

Offsite Housing Review

February 2013



Offsite Housing Review

As requested by Ministers at the Department for Communities and Local Government and the Department for Business, Innovation and Skills, we have undertaken a review of the housing market in England and examined the potential for offsite construction methods to play a more significant role in the house-building industry in future. We have been aided in this task by a large number of very knowledgeable people drawn from across industry and government, and the findings of our combined efforts are presented in this report.

Perhaps the most striking aspect of our investigation has been the broad level of agreement amongst experts that there is a housing stock shortfall in England which looks set to get worse. If this shortfall is to be rectified, it implies an expanding market for builders across all segments of the house-building industry. At the same time, the need to address the Government's carbon and energy-related agendas is driving the introduction of higher build standards. The need, therefore, is to build better houses faster. This combination of requirements plays to the strength of offsite construction and, for this reason, the scene appears to be well set for offsite construction to play a significant role in delivering more homes to higher standards in the coming years.

However, the successful introduction of these new methods of construction will require a great deal of time and effort. Offsite construction has enjoyed considerable success in the mainstream construction industry and there are few large buildings, these days, in which the construction process has not been influenced by the benefits which offsite products can bring. The house-building sector is unusual in that this has not happened. However, the reasons for this are clear: house-building has its own set of economic and technical drivers and they are very different to those of the mainstream construction industry. The combination of very low construction costs, and the need for very agile production processes, represents a difficult target market for the offsite producer.

To crack this market, offsite producers will need to innovate. Factories will have to be built and new products will have to be developed. Investment decisions will have to be taken and cultural changes will have to be brought about. To embark on a route which holds such risks will require that business leaders have great confidence that the future market is real.

In this report, we have therefore tried to give firm foundations to the arguments that demand will increase and that standards will rise. We have also tried to characterise the likely scale and nature of the future housing market so that businesses might be attracted to the opportunities which are there. In parallel with this, we have also tried to highlight, for Government, the key factors which will encourage these developments: namely, clear signals that the Government is committed to addressing the serious stock shortfall problem, and the provision of short-term encouragement for industry to invest ahead of the rising need. Our conclusions and recommendations are framed around these considerations.

In conclusion, we should say that this report represents the willing efforts of a great many people over a very short space of time. They are identified in Annex 1. We are indebted to all of them and would like to thank them sincerely for their significant contributions.

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Executive Summary

The work undertaken by this Review Panel has focused on the opportunities to increase the role of offsite solutions to improve the delivery of new homes for both sale and rent and to examine the actions that can be taken by a range of stakeholders including Government to improve the capability of offsite solutions to make a more significant contribution to help meet current and projected housing needs in England. The Terms of Reference set by Ministers are shown in Section 1 along with the specific issues the Review Panel has been asked to address.

It needs to be noted that a number of offsite solutions are already extensively used within the house-building industry. For example almost all new low-rise homes will be built using factory manufactured truss-rafters for the construction of pitched roofs. Similarly there is ubiquitous use of factory-finished windows and doors and there is, of course, significant use of factory manufactured timber-frame walling systems of various forms. Accordingly there is plenty of evidence to demonstrate that the house-building industry is receptive to the use of offsite construction solutions where it is in their commercial interests to do so. For this report we consider that offsite is defined as involving substantial factory manufacturing intervention to add to project value. The challenge for offsite suppliers is to address the actions that need to be taken to create the project and economic case for a step-change increase in the use of offsite solutions of all types.

The strategic housing challenge that needs to be addressed by Government is the requirement to substantially increase the number of new homes being built to meet the needs of a rapidly growing population and a substantial increase in the number of households. The Government's housing Strategy for England sets out to stimulate the market. Assuming that it is possible and affordable to increase the size of the annual new build programme to close to the rate required to meet demand then the additional challenge will be to sustain that rate of build over a period of not less than 20 years in order to address the growing need for additional homes.

In direct response to market conditions currently the house-building industry in England is delivering something like 100,000 homes a year. The house-building industry asserts that given due notice to resource an expanded programme it will be able to deliver around 140,000 new homes a year using traditional methods of site-based construction. However, they do point out that the skills of the traditional workforce are in long term decline and additional skilled labour may need to be recruited from overseas. The house-building industry will contend that the reduction in the size of the new build market over recent years has had a significant effect on the ability of the traditional workforce to develop the necessary skills.

What seems abundantly clear is that if there is to be a significant and sustained increase in the rate of build of new homes to levels above 140,000 a year it is entirely likely that this will need to be enabled at least in part by a substantial increase in the use of offsite and industrialised construction methods. This has been the clear learning point from previous step-change increases in rates of house-building since the late 1940's onwards. However, the difference this time around is that the rationale for increasing the rate of build is not something to be maintained only long enough to meet a particular short term or local need – but rather we are talking about establishing a new substantially higher base level that will need to be sustained year on year.

It also seems clear that real growth in the provision of new housing will need to be driven by a combination of recovery in the private new build housing market, expansion of the self-build market, by growth in the private market rent sector and by a substantial increase in social house-building. Private sales, self-build and private rent on their own cannot meet the level of demand that is anticipated on the basis of the Government's own figures for household and population growth. How a significant increase in the size of the social housing sector is to be funded either in terms of capital or revenue at a time of low economic growth, the necessity to reduce public debt, and declining levels of personal income is a challenge that only Government can address.

In terms of performance levels offsite forms of construction have substantial potential advantages over traditional forms of construction particularly in terms of speed of build on site, quality of build and in terms of cost of ownership, sustainability, health and safety and waste reduction. Other client sectors have long recognised these attributes and the business value they can deliver but significant sectors of the house-building industry (and to some extent their clients) whilst being aware of these attributes have to date taken the view that in isolation they are not of prime benefit given the way in which the housing industry operates. House-builders have developed efficient supply chains which can deliver current volumes of new homes at a first price that the offsite industry will find it very difficult if not impossible to match. It is the price point that is all important to house-builders.

The reality is that faster build times on site and improved quality are of no particular interest to volume house-builders because at current rates of demand they do not need to build out their sites any faster than they can currently achieve through the use of traditional methods. Also because of the way in which the construction process is managed there is generally little if any financial benefit in terms of reduced borrowing costs that would be attributable to a faster rate of build. However, faster rates of build might well appeal to social landlords who wish to provide homes for tenants as quickly as possible to meet housing need, to developers of market rent dwellings able to generate income that bit sooner and also to self-builders. House-builders also claim that there is no consumer demand for improved levels of quality (including energy efficiency) and that as the price of new homes for sale is in the main set by the assessed value of adjacent and comparable homes there is unlikely to be any uplift in the value of new better quality homes versus other properties. As a direct result house-builders are generally unlikely to see any commercial advantage in constructing new homes to a level of performance above the basic requirements set by Regulations. This position reflects the fact that house-builders currently have no interest in the performance of the new homes in use beyond the provisions of the normal structural warranties. This assessment by house-builders also helps explain the almost complete absence of quality brands in the domestic mass housing market. The key issues for private buyers are said by house-builders to be location and price.

