

Homes through the decades

The making of modern housing



Guide



Acknowledgements

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Welcome

Over the past two centuries, Britain has experienced seismic changes in society, politics, technology and culture. From Victoriana to the digital age, housing has played a pivotal role and has featured, for different reasons at different times, at the very top of the political agenda. Analysis of housing policy, design or construction has been prominent in most historians' studies of the 20th century.

We are now embarking on a further historically-important step for housing as we seek to establish a generation of new homes suitable for the 21st century. Our thinking should be informed by a clear understanding of what has gone before and an enlightened view of how we should address the challenges of today and tomorrow. I am therefore delighted to welcome you to 'Homes through the decades', the NHBC Foundation's account of the drivers, endeavour and experience that over the last hundred and fifty years has shaped the modern home. In its pages we are engaged by evocative images of landmark projects and of how we lived. We are reminded of the pivotal events and inspirational people – reformers, planners, architects, designers, technologists and construction teams – who grappled with the pressures and constraints of their time to deliver our unique housing heritage.

For this century, the drive to protect the future environment has defined a new phase – that of sustainable housing design. This has already resulted in a technical transformation of new homes, in particular to reduce energy usage and to minimise carbon emissions. At the same time new and unstoppable demographic and societal changes are on the immediate horizon, including further decreases in family size and a growing trend towards single occupancy, by choice, circumstance or as a characteristic of an ageing population. Together with technological advances, these will drive the next chapters of the fascinating history of British housing.

I hope you find this latest NHBC Foundation publication enjoyable, thought-provoking and informative.

Rt. Hon. Nick Raynsford MP
Chairman, NHBC Foundation



Victorian workers' slums in Bath Street, Grimsby – a reminder of how people lived

Introduction

Although there are different ways of classifying the history of housing, it is widely accepted that the modern home has strong connections dating back to Victorian and Edwardian times. Homes from that period, up to 1918, form Part 1 of this guide - a time when public health was a priority consideration and when private renting the norm for most families. Part 2, between the wars, marks a major change in house design and tenure, away from terraces towards cottage-style homes and the establishment of local authority council housing for poorer people. These were the 'Homes for heroes' and, politically, the provision of a good home was seen as crucial in preserving the stability of our nation.

After the Second World War our story reflects an ongoing preoccupation with how we would provide new homes in sufficient numbers, but there were very distinctive phases. Part 3 describes the immediate post-war rebuilding programme to 'win the peace' with the deployment of prefabrication a symbol of British ingenuity and resolve. In the 1960s and 70s, Part 4, it is often not appreciated that we came close to addressing, at least numerically, the nation's long-term housing shortage, but failed to provide solutions that worked with communities. In just two decades we saw the rise of the residential tower block and its fall from grace - an expensive and damaging episode.

In Part 5 we see a period characterised by an expansion in technical information and guidance as housing moved further from its craft-based roots. The 'Right to Buy' policy, saw 1.9 million homes moved from public to private ownership by the end of the 1990s.

From the turn of this century, sustainability was beginning to give a new direction to design. From Part 6 we can see how the house-building industry has contributed to carbon emissions reductions by pioneering new energy technologies and by raising thermal performance dramatically. For the future, Part 7, housing will be a meld of what is known to work for owners and occupiers – the good experience and insight from successful housing over the years – but also a response to new needs as the population ages and as patterns of occupancy change.

In this guide we have not sought to make quality comparisons between homes from different times, but to show what different periods contributed to modern thinking and design. Advocates of Victorian homes will emphasise the aesthetic qualities of homes from this era. Others will argue the benefits of a new low energy home with its lower heating costs and interiors designed for modern living. In between these two ends of the spectrum most types of homes have attracted admiration - even the occupants of the post-war temporary prefabs loved their homes. In truth, homes from different periods were intended to meet different needs and it is against the backdrop of their own time that they should be judged.

Victorian and Edwardian legacy pre 1918

Homes and public health

The 19th century saw massive social change as a largely agrarian past was overtaken by an industrial future. Led by social reformers, Victorian politicians, architects, engineers and health scientists became intertwined in a national effort to improve the living conditions for the new urban workers and the poor. Many of the homes built for the emerging middle classes and the rich are a lasting legacy, adorning many UK towns and city districts today.

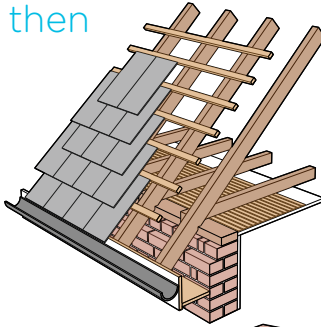


Part 1

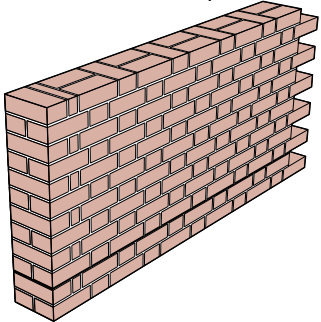
- From 1800 to 1900 the UK population grew from about 11 million to 32 million. The urban population increased from around 2 million to over 20 million.
- In the new urban areas, workers lived in overcrowded houses. Lack of sanitation and fresh water, and poor food often contributed to a depressing downward spiral towards slum conditions.
- Victorian mains sewers, flushing WCs and waste collections were breakthroughs in public health.
- Public health concerns drove the development of the 1878 Model Bye Laws, which consolidated a process of building control.
- Henry Roberts' Model Home established new standards for workers' dwellings.

How we built then

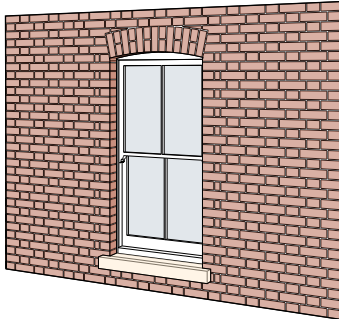
Traditional cut roof with overhanging eaves, natural slate tiles and cast iron guttering. No felt or insulation



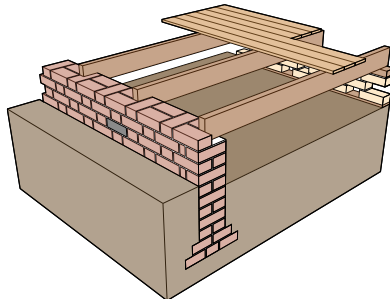
Solid walls at least one brick thick with lime mortar, typically Flemish bond



Timber sash windows. Victorian improvements in glass technology allowed larger panes



Shallow stepped brick footings. Ventilated suspended timber ground floor



Signs of the times

The Victorian expansion of the railway system gave mobility and led to the development of new suburbs around major cities. It also eased the transport of mass-produced building components, enabling the speculative builders of the time to build more efficiently. Historical commentators describe a glut of good quality houses for the well-off middle classes.

The plight of the urban worker, however, was a national concern. Slum conditions had become commonplace in many industrial cities and overcrowding perpetuated illnesses like tuberculosis. In London, poor sanitation allowed the spread of cholera, which had a devastating effect on the capital, killing over 43,000 people between 1832 and 1866. The early Victorians were understandably fearful of such diseases that killed indiscriminately, and public health drove the reform of towns and cities.

By the end of the Victorian period a number of significant improvements were in place. The basic housing needs of workers and their families had been recognised and embodied in new Model Home designs. In 1875, Joseph Bazalgette's renowned sewerage system had been completed, improving the health of Londoners, and the 1878 Building Act established new Bye Laws for housing development.

The early Edwardian period was a time of optimism and people sought respectability through their homes. From now on, new options were available. First, in 1904, the Halifax Building Society offered mortgages of up to 90% on middle-bracket homes, a move that opened up a realistic prospect of ownership for many, and challenged the tenancy model that had dominated the Victorian period. Second, apartment living, which had been stigmatised as housing for the poor, was now recognised as a respectable and economic option.

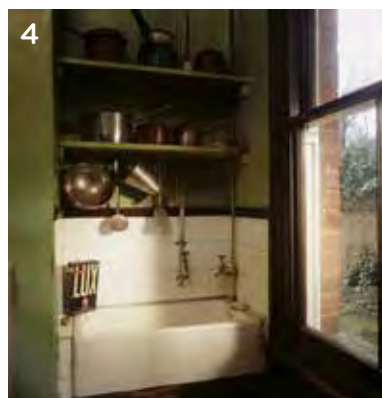
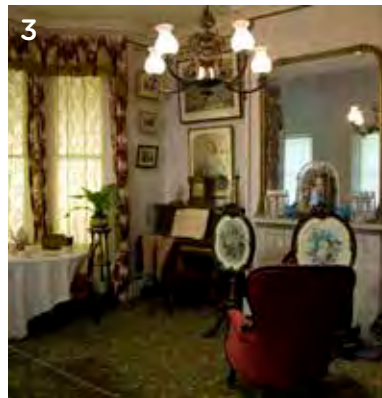


Elegant exteriors and a chimney-dominated skyline along Northwood Road, London. An illustration of the popular perception of Victorian housing

New features of the time

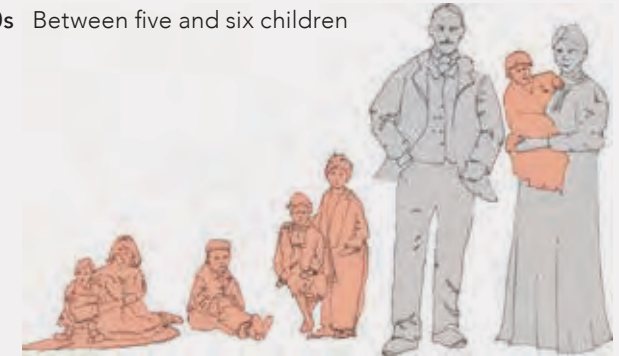


1. Edwardian bathroom. Flushing WC with high level cistern and ornate sink. Running water
2. By the middle of the 19th century, a separate dining room was a common feature
3. The parlour, or drawing room, became a space for comfort and relaxation
4. Part of a working family's kitchen – showing basic amenities



Children per family

1870s Between five and six children

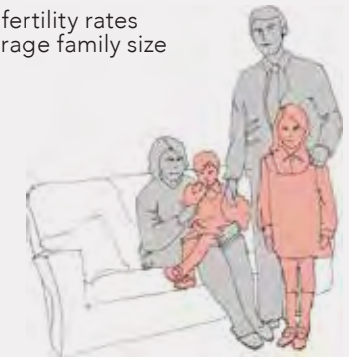


1930s Two children

1950s Post Second World War baby boom leads to an increase in average family size

1960s Baby bust – gradual decline in fertility rates

1980s Continuing decline in fertility rates and gradual fall in average family size to 1.6-1.8 children



2000s Slight rise in fertility and average family size, this time as the grandchildren of the original baby boomers start their own families

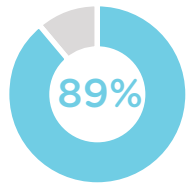
As well as families having fewer children, average household size, which includes single person occupation, has been declining: it was 3.2 in 1951 and is continuing to fall, being 2.4 in 2001 and 2.3 in 2011. Source: Office for National Statistics

Source: Dermot Grenham, 'Demography: The effects of changing population profiles' Staple Inn Actuarial Society, 1996.

Tenure 1914



Owner-occupied homes



Privately-rented homes



Rented from local authorities

Homes then

The Victorian age was a period of stark contrasts. Housing from this time reflected the fortunes of people, perhaps more graphically than in any other period.

The rich and well-off middle classes typically lived in villas. These homes were intentional status symbols, having ornate exteriors and separate quarters and entrances for servants. Villas usually had several reception rooms, and might include a drawing room, a morning room and elaborate conservatories.

For middle class families of modest income, less prestigious homes, mostly in terraces, were available. These overlapped in quality and size with the upper end of homes for well-paid workers. Facilities in these homes were more basic and typically followed a 'two-up two-down' room configuration.

Homes for poorly paid industrial workers were cramped two-roomed 'back to backs', sometimes built in densities approaching 250 houses per hectare. In these homes, kitchen amenities were so minimal that families often relied on meals being prepared elsewhere and had to use the local bake houses for cooking.

As the Victorian period progressed, general improvements were seen across all classes of new homes. New standards made homes progressively safer and there were improvements in facilities and appliances. Flushing WCs became a common feature in new homes during the 1890s, providing a welcome alternative to the chamber pot or earth closet.

Without electricity, Victorian home life was far more physically demanding than today and tasks like washing clothes, cooking, cleaning and simply keeping warm were considerable daily chores. In the absence of electric lighting, homes at night, even those with gas lamps, would seem very gloomy to us. Candles remained the main source of lighting.

Throughout the Victorian period architectural style evolved considerably, initially reflecting Regency style and then in turn adopting elements of Italianate and Gothic revival. The Arts and Crafts Movement had built a strong following by the 1880s. It was a reaction to industrialisation and instead placed value on traditional craftsmanship and the natural beauty of materials in design. It became a major international trend, influencing architecture strongly at the turn of the 19th century with an ongoing impact on subsequent design. Many housing developments which adopted this approach, such as Edwin Lutyens' Hampstead Garden Suburb, remain popular to this day.

The Garden City Association (which later became the Town and Country Planning Association) was established by planning reformer Ebenezer Howard. Through Letchworth, the first Garden City, the Association promoted a new way of living, away from the pressures, and poor air, of urban life.

