Energy Bill REVOLUTION

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Fact-file: The Cold Man of Europe

How the UK's housing performs against comparable European countries in terms of fuel poverty and energy efficiency, and David Cameron's pledge to be the "most energy efficient country in Europe". A report commissioned by the Energy Bill Revolution and written by Pedro Guertler and Sarah Royston

Summary

Fuel poverty is a major social crisis in the UK. There are over five million households in fuel poverty needing to spend more than 10% of their income on energy in order to keep warm. This number will increase significantly if gas prices rise as the Government expects.

This fact-file compares fuel poverty and energy efficiency in the UK to 15 other European countries with comparable levels of prosperity and heating need. It ranks these countries against six key indicators for which consistent and recent European data are available to assess the energy efficiency of the UK's homes. The UK is ranked lowest for energy (or fuel) poverty out of 13 western European countries and near the bottom of the other league tables on affordability of space heating (14 out of 15), share of household expenditure spent on energy (11 out of 13), homes in poor state of repair (11 out of 15), thermal performance (6 out of 8), and the gap between current thermal performance and what the optimal level of insulation should be in each country (7 out of 8). Overall, no other country of the 16 assessed performs as poorly as the UK across the range of indicators.

Table 1: UK's ranking across six key indicators (number of countries compared varies according to data availability)

Indicator	UK ranking
Affordability of space heating	14/15
Share of household expenditure spent on energy	11/13
Percentage of households in energy poverty	13/13
Homes in poor state of repair	11/15
Thermal performance of walls	6/8
Gap between actual and optimal thermal performance of walls for country	7/8

The UK ranks so low despite the fact that it has amongst the lowest gas and electricity prices in Europe and relatively high household incomes compared to the other countries. And yet it has the highest rate of fuel poverty and amongst the highest rate of excess winter deaths. In this context, the poor energy efficiency of our housing stock emerges as the main cause of these problems. David Cameron recently pledged that he wanted the UK to become "the most energy efficient country in Europe". This ambition is all the more laudable and appropriate because this fact-file finds that presently, the UK can only be characterised as the 'cold man of Europe'.

The Energy Bill Revolution is calling for the carbon tax every household pays via their bills to be used to make UK homes highly energy efficient, prioritising the homes of the fuel poor. There is enough carbon tax revenue to fulfil the Prime Minister's ambition. It is enough to end fuel poverty and significantly reduce carbon emissions. It is also one of the best ways to generate growth and jobs in the UK economy.

1 Introduction

On February 4 of this year, David Cameron gave a speech at the launch of DECC's Energy Efficiency Mission at the Royal Society. In it, he pledged to make Britain "the most energy efficient country in Europe"[1]. Using this pledge as a locus, this briefing focuses on the position of the UK's housing stock in comparison to other European countries. In 2011 the housing stock was the cause of 30 per cent of our CO_2 emissions[2], and 26 per cent of final energy consumption[3]. UK housing has often been described as amongst the least efficient in Europe[4]. At the same time, fuel poverty remains a serious and growing problem – 5.3 million households are in fuel poverty today; a 25% increase in the average gas and electricity bill would double the number of children in fuel poverty to 3.2 million[5], whilst there are projected to be eight million households in fuel poverty by 2016[6] – the deadline for eradicating fuel poverty.

Against the backdrop of the Prime Minister's pledge – and the 2013 Budget – this briefing posits that the UK and the Coalition Government have before them an impressive array of opportunities with respect to improving the energy efficiency of the housing stock:

- **Political opportunity**: The UK's housing stock has a huge amount of ground to make up relative to the energy efficiency of other sectors of the economy[7]. Raising the energy efficiency of the housing stock offers the best way to bring down energy bills for households.
- **Social opportunity**: Making homes highly energy efficient is by far the best solution to end fuel poverty.
- **Environmental opportunity**: Reducing CO_2 emissions from housing is imperative to meet the UK's Carbon Budgets; using aggressive and ambitious energy efficiency improvement as the core means of achieving this brings additional benefits in terms of energy security and reduced energy imports.
- **Economic opportunity**: Recent research by Cambridge Econometrics shows that government investment in improving the energy efficiency of housing for fuel poor households brings the greatest

[1] (Cameron 2013)
[2] (DECC 2013)
[3] (DECC 2012a)
[4] For example: (Boardman et al. 2005); (Parliamentary Office of Science and Technology 2005); (Cities Action for Sustainable Housing 2010); (DECC 2011); (UKGBC 2012)
[5] An increase considered by Ofgem to be likely this year; see (Guertler and Royston 2013).
[6] (Hills 2012); this figure is based on central price projections, and includes policy impacts.
[7] This means it has a huge contribution yet to make in meeting David Cameron's ambition. See Appendix I.

benefit to the economy when compared to other options for fiscal stimulus including: general capital spending; increased current spending; a reduction in VAT; and a reduction in fuel duty[8].

These political, social, environmental and economic opportunities can be realised because the revenues exist to finance them. Proceeds from the auctioning of EU Emissions Trading Scheme CO_2 permits and the Carbon Price Floor – for which we all pay via our electricity bills – will average £4 billion over the next 15 years. Germany, France, the Czech Republic and others are re-investing EU ETS proceeds into climate mitigation and energy efficiency, and the European Commission is formally requesting that all Member States do so. The UK is set to financially *compensate* energy intensive industries for the cost the EU ETS and the Carbon Price Floor imposes on their business. A much larger and more meaningful *investment* opportunity awaits.

2 Methodology

2.1 Rationale for choice of countries to compare

The rationale in this briefing is to compare the UK with countries in Europe that are both fairly prosperous, and have 'full' heating seasons (in other words, that usually need to heat their homes throughout the winter). The purpose of this is to avoid including countries that are either significantly less prosperous than the UK, or have warm climates, or both.

The basis for the selection of 'prosperous' European countries is the 2012 Legatum Prosperity Index[9], selecting European countries that rank as having 'high prosperity' according to the index. The basis for choosing countries with 'full' heating seasons is to use the average annual heating degree days for each country as collated by Eurostat[10]. Appropriate thresholds for heating degree days – to characterise different climate zones according to heating need – have been developed by the International Energy Agency in support of the G8 Gleneagles Plan of Action for Climate Change[11]. These thresholds are presented in Table 2. The 'cold', 'heating based' and 'combined'[12] climates each share the same threshold for heating degree days of more than or equal to 2,000 HDDs, so this was used.

