



# Identifying the Fair Share: Billing for District Heating

Research into Social Landlords' Experiences of  
District Heating

## APPENDICES

October 2015

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# CONTENTS

<b>A: LITERATURE REVIEWED .....</b>	<b>2</b>
<b>B: METERING AND BILLING COMPANY INTERVIEW QUESTIONS .....</b>	<b>4</b>
<b>C: SOCIAL LANDLORD SURVEY .....</b>	<b>5</b>
<b>D: SOCIAL LANDLORD INTERVIEW QUESTIONS.....</b>	<b>12</b>
<b>E: RESIDENT SURVEY .....</b>	<b>14</b>
<b>F: RESIDENT INTERVIEW QUESTIONS .....</b>	<b>18</b>
<b>G: BACKGROUND RESULTS FROM SOCIAL LANDLORD SURVEY .....</b>	<b>20</b>
<b>H: BACKGROUND RESULTS FROM THE RESIDENT SURVEY.....</b>	<b>23</b>

## APPENDIX A: LITERATURE REVIEWED

- AECOM (2013) [An Investigation into Heat Meter Measurement Errors Final Report](#)
- Bioregional (2012) [Retrofitting district heating schemes: creating replicable retrofit models in Hackbridge](#)
- BRE (2012) [District Heating – Heat Metering Cost Benefit Analysis](#)
- Consumer Focus Scotland (2012) [21<sup>st</sup> Century heating in rural homes](#)
- DECC (2014) [Implementing the Energy Efficiency Directive as it applies to the metering and billing of heating and cooling](#)
- DECC (2013) [The future of heating – meeting the challenge](#)
- DECC (2013) [Research into barriers to deployment of district heating networks](#)
- DEFRA (2007) [Desk study on heat metering: EC Directive on Energy Use Efficiency and Energy Services](#)
- Energy Saving Trust (2004) [Community heating – Aberdeen City Council case study](#)
- Energy Saving Trust (2011) [Slateford Green and Lasswade Road – A case study on small scale communal heating](#)
- Energy Saving Trust (2013) [Renewable heat in Scotland, 2012](#)
- Euroheat and Power (2011) [Final Report: Good Practice in Metering and Billing](#)
- Heat and the City (2012) [Wynford Survey Preliminary Results](#)
- Heat and the City (2013) [Wynford Survey of Owner-Occupiers Preliminary Results](#)
- Heat and the City (2011) District Heating International and UK Case Study Selection
- Heat and the City (2011) [Key findings – year 1](#)
- Homes and Communities Agency (2011) [District heating good practice: Learning from the Low Carbon Infrastructure Fund](#)
- Independent Heat Customer Protection Scheme steering group (2014) [Independent Heat Customer Protection Scheme](#)
- Morgenstern, P., Lowe, R. and Fong Chiu, L. (2014) [Heat metering: socio-technical challenges in district-heated social housing](#), Building Research and Information
- Sigglesten, S. and Olander, S. (2010) Individual heat metering and charging of multi-dwelling residential housing
- Identifying the Fair Share: Billing for District Heating: Appendices – October 2015

Technische Universität Dresden (2013) Impact of individual metering / billing on consumer behaviour

The Association for Energy Cost Allocation (2013) Needs for individual metering and billing of heat/cool/hot water consumption in Europe

The Scottish Government (2013) [Outline for a draft heat vision](#)

The Scottish Government (2014) [Towards decarbonising heat: maximising the opportunities for Scotland – Draft heat generation policy statement for consultation](#)

The Scottish Government (2011) [2020 Routemap for renewable energy in Scotland](#)

Which? (2015) [Turning up the heat: Getting a fair deal for District Heating users](#)

University of Oxford (2006) [The Effectiveness of Feedback on Energy Consumption](#)

VIBO (2013) Challenges related to metering and billing of individual consumption – views from the housing associations

# APPENDIX B: METERING AND BILLING COMPANY INTERVIEW QUESTIONS

## **Background to organisation**

- About your company:
  - How long has it been running?
  - Where are you located / where do you operate?
  - What services do you provide around metering and billing?

## **Metering**

- Do you provide individual metering?
- How are meter readings collected from your system (e.g. radio, broadband, etc.)?
- How would you describe your equipment compared to other products on the market?
  - Recent developments?
  - Are there many differences between products?
- What are the costs of individual metering?
  - Installation
  - Maintenance / on-going
- Have you experienced problems with meters (e.g. incorrect/missing meter readings, tampering)?
  - How are these overcome
- Are there circumstances in which you have been unable to install individual metering? (e.g. in retrofit due to technical issues)
  - Or circumstances in which meters won't work?

## **Billing**

- What services do you provide in terms of billing social housing district heating schemes?
  - Variation in services?
  - Payment options (e.g. prepayment, monthly billing, direct debit)?
- What are the costs of providing this system? E.g. per flat
- How do you calculate costs of fuel charged to the social landlord or to the tenant?
  - How often would you review charges?
- How do you deal with debt? E.g. emergency credit, payment plans
- How do you keep social landlords in the loop on problems that arise

## **Other**

- What are your experiences of working with social landlords?
  - Challenges / issues
  - Successes – where has it worked well?
  - Recommendations for this sector for new or existing district heating schemes
  - Anything that would make it easier/ cheaper to provide your services?
- Do you have any other comments?

## **Thank you for your time**

## APPENDIX C: SOCIAL LANDLORD SURVEY

These are the questions used in the social landlord survey. Please note that the survey was carried out online and respondents were directed to particular questions based on their answers to previous questions: for example, if they stated they did not have individual meters, they would automatically skip questions related to experiences of meters.

### About your organisation

#### 1. Which organisation do you represent?

#### 2. Are you a:

- Local authority  
 Housing association or housing co-operative  
 Other (please specify)

#### 3. Are you based in:

- England - London  
 England - South (other than London)  
 England - Midlands  
 England - North  
 Northern Ireland  
 Scotland  
 Wales

The remainder of this survey is about your district heating schemes. Within the survey, the term 'district heating' refers to schemes where homes are heated from a central source through a network of pipes carrying hot water - sometimes known as 'heat networks'. It includes 'communal heating' and CHP (combined heat and power) providing homes are heated by the CHP scheme.