1832
The first **cholera** outbreak in London, followed by further outbreaks in 1849, 1854 and 1866, overall killing more than 43,000 Londoners

1842
Edwin Chadwick's report 'The sanitary conditions of the labouring population' links poor living conditions with ill health

1844
The Society for Improving the Condition of the Labouring Classes is established with Albert, the Prince Consort, as its President. Aims to improve the dwellings of the poor

1848
Public Health Act establishes a Central Board of Health and a framework of voluntary responsibilities to improve public health. Local Health Boards, early precursors of local authorities, are formed to implement the Act

1849
Reinforced concrete is invented by Joseph Monier - additional tensile strength opens up many additional uses for concrete in engineering and construction

1851
Henry Roberts' Model Home for working families is shown at the Great Exhibition



Letchworth Garden City, Hertfordshire. A vision of Hillshott, a street of small houses in a typical setting

Health and homes today

When Edwin Chadwick made the link between poverty and poor health in 1842, which led to the 1848 Health Act, he triggered an ongoing public health debate that still has significance today.

The Victorians worked to address many of the basic characteristics of substandard housing, such as dampness, cold, poor indoor air, lack of daylight, poor sanitation, inadequate food storage and unsafe drinking water. For later generations of Britons buying new homes, these deficiencies gradually became a thing of the past, and would not be experienced in a home built to today's standards.

The way we live also has potential impact on health. Over time, health and safety guidelines have been developed to avoid the use of the most dangerous chemicals in the home and to guide the safe use of everyday products, such as paints, varnishes and cleaning agents. A situation very different to that in Victorian times, when the health risks of using even highly toxic materials in the home, such as arsenic and lead, were not appreciated.

As we address the challenges of overheating and indoor air quality in tomorrow's energy efficient homes, health again overlaps with design and planning. However, in seeking effective solutions to these problems and others that might be on the horizon, we can draw on mature scientific approaches and disciplines - an option that was simply not available to Edwin Chadwick in the 1840s.



Where Shall I Live? 'In Letchworth, of course!' will be your answer when you have visited the 1907 Cottages Exhibition promoting the joys of living in Letchworth Garden City

1865
London sewerage system
formally opened by HRH the Prince of Wales

1875
Public Health Act. Running water and proper drainage now a legal and enforced requirement for all new homes

1879
The electric light bulb is invented by Swan and Edison for home use

1896
Death of **William Morris**, whose work had a profound influence on Victorian (and subsequent) design

1899
The '**Garden City' Association** is founded by Sir Ebenezer Howard to promote the idea of the Garden City

1911
London's population now exceeds 7 million. For over 100 years, from 1825, it was the most populous city the world had seen

1914
The First World War begins

Themes



Railway building brought about increased mobility including wide scale national access to house-building materials



Victorian philanthropic house building provided model villages for workers, such as Bournville, Birmingham



The 19th century saw revolutionary sanitary engineering, particularly the development of the modern WC cistern

Indoor air quality and health - how today's research protects households

Air quality inside homes is a long-established issue, and one which preoccupied the Victorians.

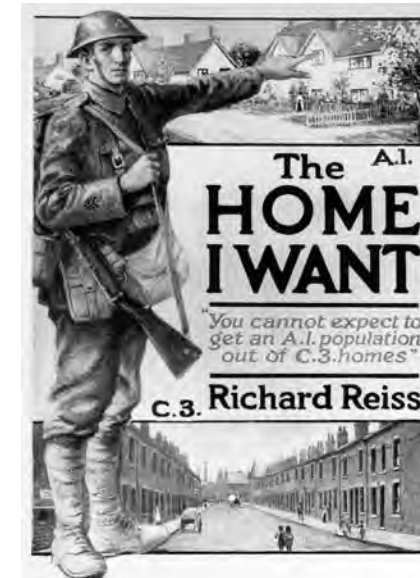
Currently as we strive for greater energy efficiency, attention has refocused on how new homes are ventilated. Homes built today are more airtight than ever before, which is beneficial in terms of reducing unwanted heat loss; however, it is increasingly important that the ventilation provided works well to maintain healthy conditions indoors.

Whereas Victorian homes had chimneys and loosely fitting windows that provided plenty of ventilation (and uncomfortable draughts), the ventilation for new homes is generally now provided by means of trickle ventilators placed at the top of windows, a cooker hood in the kitchen and extract fans in bathrooms and WCs.

As an alternative, some new homes built to the latest energy efficiency standards use a system called 'mechanical ventilation with heat recovery' (MVHR). This system has the potential to improve energy efficiency by capturing heat from the outgoing exhaust air and transferring it to the incoming ventilation air and thereby reducing fuel use.

In 2014 NHBC introduced new guidance for the house-building industry, raising standards for the design, installation and commissioning of MVHR so that systems deliver good performance in use.

Looking forward from 1918



The poor health and low fitness of many who volunteered to serve in the Great War was a stark reminder of the living conditions that still prevailed across the UK's towns and cities.

To improve the health of the next generation and provide better homes for returning soldiers the Government initiated the 'Homes for heroes' campaign. And it became the job of the Tudor Walters committee, commissioned in 1917, to propose a totally new approach to the nation's new housing. As it turned out the Tudor Walters proposals, which were incorporated in the Addison Act, proved over-ambitious, but they represent an early attempt to steer housing design towards the well-being of occupants, not just their physical health.



Between the wars 1919-1939

New tenure and lifestyle

During the inter-war period a fundamentally new 'dual' approach to house building emerged. Local authorities, funded by central Government, built over a million homes for rent. In parallel, private house building grew rapidly as mortgages became more affordable. For working families moving to the newly-created suburban developments, life was transformed, revolving increasingly around the home, rather than the tight-knit urban communities they were used to.

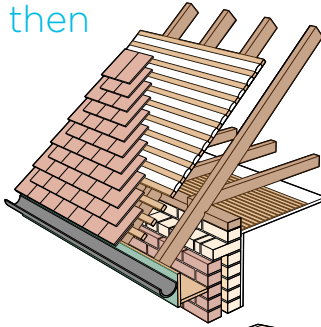


Part 2

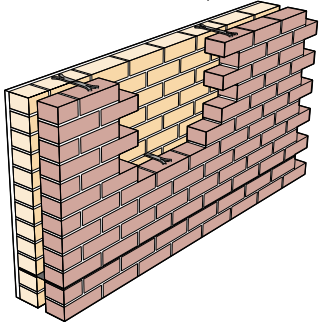
- From 1919 the role of housing, in both the social and financial stability of the nation, assumed growing political significance.
- The UK embarked on a large-scale post-war council house building programme. By 1939 this was accommodating about 1 in 10 families.
- British people embraced private ownership. Compared with just 10% in 1914, around 25% of all Britons owned or were paying for their own home by 1939.
- New housing was typically of cottage style, semi-detached and suburban. While traditional materials were mainly adopted, the distinctive, streamline 'Moderne' style emerged in the 1930s.
- In the mid 1930s, concerns over the variable quality of new homes for private buyers triggered the establishment of a national registration scheme for house builders.

How we built then

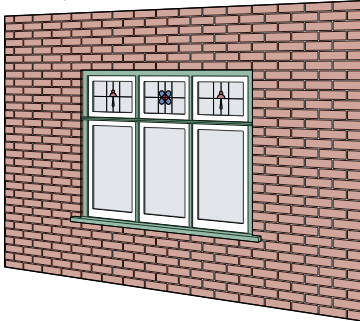
Traditional cut roof often with hipped ends, clay plain tiles. Some houses had torching (lime mortar under the tiles)



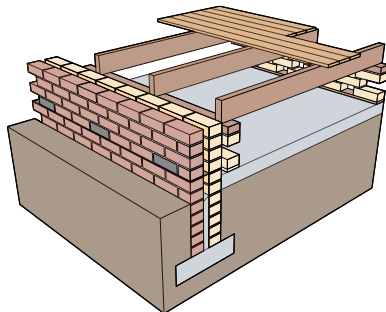
Most new houses had cavity walls: two independent leaves of brickwork tied together



Timber hinged casements were very common, sometimes with stained glass in top lights



Concrete strip foundations. Timber floor joists protected from dampness



Signs of the times

After the war it was hoped that the nation would quickly recover its trade and its output from traditional industries. However, this did not happen and by 1921 Britain was in a downturn and long-term unemployment faced by many. While the nation diversified into new technology-led industries, ongoing investment in a large-scale re-housing programme also played a part in stabilising the economy and protecting it from the worst of the global depression of the 1930s.

For men returning from war but also for all families subjected to poor living conditions, the urgent provision of good quality, affordable homes would, it was argued, help maintain social stability. So, immediately after the war, the 1919 (Addison) Housing Act introduced new standards for homes and together with the first Labour Government's 1924 Housing Act embedded the principle of subsidised council housing. Within about 15 years, under this legislation, a million modern, hygienic new homes had been built, many in suburban settings.

Remarkable too was the growth in private home ownership. Those in work now had greater disposable incomes and the availability of affordable mortgages, from a rapidly increasing number of building societies, put home ownership within their grasp.

This dual system with local authorities providing for poorer people and private house builders building for those with the means to buy, established a housing provision model that persisted into the 1980s. Rent control, introduced during the war, was gradually relaxed from 1923, but though still the most common form of tenure in 1939, private renting was in decline and home ownership was firmly in the ascendency.



Aerial photographs of suburban development taken in the 1930s. Top: Ashfield Housing Estate, Glasgow; bottom: Braunstone Park, Leicester. The term 'sprawl' was coined in the 1950s to describe this kind of expansion

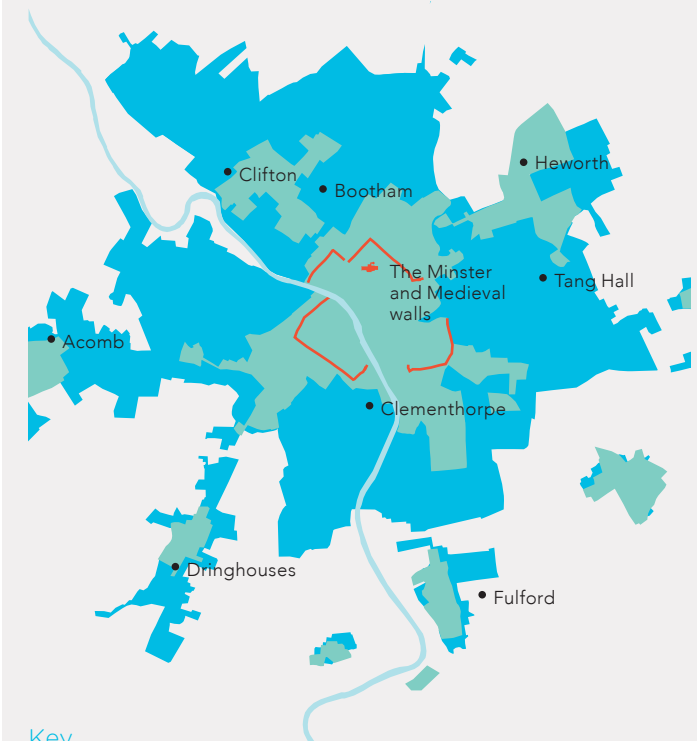
New features of the time



1. All new houses had a kitchen, though even in the 1930s it was often pretty basic
2. Early gramophones were available, but an expensive luxury
3. A typical 1930s bedroom, with twin beds covered in shiny quilted bedspreads
4. The bathroom at Mendips, John Lennon's childhood home, showing many original 1930s fittings



York's rapid expansion and suburban sprawl

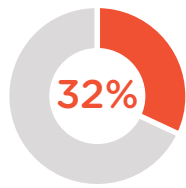


Key

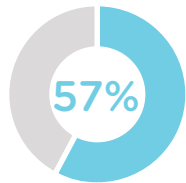
- Medieval Crowded walled city, population about 7,000 in 1377
- 1853 Following the arrival of the railways, the city expanded considerably supporting a population of approximately 41,000
- 1938 By 1938 suburban sprawl had resulted in a huge expansion of the city. Its population was 94,000 by 1937, subsequently rising to 200,000 by 2013

Source: Ordnance Survey Historical Mapping. Office for National Statistics for 2013 population and historic census data for 19th century and medieval figures

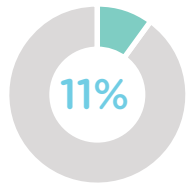
Tenure 1938



Owner-occupied homes



Privately-rented homes



Rented from local authorities

Homes then

Following the First World War, the monotony of Victorian terraces was rejected in favour of a new cottage-style two-storey home. Because land was cheap, homes were built at low densities with generous gardens and often in tree-lined avenues and cul de sacs with open green spaces. This period is characterised by the semi-detached home, often with a garage for the more wealthy, and it was the heyday of the bungalow, particularly in coastal developments.

The design of the semi-detached home was fairly standard across the nation, with pitched roofs, a prominent front gable and bay window, brick cavity walls, wooden casement windows and covered porches. However, a range of styles including Mock Tudor and Neo-Georgian were adopted.

Typically homes had three bedrooms, a living room, dining room, kitchen, bathroom and separate internal WC. No longer was there any allowance for servants' quarters, a luxury beyond the means of the new middle classes. Instead, the kitchen was designed at the heart of the home and many were fitted with the latest labour-saving appliances and fittings. Middle class housewives positively adopted their new home-owner status, and were proud of their modern, light and wholesome homes.

By the 1930s the 'Modernist movement' was spreading across Europe and the USA. In Britain, house builders began to add features to their home designs, offering a new look called 'Moderne'. While most of the additions were cosmetic, these homes (alongside the ubiquitous traditional semis) remain a hallmark of the inter-war years. Also stemming from the Modernist movement, the close of this period saw experimentation in open-plan living, which would further revolutionise how people live in their homes.