Table 2: Heating and cooling degree day thresholds used by IEA to characterise different climatic zones for buildings

	Heating degree day (HDD) threshold	Cooling degree day (CDD) threshold
Cold climate	HDD ≥ 2000	CDD < 500
Heating based	HDD ≥ 2000	500 ≤ CDD < 1000
Combined climate	HDD ≥ 2000	CDD ≥ 1000
Moderate climate	HDD < 2000	CDD < 1000
Cooling based	1000 ≤ HDD < 2000	CDD ≥ 1000
Hot climate	HDD < 1000	CDD ≥ 1000

[8] (Cambridge Econometrics and Verco 2012)

[9] (Legatum Institute 2012); The Index comprises a global assessment of national prosperity based on both wealth and wellbeing. The ranking is based on data encompassing eight indicators: economy, entrepreneurship and opportunity, governance, education, health, safety and security, personal freedom, and social capital.

[10] Heating degree days (HDDs) are a measure of the need for space heating. The data and thresholds used in Table 2 and Table 3 are based on an expectation of an internal temperature of 18°C. Heating is assumed to be required when the average daily external temperature is more than 3°C colder than this (i.e. colder than 15°C). For example, if the average external temperature on January 1 was 4°C, then January 1 had 11 HDDs. These are added up over the course of a year to provide annual HDDs. For this briefing, we have used the average annual HDDs from 1980 to 2009 – the years for which Eurostat has data available. For the UK, for example, the average annual HDDs over this period was 3,115. In contrast, Sweden has average annual HDDs of 5,444 over the same period.

[11] (Laustsen 2008)

[12] So-called because it has both significant heating and cooling needs to maintain indoor comfort.

Table 3 shows the 16 European countries which meet the two criteria. The remaining 16 countries meet either none or only one of the criteria, and have therefore been excluded from this comparison[13].

Table 3: Selection of countries by prosperity and heating criteria

	2012 Legatum Prosperity Index 'High' ranking	HDD >= 2000 (Eurostat)	Country included in comparison
Austria	✓	✓	✓
Belgium	✓	✓	✓
Czech Republic	✓	✓	✓
Denmark	✓	✓	✓
Finland	✓	✓	✓
France	✓	✓	✓
Germany	✓	✓	✓
Iceland	✓	✓	✓
Ireland	✓	✓	✓
Luxembourg	✓	✓	✓
Netherlands	✓	✓	✓
Norway	✓	✓	✓
Slovenia	✓	✓	✓
Sweden	✓	✓	✓
Switzerland	✓	✓	✓
UK	✓	✓	✓

2.2 Choice of data to compare

The selection of data for comparison in this briefing is based on two principles. First, the data need to relate to the heating of the housing stock. Second, the data need to have been collected and compiled authoritatively, and on a consistent basis for each country. These principles yield three sources and corresponding data, described below:

- Eurostat, the European Commission's statistics agency:
  - The annually conducted Statistics on Income and Living Conditions (SILC) survey – this includes two questions which relate to the heating and quality of housing, the answers to which have been used in existing academic studies examining the prevalence of fuel poverty across Europe, conducted at the Universities of Manchester and York.
  - Eurostat data on incomes and domestic retail gas and electricity prices.
  - Data from Eurostat's Housing Budget Survey, used by the Commission to estimate and compare 'energy poverty' across the EU.
- The Buildings Performance Institute Europe's Data Hub for the Energy Performance of Buildings:
  - This provides data about the housing stock, including total floor area, number of dwellings and wall U values.
- The ODYSSEE database, funded by the European Commission's Intelligent Energy programme to monitor energy efficiency trends in Europe:
  - In particular, data on energy consumption for space heating in the residential sector.

In the next section, data from the above sources are presented and compared for each country.

[13] The 32 European countries assessed comprise the EU27, plus Croatia, Iceland, Norway, Switzerland and Turkey.

3 Results

3.1 Affordability of heating and energy poverty

A vitally important issue is whether people can afford to heat their homes adequately. The aforementioned SILC survey asked households whether they could afford to adequately heat their home. For the countries compared in this briefing, only Belgium has a higher proportion than the UK of households who say they are unable to afford adequate heating. Table 4 shows that 6.5% of UK households say they cannot afford to keep their home warm.

Table 4: Proportion of population who say they are unable to afford to adequately heat their home, 2011[14]

Country	Proportion who say they cannot afford adequate heat (%)	Rank
Luxembourg	0.9	1
Norway	1.2	2
Sweden	1.6	3
Netherlands	1.6	4
Finland	1.8	5
Iceland	2.0	6
Austria	2.6	8
Denmark	2.6	7
Germany	5.2	9
Switzerland	5.3	10
Slovenia	5.4	11
France	6.0	12
Czech Republic	6.4	13
UK	6.5	14
Belgium	7.1	15

It is important to note that 'adequately' warm is a subjective measure of an expectation of comfort which undoubtedly varies from country to country. People may also have different understandings of what it means to "afford" their heating. It is also important not to view the data in Table 2 as equivalent to fuel poverty. This is defined in the UK as having to spend more than 10% of your income to provide adequate heating, lighting and cooking. So a household that is defined as fuel poor would not *necessarily* say they could not afford adequate heating. Conversely, a household that says it cannot afford its heating may not *technically* be fuel poor. In the UK, approximately one in five households are defined as fuel poor, so while 6.5% say they are *unable* to adequately heat their homes, many more are likely to be struggling to keep warm, or at risk of energy debt or cuts in other areas of household spending. The table is however a good indicator of where the UK stands next to other western European countries.

On fuel poverty (or 'energy poverty' as it is referred to in European policy circles) the European Commission developed an estimate of its incidence in the European Union, in a working paper on 'An Energy Policy for Consumers' in late 2010[15]. The results are presented in Figure 1.