The Panel considers that potentially the most significant technical development that will support the increased use of offsite construction methods rests with the Government's ambition to raise the requirements for the thermal performance of new homes through the uplift in Part L of the Building Regulations. Improving the thermal performance of new homes is a core component of the Government's sustainability strategy and as the performance requirements increase it will become more difficult and therefore more expensive for house-builders to achieve the build quality necessary to deliver the prescribed performance levels through traditional forms of construction. We believe that once this tipping point is reached house-builders will automatically seek to switch over to the use of offsite solutions. The Panel is of the view that Government's confirmed intention of increasing the requirements of Building Regulations is the single most important technical measure that will serve to advance the increased use of offsite solutions and adventitiously drive higher standards of build quality into the house-building industry.

House-builders advise that the introduction of new more demanding performance standards and the costs associated with these changes has already been factored in to the prices that they will have paid for new land acquisitions. In simple terms the more that it will cost a house-builder to construct new homes will usually lead to a corresponding reduction in the value of land. Taking this advice on face value suggests that there is no pressing financial case for Government to delay the introduction of more demanding standards because, so we are told, this will not increase the cost of new housing. The flip side of this argument would be that if the Government decided to go slow on or even to abandon the previously announced increases in performance standards the effect would not be to reduce the overall cost of new housing but rather would increase the price that could be paid for land for future development plus some element of windfall profits in respect of the development value of existing sites. Arguably a similar effect would apply in the event of a reduction in S106 settlements or CIL.

There is no evidence of any fundamental objection from house-builders to the increased use of offsite solutions. Theirs is predominantly a cost-based decision, not a technology-based decision. There are, however, concerns among house-builders regarding the ability of the offsite supply side to deliver products that suit their development needs. Currently most house-builders have a good working knowledge of offsite systems and will make use of offsite components where this makes commercial sense. Indeed some house-builders operate their own offsite manufacturing facilities as part of their strategic product and process mix.

The offsite supply side is a relatively immature industry both in the UK and also in much of the rest of the world. This is particularly the case with regard to the development of products for the house-building sector. There are few enterprises operating at significant scale although there is evidence that a number of very substantial manufacturers that have traditionally focused on the production of what are essentially commodity products for traditional site-based construction, are now investing in the development of high value offsite components. We understand that their commercial judgement is that the house-building industry will at some point undergo a sea-change that will see offsite components increasingly being used in place of traditional site-based construction methods. Whilst this development is welcome there is a clear need for offsite suppliers (with some notable exceptions) to develop the products, services and value propositions that house-builders require in order to improve the commercial attractiveness of their offerings. It will require considerable efforts by off-site suppliers to understand how the house-building industry operates in order that it can better meet the project needs of the market. Unless the domestic offsite industry can rise to this challenge there is a risk that innovative offsite solutions will be imported to fulfil any excess demand that emerges.

The Conclusion of the Review Panel is set out in Section 7
The Recommendations for Action are set out in Section 8

1 Introduction and Terms of Reference

- 1.1 Ministers invited the Review Panel to consider and make recommendations to Industry and Government on the contribution which the offsite construction sector can make to increase the delivery of more homes and how the increased use of off-site construction can be incentivised in England.
- 1.2 Addressing these objectives involves three specific requirements:
 - Identifying and examining any barriers holding back the growth of the offsite housing construction sector, taking account of previous work and initiatives to promote offsite construction
 - Making recommendations on how the increased use of offsite construction can be incentivised to promote housing supply and unlock high value jobs in the UK
 - Identifying what short term and longer term action should be taken by industry and, if necessary, Government to implement the recommendations.
- 1.3 The focus for the Review has been the new-build homes market and includes both private and social sectors.
- 1.4 The Review is highly relevant to the Government's ambition to identify and support initiatives which can make a significant contribution to sustainable economic growth and to employment domestically and in winning work in international markets.

2 Responding to the specific questions asked by Ministers

- 2.1 Detailed Recommendations on how the increased use of off-site construction can be incentivised to promote housing supply are set out in Section 8.
- 2.2 In the course of our work the Panel has carefully considered the extent to which there are barriers which are serving to hold back the increased use of offsite housing construction solutions within the new build housing market. Our view is as follows:
- There is no evidence of national regulatory barriers to the increased use of offsite solutions. Indeed the effect of planned changes to the requirements of Part L of the Building Regulations are likely to lead to changes in construction methods that will support the business case for the increased use of offsite solutions. However, it does seem likely that local requirements impacting on the design of new homes in certain locations serve to introduce variability into the build process which serves to impede the cost effective use of standard or factory made solutions and therefore make it much more difficult and expensive for offsite solutions to compete. The rationale for these local requirements is unclear to us. The Panel notes that this issue is being examined as part of the Government's Housing Standards Review and we welcome this development
 - There are certainly significant commercial challenges to the increased use of offsite construction solutions being pitched to the price sensitive house-building sector that the offsite supply side will need to address if it is to compete effectively. However, there is ample evidence to demonstrate that where the business or project case exists the house-building industry is very supportive of the use of offsite solutions. The extent to which the use of factory manufactured truss-rafters and timber frame systems have become commonplace across the house-building industry serves to support this view.
 - Some elements of the offsite supply side have to some extent created their own obstacles to the use of offsite solutions by operating manufacturing practices that make it hard to provide for the cost effective delivery of small batch production runs capable of meeting the development practices of the house-building industry as it exists today. Currently the opportunities to apply economies of scale through mass-production techniques to reduce unit price do not exist in the domestic house-building for private sale market. Nor outside of a Government-led house-building programme requiring rapid rates of build is it likely that the potential gains from mass production will be demonstrated at a scale sufficient to deliver significant savings in manufacturing cost.
 - It is not obvious that the offsite sector has as yet totally got to grips with the detail of how the house-building industry goes about its business and many manufacturers have concentrated on markets that are easier to enter. Some offsite businesses have commercial links which will ensure a good knowledge in relation to their particular product ranges but we remain unconvinced that this essential market knowledge is actively being sought by the offsite supply side at large.
 - Unless the market changes it should not be assumed that all offsite manufacturers will regard the commercial opportunities to compete in the house-building market as an immediate commercial priority. They may conclude that this sophisticated and almost entirely cost-focused market place is simply not worth the effort. Their judgement might be to focus development efforts on other possibly more profitable sectors of the construction market.

- We do not believe that there are any significant barriers in the form of lack of awareness of offsite solutions on the part of house-builders or their supply chains. House-builders are generally well informed of developments within the offsite sector and indeed many will have extensive experience of the use of such solutions and their advantages and disadvantages.
- House-builders are risk averse and typically will not adopt the use of novel technology unless there are powerful commercial arguments that justify taking on that risk. We need to bear in mind that the cost of materials used in the construction of new homes represents only a small proportion of the overall cost of new homes and any savings from the introduction of new solutions or processes are likely to be modest - see Section 4.7

2.3 Impact on jobs

With regard to the impact of the increased use of offsite construction methods on house-building Ministers need to be aware that there is no reason why the use of mass production techniques should have any different impact on jobs in house-building than has been experienced as a result of introducing similar techniques in other industries.

It is entirely likely that the increased use of offsite solutions to deliver new build housing will involve fewer people being employed on construction sites with a consequential loss of jobs in traditional construction craft skills and a significant reduction in jobs requiring low-level skills. However, there will certainly be new highly skilled and transferrable jobs created for example in the manufacturing plants, in the assembly of factory made components on site and in the integration of offsite components with traditionally crafted elements.