A typical British suburban semi-detached house with green paintwork, actually No. 17, Braemar Gardens, West Wickham, Kent

1918
Tudor Walters Report
establishes new housing design criteria which remain influential for the next 25 years

1919
Addison Housing Act instructs local authorities to address their housing needs and provides subsidy for the new housing required

1920
Work starts on Welwyn Garden City, a new town designed for healthy living, and which continues to influence and inspire the planning of new towns to this day

1924
Through the Great Housing Charter the first Labour Government establishes the political principle that all people must be properly housed

1924
The Moir Report, first report from The Committee for Standardisation and New Methods of Construction, highlights early innovation in prefabrication

1926
Concerns about urban sprawl and ribbon development lead to the establishment of the **CPRE** (Campaign to Protect Rural England) one of the oldest environmental campaigning organisations

Social housing in the UK

Some notable social housing schemes, largely built by philanthropists, existed before the 1920s. However, it was not until 1919, and the start of the major council house building programme, that we see national commitment to provide good homes for the less well off.

After the Second World War council home building continued apace and by 1979 nearly 32% of all homes (about 6.5 million) were public rented. In 1980 the Government's 'Right to Buy' policy changed the picture: twenty years later, 1.9 million council homes had passed into private ownership. While reinforcing Britain as a property-owning democracy, there were repercussions for the remaining council housing. What was left was of lower quality and income from sales was not reinvested in new homes or maintenance. Much existing public housing was allowed to deteriorate and after 1993 the production of council housing effectively ceased.

In the 1960s the Government sought more private sector involvement in the provision of state-supported housing, and looked to expand the role of Housing Associations. In the early 1970s, legislation granted subsidies to Housing Associations to build homes for affordable rent, and this sector subsequently expanded rapidly.

Housing Associations now manage about a third of all social housing in England and Wales. This proportion is increasing, with over 36,000 affordable housing completions in 2013/14. Housing Associations have a non-profit making status, ploughing any surplus back into maintenance of their stock and investment in new housing for rent. Some, like the Peabody and Guinness Trusts, have proud histories, traceable back to Victorian philanthropy.



Moderne style. Clissold Court, Greenway Close, Stoke Newington, London



The term 'Metro-land' promoted the dream of a modern home in beautiful countryside with a fast railway service to central London. This was epitomised by Harrow Garden Village

1930
Greenwood Housing Act sets in place plans to finally eradicate slums

1934
Isokon was the first modernist housing development in the UK, now listed and renovated for 21st century living

1935
Construction work starts in Leeds on the **Quarry Hill** multi-storey apartment complex. This huge project ultimately re-houses 3,000 people

1936
The **NHBC** (National House Builders' Registration Council), forerunner of the NHBC, is set up, supporting reputable builders and setting minimum standards

1937
The **SSHA** (Scottish Special Housing Association) founded to address housing shortages for workers in Scotland

1938
The Homewood, Patrick Gwynne's pioneering open-plan home, is completed in Esher

1939
Second World War begins – new housing production virtually ceases

Themes



A new symbol of quality in house building. The NHBC lighthouse with its motto 'Cavendo Tutus' – safe by being wary



The Isokon flats in London built in 1934 reflected the ideas of Corbusier and the Bauhaus movement



The Campaign to Protect Rural England (CPRE) was formed in 1926 to challenge urban sprawl and ribbon development: led to the formation of National Parks and green belts

Private house building between the wars

This period saw the introduction of a degree of mechanisation on building sites, and some progress on the standardisation of components: speeding up and simplifying construction. Better transport and particularly the growth of lorry haulage meant that materials costs were reduced. As a result, house builders were able to keep the cost of homes down.

At the top end of the scale, the new homes available were exceptional value for money, and were offered to a high quality and with deluxe fixtures and fittings. At the lower end of the scale, house builders were tempted to add attractive cosmetic features, which had become expected, but to make a profit were forced to economise on the basic fabric of the home. A number of serious early failures triggered accusations of 'Jerry building', a term used to describe poor construction standards and inadequate materials. Government and national concern was fuelled. It was the industry, however, that developed a solution under the initial direction of the National Federation of Building Trades Employers. Ultimately this led to the formation of the National House-Builders Registration Council, the forerunner of the NHBC, which would provide a certification scheme for private house builders and introduce building standards and an inspection regime.

Looking forward from 1939



Open-plan living at The Homewood

Homes from the period between the wars have affection in the public mind, being synonymous with tranquil leafy drives and a comforting traditional air. However, in this period, foundations were laid for dramatic changes in our approach to housing. It not only sees the emergence of the modern design movement in the UK but also the first steps towards the high-rise approach to living that dominated the 1960s and 70s. In terms of construction technology, many lessons were learned from pioneering projects from this time, which explored the use of new materials and prefabrication – both contributing significantly to the nation's ability to rebuild after the Second World War.



Post-war recovery 1945-1959

Prefabrication, productivity and planning

On top of the pre-war housing shortage, nearly half a million homes were destroyed or made uninhabitable by war time bombing, and many slums still remained. Plans made during the war were enacted in earnest from 1945 to relieve the acute overcrowding in British homes. Prefabrication was adopted on a massive scale as a way of urgently supplying new homes, playing both a symbolic and practical role in the nation's recovery.

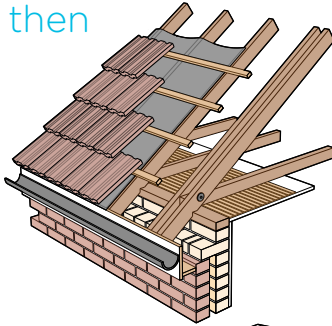


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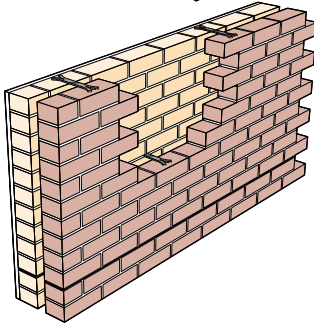
- Following the Second World War, the nation endured a protracted period of recovery, with food rationing continuing until 1954.
- The population united behind a post-war reconstruction to 'win the peace'.
- A large number of non-traditional homes were built using a range of prefabrication approaches. These helped to boost housing output to a high level (just under 354,000 homes were built in the UK in 1954).
- Centralised planning introduced new principles for establishing communities and social interaction.
- Successive Housing Manuals (in 1944 and 1949) introduced new standards which shaped a distinctive new generation of housing.

How we built then

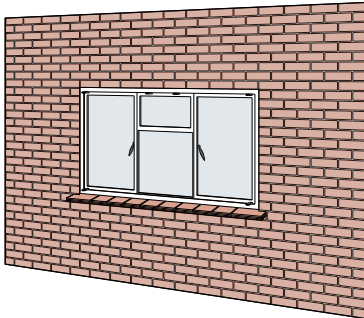
New techniques such as the TRADA truss introduced. Concrete tiles underlaid with felt and cast iron or asbestos guttering



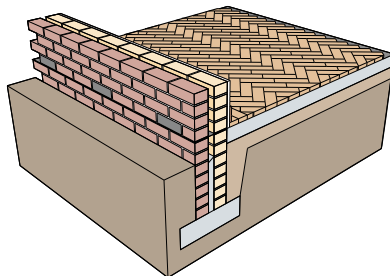
Traditionally-built houses had mostly brick cavity walls. Early blockwork also used for the inner leaf



Galvanised metal windows very common. Single glazed



Concrete strip foundations. Thin concrete ground floor. No polythene damp-proof membrane (DPM)



Signs of the times

Following the war, people wanted to help rebuild the nation: the welfare state was established, the railways nationalised and the hugely ambitious plan to bring good healthcare to all, financed by taxation, was realised with the creation of the NHS. The need to rebuild homes in great numbers led to a period of rapid experimentation, particularly in planning.

In the realm of housing the period up to 1959 led to much closer conformity between the quality of public and private homes. This was largely achieved by the 1944 and 1949 Housing Manuals - guidance that can be viewed as precursors of current standards - and also by the changes in the 1949 Housing Act that enabled local authorities to provide housing for professional as well as manual workers.

In this period there were very significant developments in the planning system. Perhaps the most significant was the Town and Country Planning Act of 1947, which was a response to uncontrolled expansion of the suburbs which started in the 1930s. This Act established enduring planning principles that still apply today. Town planning came of age, particularly in the development and evolution of the so-called 'Mark 1' New Towns, which started with the initial approval for Stevenage in 1946. In the development of these towns and other residential areas, planners were adopting new concepts, including the neighbourhood unit approach - establishing units of 5 to 10 thousand people with their own dedicated facilities. The concept of mixed-accommodation developments, in which people up-sized or down-sized progressively through their lives, was also explored in towns and cities across the country, though later found to be flawed.



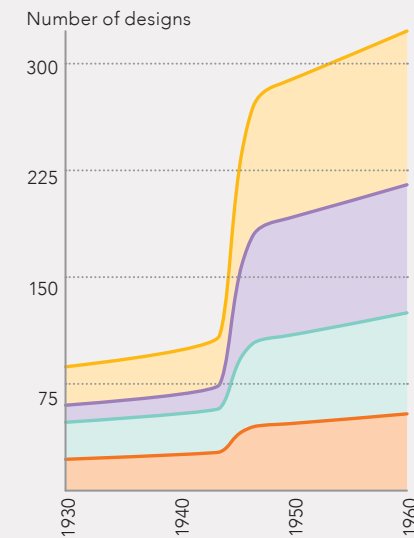
Terraced houses on the Somerford Estate, Hackney, London, 1952. This public housing was the first mixed-accommodation development in England, consisting of low-rise flats, terraces of two-storey houses and bungalows

New features of the time



1. In 1955, a third of UK households had a television
2. 'Avon' portable two-bar reflector fire, designed in 1954 and manufactured by Morphy Richards, between 1955 and 1970
3. A larger fridge had become a standard feature of the modern home
4. A contemporary advert – bathrooms were becoming a lifestyle statement

Post-war non-traditional housing



Key

Timber-frame designs			
Spooner	4,800	Brick clad	
Swedish Timber	4,500	Timber clad	
In-situ concrete designs			
Wimpey No-fines	300,000	Rendered	
Easiform Type II	100,000	Rendered	
Metal frame designs			
BISF Type A1	35,000	Metal clad	
Trusteel Mk 2	20,000	Brick clad	
Precast reinforced concrete designs			
Cornish Unity	30,000	Concrete clad	
Airey	26,000	Concrete clad	

Some of the main post-war non-traditional house types are shown above, including numbers built. These, as the graph shows, are just a fraction of the number of different designs produced just after the war

Based on details published in the BRE Report 'Non-traditional Houses: Identifying non-traditional houses in the UK 1918-75'



Homes then

For more than 125,000 homeless and bombed-out families across Britain the emergency temporary 'prefabs' built shortly after the war were a godsend. These small two-bedroom detached homes offered all the basic amenities including a factory prefabricated bathroom and fitted kitchen unit.

Alongside these temporary prefabs (which typically endured well beyond their expected 20 year life) the main programme of 'permanent' non-traditional homes rapidly gathered momentum, delivering slightly under 450,000 new homes in the decade following the war. These homes consisted of a considerable range of steel frame, precast concrete, in-situ concrete and timber-frame homes with various degrees of prefabrication. Following the 1944 Housing Manual, these typically quite generous three-bedroom homes, with state of the art facilities and services, were much appreciated at the time despite the austere appearance of some designs.

Traditionally-constructed homes still formed the major part of the house-building profile, though adaptations were necessary because of restrictions, particularly on the availability of timber. Concrete floors and metal windows predominated at this time. Walls were by now almost entirely of cavity construction, often with early blockwork inner leaves.

Compared to today's new homes, those from this period were draughty and difficult to keep warm in winter. Central heating was still rare and the fireplace was a focal point in cold weather.

Swedish and Bauhaus influences had an impact on the design of higher density housing projects and a number of apartment blocks, including Lubetkin's Spa Green development were potent symbols of success in the immediate post-war period.



Surviving Airy houses clad in their hallmark precast concrete panels. In 10 years from 1945 to 1955 over 26,000 were built in England and Wales

1940
The **Barlow Report** analysed the problems of urbanisation in Britain and deficiencies in planning legislation. Its findings greatly informed post-war planning

1942
The **Burt Committee** reviewed experience of prefabrication between the wars, and made recommendations to improve efficiency, economy and speed of erection in post-war housing production

1944
The **Housing (Temporary Accommodation) Act** calls for at least 300,000 temporary (prefabs) for homeless families

1944
New standards for local authority housing (Dudley Report) and private housing are set out by the **Central Housing Advisory Committee**

1945
Temporary aluminium bungalow homes start to roll off production lines in modified aircraft factories. Over 125,000 are manufactured

1946
The **New Towns Act**. A key element of post-war planning leading to the creation of new towns. The first wave included Basildon, Corby, Hatfield and East Kilbride



Spa Green (1943-50) by Berthold Lubetkin and Tecton, Clerkenwell, London, photographed in 2009

Non-traditional housing today

In recent decades prefabrication has fallen out of use, the term 'Prefab' bringing to the public's mind the idea of temporary, poorly built homes unworthy of investment. This tended to undermine the concept of prefabrication and possibly held back what some see as a natural progression away from a craft-based industry and towards a modern manufacturing approach, as strongly advocated by Sir John Egan in 1998. To give a fresh start, prefabrication has been aligned within the umbrella term 'Modern methods of construction' (MMC). Today the acronym MMC embraces a range of approaches from pre-assembled components and sub-assemblies such as floors and roofs, right through to complete pre-assembled home modules.

The drivers for the adoption of MMC today have some parallels with the pressures that applied in post-war Britain. Today, as then, there is an acute housing shortage and again we are exploring the wider use of non-traditional construction with its potential for increasing housing output and cost savings. Shortages of skilled craftsmen and availability of materials are again giving a nudge towards the use of non-traditional approaches.