#### 4. What were your THREE most important motivations for installing district heating? Tick a max. of three boxes.

- |   |  |
|---|--|
| <input type="checkbox"/> Reduce tenants' fuel bills and/or alleviate fuel poverty | <input type="checkbox"/> Comply with building regulations                                    |
| <input type="checkbox"/> Increase warmth and comfort in tenants' homes            | <input type="checkbox"/> Needed to replace outdated heating systems                          |
| <input type="checkbox"/> Meet housing standards                                   | <input type="checkbox"/> Make opportunity of grant / subsidy for district heating (e.g. RHI) |
| <input type="checkbox"/> Reduce CO2 emissions                                     | <input type="checkbox"/> Electricity generation income (for CHP systems)                     |
| <input type="checkbox"/> Meet a planning requirement                              | <input type="checkbox"/> Don't know  |
| <input type="checkbox"/> Other (please specify)                                   |  |

## About your district heating schemes

5. Please give details of your district heating schemes in the boxes below. We have allowed for details of up to 10 schemes.

If you have several similar schemes which are managed in the same way, please include these as one scheme.

	Status	Total no. of homes connected	Type of buildings included	Type of scheme	Year of commission
Scheme 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scheme 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scheme 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scheme 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scheme 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scheme 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scheme 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scheme 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scheme 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scheme 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Please give further details of your schemes, using the same scheme numbering as above.

	Main fuel	Second fuel	Is it CHP?	Is/are the building(s) connected to mains gas?	What meters does it have (to measure heat energy usage)?
<b>Scheme 1</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scheme 2</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scheme 3</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scheme 4</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scheme 5</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scheme 6</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scheme 7</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scheme 8</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scheme 9</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scheme 10</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Metering

**7. If you HAVE meters installed on individual homes on AT LEAST ONE scheme, why did you decide to install them? Tick all that apply.**

- |   |   |
|---|---|
| <input type="checkbox"/> We needed this information to bill tenants on their actual consumption | <input type="checkbox"/> To comply with RHI regulations   |
| <input type="checkbox"/> To provide feedback to tenants on their energy consumption             | <input type="checkbox"/> To comply with upcoming regulations under the EU Energy Efficiency Directive |
| <input type="checkbox"/> To help monitor and evaluate the scheme                                | <input type="checkbox"/> To overcome problems experienced with previous unmetered schemes             |
| <input type="checkbox"/> To identify any problems with the scheme                               | <input type="checkbox"/> n/a - we do not have individual meters on any of our schemes                 |
| <input type="checkbox"/> It is a new scheme and metering was designed in from the outset        | <input type="checkbox"/> Don't know   |
| <input type="checkbox"/> Other (please specify) <input type="text"/>                            |   |

**8. Why did you chose not to install meters into individual homes? Tick all that apply.**

- |  |   |
|--|---|
| <input type="checkbox"/> We didn't consider it at the time           | <input type="checkbox"/> The meters were too technically difficult to install |
| <input type="checkbox"/> We didn't feel it was necessary             | <input type="checkbox"/> Don't know   |
| <input type="checkbox"/> It was too expensive                        |   |
| <input type="checkbox"/> Other (please specify) <input type="text"/> |   |

## Meters on individual homes

**9. What have you used the data collected from metering individual homes for? Please tick all that apply.**

- |  |   |
|--|---|
| <input type="checkbox"/> To bill tenants directly                                  | <input type="checkbox"/> Inform decisions on operation of the scheme          |
| <input type="checkbox"/> Inform the 'heat with rent' / flat fee charges            | <input type="checkbox"/> Inform development of new district heating schemes   |
| <input type="checkbox"/> Compare actual and predicted energy consumption           | <input type="checkbox"/> We have not used the data but plan to                |
| <input type="checkbox"/> Monitor performance / efficiency of scheme                | <input type="checkbox"/> We have not used the data and have no plans to do so |
| <input type="checkbox"/> Provide feedback to residents on their energy consumption | <input type="checkbox"/> Don't know   |
| <input type="checkbox"/> Compare variation in energy consumption between homes     |   |
| <input type="checkbox"/> Other (please specify) <input type="text"/>               |   |

**10. Have you experienced any of the following issues with metering individual homes? Tick all that apply.**

- |   |   |
|---|---|
| <input type="checkbox"/> Incorrect /inaccurate meter readings                               | <input type="checkbox"/> Incompatibility between meter outputs and third party billing requirements |
| <input type="checkbox"/> Missing readings (i.e. readings of zero)                           | <input type="checkbox"/> Installation / set-up costs of meters have been higher than expected       |
| <input type="checkbox"/> Tenants interfering with the meter or meter readings               | <input type="checkbox"/> On-going costs of meters have been higher than expected                    |
| <input type="checkbox"/> Transmission or software problems                                  | <input type="checkbox"/> No - we have not experienced any of these issues                           |
| <input type="checkbox"/> High administrative costs  | <input type="checkbox"/> Don't know   |
| <input type="checkbox"/> Difficulty accessing meter readings (where not managed internally) |   |
| <input type="checkbox"/> Other (please specify) <input type="text"/>                        |   |

## Billing

**11. Are ANY of your district heating schemes set up on heat with rent/ flat fee charging systems? i.e. tenants pay a set amount for their bill regardless of how much energy they consume in their home**

- Yes  No  Don't know

## Heat with rent / flat fee schemes

**12. Why did you decide to use a heat with rent / flat fee arrangement? Tick all that apply.**

- |  |  |
|--|--|
| <input type="checkbox"/> Simple to administer                              | <input type="checkbox"/> We considered it to be fairer because all tenants pay a similar or the same amount  |
| <input type="checkbox"/> Costs of administration are (relatively) low      | <input type="checkbox"/> We considered it to be fairer because some properties will have higher heat demands (e.g. flats located next to an unoccupied flat) |
| <input type="checkbox"/> Avoid complexities or problems with billing       | <input type="checkbox"/> There were less risks associated with it compared to alternatives   |
| <input type="checkbox"/> Reduced risk of tenants under-heating in homes    | <input type="checkbox"/> Don't know  |
| <input type="checkbox"/> Tenants voted for the scheme to be heat with rent |  |
| <input type="checkbox"/> Other (please specify) <input type="text"/>       |  |

