element in the system might be a thermal store. Start with the 'keep it simple' principle.

The final key area is the use of low temperature heating. This requires additional tenant information at the least – and preferably some pro-active engagement. Otherwise there will be "my radiator isn't hot" complaints – and there is the potential for these issues to generate doubt which can be hard to turn around later. Typically the more a household is a low level or intermittent user of heating (i.e. under-heating vs SAP) the less likely it is that low temperature heating will work for them. The reality is probably that heat pumps would be preferred by some tenants and HHR night storage heater would be preferred by others.

- **Summary issues with heat pumps**

Issues	Air Source	Ground Source
Site	Will probably require outside space and storage.	Will need space for hole boring (or trenches)
Customer	Noise and vibration reported in some cases. Understanding (& controlling) lower temperature heating.	Understanding (& controlling) lower temperature heating
Install costs	Typically higher than HHRNSH	Typically the highest install costs
Maintenance	Lower requirements than gas but supply chain still developing	Lower requirements than gas but supply chain still developing
Other	Condensate drain	

HEAT PUMP CASE STUDY

Heat pumps are significantly different heating systems compared to both mains gas and electric heating. There have been a number of examples of problems arising from heat pump installations but many of these problems are things that can be avoided.

In the case study there was follow up with around 80 residents where Air Source Heat Pumps had been installed.

The overall results were broadly positive, but there were some problems and significant numbers of tenants who were not 'satisfied' under the terms used.

Key positives
- 78% of tenants said they would recommend Air Source Heat Pumps
- 76% satisfied with warmth now (vs only 23% with previous heating)

Key negatives
- Only 36% said costs were reduced (16% said increased)
- Only 55% said that the Air Source Heat Pump system was affordable

Alternative heating additional options – solar options

Solar, which includes both Photovoltaic (PV) which generates electricity, and solar thermal, which generates hot water, are typically supplementary to the main heating system. However, solar can play a very important role in helping to achieve the key objectives for a site, such as achieving minimum SAP targets, and reduced energy costs for tenants.

There are many ways in which solar might be valuable to a project. At one extreme there will be projects where landlords put photovoltaic panels on roofs as a purely financial investment - but this will still provide a customer benefit.

At times there could be projects where neither gas, Ground Source Heat Pumps or Air Source Heat Pumps are possible or viable and where HHR Night Storage Heaters and solar could be the only practical way to achieve required standards. In simple terms, adding solar (thermal or photovoltaic) to high heat retention storage heaters will provide a SAP benefit and the opportunity for an energy cost reduction for tenants. The interaction between solar and storage heaters – and the benefits in practice for tenants needs careful consideration. Tenant engagement and consideration of the full range of technical options could make a considerable difference to the impact of these combinations in practice. An example of the problems is that a storage heater system will typically heat up the hot water over night. If that hot water is not used in the morning – then there could be no capacity available for solar thermal to provide useful heat, because the hot water tank is already full of hot water.

There will be sites where different roofs, orientation and shading mean that photovoltaics may be possible on some properties, whereas only solar thermal will be possible on others (because solar thermal requires a smaller roof area), and where no solar at all is possible on others. This could raise the possibility of having different spec and possibly even heating on different houses, to achieve desired target.
The impact of solar will vary considerably depending on the heating being used (and potentially its associated tariff), this applies both in SAP and practice. The realities of household energy use can also have an enormous impact on the benefit provided.

It is also important to consider lender consent on solar installations. This is will be because they will be considered to be a structural alteration or there may, in the case of third party financed installations, third party interest in the property. While lender consent is no longer seen as a barrier to installations, it is important to make it part of the assessment process.

Solar SAP assessment

Photovoltaic & Solar Thermal SAP and costs

2 bedroom semi-detached house	SAP	CAPEX	Cost per SAP point	TGP life cost	Lifetime tenant saving	Saving per lifetime £
Starting SAP (modern NSH)	61					
Just add solar thermal	64	£2,500	£833	£4904	£2,040	£0.42
Just add photovoltaic	72	£4,170	£379	£976	£4,170	£3.72
HHR night storage heater (Dimplex Quantum)	67	£5,000	£833	£6,500	£3,900	£0.60
Solar thermal and HHR night storage heater	71	£7,500	£750	£11,404	£5,940	£0.52
Photovoltaics & HHR night storage heater	78	£9,000	£529	£7,476	£8,070	£1.08
Ground source heat pumps	76	£11,000	£733	£12,973	£13,020	£1.00

The first thing to remember about the use of solar is that it is not an imperative (and typically sites will be being reviewed because heating is due to be replaced). Solar may provide great value, but it might not be necessary to get properties above the required standards. The evaluation of solar is sensitive to the assumptions used. The important point to recognise is that solar may often provide a way of achieving required targets, or it may be a part of the most cost effective solution.