However, the debate on MMC is ongoing, with advocates and sceptics evaluating evidence for cost, quality, environmental and social benefits. The important distinction, however, is that this time round, in contrast to the post-war period, the engagement with non-traditional construction techniques is proceeding with decades of hindsight, and the availability of certification and warranty for a growing number of products and systems. Significantly the word 'prefabrication' is again emerging in product literature, perhaps indicating growing interest in this approach within the UK.

100

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1947 **Town and Country Planning Act.** To counter concerns about urban sprawl, development would now be subject to planning permission, with decisions based on development plans set for counties

1951 **Festival of Britain** showcases the best of British modern design

1951 **The Lawn** Harlow Essex—the first multi-storey residential tower block in Britain is completed. Showcases how careful design could deliver successful high-rise housing

1954 **Polyfilla** invented. One of a range of products supporting the new, national enthusiasm for DIY

1955 Government invites Local Planning Authorities to consider the establishment of **Green Belts** around large urban areas

1957 Eric Lyons co-founds **Span** and, through a series of projects into the 1980s, shares his vision of how people might live—in well-designed landscapes and homes

1959 By 1959 one in three families owns a car. **Car ownership doubles** in the 1950s. UK's first motorways open

Themes



Non-traditional construction, including these prefabricated types, helped to boost housing production



Emphasis on terraces and other economies helped increase numbers of homes



Stevenage was England's first New Town, followed by Basildon, Harlow, Hemel Hempstead and Bracknell

Post-war innovation – the legacy

Born out of necessity the post-war non-traditional housing programme was a remarkable period in the history of UK housing. Many of the systems look set to last well beyond the 60-year life expected of them. With some exceptions their performance in terms of ongoing costs is estimated to be no worse than that of their traditionally-constructed contemporaries.

For some precast reinforced concrete (PRC) homes, structural weaknesses came to light in the 1980s when occupants were first offered the right to buy. A survey of PRC homes, carried out by the Building Research Establishment, established a generic problem of carbonation of the concrete, due to inadequate protection of the steel reinforcement. As a result, more than 20 types of PRC homes, were designated as defective and immediately became unmortgageable.

To restore confidence, Government grants were made available for 90% of individual repair costs. To ensure that the homes were properly repaired, the Government approached NHBC to set up and administer a repair scheme. This scheme eventually repaired over 13,000 homes, adopting tailored repair procedures for most of the defective house types. The scheme was run by PRC Homes, a subsidiary of NHBC, and as well as offering certificates of repair acceptable to mortgage lenders, owners were given an equivalent of the ten-year NHBC Buildmark warranty.

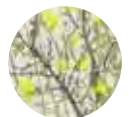
Looking forward from 1959



A contemporary timber-frame house under construction

By the mid 1950s the proportion of non-traditional houses within the overall housing output was beginning to decline, though some types like Wimpey No-fines continued to be built in large numbers. Timber-frame construction, however, did secure long-term popularity among house builders and today, for low-rise, remains the UK's main alternative to masonry.

Though not adopted as a long-term solution for the structural frames of houses, precast concrete did find its niche in medium- and high-rise apartments where it has become the principal framing and cladding material. Steel frame has been a somewhat less common solution for housing since the post-war period; however, it has its advocates, who value the flexibility provided by the light structures that can be designed.



Towers in the sky 1960-1979

A misapplied utopian vision

In the 1960s and 70s, to reduce the ongoing housing shortage and to re-house those in substandard homes, local authorities across the land built large numbers of residential tower blocks. It was supposed that everyday people would enjoy high-rise living and share the utopian vision of an elite professional minority who precipitated this change. In practice many of the tower blocks were social and financial failures. In the worst cases, vertical slums replaced horizontal ones.

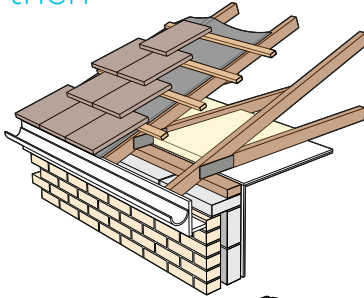


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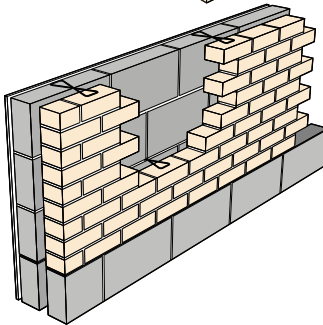
- In the 1960s and 70s more homes were built in the UK than at any other time, including over 425,000 in 1968.
- Residential tower blocks were a major part of the new housing mix: about 55,000 were built in this period – over 400,000 homes.
- Public disapproval of tower blocks quickly grew. Poor design for community security, austere, repetitive concrete exteriors and technical deficiencies all contributed to dissatisfaction.
- In 1964, Scotland introduced Building Regulations. England followed in 1965 when the long-standing local Bye Laws for building were replaced by national Building Regulations.
- Two further waves of 'New Towns' were designated. The early 1960s group included Telford and Washington and the final group in the late 60s included Milton Keynes and Warrington.

How we built then

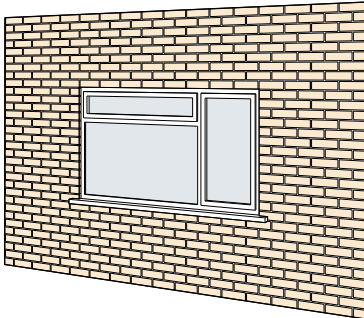
Mostly prefabricated roof trusses, concrete tiles with felt and plastic guttering. Some insulation



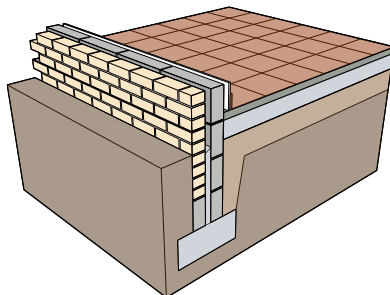
Most houses had cavity walls: block inner leaf almost universal and brick outer leaf



Single glazed timber casement windows popular or horizontal sliding aluminium windows



Concrete strip foundations and ground floor. Polythene DPM from mid 1960s



Signs of the times

In the swinging sixties, a new generation enjoyed new freedoms and a brighter future. It was felt that the nation should by now have left poverty behind and there was a genuine political determination to ensure that all enjoyed a good quality of life. The reality of the time was very different for many people, and at least 100,000 families were still living in poverty, as were half of all old age pensioners. Living conditions for some remained shockingly bad. In 1975, perhaps a million homes were still rated as slums, and 1.8 million unfit for habitation, lacking basic amenities such as running water, baths and toilets. At the same time at least half a million families were still sharing homes and as many as 30,000 were homeless.

The 1960s solution to the housing problem was the large-scale construction of residential tower blocks; however, even within a few years many of these were demonstrating serious shortcomings in design and construction and were rapidly falling out of favour with the public. Resistance grew to the practice of demolishing the existing housing and replacing it with the seemingly inhuman towers, which isolated individuals and were inappropriate for families. By the early 1970s Government policy makers, now increasingly wary about the merits of the high-rise solution, were advocating policies to improve and upgrade existing low-rise homes.

The 1960s and 70s saw the rapid expansion of the New Towns policy across the country. House building reached a peak at this time and a threshold was crossed in 1968, the year when half the families in the UK owned their own homes.



Boys drop rocks into a large puddle in an area of wasteland in Manchester. In the background can be seen abandoned and half-demolished Victorian terraces and a high-rise residential tower block

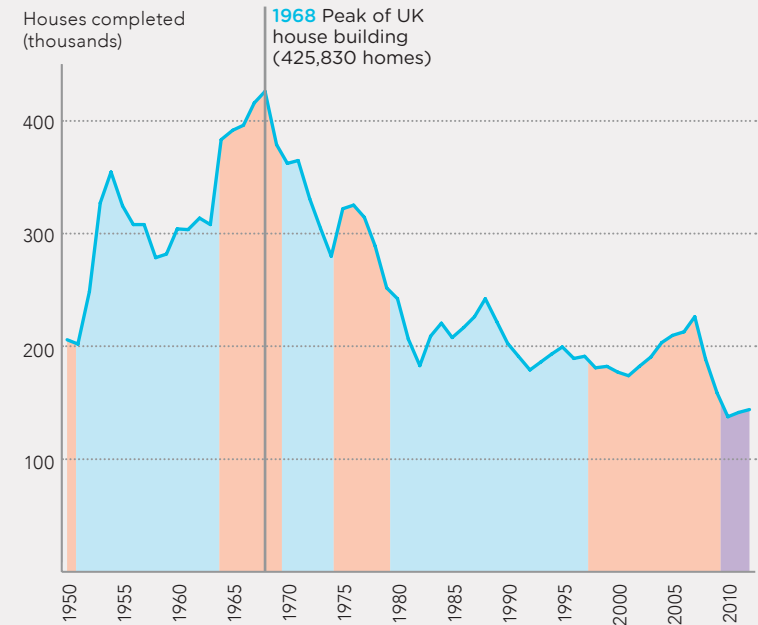
New features of the time



1. A radiator – a rare sight in 1970 when just one-quarter of homes had central heating. By 1990, this had risen to nearly three-quarters
2. In the 1960s cheaper, initially Italian, imports led to domestic appliances becoming much more affordable
3. Fashionable Roberts 'R' portable radio
4. Frozen oven chips, pizza and indulgent gateaux became a staple of everyday family life by the mid 1970s



UK houses built 1950-present



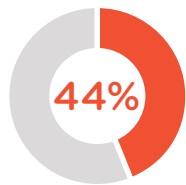
Key

- Government of the day
- Labour
- Conservative
- Conservative/Lib Dem Coalition

Permanent dwellings completed in the UK per year from 1950-present compared with the Government of the day

Source: Office for National Statistics Table 241 House building

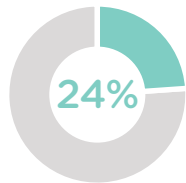
Tenure 1961



Owner-occupied homes



Privately-rented homes



Rented from local authorities

Homes then

From 1965, national Building Regulations were in force and new homes would now need to comply to a range of common technical requirements. The new homes could be expected to perform well, though some aspects, such as sound transmission between homes, was only poorly understood and was proved to be a shortcoming, particularly with the proliferation of more powerful hi-fi systems.

Tower block construction quality was at best described as variable. While some construction systems performed badly, being difficult for residents to keep warm, and vulnerable to rain penetration and condensation, some have performed well and been popular with residents.

The majority of houses from this period were functional in their design and tended to be box-like. A typical home would be built with minimal eaves overhangs and windows flush to the exterior, giving a profile of little relief or interest. Electrical and gas central heating systems were increasingly adopted as the norm and fireplaces and chimneys omitted from the design.

Internally, the lounge was still the main place for relaxing and entertaining, and a centre for family activity; however, designs increasingly looked at open-plan configurations and a separate dining room became less common. Interior design favoured bold colours and a range of styles, including pop art.

Design from the early 1960s onwards, particularly that of public sector housing, was strongly influenced by the Parker Morris report in 1961, which set out principles of space design in homes. Designers now had guidance to help enhance the usability of space.



Boys and girls leave a housing estate and set off for school. Late 1960s

1961
Publication of the influential **Parker Morris** report, 'Homes for today and tomorrow', sets out spatial considerations for interior design

1964
The 1964 **Housing Act** establishes the Housing Corporation to regulate Housing Associations and channel funds for new affordable housing

1965
A set of prescriptive national **Building Regulations** replaces Bye Laws for construction in England

1965
Homeowner protection. NHBC warranty period for major structural defects in new homes increased from two to ten years

1966
The Government establishes the **Agrement Board**, offering approval of construction products and installers

1967
Third wave of **New Towns**, the last of the 20th century, is designated between 1967 and 1970. These include Milton Keynes, Warrington and Telford

1967
Work begins on Runcorn's **Halton Brow** residential development, which pioneers estate design which prioritises pedestrians over cars

Apartment living

In ancient Rome, apartments provided an affordable housing solution for most people. In Victorian and Edwardian times, low- and medium-rise apartment blocks were built but not extensively. In the 1930s the building of apartment blocks accelerated as a housing response to slum clearance. At this time the apartments were medium rise, up to five storeys and with no lifts. Into the mix at this time were the ideas of Corbusier and the Bauhaus movement, the latter reflected in the Isokon flats in London. After the Second World War a number of local authorities commissioned medium-rise apartment blocks, some of which, like Lubetkin's Spa Green development, remain popular to this day.

The unfortunate, faulty application of high-rise to the housing problems of the 1960s and 70s undermined public confidence in the basically sound concept of the residential apartment block for many years.

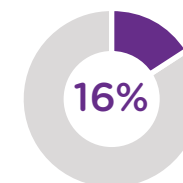
By the late sixties, enlightened architects sought to bring together insights and experiences to generate more beautiful apartment complexes at a more human scale. Research demonstrated that high rise was not the only way of achieving high density required by planners or dictated by available space. Other configurations could be equally effective.

Today, apartment living is in renaissance. We have learnt that communities in apartment blocks need facilities and meeting places that allow human interaction and expression, and should create an ambience that reinforces good citizenship. High-rise modern apartment living is now popular as a housing solution for young professionals in cities and the luxury apartment market is booming. Current trends suggest that the proportion of people living in apartments, currently at about 20%, is set to expand significantly.