[14] (Eurostat 2013); no data on Ireland for 2011.
[15] (EC 2010)

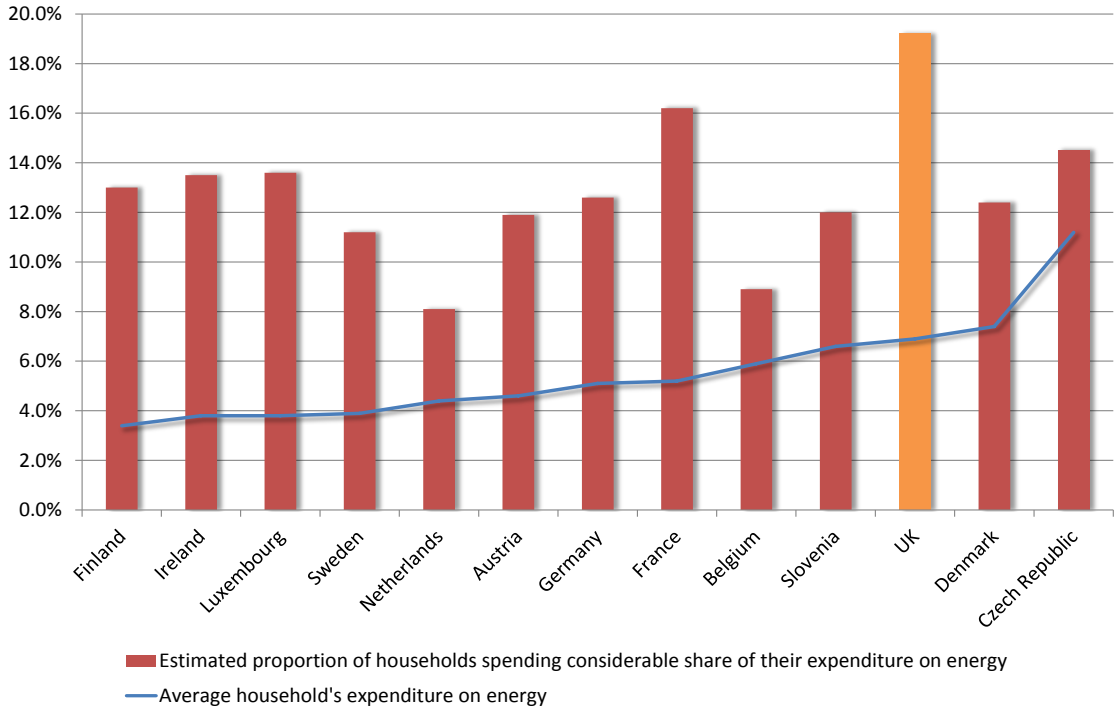


Figure 1: European Commission estimate of Energy Poverty

The data available are for all 27 Member States, although Figure 1 only presents data for the countries compared here. Not being Member States, equivalent data for Iceland and Norway are not available. The countries in Figure 1 are ranked, from left to right, according to the share households' energy expenditure constitutes of their total expenditure (the blue line). On this basis, only Danish and Czech households spend proportionately more of their income on energy than the UK households do.

To provide an estimate of the number of households in 'energy poverty', the Commission assessed how many households in each country were spending more than twice the national average share of their expenditure on energy. On this basis the UK has the highest incidence of 'energy poverty' amongst the countries compared here – 19.2%, as indicated by the orange bar[16].

3.2 Energy prices, incomes and state of the housing stock

3.2.1 Energy prices and incomes

It might be assumed that UK residents are struggling to keep warm because of high energy prices. Whilst it is true that retail gas and electricity prices have seen significant increases in the last few years, the UK has relatively low energy prices compared to other European countries. DECC's most recent Quarterly Energy Prices update[17] states that in 2011, average UK domestic electricity prices, including taxes, were the third lowest in the EU15[18]. Average UK domestic gas prices, including taxes where not refunded, were the second lowest in the EU15. According to Eurostat data for 2011[19] for the countries included in this briefing's comparison, the UK had the fourth lowest electricity price and the lowest gas price.

[16] In fact, out of all 27 Member States, the UK ranks 26th according to this measure. Only Estonia had a higher incidence of 'energy poverty' at 19.7%.
[17] (DECC 2012b)
[18] Including the UK, 11 out of the 16 countries compared in this briefing are also part of the EU15 group.
[19] Eurostat data reports domestic prices across three consumption bands for gas, and five bands for electricity. The first consumption band usually has the lowest price per kWh, with unit prices falling the more is consumed. We have chosen the middle consumption band for gas and

For incomes, we examined 2011 'real adjusted gross disposable income of households per capita' from Eurostat. At €21,900, the UK ranks 7th out of the 13 countries for which data are available, and is within €1,000 in each direction of the Finland and the Netherlands (which have marginally less income), and Sweden and Belgium (which have marginally more).

This makes the data presented here so far all the more significant – UK residents struggle more than all the other countries (apart from Belgium) in this comparison to afford their heating bills, and have the highest incidence of 'energy poverty', despite facing amongst the lowest energy prices and having middling incomes. This is not to say that income is not a factor here – calculating disposable income after housing costs could mean the UK's position on income is lower, but data on income after housing costs were not available. It is nonetheless worth noting that Sweden – with household disposable income that is the closest to the UK's but gas prices that are the highest (amongst the countries for which Eurostat data were available) – scores a lot better than the UK on heating affordability, average share of expenditure spent on energy, and the incidence of 'energy poverty' – all the while in a country that is colder for longer.

3.2.2 State of the housing stock

To find out why the UK performs poorly in terms of heating affordability and 'energy poverty', we need to consider the state of the buildings people live in. With the available data, there are two main ways this can be measured. First, we can examine the number of households living in a dwelling with a 'leaking roof, damp walls, floors or foundation, or rot in the window frames or floor' from the answers provided by households to the SILC survey. These sub-standard homes may be hard to keep warm, and can present a health risk to occupants[20]. Table 5 shows the UK's ranking with regard to these problems. Scandinavian countries have around half the UK's proportion of leaky dwellings, or less.

Table 5: Proportion of population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor, 2011[21]

Country	Proportion in leaky home (%)	Rank
Finland	5.7	1
Norway	7.6	2
Sweden	8.4	3
Switzerland	10.6	4
France	10.9	5
Czech Republic	11.9	6
Austria	13.6	7
Germany	13.7	8
Netherlands	14.6	9
Luxembourg	15.5	10
UK	15.9	11
Denmark	16.0	12
Iceland	16.0	13
Belgium	21.2	14
Slovenia	34.7	15

for electricity – UK mean and median consumption for different property sizes fall within these bands (DECC 2012a). Furthermore, Eurostat reports prices twice annually; we have taken the average of the two prices reported for each country in 2011. For gas prices, data were not available for Finland, Iceland, Norway and Switzerland. For electricity prices, data were unavailable for Iceland and Switzerland.

[20] It is common practice in the UK to consider issues such as mould, condensation and damp as indicators of possible fuel poverty. See Appendix II for examples of referral forms used by delivery agencies.

[21] (Eurostat 2013); no data on Ireland.