The overall effect on jobs is impossible to predict at this stage because so much depends on the number of new homes built each year, the potential transfer of labour to focus on opportunities for the refurbishment and performance upgrade of existing homes and, of course, on the pace at which offsite solutions take the place of traditionally constructed building elements. For example in the new homes for individual private sale section of the market it seems unlikely that the consumer or planner preference for brick or stone external walls will diminish any time soon notwithstanding the form of structural frame or the construction system used for foundations, floors, roofs and building services.

3 Project Management and Method of Working

- 3.1 This Review has been jointly chaired by Professor John Miles of Cambridge University and Professor Nick Whitehouse of Oxford Brookes University. Overall Project Management has been provided by the Construction Industry Council.
- 3.2 A project Review Panel comprising leading figures from the UK housing industry was established to provide expert input on the operation of the UK housing market, advice on the current and potential role of offsite construction techniques and to give advice on the specific questions asked by the Departments. The Membership of the Panel is shown at Annex A
- 3.3 A Litmus Group comprising senior technical and policy experts was established to undertake detailed assessment and scrutiny of the learning points emerging from the Review Panel and to help shape the analysis and recommendations contained in this Report. The Membership is shown at Annex A
- 3.4 The Review team has undertaken a number of Workshops involving representatives from special interest groups comprising:
 - RSLs and LAs
 - House-builders
 - Construction product and component manufacturers and suppliers

These separate Workshops have been of particular help in framing the output from this Review and brief summary notes of the Workshop Sessions have been included at Annex B.

In addition a number of one to one interviews have taken place with selected individuals drawn from industry organisations and from across client and supply chains to gather additional information and perspectives relevant to the Review. A list of those who contributed in this way is included in Annex A

4 Background to the Current Housing Market in England

Housebuilding in England has very long established traditions. The industry reached maturity long ago and, today, it is an important part of the social and economic fabric of the country. For most of the 20th Century, houses in England were delivered through a mix of private and social channels, with Local Authorities being major providers of housing stock up until the late 1970's. Since then, levels of social provision have declined significantly and, for the last 30 years, most housing has been provided through the private market. This chapter looks at the current position, and sets the activities of today's private and social providers into context.

4.1 Need for more house-building

There is a strong case for a rapid increase in house-building in England. This case is based on the emerging evidence of overcrowding (particularly in the rented sector), the projected increase in population over the next two decades, and social trends towards the breakdown of the nuclear family and more people living alone (see Box). The Government's Housing Strategy for England reviews both the demand and supply side of current housing provision.

Despite these demand pressures, private housing output is currently at a low-ebb (primarily because of restrictions in the mortgage market) although there has been some welcome recovery during the last year

In light of the above, something dramatic needs to be done to accelerate the rate of house-building. However, it is not credible that, on its own, the increased use of offsite construction will increase the number of new homes. Offsite is a manufacturing best practice and as such it cannot create market demand that does not exist.

The response, therefore, must be to stimulate house-building rates via some other mechanism (beyond the terms of this Review). With the right encouragement, there is a high possibility that off-site building techniques could flourish.

Any increased activity in the social sector, the private rental sector and also the self-build sector are likely to create significant new market opportunities for the offsite sector (in contrast with the private purchaser sector which currently can largely fulfil its needs at lowest cost using conventional building methods – although this situation is liable to change because of factors identified in this Report)

4.2 Capacity of House-Builders

In terms of their capacity house-builders claim that given time to resource they will be able to ramp up to undertake a build rate of 130,000 – 150,000 new homes a year in England using conventional techniques (against a current rate of around 100,000). This was the build rate achieved in 2006/07 at the peak of the market immediately before the financial collapse.

For build rates in excess of this figure, the opportunity to ramp up the use of offsite construction methods begins to grow dramatically.

4.3 Skills

House-builders have advised that they have concerns about the declining level of traditional skills within the workforce. This is not an immediate issue and there is, of course, the option of recruiting additional skilled labour from overseas. The house-building industry is comfortable with the use of overseas labour and anecdotally we understand that over recent months their use has led to a significant reduction in labour rates. The need to access the required level of skills will become increasingly significant as the construction of new homes itself becomes more complicated in response to increased performance requirements under planned revisions to Part L of the Building Regulations.

Skills in the effective design and installation of offsite systems are an important consideration for clients and constructors. Initially at least it is likely that the installation of significant offsite installations will be undertaken by specialist teams who will have been trained by particular manufacturers. We do not believe that a shortage of skills has to date held up the adoption of offsite systems. However, if there was to be a significant expansion in the use of offsite systems to deliver housing then some shortage in capacity might emerge. In part this is a challenge for suppliers but given that it is unlikely that offsite methods will completely replace traditional methods there will be a need to provide the workforce with the skills it will

The Shortfall in Housing Stock

Britain needs more houses. There is a shortfall in housing stock and each year this shortfall increases because there is a deficit in annual build rates. This situation is beginning to show up as overcrowding and through increased waiting lists for social and private rental. It can only be a matter of time before the numbers of homeless include persons and families who cannot be accommodated because of a fundamental lack of stock in the right place. This drift cannot be allowed to go on indefinitely; at some point, the supply deficit will have to be reversed.

Why do we need more houses?

There are two critical elements which drive the need for more housing. First, the UK population is expected to increase quite significantly over the coming decades – see Fig (i). Second, there are changes taking place in our patterns of living. With the break-up of the nuclear family and the increase in life expectation, there is increasing demand for one and two person accommodation and other specialised types of housing – see Fig(ii). This suggests that the average occupancy rate per dwelling will decline in future (as it has done consistently over the past 50 years).

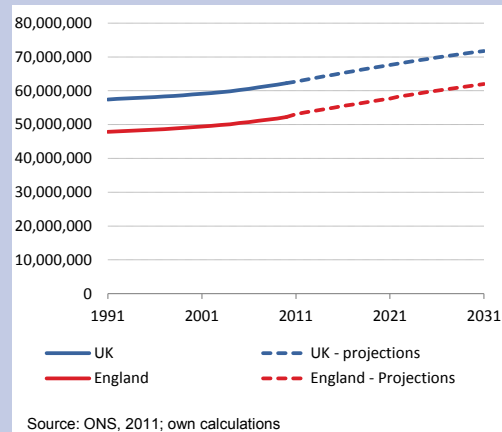


Fig (i) Projected Population Growth

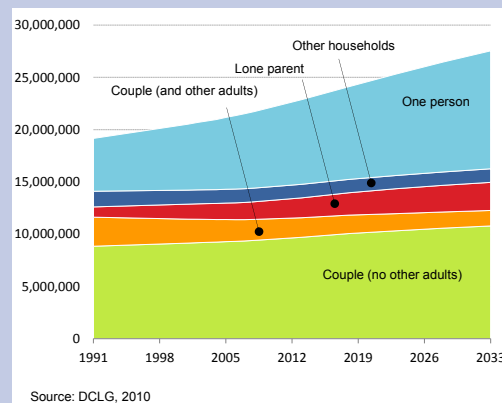
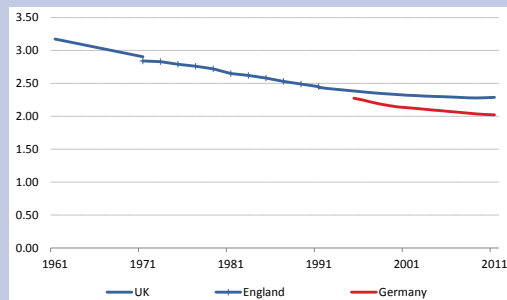