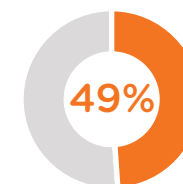


An elevated view of Camden Housing Estate, built between 1970 and 1979

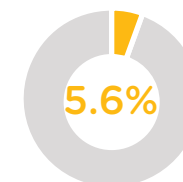
Energy efficiency 1979



Homes with double glazing



Homes with central heating



Fuel as a percentage of household expenditure

1968
425,830 new homes built. The highest annual output achieved in the UK

1968
Gas explosion causes progressive collapse at **Ronan Point**. This serious failure undermines public confidence in the modernist high-rise approach

1969
Housing Act shifted emphasis from demolition to restoration of older homes, providing funding and improvement grants

1971
The Northern Ireland Housing Executive (**NIHE**) is established. Its aim is to ensure that everyone in the province has access to decent and affordable homes

1973
The **Oil Crisis** and the UK **Miners' Strike** force the introduction of a three-day week

1973
The NHBC changes its name to become **NHBC**, the National House-Building Council

1978
Anne Richardson's Government-backed report **involved** 'getting tenants' number of tenant-participation schemes challenging poor quality or inappropriate housing

1979
Margaret Thatcher becomes Prime Minister

Themes



High-rise and non-traditional construction led to more homes being built in the UK than at any other time (425,830 in 1968)



The third and last wave of New Towns (1967–70) allowed for growth chiefly further north from the previous New Towns around London



Span sought to bring modern architecture to middle class, middle income people. The design of the landscaping was important

The problem of noise

Noise transmission between homes was an emerging concern in the 1960s. This was linked to increasing use of Hi Fi, but also to the transmission of everyday noise between dwellings. In the new apartment blocks of the time, noise transmission between homes and particularly across party floors was often a serious concern.

Prior to 2003, successive editions of Approved Document E (which sets out how to achieve compliance with acoustic aspects of the Building Regulations) had not made a sufficient impact on the number of noise complaints from occupants. So, for the 2003 edition of Approved Document E, more demanding requirements were set. Additionally, new homes would be tested for compliance, or alternatively could be built using proven construction details, available under a new scheme called Robust Details.

The Robust Details scheme, built on industrial expertise and academic rigour, has proved very popular with home builders and is now adopted on the majority of new developments across the UK. Recent research by the NHBC Foundation (NF56) has now demonstrated an encouraging decline in noise concerns from homeowners since 2003, including those living in apartments, where the acoustic challenges are highest. In this case the original research and development which led to improved construction details has delivered very positive benefits for the owner of a new home.

Looking forward from 1979



In May 1968 there was a gas explosion within Ronan Point, a newly-completed high-rise apartment block. A complete twenty-two storey corner of the building collapsed as a result, killing four people and injuring many others. A public enquiry followed, which concluded that the concrete structure was unsound - a finding that seriously undermined the public's confidence in the modernist high-rise buildings of the time. Though Ronan Point was repaired, it was eventually demolished in 1986 and, ironically, replaced by low-rise terraced homes - the very houses it was intended to supersede.

In the UK, high-rise concrete buildings are now built to a design code that has stringent requirements to prevent progressive collapse and high rise has today earned an acceptance, in some cases acclaim, for the lifestyle and value it provides.



Technology and society 1980-1999

Towards safe, secure and comfortable homes

The last twenty years of the 20th century will be remembered as a time of economic boom and bust, and a time of political activism as the nation's inequality gap widened. The 'Right to Buy' scheme was the landmark policy for housing. However, behind the scenes, a quiet revolution was taking place as advances in technology and social sciences were assimilated in improved regulations, standards and guidelines for new housing developments.

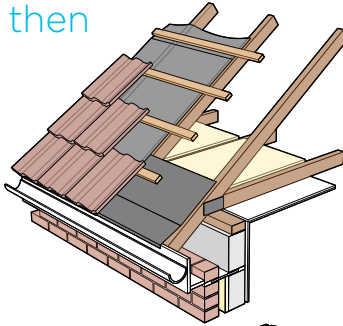


Part 5

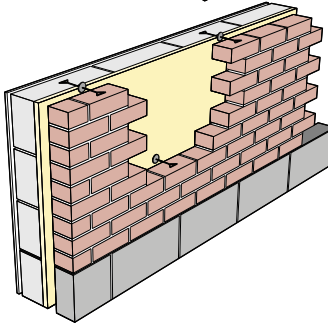
- In the 1980s, incomes improved for most people. It was a time of entrepreneurship and innovation.
- Economic success drove up house price inflation, which reached 32% in 1988. The bubble burst in 1990 resulting in negative equity for many. In 1992 alone 75,000 families had their homes repossessed.
- The Right to Buy scheme was launched in the 1980 Housing Act. By the end of the 1990s about 1.9 million council homes had been sold.
- There was a huge expansion in technical information. Radically new, performance-based Building Regulations appeared in 1985. In 1992 the new 'NHBC Standards' were published.
- Safety standards in homes were improved significantly and set a path for much safer homes today.

How we built then

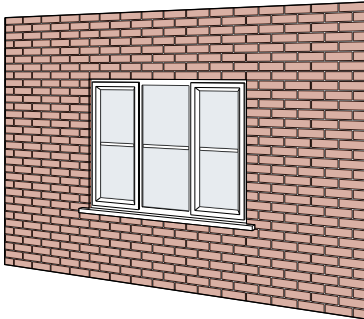
Trussed rafters almost universal. Roofs ventilated at eaves. 100 mm roof insulation



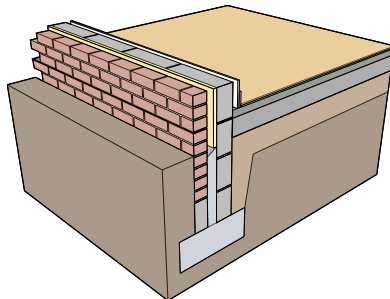
Cavity walls with aerated block inner leaf. Cavity typically 50 mm or 75 mm if partial cavity insulation included



Double glazed PVC-U windows, often casement style



Deeper concrete strip foundations. Concrete floor, DPM and screed. Insulation rare



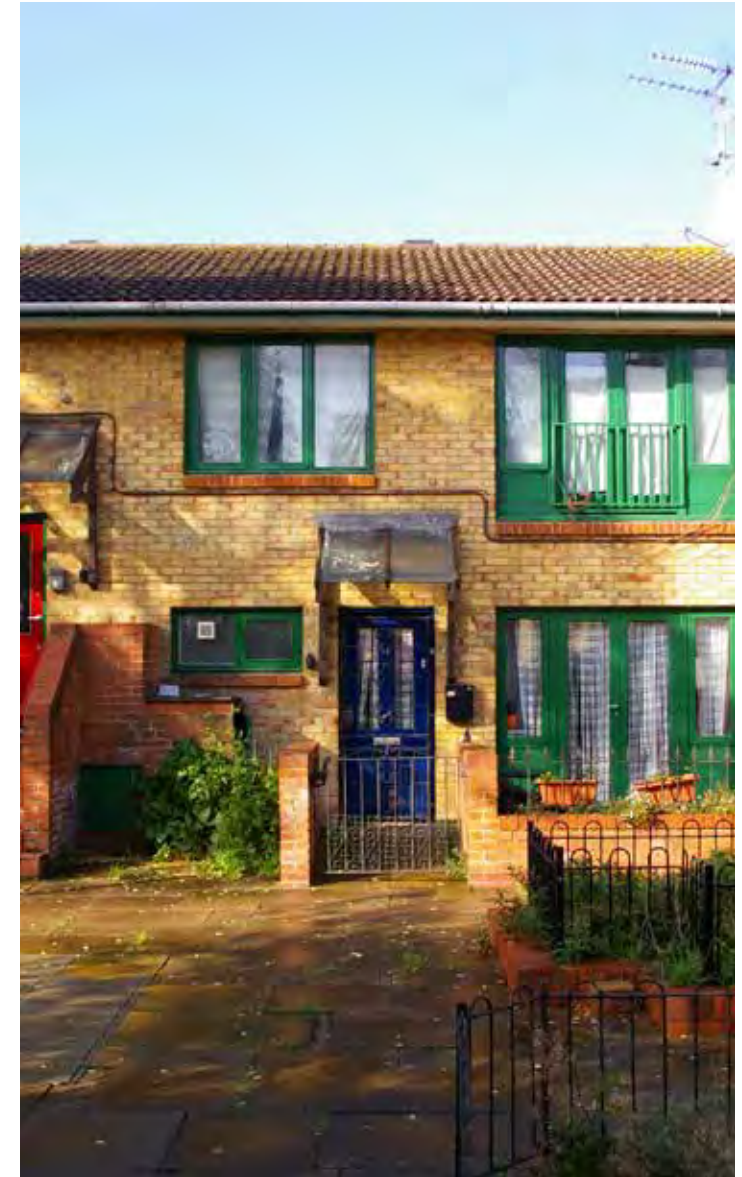
Signs of the times

Affluence reached new heights in the 1980s when disposable income nearly doubled for the wealthy and increased significantly even for those on average incomes. Many people invested heavily in expensive cars, prestige homes, luxury holidays and a generally lavish lifestyle. It was a time when those with initiative and imagination became millionaires, and a time of innovation, particularly in the services sector.

Celebrity culture emerged, promoted by new glossy magazines like Hello. Television, now in practically every home, was a powerful and influential political medium, allowing the population to more easily engage with and participate in the pressing social issues of the day, such as the Miners' Strike and the Poll Tax revolts.

As a free-market economy was being established across the world a number of changes were cementing capitalism within the UK. The 'Right to Buy' scheme gave many council tenants the chance to own their own homes and, as significant, was the increase in share ownership notably from the privatisation of public utilities.

For housing the 1990s were a time of transition. Housing Associations were replacing local authorities as the providers of social housing, and they explored novel solutions for young people and also the elderly. Government emphasis on providing homes for private sale pushed housing ownership up to 67% by 1995. To improve the design quality of developments, the Commission for Architecture in the Built Environment (CABE) was established.



Loanda Close, Stonebridge Estate, Haggerston, London. Typical 1980s housing elevation in a regeneration area

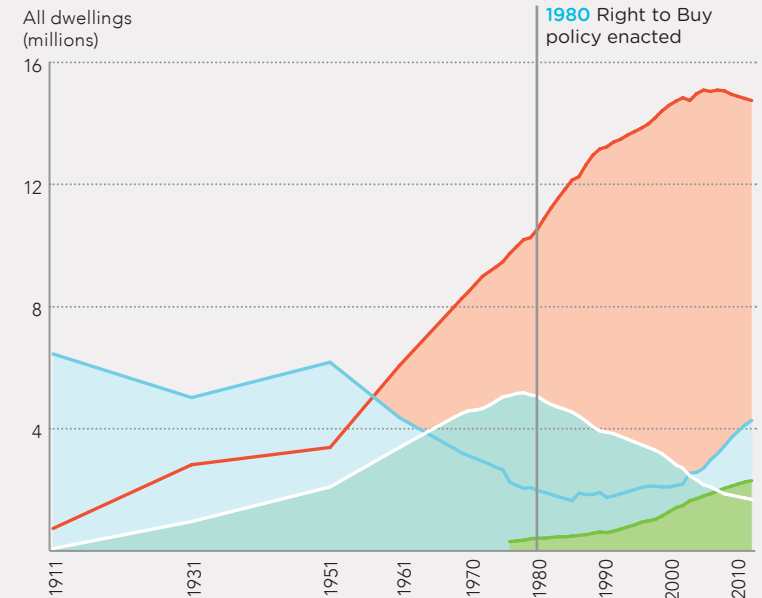
New features of the time



1. 1980s couple working an early Apple home computer
2. A family of 'Couch Potatoes', lounging on the sofa watching TV
3. Cordless telephones were now a common convenience
4. The microwave is added to the growing list of appliances that was expected in every household



Dwelling stock by tenure, England



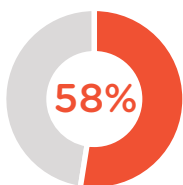
Key

- Owner-occupied
- Privately rented
- Rented from local authorities
- Rented from Housing Associations

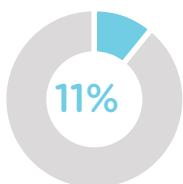
Overlaid tenure trends for English housing stock since 1911. Note the marked rise in private renting starting in the early 1990s

Source: Office for National Statistics Table 104 Dwelling stock and 'Tenure in England: 1914-99' in Research Paper 99/111 A Century of Change: Trends in UK statistics since 1900. House of Commons Library, 1999, p. 12

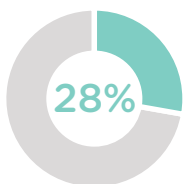
Tenure 1981



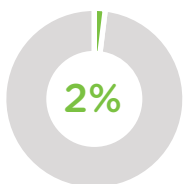
Owner-occupied homes



Privately-rented homes



Rented from local authorities



Rented from Housing Associations

Homes then

Housing from the period between 1980 and 2000 was characterised by more complex exteriors, typified by developments such as Mallard Place in Twickenham. Designers successfully explored how to deliver quite dense housing, but still achieve a spacious feel.

By the 1990s planning and design now became more closely linked, as good urban design principles were incorporated into schemes. Many were carefully designed around existing features, and incorporated amenity areas and facilities to encourage social interaction. While some high-rise apartment blocks were built, medium rise, with its more human scale was viewed as a more acceptable option.

Owners of new homes were now seeing the benefits of improved energy efficiency in construction and heating systems as national standards were raised. People could afford to heat their homes to much higher levels of comfort and average temperatures in homes increased by a remarkable 5.5°C between the early 1970s and the late 1990s. Practically all new homes had central heating installed and double glazing, and were typically equipped with fridges and washing machines. Most also had microwaves, dishwashers and tumble dryers. The kitchen, once the lowliest room and a place of drudgery, had now been transformed into perhaps the most important room in the house – a place to cook, eat, drink, work, and entertain. Kitchens became more spacious in new home designs and became a statement of an owner's wealth and status, and an undisputed deal maker in house sales.