**13. What is your approach to calculating how much tenants are charged in these schemes? Tick more than one if multiple schemes are set up differently.**

- The charge assigned to tenants is designed to cover all or part of the costs of the system (e.g. to cover maintenance and fuel costs)
- The charge assigned to tenants is designed to ensure it is comparable or lower than other fuels (e.g. 10% cheaper than gas central heating)
- A mix between both of the above two approaches
- Don't know
- Other (please specify)

**14. How do you calculate exactly how much each home should pay within heat with rent/flat fee schemes? If you have more than one scheme, tick all that apply.**

- |   |   |
|---|---|
| <input type="checkbox"/> All homes are charged the same amount e.g. £5 a week | <input type="checkbox"/> Homes are charged based on floor size / area of the property |
| <input type="checkbox"/> Homes are charged based on number of occupants       | <input type="checkbox"/> Don't know   |
| <input type="checkbox"/> Homes are charged based on number of bedrooms        |   |
| <input type="checkbox"/> Other (please specify) <input type="text"/>          |   |

**15. Approximately how much do you charge tenants on heat with rent/flat fee schemes? e.g. £10 a week. If it varies within a scheme, please give an approximate range (e.g. £5 - 15 a week). Please indicate where you have different prices for different schemes.**

**16. Thinking about your heat with rent/flat fee scheme(s), have you experienced any of the following challenges? Tick all that apply.**

- |  |  |
|--|--|
| <input type="checkbox"/> Difficulty raising tenants' heat with rent charges (e.g. for political reasons) | <input type="checkbox"/> Income from tenants not matching the costs of the systems |
| <input type="checkbox"/> Tenants are over-heating homes (no incentive to save energy)                    | <input type="checkbox"/> Private owners not signing up                             |
| <input type="checkbox"/> Tenants are concerned that they are paying for others' consumption              | <input type="checkbox"/> No - we have not experienced any problems                 |
| <input type="checkbox"/> Tenants not understanding how the scheme works                                  | <input type="checkbox"/> Don't know  |
| <input type="checkbox"/> Rent/heat with rent charge arrears  |  |
| <input type="checkbox"/> Other (please specify) <input type="text"/>                                     |  |

**Billing based on actual consumption**

**17. Do you have any district heating schemes where tenants are billed on ACTUAL energy consumption in their home from metered data?**

- Yes                       No                       Don't know

**Billing**

**18. Why did you choose to bill tenants for their actual consumption rather than use a heat with rent/flat fee scheme? Tick all that apply.**

- |   |  |
|---|--|
| <input type="checkbox"/> Fairer for tenants that they pay for the amount of energy they use, rather than an average | <input type="checkbox"/> Encourages tenants to save energy     |
| <input type="checkbox"/> Tenants voted for it / like this system  | <input type="checkbox"/> Heat with rent can be too problematic |
| <input type="checkbox"/> Because of upcoming Government regulations on the EU Energy Efficiency Directive           | <input type="checkbox"/> Don't know                            |
| <input type="checkbox"/> Other (please specify) <input type="text"/>  |  |

**19. Which payment methods is/are your schemes set up with? If you have multiple schemes, tick all that apply.**

- |  |  |
|--|--|
| <input type="checkbox"/> Prepayment or pay as you go only            | <input type="checkbox"/> Schemes with a mixture of the above |
| <input type="checkbox"/> Direct debit only                           | <input type="checkbox"/> Don't know                          |
| <input type="checkbox"/> Quarterly/annual billing only               |  |
| <input type="checkbox"/> Other (please specify) <input type="text"/> |  |

**20. Why did you choose this/these payment method(s)?**

- |   |   |
|---|---|
| <input type="checkbox"/> It was the same payment method tenants had with the previous heating system (that district heating replaced) | <input type="checkbox"/> Allows tenants to budget                     |
| <input type="checkbox"/> Tenants voted for it / like this system  | <input type="checkbox"/> It was the only payment system offered to us |
| <input type="checkbox"/> Easy (for the landlord or third party) to administer   | <input type="checkbox"/> Don't know                                   |
| <input type="checkbox"/> Easy for tenants to use  |   |
| <input type="checkbox"/> Other (please specify) <input type="text"/>  |   |

**21. Is online billing available for any of your schemes?**

- Yes
- No - and we currently have no plans to make this available in the future
- No - but we are planning to do so in the future (in at least one scheme)
- Don't know

**Other billing issues**

**27. Are any of your district heating schemes set up on billing arrangements other than those already mentioned in this survey? i.e. schemes that are NOT (1) heat with rent/flat fee, or (2) prepayment, direct debit or quarterly/annual billing based on actual consumption.**

- Yes
- No
- Don't know

If yes, please specify:

**28. Overall, how successful would you say your approach to metering and billing in district heating schemes has been?**

- Very successful
- Successful
- Neither successful or unsuccessful
- Unsuccessful
- Very unsuccessful
- Don't know

**29. Would you do anything differently in future schemes?**

- Yes
- No
- Don't know

If you answered 'yes', what would you do differently?

**30. Assuming you had more suitable homes, would you install another district heating scheme? Please base your answer solely on your experiences of metering, billing and tenant interaction with schemes, rather than any technical issues you may have experienced (e.g. boiler size, quality of fuel, etc.).**

- Yes - definitely
- Yes - probably
- Maybe
- No - probably not
- No - definitely not
- Don't know / unsure

If you answered 'no', why not?