Fig (ii) Projected Household Formations

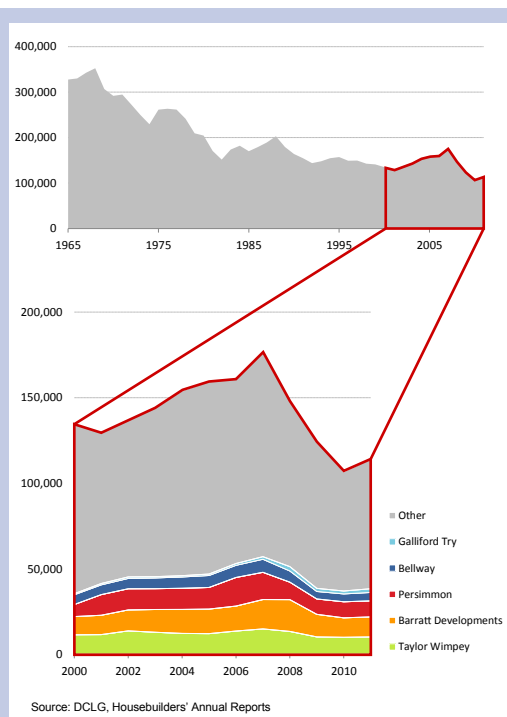
How do UK occupation patterns compare with other countries?

Falling levels of average occupancy reflect rising standards of living and changing patterns of life. This phenomenon is not unique to the UK – it is common amongst many developed countries. A comparison with Germany suggests that the UK is some way behind the patterns of that country, where average occupancy rates are also declining but are already some way below our own – see Fig (iii).



Source: DCLG, ONS, Statistisches Bundesamt Deutschland

Fig (iii) People per dwelling



Source: DCLG, Housebuilders' Annual Reports

Permanent dwelling completions by housebuilder i

need to effectively manage the interface between traditionally constructed elements and offsite elements. Gearing up to provide appropriate generalised training in site assembly techniques is something that the construction skills organisations will need to consider as a priority.

The traditional industry suffers from declining skills due to:

- An ageing work force
- Cyclical demand causing loss of staff to other industries
- Peaks of demand have attracted an itinerant workforce from other countries
- A limited supply of new trainees

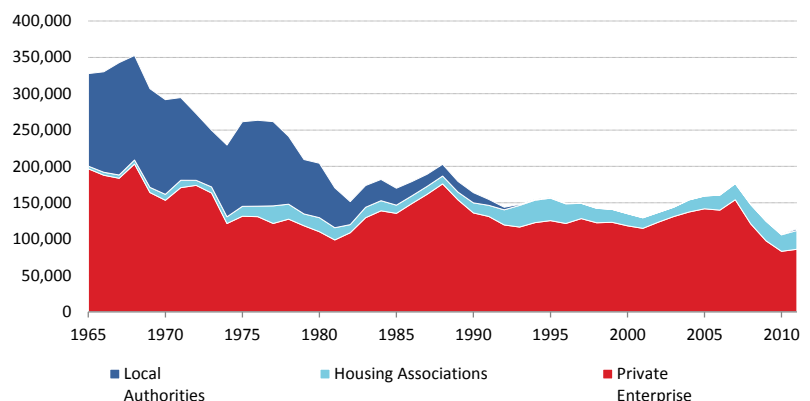
Offsite construction requires new skills in:

- Design for manufacture and assembly
- Production engineering and process efficiency
- Purchasing, planning, and materials handling
- Project integration and multi-skills

4.4 Historic rates of build

In general terms the annual rate of build of new homes in England has been in decline for more than 40 years. This decline has mostly been attributable to a long-term reduction in the rate of build for additional social housing. For the most part the build rate of new homes for private sale over this period has remained broadly constant at around 140,000 annually. It is not obvious what market factors would serve to drive this market at a higher rate in the absence of Government intervention.

During 2011-12 the total number of dwellings completed in England was just below 100,000 an increase over the previous year. Housing Associations accounted for approximately 23% of all new dwellings but in London they accounted for approximately 42% of the new build. LAs account for only a very small number of new build homes but many authorities have ambitions to make a return to house building activities although it is uncertain to what extent authorities have either retained or have acquired the necessary skills to carry out such a programme. It is also unclear what LAs believe that they can offer that is not already available through HAs or by working in collaboration with house-builders and HAs with the relevant skills and track record.



Source: DCLG, 2012

Permanent dwelling completions by tenure (England)

4.5 Distribution of product types

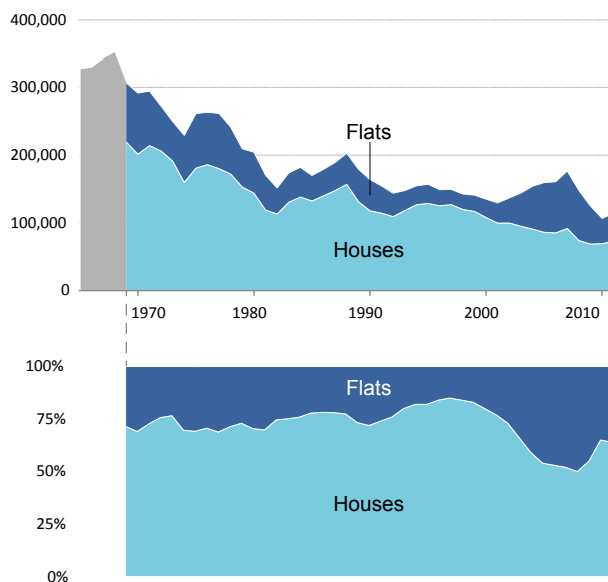
The build for private sale new build market is dominated by low-rise housing developments as is the self-build market. Social housing and housing for private rent includes a much higher percentage of flats – mostly low-rise but some medium rise.

The peak of the new-build flat market coincided with the financial collapse when flats accounted for approximately half of all new homes. The market was seriously

oversupplied with many developers and house-builders left seriously exposed and a significant number of purchasers in negative equity. The restriction on mortgage lending accompanied by the need for borrowers to have access to historically high deposits came about as a direct result of the losses incurred at this time.

The rate of build of new flats has significantly reduced over the last few years although there is emerging evidence that in London the demand for new build flats is once again on the increase. This probably reflects the growth in population in London creating an almost insatiable demand for new homes of all types and where local planning policies are seeking higher density development.

As development sites become more difficult to find and therefore more expensive we can expect developers, Local Authorities, HAs and house-builders to become increasingly imaginative in identifying development opportunities including commercial collaborations to develop hybrid/mixed use schemes with commercial partners and also the conversion of former offices where housing will provide a more lucrative use of the real estate.