A second indicator of housing quality is the U value of walls. A U value is a measure of how much heat is lost through a building's fabric. Table 6 shows countries' average wall U values[22] in single family dwellings, with low values representing less heat loss through the walls. To reflect the fact that each country's climate is different (with colder climates necessitating lower U values), Table 6 also includes the 'optimal' wall U value for new and existing buildings in each country. Each optimum was calculated to reflect the most cost-efficient standard for buildings in each country to make their contribution to the EU's 2050 climate goals[23]. The countries in Table 6 are ranked by the size of the discrepancy between the average and optimal U values. For the eight countries for which data were available, the UK ranks second to last, with existing wall U values and discrepancy similar to Slovenia's. Sweden is by a long way the country closest to achieving its optimal U value.

Table 6: Average U value of walls in single family dwellings

Country	Average U value of walls (W/m^2K)	Optimal U value	Discrepancy	Rank
Sweden	0.35	0.17	0.18	1
Denmark	0.57	0.19	0.38	2
Czech Republic	0.86	0.22	0.64	3
Austria	1.04	0.20	0.84	4
Netherlands	1.10	0.21	0.89	5
Slovenia	1.21	0.27	0.94	6
UK	1.16	0.21	0.95	7
France	1.66	0.25	1.41	8

Together, these data suggest that the UK's buildings perform badly in terms of energy efficiency. This is a key reason why so many UK people cannot afford their heating, and are at risk of cold homes, fuel poverty, and impacts on their health and wellbeing.

4 Conclusions

Overall, the UK performs poorly in comparison to the other countries in terms of fuel poverty and energy efficiency, as shown in Table 7.

Table 7: UK's ranking across six key indicators

Indicator	UK ranking
Affordability of space heating	14/15
Share of household expenditure spent on energy	11/13
Percentage of households in energy poverty	13/13
Homes in poor state of repair	11/15
Actual wall U value / efficacy of wall insulation	6/8
Discrepancy between actual and optimal wall U value	7/8

None of the countries compared in this briefing performs as consistently poorly as the UK. The level of energy poverty is all the more worrying considering the fact that the UK's domestic gas and electricity prices are amongst the very lowest in Europe, and that average household income ranks alongside Sweden's. To a considerable extent, this is explained by the relative inefficiency and poor state of repair of the housing stock.

[22] The average U values are derived from the Building Performance Institute Europe's Data Hub for the Energy Performance of Buildings (BPIE 2013). This contains data on the average U value of walls for single family dwellings built in different periods. This has been combined with data on the amount of floor-space in dwellings built in each period to calculate a weighted average U value for each country's single family dwelling stock. A graphical representation is provided in Appendix III.

[23] See (ECOFYS 2007a) and (ECOFYS 2007b).

Figure 2 synthesises these findings to show how the performance of different countries across different indicators combine to reveal a bigger picture.

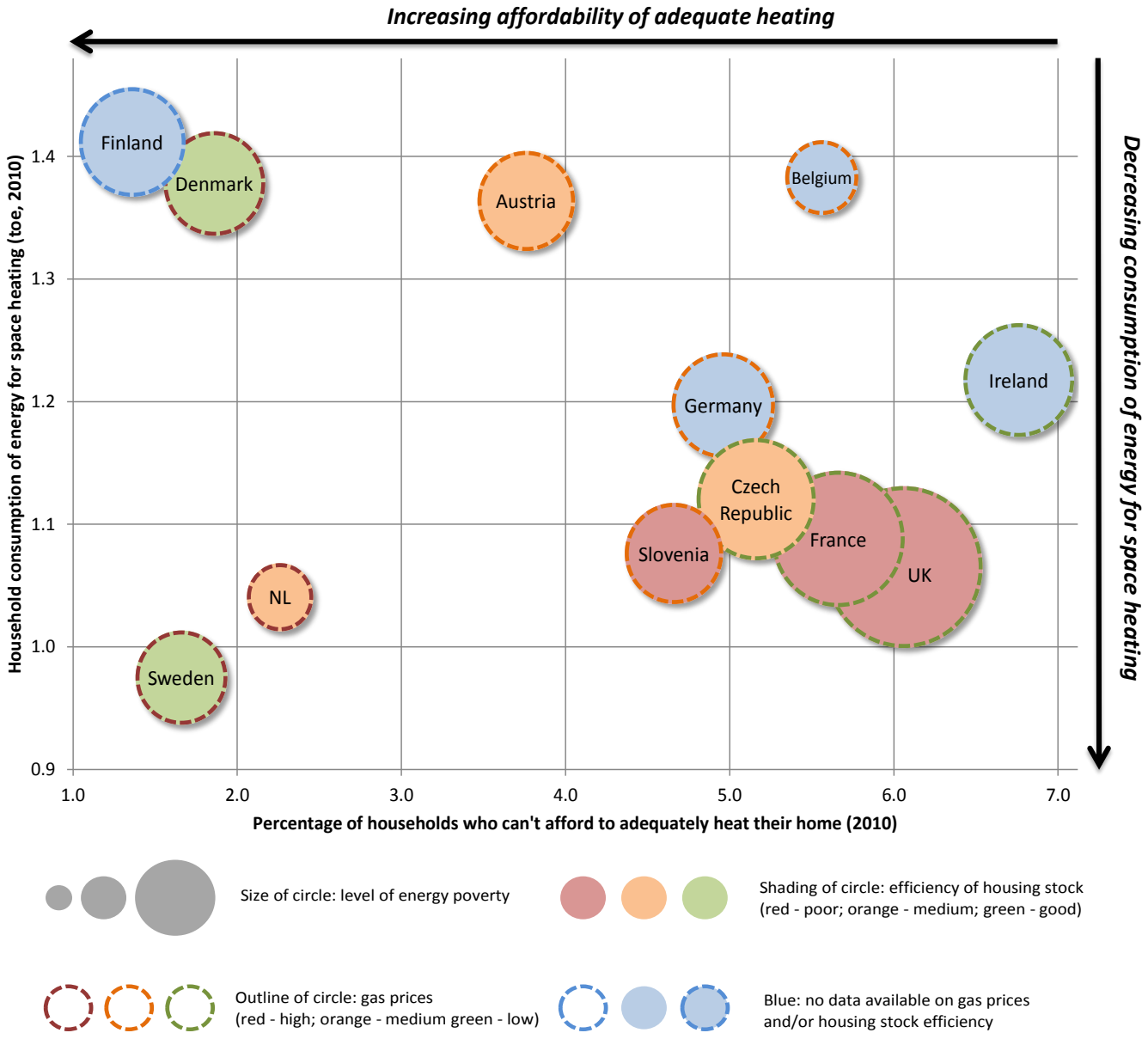


Figure 2: Bringing it all together (NL is the Netherlands)

What is striking about Figure 2 is how the countries with the highest gas prices – Sweden, Denmark and the Netherlands (circles with red outline) – have the highest levels of space heating affordability according to the SILC survey. At the same time, Denmark and Sweden have the most efficient housing stock, whilst Sweden and the Netherlands have amongst the lowest levels of energy poverty. The case of Sweden in particular suggests that energy efficient buildings can enable people to live in warm homes – even while facing high prices.