## **Tenant feedback**

**31. Thinking about your most recently installed district heating scheme, what has tenant feedback been like?**

- Mostly negative  
 Mostly positive  
 Mixed
- We have received little or no feedback  
 Don't know

**32. Can you explain your answer further or give any examples of tenant feedback?**

**33. Are you aware of any problems tenants have had with any of your district heating schemes?**

- Yes  No

If 'yes' please specify:

## **Further information**

**34. Thank you very much for completing this survey. If you have any further comments, please write them here.**

# APPENDIX D: SOCIAL LANDLORD INTERVIEW QUESTIONS

## **Background to district heating experience**

- Number of schemes
- Where installed
  - House type
  - Geographical location
- What heating system it replaced (if retrofit)
- Why installed / motivations
- Date of installation
- Who manages the scheme? i.e. you / a third party / combination

## **Billing**

- How do you bill your tenants in district heating schemes i.e. heat with rent / billing on actual consumption?
- What payment methods are available to tenants (e.g. direct debit, prepayment)?
- How do you work out what costs to charge tenants/?
- Has your approach been successful?
  - Why / why not?
- Have you used a third party to manage billing or have you done this in-house?
- Do you think tenants understand how the billing system works?
- If you have heat with rent /flat fee schemes, have you experienced problems with rent arrears / debt?
  - How have these been overcome?

## **Metering**

- Do you have meters set up on your schemes: (a) building-level and/or (b) dwelling-level?
- Were these installed when the scheme was installed or later on?
- What were the costs of these meters?
  - Was this more / less expensive than expected?
- How easy was it to specify the meters you wanted to install?
- Have you experienced any problems with the meters?
  - Have these problems been overcome?

## **EU Directive**

- Are you aware of the EU Directive on Energy Efficiency as it applies to Metering and Billing in district heating schemes? *(NB. full details have not yet been announced but there will be requirements for individual metering and accurate billing, criteria permitting)*
- If YES, what impact do you think it will have on your schemes?
  - Do you foresee challenges?
- If you don't have individual metering already, do you think it's likely you will need to install them and what issues do you foresee with this?

## **Tenant issues with district heating**

- What has tenant feedback been like in terms of?
  - Affordability / using the system / billing method / payment method
- What information did tenants receive about:
  - The district heating system installation
  - Using the system i.e. heating controls
- Was your approach to engaging tenants and providing information successful?

- Would you do anything differently in future schemes?

### **Energy use**

- Do you know if the amount of heat energy used in your schemes is similar to what was predicted?
  - a) overall and b) within each dwelling
  - If KNOWN, do you know why this is?
  - If NOT KNOWN, why do you not have this information? Would extra metering help?

### **Costs of district heating schemes**

- Ensuring that district heating schemes are financially viable is a key consideration for social landlords. Do you think:
  - The costs of your scheme have been higher or lower than expected, in terms of:
    - Installation / maintenance / administrative
  - That overall, your schemes are financially viable for your organisation? i.e. capital and on-going costs are matched by revenue from it.

### **Other issues / challenges**

- Do any of your schemes involve private owners or tenants from other social housing schemes (as well as your own tenants)?
  - If YES, have there been any issues or challenges that arose from this?
- Do you feel your organisation has had sufficient in-house knowledge and expertise to deal with your district heating schemes?
  - Is there any further guidance or support you would find helpful? (*Think about what our report can help them with*)
- Are there any other issues or challenges you've faced which we haven't already discussed?
  - Have these been overcome? How?

### **Overall experiences**

- Overall, how successful would you say your experience with district heating has been?
- What do you feel has worked well?
- Have your project objectives been met?
  - i.e. reducing CO2 emissions / fuel poverty / improving warmth of homes
- Would you install more district heating schemes?
  - Why / why not?
- Would you do anything differently in future schemes? If YES, what?
- Lastly, do you have any further comments?

**Thank you for your time.**

## APPENDIX E: RESIDENT SURVEY

### About you

Thank you for taking the time to fill in this survey. All responses will be treated anonymously and confidentially, and we will not mention your name in any reporting.

The project and this survey are being undertaken by Changeworks - a Scottish environmental charity.

#### 1. Name:

#### 2. Address:

#### 3. Postcode:

#### 4. How old are you?

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Under 20 years old | <input type="checkbox"/> 40-49 years old | <input type="checkbox"/> 70-79 years old |
| <input type="checkbox"/> 20-29 years old    | <input type="checkbox"/> 50-59 years old | <input type="checkbox"/> 80+ years old   |
| <input type="checkbox"/> 30-39 years old    | <input type="checkbox"/> 60-69 years old |  |

#### 5. Are you:

- Male  Female

#### 6. Regarding your home, do you:

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Own it                        | <input type="checkbox"/> Rent it from a private landlord | <input type="checkbox"/> Rent it from a housing association |
| <input type="checkbox"/> Own it under shared ownership | <input type="checkbox"/> Rent it from the Council        |   |
- Other (please specify)

#### 7. How many years have you lived in this property for?

- |   |   |
|---|---|
| <input type="checkbox"/> Less than a year | <input type="checkbox"/> 6-10 years         |
| <input type="checkbox"/> 1-5 years        | <input type="checkbox"/> More than 10 years |

#### 8. How many people live in the property?

- |                            |                            |                                    |
|----------------------------|----------------------------|------------------------------------|
| <input type="checkbox"/> 1 | <input type="checkbox"/> 3 | <input type="checkbox"/> 5 or more |
| <input type="checkbox"/> 2 | <input type="checkbox"/> 4 |                                    |

**9. Roughly, what is your overall household income per year after tax? This should include all income from jobs and any benefits. Please note that we will not share this information with anyone else.**

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Under £10,000     | <input type="checkbox"/> £25,001 - £30,000 | <input type="checkbox"/> I'd rather not say |
| <input type="checkbox"/> £10,000 - £15,000 | <input type="checkbox"/> £30,001 - £35,000 | <input type="checkbox"/> Don't know         |
| <input type="checkbox"/> £15,001 - £20,000 | <input type="checkbox"/> £35,001 - £40,000 |   |
| <input type="checkbox"/> £20,001 - £25,000 | <input type="checkbox"/> More than £40,000 |   |