House/flat split in England

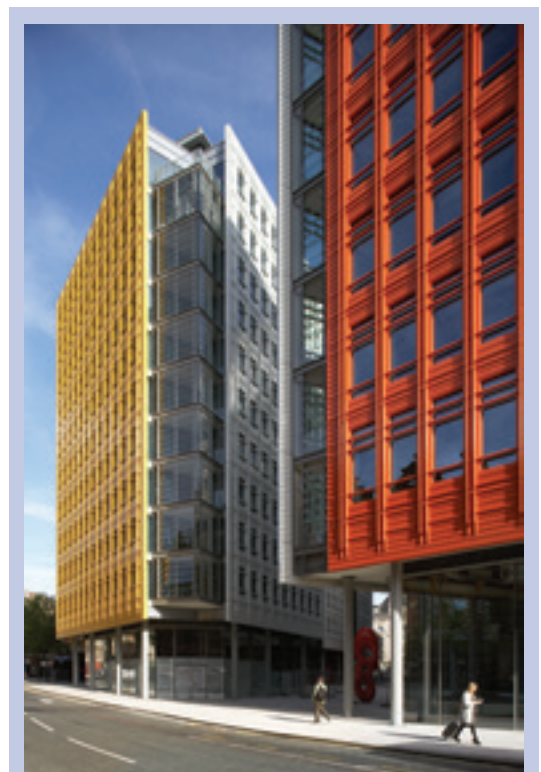
4.6 The Delivery Mechanism – the role of house-builders and others

The market for new homes in England is dominated by the house-building industry which undertakes all aspects of house-building including: finance; land acquisition; obtaining planning consent; creating and managing supply chains; undertaking site development and finally managing marketing and sales. In many other countries there are different models. This has been highlighted in the action plan to promote the growth of self build housing (NaSBA, July 2011). Some have housing markets dominated by the self build procurement route often involving individuals buying their own building plots and then contracting with an architect/designer and a builder to design and construct their property. There is no absolute reason why the domestic system needs to operate through developers and indeed there is an expanding domestic self-build sector. However, the difficulty of identifying and purchasing land plus the need to have access to finance is likely to mean that self-build is something that only a relatively small percentage of purchases will either want to or be able to undertake. This is likely to be particularly so for most first time purchasers.

House-building in England is undertaken by hundreds of builders. The industry is characterised at one end by a very long tail of one-off or small local and regional house-builders and at the other end by a few major developers operating UK wide. The key to development of any sort is the ability to identify and purchase land at the right price in the right location and to gain planning consent.

Who provides our homes

In broad terms the self-build market accounts for approximately 7% of the new build market, RSLs and LAs account for 23% (43% in London), private rental



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Examples of mixed-use and private rental developments

approximately 5%, with building for private sale accounting for 65% of sales. House-builders developing new homes as a business will handle land acquisition, negotiating planning consents and marketing. In almost all cases the actual process of building the new homes will be sub-contracted to trade contractors usually through competitive tendering. House-builders will fix a maximum sum that they will pay for the construction of new homes of particular size and specification. In large part this is determined by the sale prices of broadly comparable properties in the contiguous second-hand homes market. Major house-builders will be expert at obtaining best value from their suppliers and will have impressive knowledge of the cost of the individual elements of a new build construction at a granular level.

Each of the market segments has its own particular characteristics:

Build for Sale: House-builders will invariably build out a site at a rate that is consistent with the capacity of the local market to sustain sales. We understand that in many parts of England even the largest sites will deliver sales of less than one new home a week. House-builders have absolutely no interest in building new homes that will remain unsold for possibly a considerable time. To do this would involve incurring cost and taking on risk for no commercial gain. Such slow rates of build make it very difficult for offsite suppliers to compete effectively against traditional construction methods although anecdotally we understand that some house-builders will use offsite methods to construct show homes but will then revert to traditional construction methods to build out the site for private sale.

Build for Private Rental: The private rental new build market in parts of England is growing rapidly because it represents a considerable development opportunity for investors (domestic and international) looking to secure significant and assured long term returns on capital. Previously characterised by small investors not always offering decent homes the market is now attracting significant investments from Property Development and Institutional investors looking to take a long term stake in the private market rental business. These new players are looking to attract tenants who are prepared to pay market rents for good quality, well-managed and well maintained accommodation. Many of these tenants would previously have considered owner occupation and may well do so at some point in the future. However, for a mix of reasons including lack of access to a sufficient deposit and also lifestyle choice are deliberately selecting such accommodation – usually flats in the metropolitan areas – at market rents.

As reflected in the Montague report a number of Investors are now beginning to create “brands” to distinguish their commercial offerings from those of others.

Build for Social Rental: The social rental market is served by the Housing Associations, or Registered Providers (RPs). The HAs have taken the brunt of the load of providing housing for social rent since the Local Authorities withdrew from the market towards the end of the 1970's. There are many HAs in England, many of them being small associations with limited resources building less than 100 units per year. There is only a handful which build more than 1,000 units per year. In general, the HAs lack scale and therefore struggle to get the extraordinary levels of supply chain efficiency which the private housebuilders have established (see below).

Most of the HAs build houses using government grants which are dispensed via the Homes and Communities Agency (HCA). However, some are able to access the bond markets, either alone or in combination with other Associations, and this represents a significant stream of funds which can be used to construct new dwellings. Some of the larger HAs also engage in building houses for private sale, using the profits from these transactions to subsidise new build programmes for social rental accommodation.

Build for Self: This segment of the market has long been established and represents a wide variety of different end-users. Some self-build properties are built by the prospective owner as part of a plan to build a dream home, and the owner may even participate in the build programme directly. But the majority are much less grandiose and are built by local builders to designs commissioned from architects by the prospective owner. There is an extensive network of local architects, builders, and property agents engaged in this market, and the total number of dwellings constructed each year is surprisingly high – at 7,000 units per year this segment delivers as many houses as the largest of the big national housebuilders.

4.7 Cost breakdown of new housing developments

In crude terms the cost of new housing by house-builders involves the following 4 elements:

- Land acquisition
- Obtaining planning consents including dealing with S106 and CIL, site development and marketing
- Building costs
- Gross Profit

Typically the cost of land and the cost of construction of an average new build property may each account for approximately 40% of the overall property sale price. The remaining 20% is split between sales and marketing costs, and profit. (This is a rough guide – the balance of build cost to land cost varies quite considerably across the regions). Of the 40% construction costs, some 15% is spent on site-wide infrastructure and landscaping, leaving only about 25% for the actual construction cost of the house itself. This breakdown of costs is important because it highlights that the element of the overall cost that the use of offsite methods can influence represents only 25% of total development cost.

House-builders advise that in most parts of the country where there is a good supply of land and house-price inflation is modest any increase in the cost of construction will reduce the amount of money that is available to fund the purchase of land – accordingly additional build costs attributable to the introduction of Building Regulations requiring higher and more expensive standards will serve to reduce the land value of future acquisitions. However, if competing demand for land for commercial and other applications is strong this may mean that a locality is simply not viable for house-building. Such factors present special challenges in meeting local housing need.

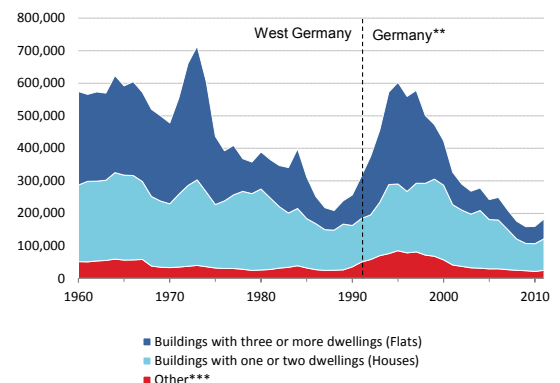
House-builders have evolved spectacularly cost effective supply chains. These are probably the most efficient in any sector of the construction industry – not just in the UK but in most advanced economies. The construction price point for build for private sales for typical low rise new build is estimated to be in the range of £40 - £60 psf. The corresponding figure for RSLs for broadly comparable construction is approximately twice as expensive. Perhaps not so surprisingly the cost of self-build construction is much more expensive. The cost of new build for private rent is also much more expensive although build standards are likely to be much higher and in most cases such projects will be medium rise which usually involve more expensive construction techniques.