Photovoltaics require more space than Solar Thermal, so there will be many examples where photovoltaics are not practical, but where Solar Thermal is.

The main issues with Solar

- Need at least an East or West facing roof
- Closer to South the better
- West better than East as evening sun is more useful
    - Flat roofs can be doable
    - Shading can be a problem
    - Obstructions can reduce the available space
        - Chimneys, valleys, hips, roof-lights, dormer windows etc.
- For Photovoltaics - the larger the area the greater the opportunity for reducing the cost per kWp (i.e. better value).
- Larger roofs can provide an investment proposition.
- Smaller roofs may be used to drive up SAP and help to support affordable warmth for tenants.
- Typically for photovoltaics you need about 8m2 for 1kWp of photovoltaic panels and you would really want to be doing at least 1.5kW usually (i.e. you need 12m2 of available roof). This often is simply not available (or there is shading etc).
- For Solar Thermal a typical system uses a much smaller area than Photovoltaic. This might typically be 3m2. This means that Solar Thermal can often be possible where Photovoltaics are not.

The suggested approach is to first look at heating options, and then think about the use of solar. Bringing solar into the picture might change the preferred heating, but taking this approach should help to simplify the process.

SUMMARY

Part Two of the Electrical Heating Guide has been designed to help you deliver the solutions that are right for your electrically heated homes. This was instigated by The Guinness Partnership in response to issues it was having in its own stock and the sector as a whole.

While it would be much easier if there was one solution to address all issues and sites this simply isn't the case. **But there is a solution for the homes you are looking at.**
Broadly the key things you will need to consider are:

- **Identify what issues you a trying to address –** for example addressing fuel poverty and affordable warmth, energy saving, carbon saving.
- **Establish what objectives you are working to –** for example minimising capital expenditure, revenue costs or meeting a corporate energy target.
- **There are a range of technical options to address these** that will replace existing electrical heating or supplement it in the case of solar.
- **The approach you take will depend on the specific site** and where possible get up to date data on the homes.
- **The solution for your homes will be depend on the issues you are addressing, your objectives and the site specifics and the Assessment tool can help you come to that solution.**

This Guide is supported by Part One and the Assessment Tool both of which are available through the **Adecoe Website.** They give you the detailed information to tackle individual properties, schemes and approach on your portfolio.

GLOSSARY

ASHP	Air source heat pump, uses low grade energy from the air and amplifies this to useable heat for space heating and domestic hot water.
GSHP	Ground source heat pump, uses low grade energy from the ground and amplifies this to useable heat for space heating and domestic hot water.
NSH	Night storage heater, an electric heater that uses cheaper Economy7 'night rate' electricity and stores heat for use later in the day.
HHRNSH	High heat retention night storage heater, a storage heater with insulation and controls so that the heat is retained better and the use of expensive 'day rate' electricity is minimised.
PV	Photovoltaic, panels that use energy from the sun to generate electricity. Solar Thermal, panels that use energy from the sun to generate hot water.
SAP	Standard assessment procedure, the National Calculation Methodology, used to provide comparative energy use for domestic properties.
RdSAP	Reduced data standard assessment procedure, a more simple version of SAP used for existing homes.
RHI	Renewable heat incentive, a government funding initiative that provides annual payments for some heat generating renewable energy technologies.
FiT	Feed in tariff, This provides payments for electricity generating renewable energy technologies.
ECO	Energy company obligation, a set of obligations for energy companies that can provide funding for energy saving measures (primarily insulation – but also a wide range of other measures).

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Inspiring energy in housing

Adecoe Kemp House
152 City Road
London EC1V 2NX

www.adecoe.co.uk