## Payment Method

**10. Approximately how much do you spend on heating? Please estimate for either week, month OR year. If you spend different amounts in winter and summer for weekly/monthly payments, please state this.**

Per week:

Per month:

Per year:

**11. Do you feel that your heating bills are:**

Very low	Low	Neither	High	Very High	Don't know
<input type="checkbox"/>					

**12. How do you pay for your heating?**

With rent payments (i.e. Heat with rent)

Monthly bills

Quarterly bills (i.e. every 3 months)

Prepayment/key/card meter

Don't know

Other (please specify)

**13. How happy are you with this payment method?**

Very unhappy	Unhappy	Neither	Happy	Very happy	Don't know
<input type="checkbox"/>					

Please explain why:

**14. Is there anything you would change about this payment method?**

Yes  No  Don't know

If you have answered 'yes' please give further details:

## How you use your heating

**15. In a typical week, when is there someone at home?**

	Always	Usually	Sometimes	Rarely or never	Don't know
Weekdays (during the day)	<input type="checkbox"/>				
Weekday evenings	<input type="checkbox"/>				
Weekends (during the day)	<input type="checkbox"/>				
Weekends - in the evening	<input type="checkbox"/>				

**16. During the winter, how often do you have the heating on?**

All of the time (e.g. 24 hours a day)

All the time when someone is in the home

It's on a timer so it comes on for some of the day

Only when I / we feel cold

Never

Don't know

Please explain your answer:

**17. Would you like to have your heating on more?**

Yes  No  Don't know

Please explain why:

**18. Keeping your home warm is:**

Very difficult       Difficult       Neither       Easy       Very easy       Don't know

Please explain why you think this is the case:

**Using your heating system**

**19. How easy is your heating system to use?**

Very difficult       Difficult       Neither       Easy       Very easy       Don't know

Please explain your answer:

**20. What type of advice (if any) have you received about how to use your heating system, including the heating controls? Tick all that apply:**

- Visit from an energy advisor       A brief explanation (e.g. from a housing officer or the installer)       Don't know  
 Leaflet or booklet       I have not received any advice

Other (please specify)

**21. How helpful was this information in helping you to understand your heating system?**

Very unhelpful       Unhelpful       Neither       Helpful       Very helpful       Don't know

Please explain why:

**Types of heating**

**22. Have you previously had another type of heating system, either in this property or a previous one? Tick all that apply.**

- Yes - a different heating system in this property  
 Yes - a different heating system in a previous property  
 No  
 Don't know

If you have answered 'No' or 'Don't know' please skip to Q.25

**23. What was the LAST heating system you had?**

- Electric storage heaters       Gas boiler       Oil/LPG boiler  
 Electric panel heaters       Electric boiler       Don't know

Other (please specify)

**24. Do you prefer your current heating system to your last one?**

Yes

Don't know

No

Please explain why:

**Other comments**

**25. Have you ever experienced any problems with your CURRENT heating system?**

Yes

No

If you have answered 'Yes' please explain what these problems were:

**26. Do you have any other comments about your heating system or heating bills?**

**Thank you**

## APPENDIX F: RESIDENT INTERVIEW QUESTIONS

### Heating system

- 1) What type of heating system do you have?
- 2) How easy do you find it to use?
- 3) How do you control it? (In other words, what controls do you have to use it – such as a thermostat and do you use these?)
  - Do you understand how to use the controls?
- 4) How often do you tend to have it on for in a typical day in the winter?
  - Would you like to use it more?
- 5) What advice did you receive on how to use the system?
  - Would you have liked more information? If so, what?

### Bills / method of payment

- CHECK WHAT TYPE OF BILLING METHOD THE TENANT HAS FROM THE SURVEY & CONFIRM WITH THEM

#### ❖ **IF HEAT WITH RENT:**

- 6) Are you happy paying your heating by heat with rent?
  - Why / why not?
- 7) Do you like paying a fixed amount (e.g. the same every week) rather than an amount that changes based on your consumption?
  - Do you think it is fair?
  - Do you think the amount you pay is reasonable?
  - Does this method help you budget your finances?
- 8) How long have you had this payment method for?
  - Do you prefer it to how you paid for heating before?
  - Do you think you use your heating more or less with this heating system?

#### ❖ **IF BILLS ARE BASED ON VARIABLE RATE:**

- 9) How do you pay for your heating? For example, prepayment, monthly direct debit.
- 10) Do you like this method of payment?
  - Why / why not?
  - What do you like about it? What do you not like about it (if anything)?
  - Do you have any choice of method?

11) Would you prefer a different method of payment? *(NB: asking question for research purposes only)*

- If so, what would you prefer?

12) Do you get a paper bill?

- Do you read it?
- Do you understand it?
- Do you understand how you are charged (i.e. how the bill is made up)?
- Is there anything you find unclear about your bill?
- Would you like to receive further information on the bill?

13) Do you think your charges are reasonable / unreasonable?

14) How long have you paid for your heating by this method?

- How have you previously paid for heating?
- Do you prefer this method or a previous method?

❖ **FOR ALL:**

15) Is there anything you would change about your heating or how you pay for your heating?

16) Overall, how happy would you say you are with (a) your heating and (b) your heating bills?

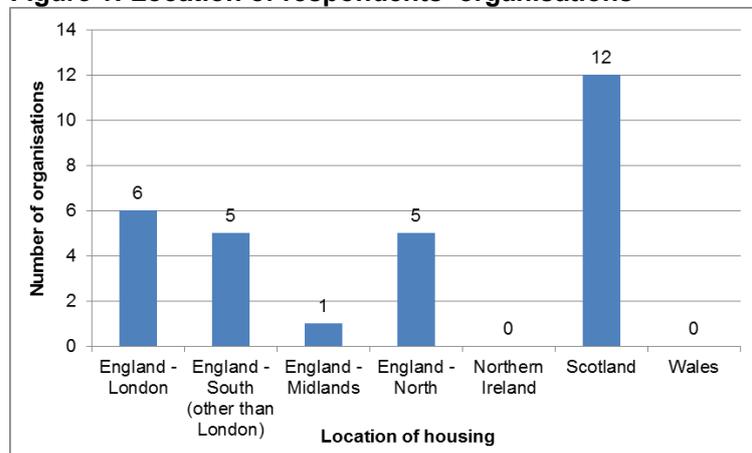
17) Do you have any other comments?