Mallard Place in Twickenham. High quality 1980s-style housing: demonstrating pleasing architectural qualities

1980
Described as the 'Sale of the Century' the 1980 Housing Act introduces the **Right to Buy** policy

1981
Government enquiry into riots in Brixton, Toxteth and Moss Side recommends closer involvement of communities in decisions affecting their home and environment

1981
NHBC launches **Pride in the job**, an award scheme which recognises the best site managers and drives up quality across new build housing developments

1983
A World in Action documentary claims that timber-framed houses were susceptible to decay. Though discredited, the claim almost destroyed the timber-frame market at that time

1983
A total of 171 **low energy homes** are completed at Pennylands, Milton Keynes. These inform the national debate on low cost, passive energy systems

1984
The **1984 Building Act** announces a new approach to Building Regulation based on performance standards. Approved Documents set out how to comply

1989
Developed by the Police Force, the **Secured by Design** scheme is launched to encourage early consideration of security in the design of homes and estates

Technology informs design

This period was marked by a huge expansion in the availability of technical information, including radically new performance-based Building Regulations supported by detailed guidance, the Approved Documents. With the establishment of the digital age, there was a rapid expansion in the use of computer technology in industry and commerce. In housing, one of the main early computer applications was in the field of energy modelling. Now designers need not rely on uncertain empirical judgement, but would have software to demonstrate compliance to the standards of the day.

Quite sophisticated computer-aided design tools became widely used, making it possible for projects to be more easily visualised, designed and communicated with clients.

Through the 1980s and 1990s the safety and security of homes was improved enormously. Some of the main safety aspects addressed at the time – a basis for today's practice - are shown on page 30. In each case the new Regulations were built on a mixture of technical advances and improvement in design informed by a better understanding of how people interact with their homes.

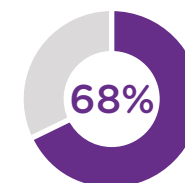
There were straightforward improvements. So, safety glazing was introduced in the 1992 Building Regulations, protecting owners of new homes from the common and nasty accidents caused by weak glass on low level windows and doors. At a much more complex level an urgent answer was needed to the alarming number of house fire deaths, which exceeded 700 people per year in the late 1960s. Much is owed to a suite of fire safety measures introduced in the 1980s that are credited with reducing significantly the number of people killed or injured by fires in their homes.

The 1990s saw the emergence of far more elaborate security arrangements. For new and refurbished apartment blocks, the welcoming concierge became common. On individual houses and apartments more robust windows, doors and locks, resistant to burglary attack, could be specified under a methodology set out in the 'Secure by Design' scheme. Developed by the Police and guided by security experts, Secure by Design also gave recommendations for the planning of neighbourhoods to deter criminals.

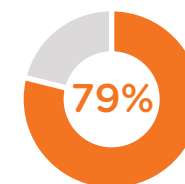
Research on how people used their homes and the whole discipline of post occupancy evaluation became established during this time, providing vital feedback on how owners and tenants respond to the new designs that were emerging.

To combat urban sprawl and make better use of derelict land, the Government, in 1998 pressed for 60% of all new housing developments to be built on brownfield sites. The major complications associated with brownfield sites, including contamination and weak ground, pose very significant technical challenges and risks for house builders. To open up the safe use of these sites, the NHBC provided detailed step-by-step guidance (Chapter 4.1 of the NHBC Standards) to help builders in the evaluation of land and the management of the major risks. To encourage housing developments on brownfield sites, a revised version of Planning Policy Guidance 3 (PPG 3) was prepared.

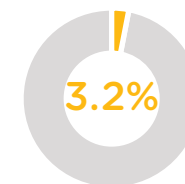
Energy efficiency 1999



Homes with double glazing



Homes with central heating



Fuel as a percentage of household expenditure

1990
The huge **Glasgow Gorbals regeneration** project begins. Eight separate areas managed by agencies and charities, and delivering housing and facilities for an envisaged population of 16,000

1991
Property values crash in the recession. The term '**negative equity**' enters everyday language, affecting more than 25% of property owners in the South East by 1995

1992
NHBC Standards published setting out more comprehensive requirements for the design and construction of new homes

1993
Work starts on **Poundbury**. Dorset: the Duchy of Cornwall explores the concept of urban villages in a town setting

1994
Through his report 'Trusting the team' Sir Michael Latham promotes a **partnering** approach between clients and construction firms

1997
Rethinking Construction (The Egan Report) invites a re-evaluation of the role of prefabrication in construction

1999
Commission for Architecture and the Built Environment (**CABE**) established to champion good quality housing and spaces. Develops the Building for Life scheme

Themes



Margaret Thatcher hands over a copy of the deeds to the GLC's 12,000th council house buyer in 1980



Council estates fast became the accommodation of last resort, as families on middle incomes sold up and moved out



The introduction of the World Wide Web in 1991 provided unparalleled opportunity for creativity, sharing and collaboration

Steps towards safer homes

Fire safety – avoiding deaths from fire, smoke and combustion products

- Providing fire escape routes (regulated 1985)
- Fire resistant construction (regulated 1985)
- Chimney and hearth construction (regulated 1985)
- Ventilation for solid fuel/gas appliances (regulated 1985)
- Fire resistant furniture and furnishings (regulated 1988)

Gas safety – avoiding gas leaks and explosions

- Requirements for safe connection and installation of gas appliances (regulated 1994)

Glass and window safety – avoiding cuts, injuries and falls

- Safety glass required in critical (dangerous) locations (regulated 1992)
- Opening restrictors required above ground floor (regulated 1992)

Lead – avoiding poisoning

- Lead additives removed from household paints (regulated 1992)

Stairs – avoiding falls

- Consistency in stair design (regulated 1992)
- Safe lighting on stairs (regulated 1992)
- Safe height and impact resistance of balustrades (regulated 1992)
- Safe gaps between or under elements of balustrades (regulated 1992)

Looking forward from 1999



Pennylands in Milton Keynes, a large-scale pioneering project exploring passive solar design

In the mid 1980s a strong worldwide economic upturn contributed to a boom, perhaps unprecedented, in the UK housing market. At one point house prices increased by as much as 30% in just six months. When this bubble eventually burst many who had invested significantly during the upcycle found themselves trapped in negative equity, with their properties worth less than the borrowing they had taken out. Negative equity was a rude shock for a nation conditioned to thinking that property was a safe investment option. For many people the entire financially-attractive concept of home ownership was temporarily called into question at that time.



Embracing sustainability 2000-present

A new norm for British housing

Housing has been a policy priority for successive Governments throughout the 20th century. In the new century, with binding national targets on carbon emissions, housing was identified as having a key part to play in the Government's carbon reduction strategy. An ambitious timescale and performance target for zero carbon homes was set down, triggering a wave of pioneering innovation by manufacturers, architects, designers and house builders.

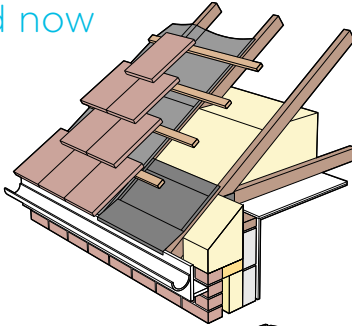


Part 6

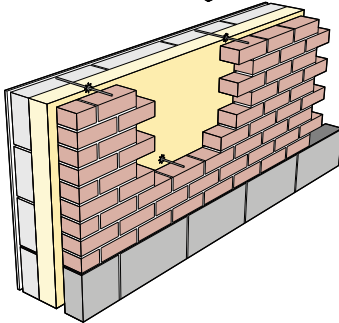
- Globalisation, through the internet and improved communications, has driven commercial and social change, but also played a part in the 2008 financial crisis and subsequent deep recession.
- Potential economic impact of global warming is highlighted in the Stern Review - Government and the business world start to engage with sustainability and to promote principles of sustainable living.
- Government supported the development of the Code for Sustainable Homes, which set out a range of environmental sustainability standards for new homes.
- The Zero Carbon Homes policy is established, with the ambition of establishing zero carbon standards by 2016. Delivery would be facilitated by the Zero Carbon Hub.
- Low energy housing designs and low carbon energy technologies both evolve rapidly. However, in 2010 housing output declines to the lowest level since the Second World War.

How we build now

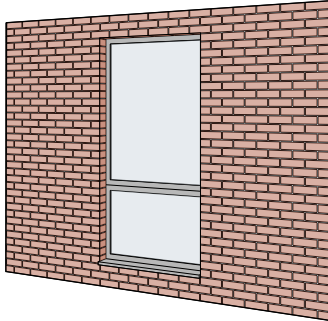
Braced and restrained trusses.
Vapour permeable roof underlays and eaves ventilation.
Deep roof insulation



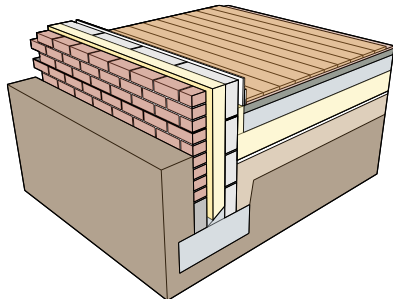
Cavity walls with aerated block inner leaf. Wide cavity with significant insulation



Double glazed PVC-U, timber or aluminium/timber windows



Concrete strip foundations and ground-bearing floor with insulation below

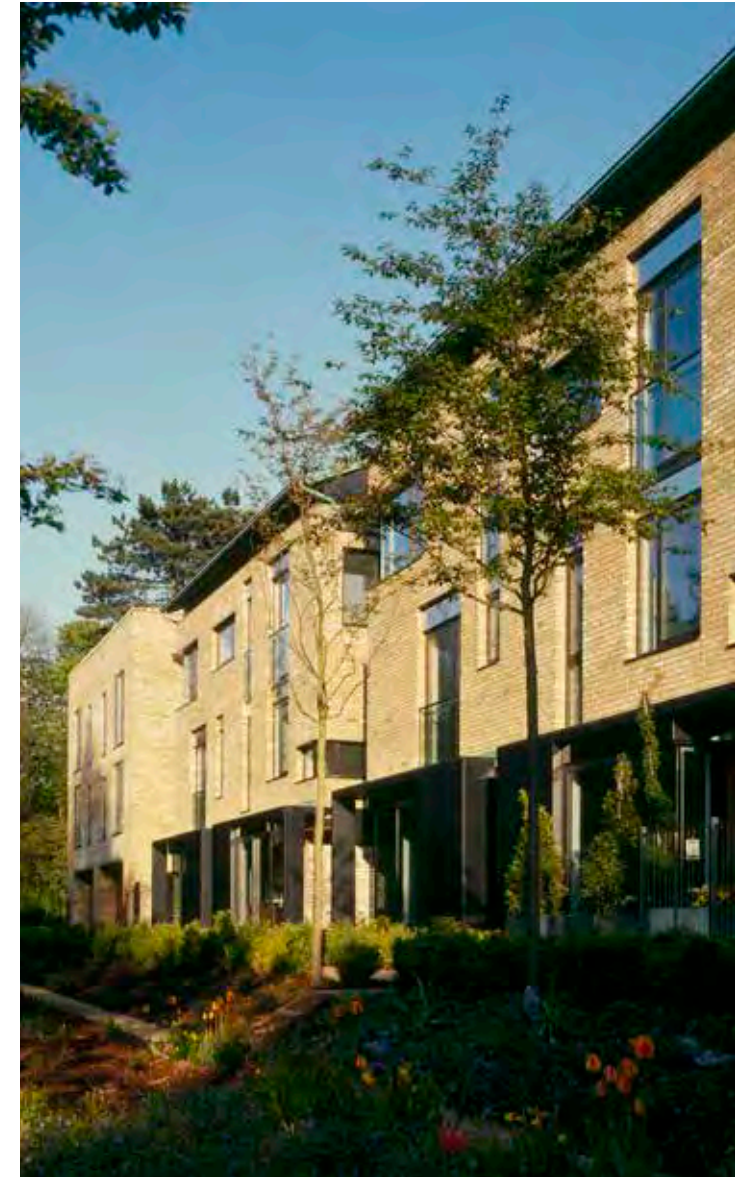


Signs of the times

With the new millennium, the concept of globalism swept into everyday life. The internet expanded rapidly and by 2006 three-quarters of British children had access to the internet at home. Between 2006 and 2010 sustainability moved from a minority interest to being a boardroom consideration. It was the Stern Review of 2006 that truly changed perceptions in Government and business, with its stark economic forecasts of climate change impact. Many practices would be changed to reduce pollution and protect natural resources.

Homes would now be built to meet environmentally-sound criteria and sustainable practices such as organic farming would gain wider public acceptance. Among a range of measures to encourage a new sustainable lifestyle, the Government would reduce vehicle excise duty for low emission cars and a European star rating scheme was introduced for low-energy appliances.

The affordability of homes was becoming a major issue. In 2002 only about 37% of households could afford to buy a home, compared with 47% in the late 1980s. From 2004 a young couple both working and earning average wages would struggle to secure a mortgage for an average-priced home. That situation has not improved and property ownership is now a distant prospect for many prospective first time buyers, particularly in London and the home counties. Indeed private ownership has started to decline in the last decade and private renting to increase.