The differential between the cost of build for private sale and the cost of build for low-rise RSL house-building merits detailed scrutiny.

4.8 Comparisons with other developed countries

Comparisons with other countries

- Western Europe and Scandinavia have established housing markets where high performing offsite products are successful
- The recent history of housing production rates for Germany is illustrated in the adjacent figure.
- North America has an effective offsite house building market (usually timber frame) operating at scale but not primarily addressing high performing products
- Japan has a very well developed offsite housing market with the potential for high performance and has established strong housing brands. Export of these brands is being pursued for example in Australia.



*Excluding building extensions

**Data on building type was not available for Germany in 1991 and 1992. Therefore data for West Germany is shown during these years.

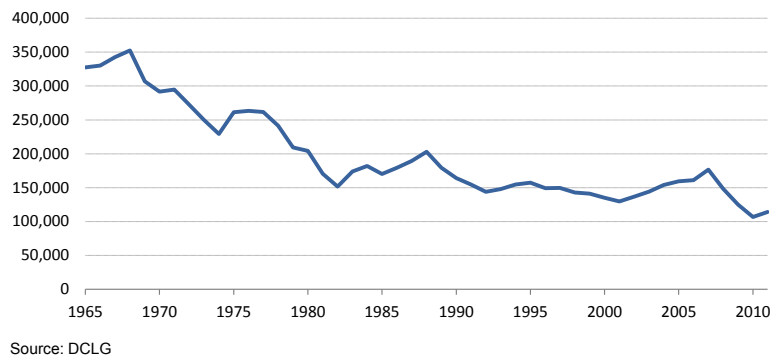
***Dwellings in non-residential buildings, existing buildings and residential hostels

Source: Statistisches Bundesamt Deutschland

Dwelling completions by type of building*

4.9 Current Status

Rates of new build bottomed out in 2009 and have been increasing since then. It can be anticipated that there is some considerable pent up demand among potential buyers who have found it difficult to secure mortgages as a result of the historically high levels of cash deposit required by lenders. Over recent years purchasing a house would typically have required a cash deposit of not less than 10% of property value with a deposit of 15% required for the purchase of a flat. This situation may now be improving as lender confidence improves - influenced in part by the Government's guarantee scheme.



Permanent dwelling completions (England)

4.10 Demand for Housing

In carrying out this review we have created a software tool which visualises information on population, rates of new build, housing waiting lists, and evidence of overcrowding.

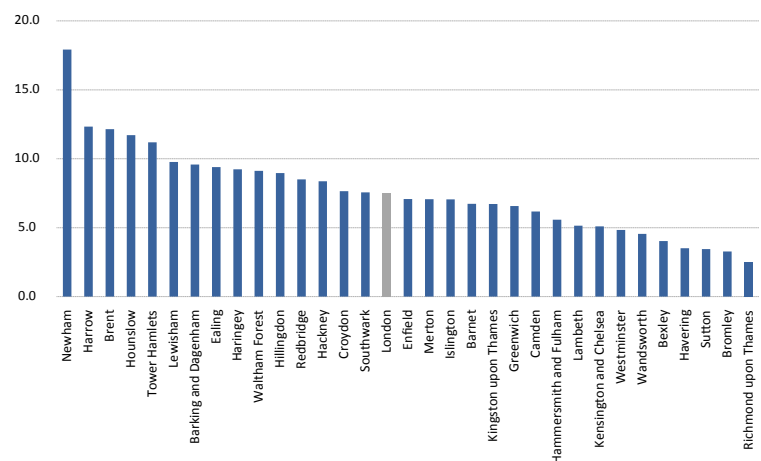
Statistics relating to the number of applicants on waiting lists are generally regarded as unreliable with nothing to prevent individual applicants from registering on any number of waiting lists. This problem is thought to be particularly prevalent in London and the other Metropolitan areas.

Evidence of overcrowding is considered to be a more reliable indicator of housing need.

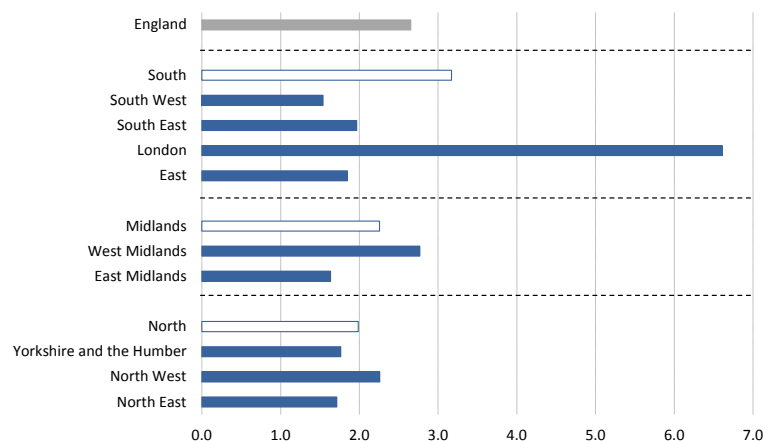
4.11 House-building as a business: managing risk, capacity constraints

The house-building industry is very clear that it exists to make money for its shareholders. It does not exist to further Government policies for housing or sustainability. It certainly has no interest in taking commercial or project risk or to invest in the building of new homes if there is insufficient local demand.

However, house-builders are also clear that they would like to be in a position to build more new homes provided the demand exists to sustain sales and also that they are able to retain their current profit margins. House-builders will not be



Percentage of overcrowded households in London Boroughs



Source: DCLG Survey of English Housing, 2007

Overcrowding by region (%)

prepared to take on the commercial risk of building new homes at a rate higher than the local market can absorb. If, however, the risks were underwritten by Government or a third party their view might change

The way the house-building industry makes money is to buy development land at what is calculated to be the right price and, at the right time to develop this land to provide new homes which it can sell at the right price to cover costs and to make the sort of % return on investment that shareholders, investors and the City demand. The share price of quoted house-builders can be seen to benefit from the net profit returned not from the number of new homes completed.

Small house-builders may simply develop sites for housing as and when these become available. Larger builders will usually hold a land bank which, market conditions allowing, will provide for a stream of house-building activity over a number of years. The largest house-builders will either own or have purchase options for substantial land banks which may be sufficient to support development activities for a rolling 6 year period or more. These land banks will have been negotiated at a price which takes account of regulatory and other requirements that are known to apply to the eventual development. This awareness of future liabilities serves to minimise commercial risk and at times of constantly rising real house prices also ensures that land banks deliver tangible added value to the balance sheet.

The primary concern of house-builders is to manage the risks associated with the land acquisition and house-building process. House-builders are specialists in identifying and pricing land, in obtaining planning consents, in managing their supply chain to deliver the homes to be built at the right cost and in marketing properties. House-builders need to ensure that they do not pay too much for land having regard to local requirements, S106 and CIL charges, housing mix, borrowing costs, the cost of construction, anticipated selling prices and anticipated local demand.