Conversely, the UK, France and the Czech Republic are the three worst-ranking countries in terms of energy poverty despite enjoying the lowest gas prices. It is no coincidence that France and the UK have the least efficient housing stocks amongst the countries compared. (The Czech Republic's housing is more efficient, which suggests that household income (which is by far the lowest for the countries compared) could be the main driver of energy poverty there.) It may also be no coincidence that these countries have the lowest gas

prices. Given the poor efficiency (UK, France) and/or low incomes (Czech Republic, Ireland), it may be politically expedient to ensure prices are relatively low through certain means – such as reduced rates of VAT on domestic energy in the UK and France.

The amount of heat consumed by each household for space heating[24] is lowest in Sweden. (The reason this is lowest despite Sweden being one of the coldest countries is because the data on heat consumption have been normalised to take account of differences in climate – to make heat consumption comparable between countries on a like-for-like basis.) Sweden's position here also appears to confirm the beneficial effects of a highly efficient housing stock; Swedes are in a position to keep warm without consuming large amounts of energy.

Conversely, the relatively low consumption of heat in the UK – in the context of its relatively low gas prices compared to other countries, low affordability, poor state of housing repair, poor energy efficiency and high energy poverty – strongly suggests that households here run a high risk of living in a cold home, relative to other Europeans. The adverse effects of cold homes on health and wellbeing are now fairly well understood, and these findings may also help explain the UK's historically and comparatively high rates of excess winter deaths[25]. In the last European survey undertaken in 1997 the UK ranked 9 out of 10 in amongst the countries compared here for excess winter deaths.

These findings confirm that the political, social, environmental and economic opportunities available in making our housing stock one of the most efficient in Europe are very real. France, who emerge in a similar position to the UK in this briefing, realised this when its government decided, in September last year, to recycle its carbon revenues from the EU Emissions Trading Scheme auctioning of emissions permits back into retrofitting its housing stock[26]. As research for the Energy Bill Revolution makes very clear[27], this choice is available to decision-makers in the UK as well. Recycling carbon revenues would provide a very powerful means of removing energy inefficiency as a cause of fuel poverty, create the types of jobs and economic benefits the UK presently needs, reduce carbon emissions and go a long way to meeting David Cameron's ambitious energy efficiency pledge.

[24] The latest available comparative data for this is for 2010 (Odyssee 2013). (See Appendix IV for tables of heat consumption data per dwelling and per m^2 of floor area in 2010.) This is why heat consumption per dwelling in Figure 2 is compared to affordability data from the SILC survey from 2010 (rather than the latest SILC survey data for 2011 used in Table 4). The 2010 affordability results are similar to 2011, with the UK still second to last in terms of heating affordability.
[25] See Appendix V.
[26] (EurActiv 2012)
[27] See (Camco 2012) and www.energybillrevolution.org.

Appendix I – Sectoral energy intensity in the UK

Figure 3 illustrates how the energy intensity of the UK's domestic sector is improving relatively slowly, especially compared to the industrial and service sectors. In the context of David Cameron's pledge to make the UK the most energy efficient country in Europe, this suggests that the domestic sector has a disproportionately large part to play in helping to meet that pledge.