Brooklands Avenue, Accordia Housing, Cambridge

New features of the time

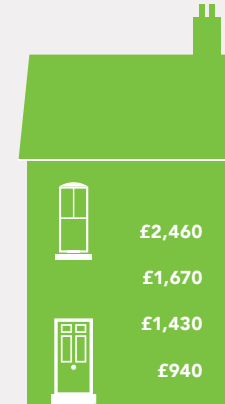


1. The transition between indoors and outdoors is a focal point for new home designs
2. A walk-in wardrobe. Now a common feature for the master bedroom
3. In April 2003 Apple launched the third edition iPod and its online music store iTunes
4. Smart meters help us manage our energy use and follow the performance of our own energy generating photovoltaics



Annual household energy spend

Victorian house
With some
modern day
improvements



£2,460

4-bed detached

£1,670

3-bed semi-detached

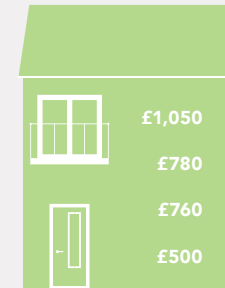
£1,430

3-bed mid terrace

£940

1-bed ground floor flat

New build house
Built to 2013
regulations



£1,050

4-bed detached

£780

3-bed semi-detached

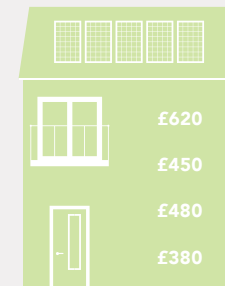
£760

3-bed mid terrace

£500

1-bed ground floor flat

Future house
2016 aspirations



£620

4-bed detached

£450

3-bed semi-detached

£480

3-bed mid terrace

£380

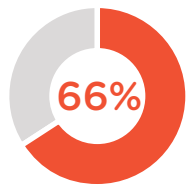
1-bed ground floor flat

Energy bills. How modern low energy homes (and the very low energy homes planned from 2016) reduce costs for homeowners

These indicative costs have been calculated by the Zero Carbon Hub



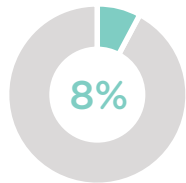
Tenure 2009



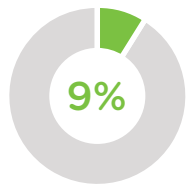
Owner-occupied homes



Privately-rented homes



Rented from local authorities



Rented from Housing Associations

Homes now

In housing, sustainability was pursued in all its recognised forms during this time. Economic sustainability was behind the Government's Sustainable Communities Action Plan which in 2003 launched a series of pathfinder projects to improve the marketability of selected run-down districts. For new housing the 'Design for Manufacture' competition explored how to build good quality affordable housing for a £60,000 construction cost.

On social sustainability, the quality of new neighbourhoods was scrutinised under the CABE 'Building for Life' criteria, and the 'Decent Homes' standard was introduced for all existing council and Housing Association homes. In 2006, the Government supported the introduction of the 'Code for Sustainable Homes' to enhance the environmental sustainability of new developments. It also sponsored the establishment of the Zero Carbon Hub to support the delivery of the zero carbon homes policy.

In response to challenging low-carbon building standards, designers and house builders have explored a range of housing solutions. The thermal performance of the envelope (walls, roofs, floors, windows and doors) has been enhanced significantly and a range of low-carbon energy technologies including solar photovoltaics, solar hot water, heat pumps and heat recovery ventilation have been adopted increasingly on new developments.

Some designs, for example BedZed, struck a futuristic tone, while others demonstrated that technologies could be incorporated almost seamlessly in traditional-appearing homes. Good quality in design is essential in delivering sustainable homes that genuinely meet today's challenging performance standards and the complex needs of communities, and there has been a timely re-engagement of the architectural profession with housing and neighbourhood design over the last decade. From 2013 the Government, through its Housing Standards Review consultation, has encouraged a wide debate on the technical standards of new homes.

2000
Through the 2000 edition of **Planning Policy Guidance 3** (PPG 3) the Government pushes for higher density housing on urban and brownfield sites

2001
The **Ingress Park** development in Dartford demonstrates effective use of a brownfield site and careful integration with local heritage. Part of the early development of the Thames Gateway growth area

2003
Energy White Paper highlights the key role of housing in reducing the nation's energy consumption

2005
Design for Manufacture competition is launched – examines how innovation in construction could contribute to lower housing costs

2006
The Government sets a target of **2016** for the delivery of **zero carbon new homes**

2006
The **NHBC Foundation** is launched under the chairmanship of ex-Housing Minister Nick Raynsford MP

Low carbon and low energy homes

A major thrust in Government policy on new homes has been to ensure that new housing from 2016 minimises carbon emissions. The pathway to this goal has entailed a rapid ramping up of the thermal performance of homes and also the adoption of low-carbon energy technologies to heat and ventilate homes, and provide hot water.

The potential financial advantages of these new homes to owners and occupiers have become increasingly significant as energy prices have risen. To ensure that homes do indeed perform as expected from design calculations, a major cross-industry study was commenced in 2013 to identify and address any part of the housing supply process that could be impacting negatively on energy performance.

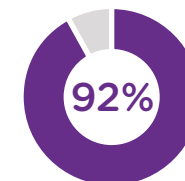
In meeting the high thermal performance standards required, homes are required to be much more airtight. In terms of ventilation this presents new challenges in ensuring adequate air quality in homes, whether related to humidity, accumulation of pollutants or just a lack of air freshness. At the same time designers are engaged with the emerging consideration of overheating. Increasing spells of hot weather are predicted under climate change projections and care will be needed to ensure that new thermally efficient homes are not predisposed to risk of overheating. Indoor air quality and overheating have been, and remain, priority areas for research and guidance.

Another main thrust of research has been directed at understanding how people use their new homes and improving the quality of advice to ensure that incorporated technologies are used to their potential.

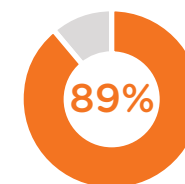


Newhall Be, Harlow, Alison Brooks Architects

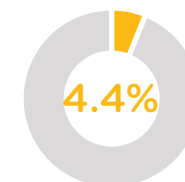
Energy efficiency 2009



Homes with double glazing



Homes with central heating



Fuel as a percentage of household expenditure

2006
The **Stern Review** on the economics of climate change introduces the stark financial impact of the global greenhouse effect

2006
The **Code for Sustainable Homes** is launched, setting environmental standards for homes, including energy and water use, enhancing biodiversity and minimising waste

2008
The **Zero Carbon Hub** is established, a private/public partnership to facilitate the delivery of zero carbon homes

2010
Consumer code for home builders comes into effect. Sets 19 requirements and principles that home builders must meet when marketing and selling homes and providing after-sales service

2010
Brookwood Farm development demonstrates that highly energy efficient homes can be delivered with a traditional appearance

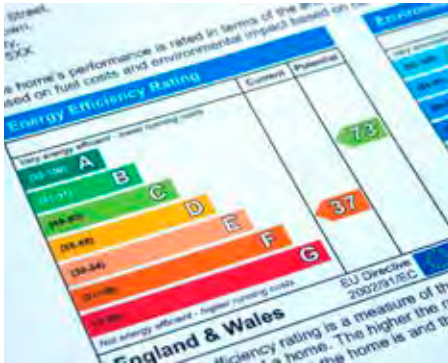
2012
The **National Planning Policy Framework** is launched – setting out a planning system for the delivery of sustainable development

2014
New energy efficiency standards for homes are set out in Building Regulations Approved Document L – the penultimate regulatory step before the introduction of zero carbon standards

Themes



Beddington Zero Energy Development (BedZed) designed for the Peabody Trust, Helios Road, Wallington, Sutton, London



Energy Performance Certificates (EPCs) were introduced in 2007 and are needed whenever a home is built, sold or rented



Low energy homes at Derwenthorpe. The design draws on the rich architectural legacy of the century-old model village at nearby New Earswick

The NHBC 'Buildmark' warranty

Around 80% of new homes in the UK are registered with NHBC and sold with the benefit of an NHBC 'Buildmark' warranty, which currently protects over 1.6 million homes.

The Buildmark warranty gives homeowners protection with:

Pre-completion insolvency cover

This gives protection if the builder becomes insolvent after exchange of contracts

Cover for the first two years after completion

The builder is responsible for putting right certain damage and defects. Homeowners also have access to the resolution service and NHBC Guarantee in the event that the builder fails to fulfil their responsibilities

Cover for parts of the home in years 3 to 10 of ownership

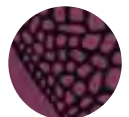
Insurance to cover the cost of putting right physical damage in specified areas of the home such as damage to floors, staircases, roofs, drains, windows and doors

Looking forward



For the rest of the 21st century, what should our aspiration be for British housing? The reality is that we have insufficient housing and a severe shortage is going to be with us, at least in the medium term, no matter what is done to boost output. It is important that the pressure on numbers does not have an adverse impact on quality, to the detriment of purchasers, owners and tenants.

There is a sunnier outlook which draws hope from the large numbers of high quality schemes and developments that are emerging in our cities, towns and villages. Many of these projects are the result of new positive partnerships between house builders and architects, and are contributing to a new and powerful public appreciation of the importance of quality in the built environment.



The future

Meeting tomorrow's needs and challenges

Part 7

In contemplating future homes it might be limiting to envisage a convergence towards one solution and more inspiring to think about how housing might be favourably adapted to meet a number of specific circumstances and pressures. Could well designed, stylish and safe homes suited to downsizing or single person occupancy become a more common new house type within 20 years? These, alongside new family homes, which are also needed, should perhaps be a priority for our 21st century pioneers in planning, design and construction.





Derwenthorpe by Richards Partington Architects. Passive measures, including good, secure ventilation, planting and reflective surfaces will protect homes from higher temperatures expected in future in the UK

Directions and priorities

Over forthcoming decades and beyond, pressures, particularly arising from demographic and social changes, are likely to have a profound effect on how we design new homes and neighbourhoods. With people spending more time at home, a focus will remain on health and well-being and, in particular, what our homes can do to prolong independent living for older people. Research and development will continue on how we can reduce still further the impact of new homes on the environment, perhaps with a move to address embodied energy in the materials used for construction. Socially we may become more aware of the positive impact of design excellence on people and place more value on the contribution good housing plays in achieving social cohesion.

In addressing these, and other issues, technology will be a major contributor. However, it will be essential that home buyers can be encouraged to recognise the value of emerging technologies and be willing and able to engage with them. The clever integration of new technologies within well-designed homes which are pleasing to people and meet their needs efficiently, has been and should continue to remain the aspiration.

A number of thematic technological areas will undoubtedly affect the development of design of new homes. Already the concept of the 'interconnected home' is gaining a foothold. Here, a mobile device such as a smartphone or tablet displays and controls the status or activity of everything from the security system to the room lighting and entertainment. This kind of technology is advancing rapidly with mobile 'apps' (software applications) available to control a range of functions remotely, for example, to provide entry for selected guests and family members.

Automation has been used for some time to operate basic devices in the home, such as closing curtains for security and operating shading devices. The idea of the fully automated house, which monitors the occupants, learns their heating and comfort requirements and even replenishes the refrigerator is also emerging. 'Whole house shutdown' systems (similar to the keycards used in hotels) could become commonplace, as could central locking by means of an electronic keyfob. For further information see NHBC Foundation report (NF43).



Emmett Russell Architects' winning entry for the Re-Imagine Ageing RIBA Design Competition offering the baby boomer generation a new model of home ownership in later life

Automation is seen to have a potentially significant role in supporting independent living for older people in their own homes, as well as those with disability or illness. In the future, monitors in homes will be able to provide remote reassurance that elderly relatives are following their normal patterns of behaviour. One step further, and being trialled in Australia, is health monitoring: key information is fed back automatically to the occupant and, via the cloud, to clinicians and relatives.

As domestic energy efficiency increases further and renewable energy technologies are improved to deliver even greater efficiency, new homes may tend to become more self-sufficient and less dependent on connections to the electricity and gas grids. This would require a fundamental rethink of the design and installation of services as well as large batteries or other means of storing energy within individual homes.