House-builders will take account of the cost of development attributable for example to announced changes in Building Regulations when negotiating land prices. If the cost of the development is going to increase because of known changes in technical or other requirements then the house-builder will look to reduce the price paid for land to retain commercial viability. In some parts of the Country where there is fierce competition for land for more lucrative commercial development uses this will not always be possible with the result that there are currently some commercial “no go” areas for volume house-builders.

In developing their sites house-builders are generally not interested in increasing the speed of construction. Their business model is based on building new homes only at the rate they can be sold onto the local market. House-builders have no interest in building homes only for these to remain unsold. At this rate of “demand led build” it is usually more cost effective for house-builders to build using traditional methods. However, if the offsite supply side could deliver singleton cost effective solutions it would be possible for house-builders to build homes only after the sales has been agreed which might be commercially attractive. However, this ambition might be realisable only in certain markets benefitting from strong local demand.

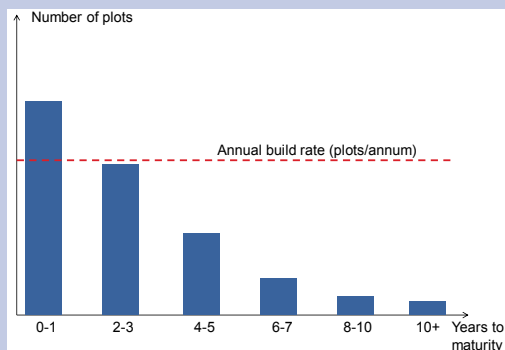
Land Banks and Build Rates- the House-builders' Perspective

All parts of the housing supply market are constrained by the availability of land – the prime raw material for production. A house-builder must therefore establish a process which delivers consented land at a predictable rate – a rate which meets the demand for new houses in the free market. This requires a number of steps to be taken in a strategic balancing act.

Once defined, it is not easy or commercially prudent to adjust the house-builder's delivery-rate at short notice.

Step 1: Land Acquisition

It can take many years to convert a speculative plot of land into a fully consented 'build ready' plot on which a house can be built. The rate of new house supply therefore reflects the profile of the house-builder's land-bank and this production rate cannot be easily changed at short notice. Typical characteristics for a land-bank profile are that the total number of plots in a 'bank' is about 6 years of annual sales, and the number of 'build ready' plots in the bank is about 1.5 years of annual sales. The value of a house-builder's land-bank is the primary means of establishing that company's market capitalisation – it is, therefore, a critical asset.



Typical land-bank profile

Step 2: Gaining Consents

There are many steps along the path to gaining full consent to build houses on any plot of land. For land bought speculatively, it might take 10 years to complete all these steps, with no guarantee of success as the final outcome. As each step is passed the value of the land increases significantly. In a free market, land may be purchased at any stage of development and the state in which land is purchased by a house-builder is a key element in the business strategy of that house-builder.

The final stage of consenting requires detailed planning permission to be granted by the local planning authority. This represents a large amount of 'late stage' work for the house-builder. For larger sites, it will involve the negotiation of Section 106 agreements with the local authority and CIL (Construction Infrastructure Levy).

Currently house-builders have no commercial interest in the performance of the homes they sell beyond the obligations that apply to them for the first two years of the free-standing 10 year structural warranties that apply to the majority of new homes. This means that issues relating to durability, maintenance, cost of ownership and performance in use all fall to the property owner or occupier.

4.12 The Dominant Market Forces

As demonstrated elsewhere in this report the market forces which drive house building are complex. For all new dwellings, land supply and planning considerations are key issues. From a purchaser perspective, the availability of mortgages and affordable deposits are key issues (particularly in the new house, first time buyer, market).

However, the biggest factor in making a decision to build new homes in any particular location is the price of the surrounding housing stock. In most cases, a property valuation will be established at the outset by surveyors, based on their experience of housing demand in the area and the availability of suitable stock. It will largely reflect the value of local second-hand houses rather than new-build houses. This sets a rigid cap on what revenue the builder can generate from the plot once it has been built out. Based on the valuation, the builder will then subtract the cost of construction, the cost of sales and marketing, the cost of achieving final planning permissions from the local authority (Section 106 requirements and CIL) and margin for a reasonable profit. If, after this, the value remaining (the net value) is greater than the present value of the site, building will likely commence. If, however, the net value is less than the present value of the site, the builder will not go ahead and the site will remain undeveloped. (See Box). This process is the mechanism which sets the benchmark for land values when bidding for plots, and this is probably the single most important issue in the entire business of housebuilding.

4.13 Recent Developments - Government Action to Stimulate the Market

Recently, the Government has implemented a number of measures that we believe will have a positive impact on the state of the housing market. These include:

- The planned uplifting of Part L of the Building Regulations to require improved levels of thermal performance and associated air tightness. A clear direction of travel sends a clear message to developers, investors and house-builders that the trajectory for more sustainable homes has been set. The clear message coming out of this Review is that the market does not want uncertainty as to trajectory. It should be noted that house-builders have already discounted the cost of meeting the uplift in Building Regulations in their negotiations on new land acquisitions. In broad terms it is a simple sum – the more the house-builder has to pay for the construction the less they will be willing to pay for land. Accordingly this is a self-regulating system which requires no further Government intervention.

Increasing the requirements of Part L will inevitably increase the cost of traditional construction and therefore tend to push house-builders towards the use of offsite build solutions which will have been factory constructed to manufacturing tolerances assuring predictable performance in use and eliminating risk associated with non-performance. This involves a judgement – regarding the point at which is it likely to be cost effective for a house-builder to shift to the use of offsite components rather than to build on site using traditional methods.

- Further enhancements in the Code for Sustainable Homes including in particular the progression to Code levels 4, 5 and 6 are having the same - but earlier - effect on the attitudes of house-builders and constructors as the planned increase in Part L.
- The Government's decision to launch a £200 million Build to Rent Fund and the intention to establish demonstration projects is a positive development which should play to the strengths of the offsite supply side. The increased role of professional developers and Institutional Investors wishing to build homes for private rent at market rent levels is going to have a significant impact on the housing market in some parts of the Country and in particular in parts of London and the other metropolitan areas. The growth of this market was addressed in some detail in the Montague Report. The requirements of investors in respect of build quality and speed of construction is likely to align with the performance attributes of offsite housing solutions. In particular the predictability of build time on site, assured quality of built solutions, energy performance and energy efficiency in use, greater predictability of maintenance requirements, a potential quality brand for the private renter.

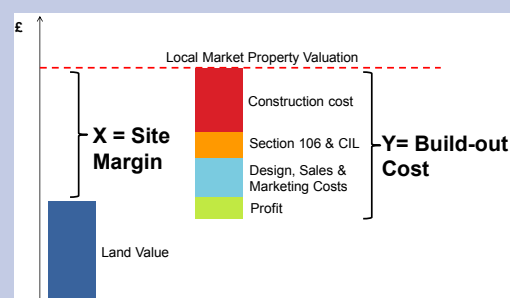
- The English self-build market currently accounts for 7% of all new house-building. Collectively this makes this market segment as large as some of the major house-builders. This market which includes high end self-builders is a potentially attractive market for offsite suppliers in part because self-builders are likely to have a focus on the overall quality of their development including cost and performance in use and build quality. To date these have not been factors that have influenced volume house-builders. The challenge for offsite suppliers will be to invest in manufacturing systems that can cope with low volume production runs. However, this is almost the same direction of travel that manufacturers will need to follow in order to engage more effectively with house-builders developing small and irregular sites.