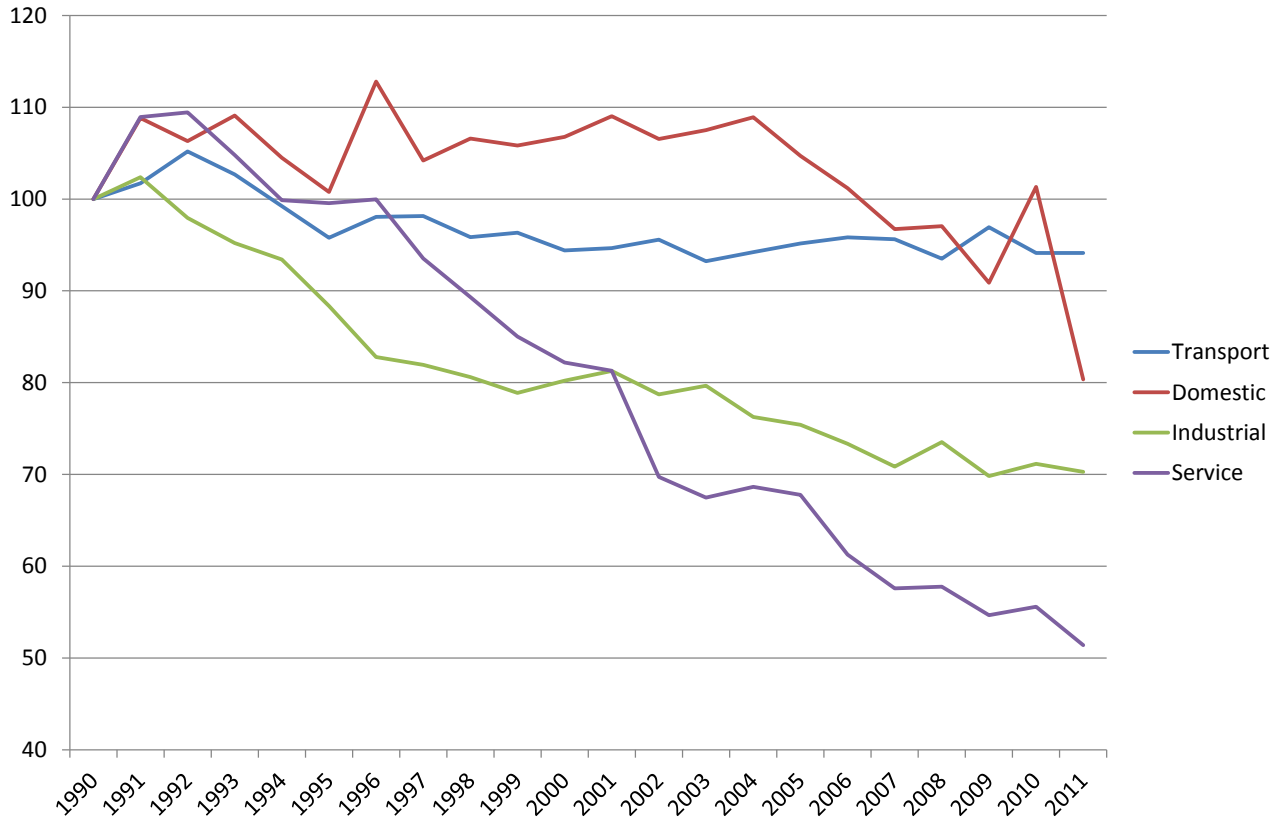


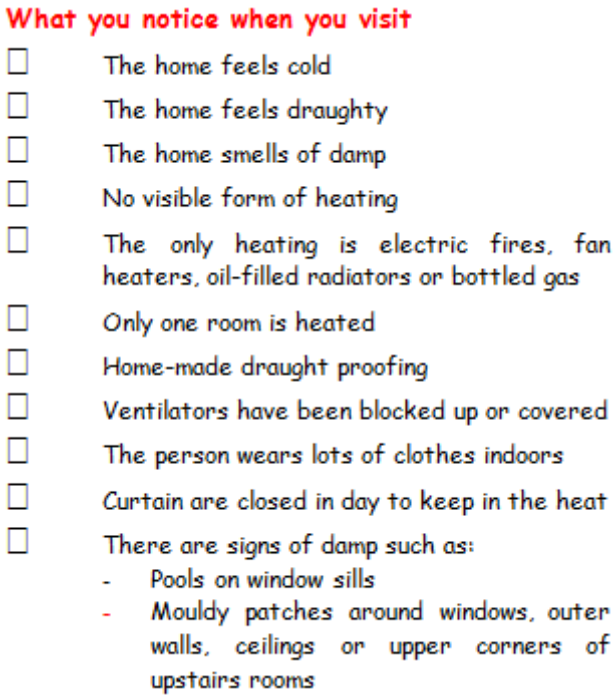
Figure 3: Energy intensity by sector, 1990 to 2011 (1990=100)

There are a number of issues of note with respect to interpreting Figure 3:

- Each sectoral indicator of energy intensity is different, which is why Figure 3 is expressed in relative terms:
  - Transport represents energy use per passenger-kilometre and per tonne of freight
  - Domestic represents energy consumption per household
  - Industry represents energy consumption per unit output
  - Service represents energy consumption per £1 million of gross value added (at 2009 prices)
- Seasonality affects domestic energy intensity fairly strongly. The winter of 2010 was unseasonably cold, which is why there was a peak; and the winter of 2011 was unseasonably warm, which is why intensity falls sharply following 2010.
- Transport energy intensity has also improved slowly. To a large extent, this is governed by EU regulations governing vehicle average fleet emissions. These are known to be improving, which may mean that people are acquiring larger vehicles (but equally efficient to smaller predecessor models).

Appendix II – examples of referral forms used by UK delivery agencies

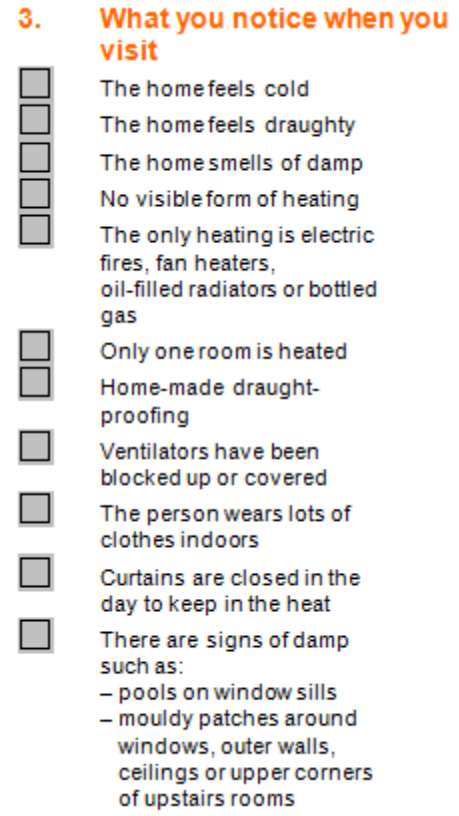
Eurostat's SILC survey asks households whether they have a 'leaking roof, damp walls, floors or foundation, or rot in the window frames or floor'. This question is particularly pertinent to this briefing as it is standard practice for health, energy efficiency and social practitioners who visit clients in their homes to check for these housing problems as symptoms of fuel poverty if they have been trained to refer households to energy efficiency support for low income households. The screenshots below show some standard examples.



What you notice when you visit

- ☐ The home feels cold
- ☐ The home feels draughty
- ☐ The home smells of damp
- ☐ No visible form of heating
- ☐ The only heating is electric fires, fan heaters, oil-filled radiators or bottled gas
- ☐ Only one room is heated
- ☐ Home-made draught proofing
- ☐ Ventilators have been blocked up or covered
- ☐ The person wears lots of clothes indoors
- ☐ Curtain are closed in day to keep in the heat
- ☐ There are signs of damp such as:
  - Pools on window sills
  - Mouldy patches around windows, outer walls, ceilings or upper corners of upstairs rooms

Figure 4: Angus Council and NHS Tayside



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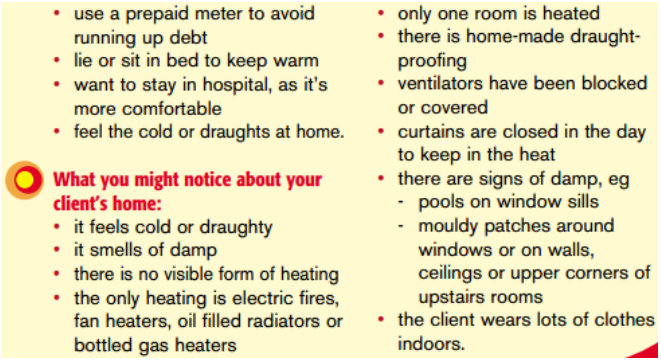
- ☐ Ventilators have been blocked up or covered
- ☐ The person wears lots of clothes indoors
- ☐ Curtains are closed in the day to keep in the heat
- ☐ There are signs of damp such as:
  – pools on window sills
  – mouldy patches around windows, outer walls, ceilings or upper corners of upstairs rooms

Figure 5: London Borough of Barnet / NHS North Central London

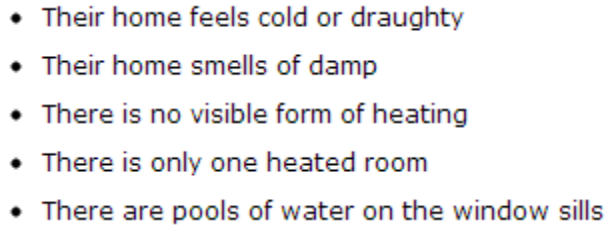


- use a prepaid meter to avoid running up debt
- lie or sit in bed to keep warm
- want to stay in hospital, as it's more comfortable
- feel the cold or draughts at home.