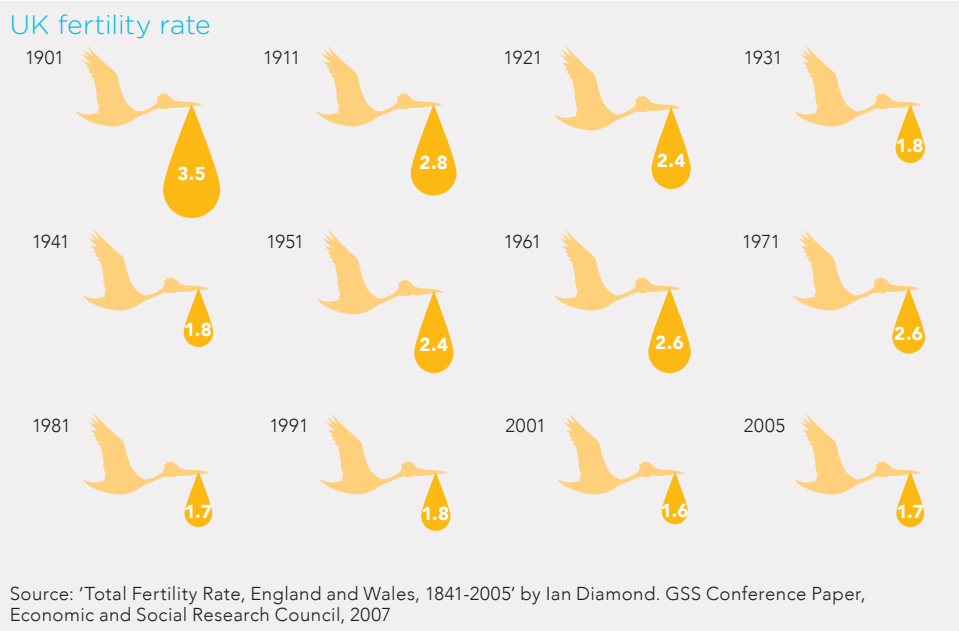
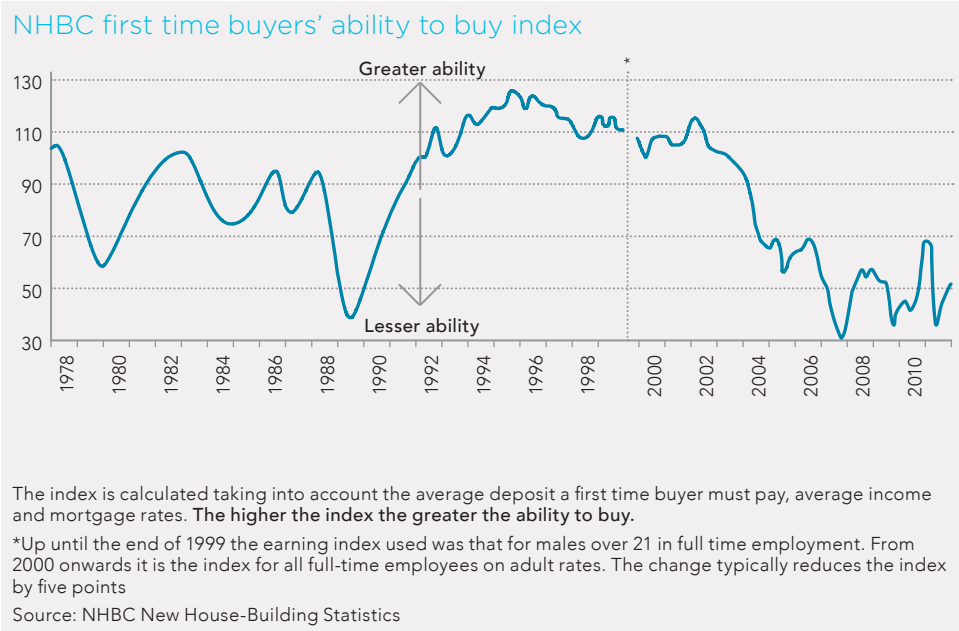
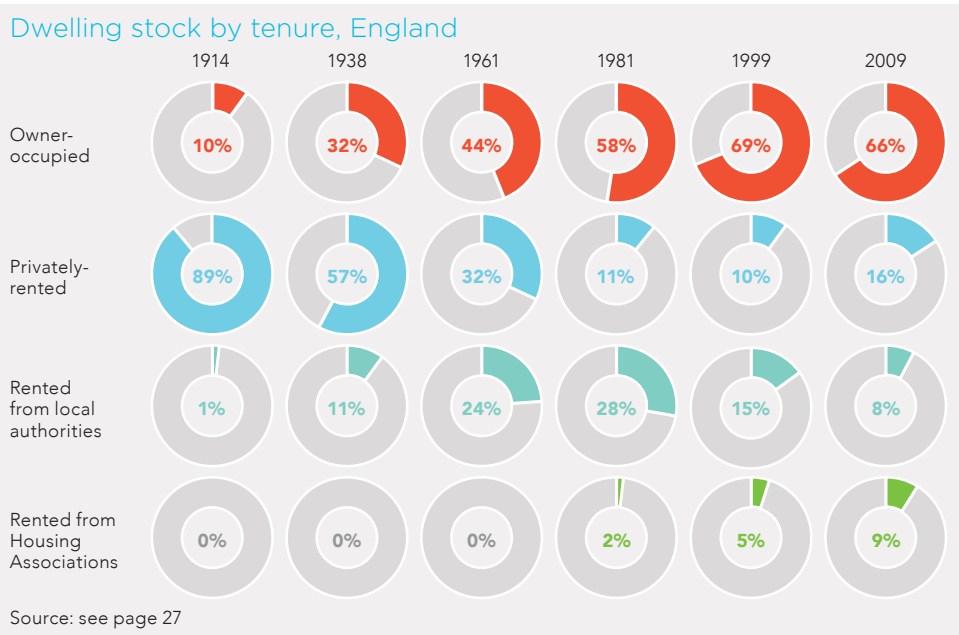
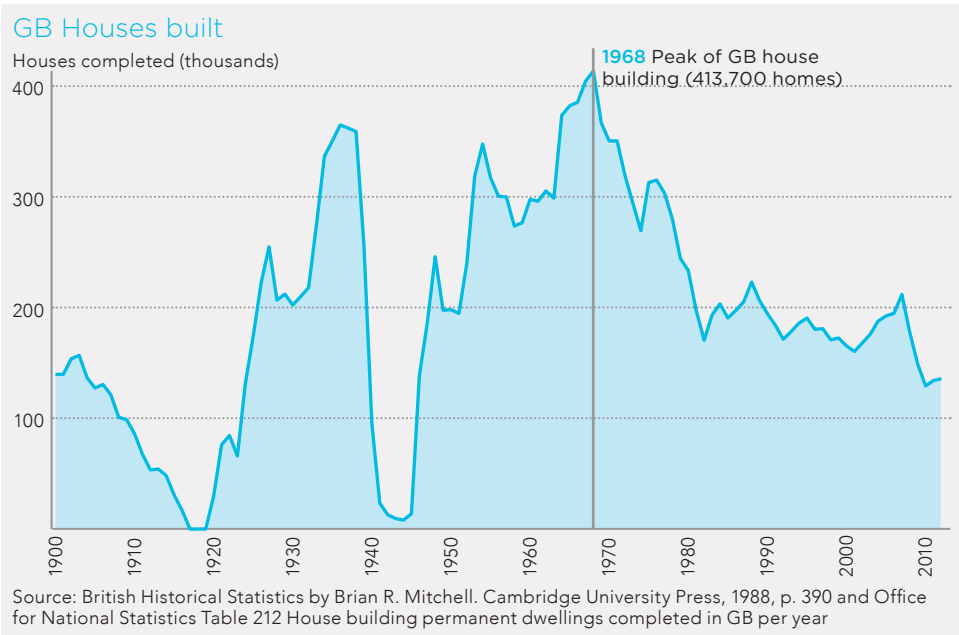
It is conceivable in the very long term that a mix of approaches might ultimately lead to the development of homes that mimic natural systems. These could be built from materials that are self-repairing and provide internal environments that are entirely self-regulating, responding to environmental changes. These ideas are gradually gaining widespread acceptance: 'biomimicry' is even a feature of some commentators' vision of a future home. However, this vision is associated with the low-density, land-hungry, detached home, with the autonomous elements requiring land and space. So in its pure form, this is unlikely to be a model for dense, urban living, though elements of self-sufficiency might become increasingly relevant in more remote areas.

The future by definition is uncertain; however, as in the past, British ingenuity will once again be central to our success in overcoming technical challenges and delivering homes that are right for the coming decades.



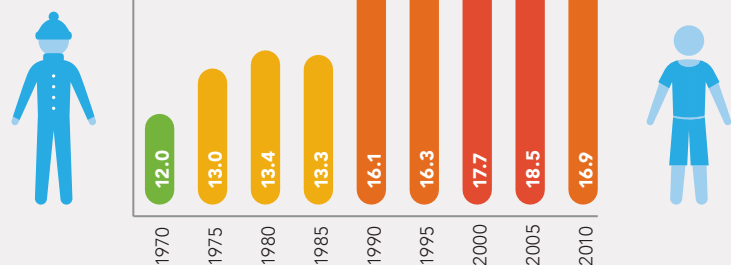
Emmett Russell Architects' Rose House, Kingsdown, Bristol. Interior of modern family home with advanced low carbon energy technologies

Summary charts



Average winter internal temperatures in °C

Average internal temperature (centrally heated and non-centrally heated homes)



Source: United Kingdom housing energy fact file by Jason Palmer and Ian Cooper. Department of Energy & Climate Change, 2013, p. 136

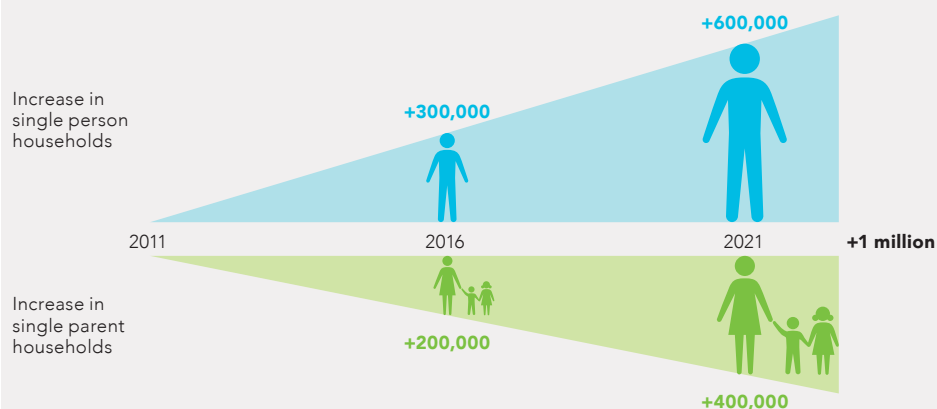
Annual household energy spend



Energy bills. How modern low energy homes (and the very low energy homes planned from 2016) reduce costs for homeowners.

These indicative costs have been calculated by the Zero Carbon Hub

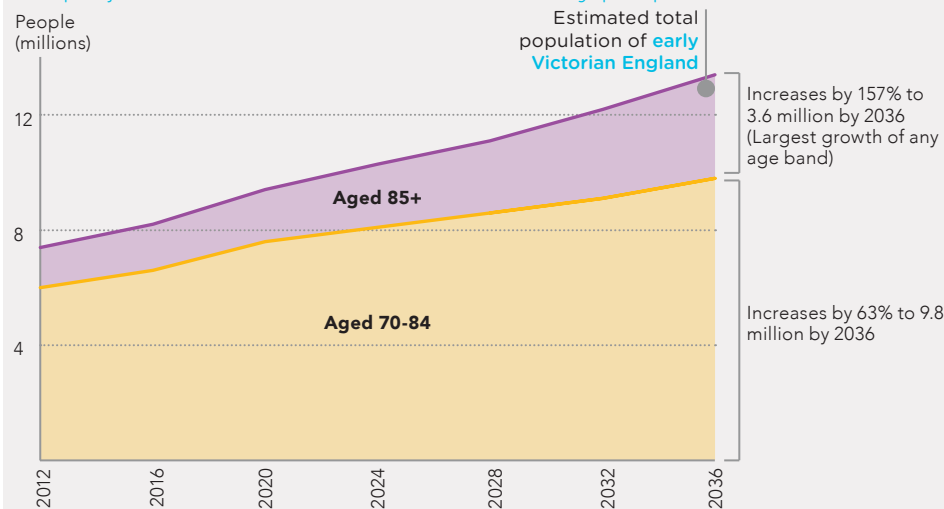
Increase in single person & single parent households, England



Two key 21st century household demographic changes: projected growth in single person and single parent households. Both trends increase the housing need, but what kinds of housing should be created for each?

Source: Household Interim Projections 2011-2021, Department for Communities and Local Government, 2013

UK projected increase in numbers of elderly people



Our ageing population. Growth in the numbers of elderly and very elderly people in the UK. Even in the medium term, up to 2036, the projected changes are staggering

Source: National Population Projections, Office for National Statistics, 2013.

Background reading and information

The life of the British home: An architectural history by Edward Denison and Guang Yu Ren. John Wiley & Sons, 2012

A history of modern Britain by Andrew Marr. Pan, 2006

The Construction of Houses by Duncan Marshall, Derek Worthing, Nigel Dann and Roger Heath. Estates Gazette, fifth edition 2013

The Effects of High-Rise Living on Residential, Social and Health Indicators and Outcomes in Glasgow: Results from the GoWell Programme by Phil Mason & Ade Kearns, Elise Whitely and Carol Tannahill www.geography.dur.ac.uk/Conf/Portals/124/Wednesday/Phil%20Mason.pdf

Energy efficient fixed appliances and building control systems, NF43. NHBC Foundation, 2012

Overheating in homes: Understanding overheating – where to start, NF44. NHBC Foundation, 2012

Sound progress: A review of homeowner feedback on noise in new homes, NF56. NHBC Foundation, 2014

NF43, 44 and 55 are available from www.nhbcfoundation.org

Brookwood Farm and Greenwatt Way. Advanced technology with traditional and modern exteriors respectively www.zerocarbonhub.org/building-profiles

Places to visit

National Trust Birmingham back to backs www.nationaltrust.org.uk/birmingham-back-to-backs/

BRE Innovation Park, Watford. Experience sustainable new homes www.bre.co.uk/innovationpark/

The Geffrye Museum of the Home, London. Explore 400 years of history of the home www.geffrye-museum.org.uk

Thrasher Street, Aylesbury. Good examples of British Iron and Steel Federation (BISF) steel frame homes from the immediate post war period

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About the NHBC Foundation

The **NHBC Foundation**, established in 2006, provides high quality research and practical guidance to support the house-building industry as it addresses the challenges of delivering 21st century new homes. To date we have published over 60 reports on a wide variety of topics, including the sustainability agenda, homeowner issues and risk management.

The NHBC Foundation is also involved in a programme of positive engagement with the Government, academics and other key stakeholders, focusing on current and pressing issues relevant to house building.

To find out more about the NHBC Foundation, please visit www.nhbcfoundation.org. If you have feedback or suggestions for new areas of research, please contact info@nhbcfoundation.org.

NHBC is the standard-setting body and leading warranty and insurance provider for new homes in the UK, providing risk management services to the house-building and wider construction industry. All profits are reinvested in research and work to improve the construction standard of new homes for the benefit of homeowners. NHBC is independent of the Government and builders. To find out more about NHBC, please visit www.nhbc.co.uk.



NHBC Foundation Expert Panel

The NHBC Foundation's research programme is guided by an Expert Panel of senior representatives from Government and industry:

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Andrew Burke Policy Officer, National Housing Federation

Richard Cook Head of Residential Development, Lend Lease

Claire Curtis-Thomas Chief Executive, British Board of Agrément

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