Thank you very much for your time.

## APPENDIX G: BACKGROUND RESULTS FROM SOCIAL LANDLORD SURVEY

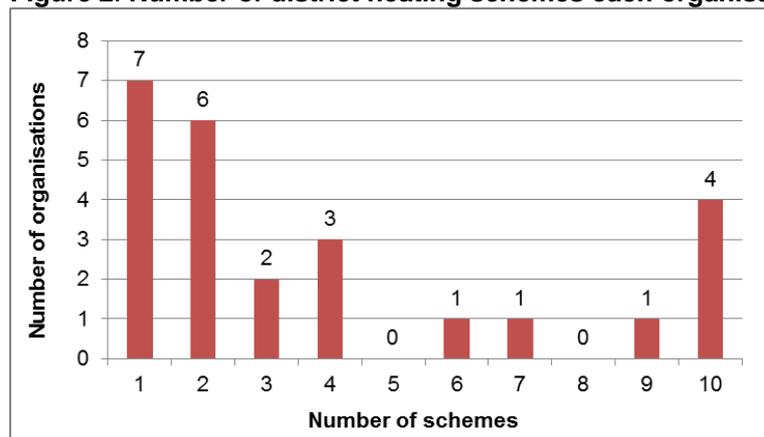
This section provides background results from the social landlord survey in chart form.