What you might notice about your client's home:

- it feels cold or draughty
- it smells of damp
- there is no visible form of heating
- the only heating is electric fires, fan heaters, oil filled radiators or bottled gas heaters
- only one room is heated
- there is home-made draught-proofing
- ventilators have been blocked or covered
- curtains are closed in the day to keep in the heat
- there are signs of damp, eg
  - pools on window sills
  - mouldy patches around windows or on walls, ceilings or upper corners of upstairs rooms
- the client wears lots of clothes indoors.

Figure 6: Health Promotion Agency



- Their home feels cold or draughty
- Their home smells of damp
- There is no visible form of heating
- There is only one heated room
- There are pools of water on the window sills

Figure 7: North Somerset Affordable Warmth Partnership

Appendix III – Single family dwelling wall U values across countries and age bands

The 'bubble' chart that is FX shows the individual wall U values for each country and each age band of single family dwellings' construction, as reported by the Buildings Performance Institute Europe's Data Hub. The size of each bubble represents the share of that country's single family dwelling stock that was built during each period. From left to right, the bubbles have been grouped into four broad eras: pre-1900, 1900 to 1945, 1945-1962, 1962 to 1982, and post-1982. Within each era, bubbles shaded red have the highest U values in their era. Green shading indicates the lowest, or best, U values; and orange bubbles represent middling U values for each era.

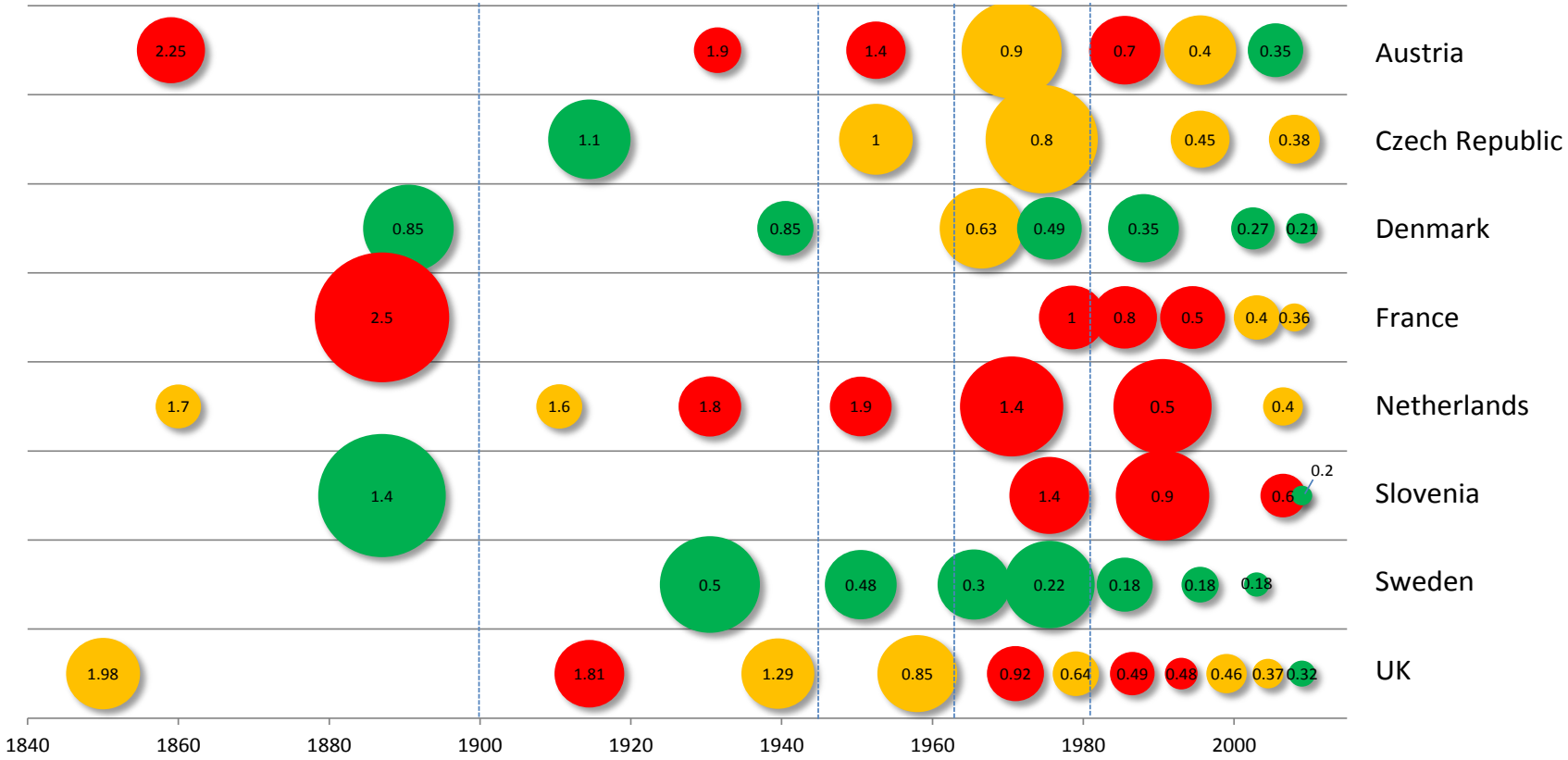


Figure 8: Wall U values by country and age band

Appendix IV – Heat consumption

For context, it is helpful to see how energy consumption varies across Europe. This data is not ranked, because high levels of consumption may be caused by a number of factors, including affluence and high demand for comfort, or poor energy efficiency (which may actually result in low levels of comfort, despite the high consumption).