**Figure 1: Location of respondents' organisations**



Base = 29

**Figure 2: Number of district heating schemes each organisation has**



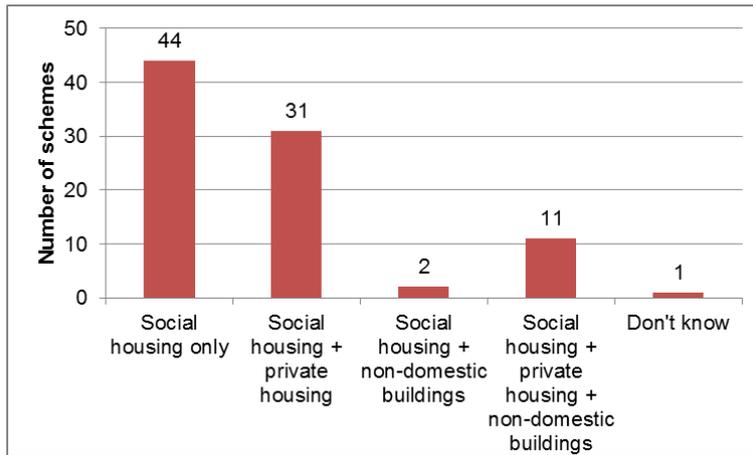
Base = 25

**Figure 3: Number of homes in district heating schemes**



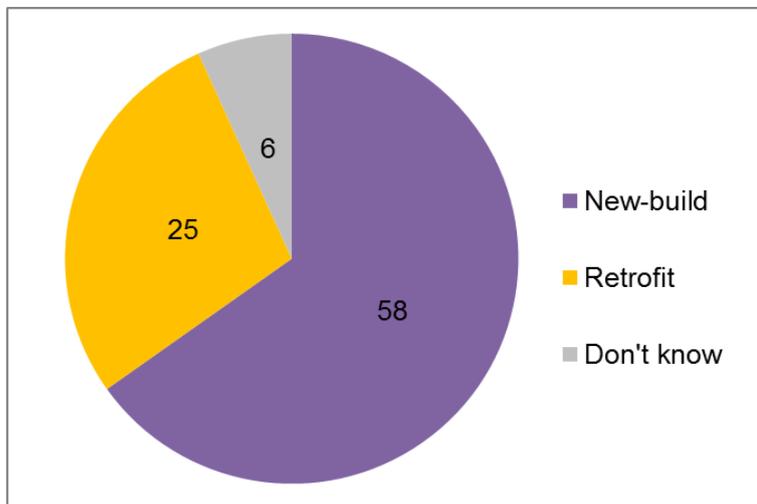
Base = 88

**Figure 4: Type of housing within district heating schemes**



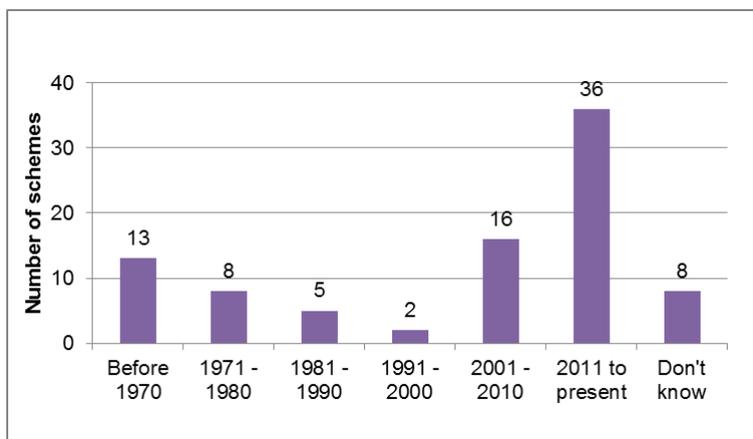
Base = 89

**Figure 5: Number of schemes in new-build vs. retrofit**



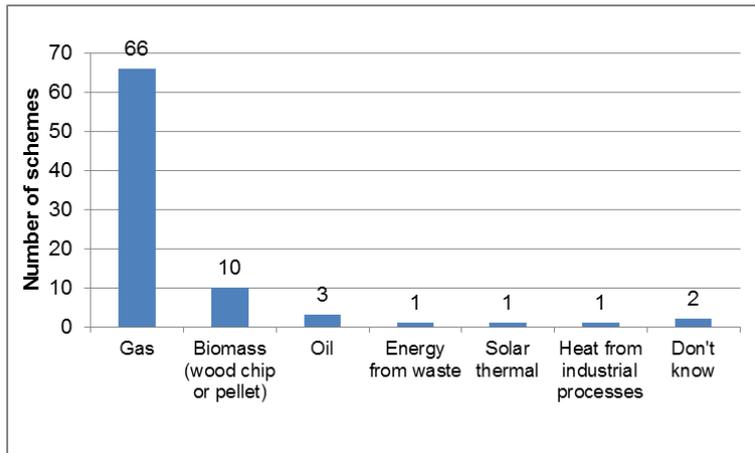
Base = 89

**Figure 6: Date of commission of district heating schemes**



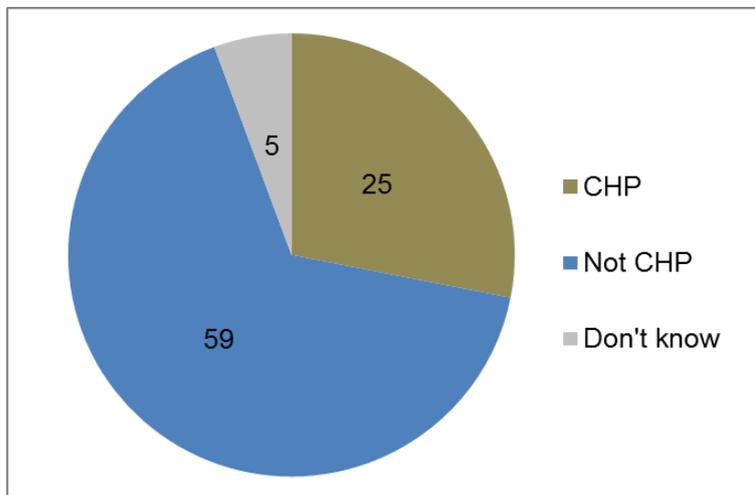
Base = 88

**Figure 7: Main fuel of schemes**



Base = 84

**Figure 8: Number of CHP schemes**

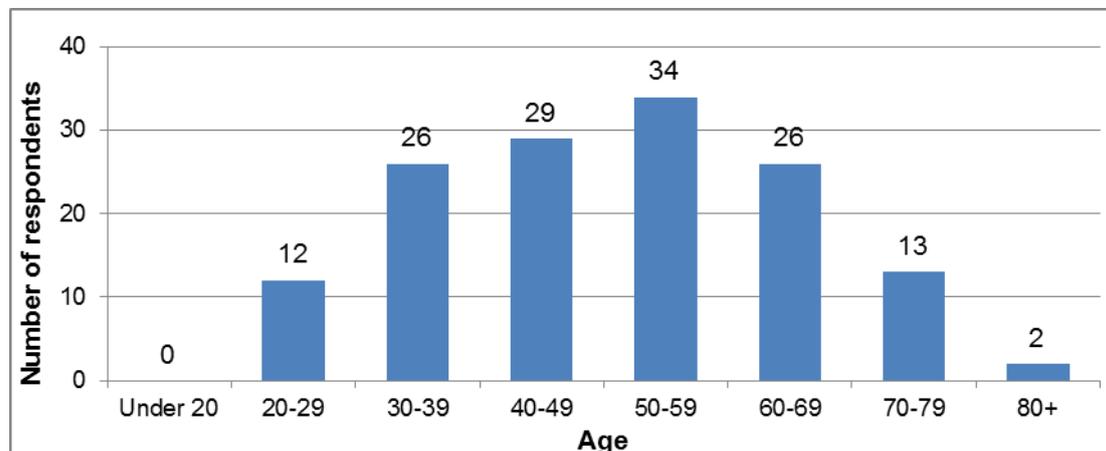


Base = 89

## APPENDIX H: BACKGROUND RESULTS FROM THE RESIDENT SURVEY

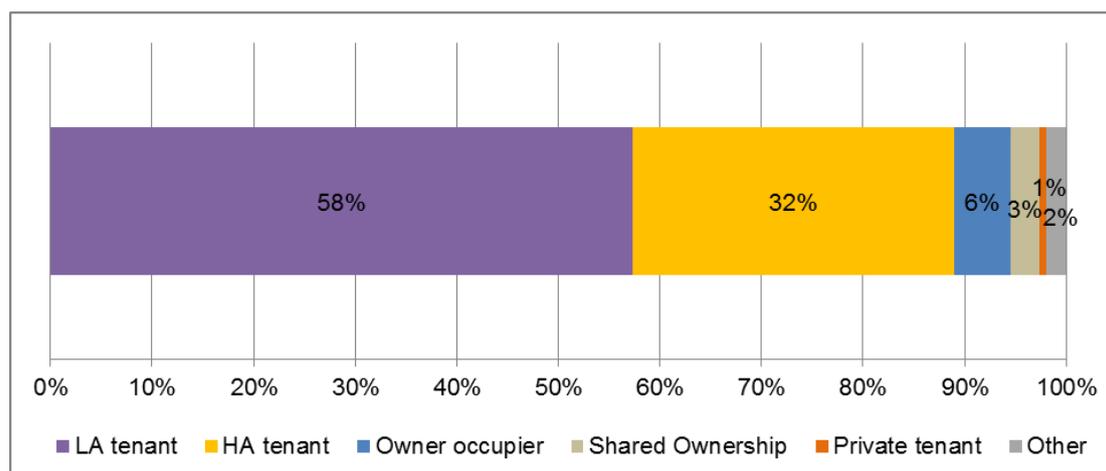
This section provides background results from the resident survey in chart form.