Table 8: Energy consumption for space heating per dwelling, adjusted for climate, 2010 (Odyssee 2013)

Country	Heat consumption (toe per dwelling)
Austria	1.42
Belgium	1.62
Czech Republic	1.16
Denmark	1.50
Finland	1.40
France	1.23
Germany	1.29
Iceland	n.a.
Ireland	1.45
Luxembourg	n.a.
Netherlands	1.08
Norway	n.a.
Slovenia	1.18
Sweden	1.19
Switzerland	n.a.
UK	1.19

Table 9: Energy consumption for space heating per m^2 of floor space, adjusted for climate, 2010 (Odyssee 2013)

Country	Heat consumption (kgoe per m^2)
Austria	13.46
Belgium	n.a.
Czech Republic	14.09
Denmark	12.10
Finland	17.29
France	11.55
Germany	13.73
Iceland	n.a.
Ireland	9.99
Luxembourg	n.a.
Netherlands	9.45
Norway	n.a.
Slovenia	13.46
Sweden	10.27
Switzerland	n.a.
UK	11.42

Appendix V – Excess winter deaths

One measure of the impacts of poor quality homes is the "coefficient of seasonal variation in mortality" (CSVM) – this indicates how many more people die in winter months than in the summer. Table 10 shows the results, for the countries compared in this briefing, of a major study on excess winter deaths, conducted in the 1990s.

Table 10: Excess winter deaths: coefficient of seasonal variation in mortality (CSVM), 1988-97 (Healy 2003)

Country	CSVM	Rank
Finland	0.1	1
Germany	0.11	2
Netherlands	0.11	3
Denmark	0.12	4
Luxembourg	0.12	5
Belgium	0.13	6
France	0.13	7
Austria	0.14	8
UK	0.18	9
Ireland	0.21	10

Bibliography

Boardman, Brenda, Sarah Darby, Gavin Killip, Mark Hinnells, Christian N. Jardine, Jane Palmer, and Graham Sinden. 2005. *40% House*. Oxford: Environmental Change Institute. http://www.eci.ox.ac.uk/research/energy/40house.php.

BPIE. 2013. "Data Hub for the Energy Performance of Buildings." *Data Hub for the Energy Performance of Buildings*. http://www.buildingsdata.eu/.

Cambridge Econometrics, and Verco. 2012. *Jobs, Growth and Warmer Homes - Evaluating the Economic Stimulus of Investing in Energy Efficiency Measures in Fuel Poor Homes*. London: Consumer Focus. http://www.consumerfocus.org.uk/files/2012/11/Jobs-growth-and-warmer-homes-November-2012.pdf.

Camco. 2012. *Energy Bill Revolution Campaign Report*. London: Transform UK, The co-operative and Consumer Focus. http://www.energybillrevolution.org/wp-content/uploads/2012/02/Energy-Bill-Revolution_full-report.pdf.

Cameron, David. 2013. "David Cameron's Speech at the Launch of DECC's Energy Efficiency Mission." *Association for the Conservation of Energy*. http://www.ukace.org/2013/02/david-camerons-speech-at-the-launch-of-deccs-energy-efficiency-mission/.

Cities Action for Sustainable Housing. 2010. *Energy Efficiency for Social Housing - Baseline Study*. Echirolles: Cities Action for Sustainable Housing. http://urbact.eu/fileadmin/Projects/CASH/documents_media/cash_brochure_Baseline_Study_web-1.pdf.

DECC. 2011. *The Green Deal and Energy Company Obligation - Consultation Document*. London: Department of Energy and Climate Change. http://www.decc.gov.uk/assets/decc/11/consultation/green-deal/3607-green-deal-energy-company-ob-cons.pdf.

———. 2012a. *Energy Consumption in the United Kingdom: 2012 - Domestic Energy Consumption in the UK Since 1970*. London: Department of Energy & Climate Change. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65954/2323-domestic-energy-consumption-factsheet.pdf.

———. 2012b. *Quarterly Energy Prices December 2012*. London: Department of Energy & Climate Change. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65940/7341-quarterly-energy-prices-december-2012.pdf.

———. 2013. "Official Statistics: Final UK Greenhouse Gas Emissions." *Inside Government*. February 5. https://www.gov.uk/government/publications/final-uk-emissions-estimates.

EC. 2010. *Commission Staff Working Paper: An Energy Policy for Consumers*. Brussels: European Commission. http://ec.europa.eu/energy/gas_electricity/doc/forum_citizen_energy/sec(2010)1407.pdf.

ECOFYS. 2007a. *U-Values for Better Energy Performance of Buildings*. Brussels: EURIMA. http://www.eurima.org/uploads/ModuleXtender/Publications/13/EURIMA-ECOFYS_VII_report_p1-651.pdf.

———. 2007b. *U-Values for Better Energy Performance of Buildings - Annexes*. Brussels: EURIMA. http://www.eurima.org/uploads/ModuleXtender/Publications/13/EURIMA-ECOFYS_VII_report_p66-104_ANNEXES1.pdf.

EurActiv. 2012. "France Puts Its ETS Money into Housing Renovation." *EurActiv.com*. http://www.euractiv.com/energy-efficiency/france-use-ets-money-fund-energy-news-515040.

Eurostat. 2013. "European Union Statistics on Income and Living Conditions." *Eurostat*. http://epp.eurostat.ec.europa.eu/portal/page/portal/income_social_inclusion_living_conditions/data/database.

Guertler, Pedro, and Sarah Royston. 2013. *Fact-file: Families and Fuel Poverty*. London: Association for the Conservation of Energy. http://www.ukace.org/wp-content/uploads/2013/02/ACE-and-EBR-fact-file-2012-02-Families-and-fuel-poverty.pdf.

Healy, J. D. 2003. "Excess Winter Mortality in Europe: a Cross Country Analysis Identifying Key Risk Factors." *Journal of Epidemiology and Community Health*: 784–789.

Hills, John. 2012. *Getting the Measure of Fuel Poverty - Final Report of the Fuel Poverty Review*. London: Centre for Analysis of Social Exclusion at the LSE. http://www.decc.gov.uk/assets/decc/11/funding-support/fuel-poverty/4662-getting-measure-fuel-pov-final-hills-rpt.pdf.

Laustsen, Jens. 2008. *Energy Efficiency Requirements in Building Codes, Energy Efficiency Policies for New Buildings*. Paris: International Energy Agency. http://www.iea.org/efficiency/CD-EnergyEfficiencyPolicy2009/2-Buildings/2-Building%20Codes%20for%20COP%202009.pdf.

Legatum Institute. 2012. "2012 Legatum Prosperity Index." http://www.prosperity.com/.

Odyssee. 2013. "Energy Efficiency Indicators in Europe - Online Indicators." *Energy Efficiency Indicators in Europe*. http://www.odyssee-indicators.org/online-indicators/.

Parliamentary Office of Science and Technology. 2005. *Household Energy Efficiency*. London: Parliament. http://www.parliament.uk/briefing-papers/POST-PN-249.pdf.

UKGBC. 2012. "Retrofit for Homes." *UK Green Building Council*. http://www.ukgbc.org/content/retrofit-homes.