**Figure 9: Age of respondents**



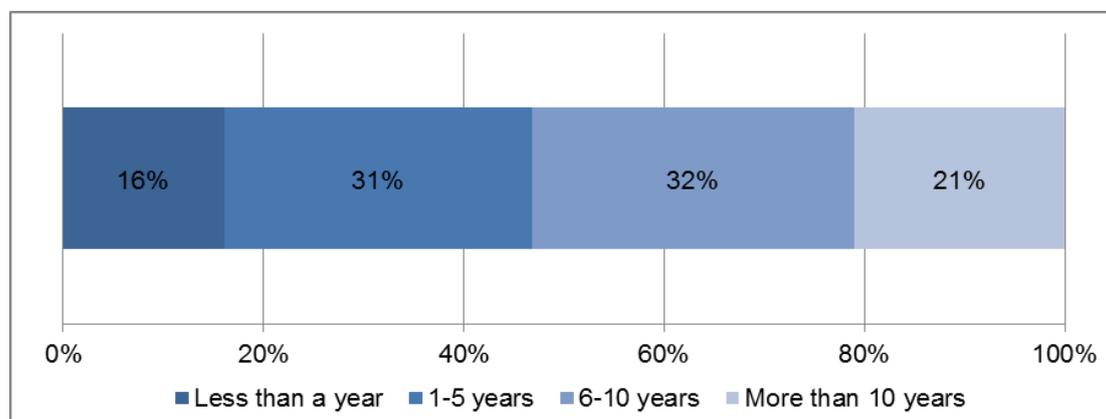
Base= 135

**Figure 10: Tenure of respondents**



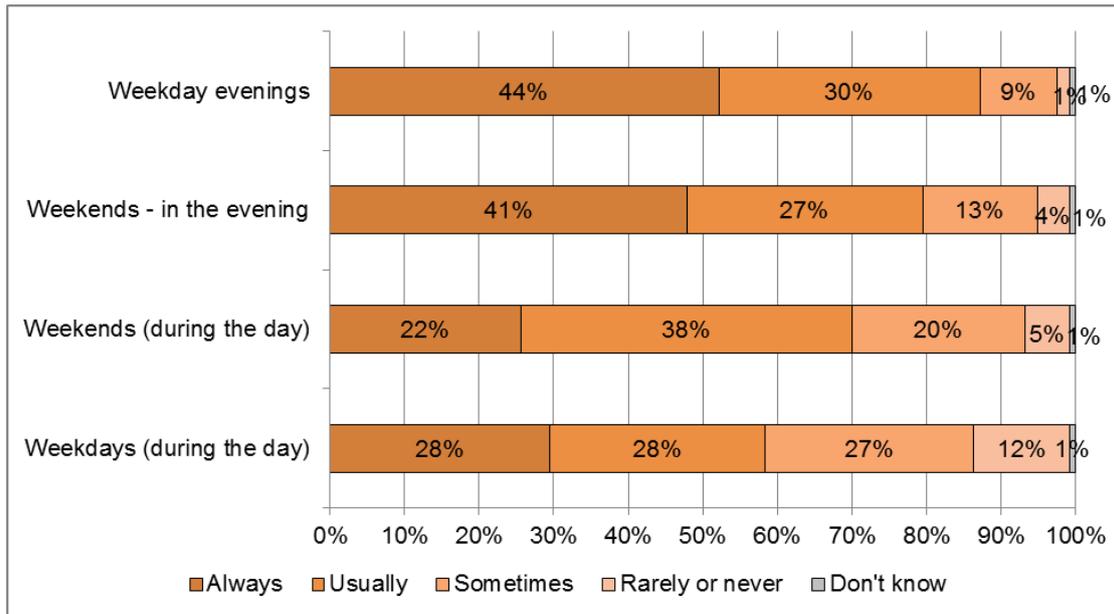
Base= 141

**Figure 11: Duration of occupancy**



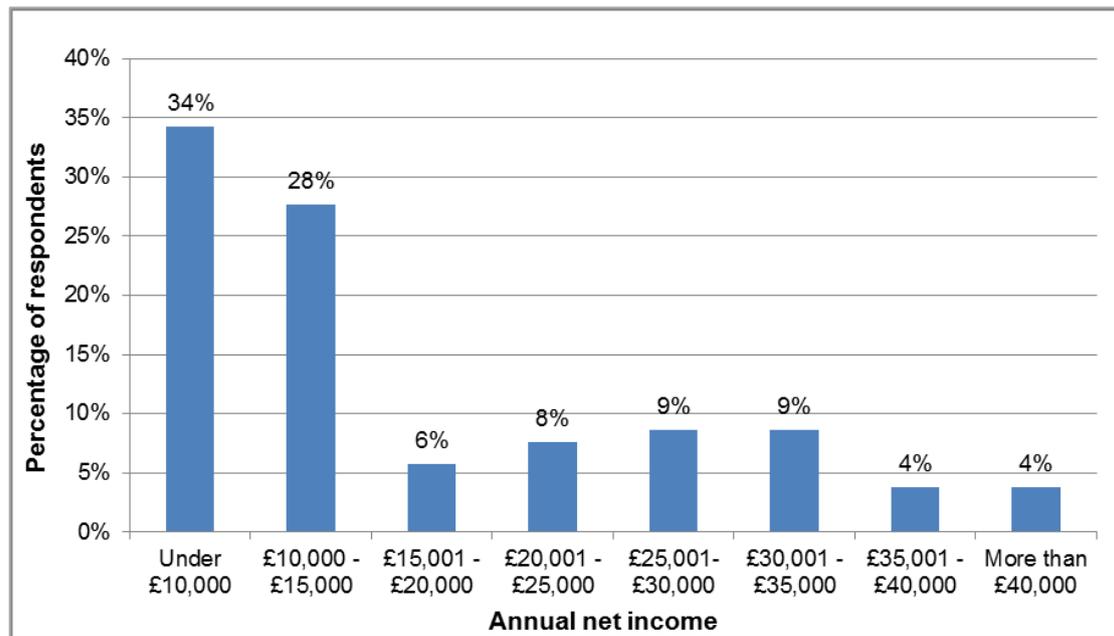
Base= 143

**Figure 12: Occupancy patterns**



Base= 138

**Figure 13: Annual net household income<sup>1</sup>**



Base= 105

<sup>1</sup> Income is after tax and includes benefits