The £30m Self-Build Fund launched by the Government in July 2012 is a useful incentive to drive growth in this sector.

- Planning Consents – Government has addressed the need to ensure that the Planning System delivers an adequate supply of land to meet local needs. At this stage house-builders are understood to be broadly content with the changes that have been introduced although it is too soon to be certain if the measures will deliver the intended results.
- The setting up of the Housing Standards Review is a welcome development to address the impact of local standards on the cost of constructing new homes and the impact (if any) on productivity.
- Public Sector Land. Government action to speed up the disposal of surplus public land is likely to be a useful intervention to increase the supply of land available for housing schemes. However, it is important that the land is in the right place to make a meaningful contribution to meeting local housing need. Of itself this will not directly benefit the take up of offsite solutions but a general increase in housing activity by public and private developers will create new market opportunities for the offsite sector.
- Large Sites/Garden Cities. The announced package of £1.5 billion support to unlock large schemes is welcomed as a mechanism to increase housing development at key locations thereby creating opportunities for the offsite industry to compete at scale. However, much will depend on the detail and pace at which individual schemes are developed and the mix between public and private sector sales.

Step 3: The Decision to Build

The cost of fulfilling Section 106 and CIL requirements represents a 'last minute' cost burden to the house-builder, whose end-sale prices are dictated solely by the valuations of similar local properties, most of which are in the second-hand market. In cases where Local Authorities press for higher targets, the house-builder will subtract these costs (plus build costs and other essential costs) from the end-sale price and compare the remaining sum with the current value of the land. If it is lower than the land value, the house-builder will conclude that houses cannot be built profitably. In such a case, building will probably be deferred until future house prices rise sufficiently to absorb the burden, or the land will be disposed of. In a market where the long term price of housing is always expected to trend upwards, sitting on an inactive site usually represents the least risk for the house-builder.



The decision to build (if $Y > X$, site is uneconomical)

Scheme/Initiative	Headline Value	Launch Date	Purpose
Strategic Land Building Fund	£400M	Q3, 2011	Designed to unlock stalled schemes for strategic land development
Growing Places Fund	£500M	Q3, 2011	Designed to assist new developments in Local Enterprise areas
Build to Rent Fund	£200M	Q4, 2012	Designed to support developers during the construction and lettings phase of portfolio assembly for the private rental market.
FirstBuy Scheme	£280M	Q2 2011	Designed to allow 16,500 new borrowers to purchase new properties with mortgages of just 75% of the market value (government shared ownership scheme)
New Build Indemnity Scheme	N/A	Q4, 2011	Designed to unlock 100,000 95% mortgages to new home buyers
Re-Consideration of Section 106 decisions pre-April 2010	N/A	Q3, 2011	Designed to allow the holders of strategic land sites to re-negotiate existing Section 106 agreements agreed pre-April 2010.

Summary of Recent Government Initiatives designed to stimulate the Housing Market

5 The Characteristics of Offsite Construction

A definition of Offsite

We define Offsite Construction as an approach to process in which the construction value added on-site is less than 40% of the final construction value at completion

Sustainability

Definition (Based on the definition adopted by the World Business Council):

Sustainability involves the simultaneous pursuit of economic prosperity, environmental quality and social equity. Sustainable construction needs to perform not against a single, financial bottom line but against this triple bottom line.

Offsite construction methods score well against this definition of sustainability. The following table is based on the work of BuildOffsite (2013).

Issue	Improvement over Conventional Construction (estimated)	Benefit to Society	Benefit to Housebuilder
SOCIAL			
Reduced Accidents & Incidents (H&S)	Up to 80%	Large	Large
Improved Working Conditions and Job Security	Significant	Significant	Small
ENVIRONMENTAL			
Reduced Road Traffic Movements (Congestion & Pollution Benefits)	Up to 70% (40%)	Significant	Small
Reduced Energy Used on Site	Up to 80% (50%)	Small	Small
Reduced Waste	Up to 90%	Significant	Significant
Reduced Energy-in-Use	20% (typical)	Significant	Small (unless house builder is also the property owner)
ECONOMIC			
Faster Construction	Up to 80% time compression on site	Significant	Large (reduced construction financing costs)
Alternative Business Model	Payment on completion	Small	Large (reduced working capital requirement)
Fewer Defects	Up to 80%	Small	Significant

Note: Figures include adjustments for delivery journeys to the factory and energy consumed during the manufacturing process.

5.1 The definition of offsite construction

In the housing sector there have been a number of different descriptions given to delivery methods which set out to improve product and process. The term Modern Methods of Construction has in the past been adopted for new products and technologies. Offsite is a construction term to describe a delivery method that adds substantial value to a product and process through factory manufacture and assembly intervention. The whole objective is to deliver to the construction site elements that are to an advanced state of completion thus removing site activity from the construction process. In some cases this may be in a three dimensional volumetric form or more commonly for housing in open or closed panel form.

5.2 Client and house-building view of offsite methods

Most new build homes are for individual private sector purchasers. To all practical purposes potential purchasers have no voice to articulate any views on the merits or demerits of either offsite or traditional methods of construction and frankly at this point in time and market maturity it is most unlikely that purchasers would be in a position to express a preference either way.

In practice purchasers have no way of directly influencing any quality, spatial or design aspect of new housing other than deciding whether or not in the circumstances they wish to purchase. This almost complete disconnect with consumer choice does not seem to have an obvious parallel in any other modern manufacturing industry.

The next most significant client group is represented by the RSLs and to a much smaller extent LAs investing resource in social housing for rent. Some HAs will have considerable experience of using offsite construction methods to deliver both medium and low-rise homes. Increasingly a significant proportion of new homes for social housing tenants are represented by flats – this is particularly the case in London and it is likely that in future flats will make up an even higher proportion of new build homes for this sector. RSLs and LAs will have a long term interest in the management of homes and therefore have a particular interest in the build quality of the asset, the cost of ownership over time and achieving performance standards for the structure that will minimise the cost of space heating. This wider view will we believe tend to encourage such clients to be prepared to invest more up front to achieve a superior and better performing asset. In turn this may create opportunities for the offsite sector to promote the overall business case for the selection of offsite solutions over traditional methods of construction.

Investors in developments for private rent and in particular Institutional Investors are in a broadly similar place to social landlords in that they can be expected to take a longer term view of cost of ownership issues and also want to ensure an overall build quality that will attract long term tenants willing to pay market rents. It is estimated that this market will continue to grow strongly over the next few years

House-builders generally have no long term interest in dwellings for private sale outside of the warranties that apply to structural elements of the building. Accordingly considerations that impact on the cost of ownership over time or on energy efficiency outside of the requirements of Building Regulations are of no interest.

As mentioned previously the primary driver for house-builders is to deliver new homes to the minimum standard appropriate in the particular circumstances, to minimise the cost of construction and to avoid taking on risk. If offsite methods become the optimum means to achieve these ambitions then the house-building industry will switch to offsite solutions. If the use of traditional methods remains the best commercial choice then these methods will continue in use.

5.3 Definable Characteristics

It is widely accepted that manufacture in a factory using production engineering techniques including in particular the use of CAD CAM will ensure a level of quality and accuracy that building on a construction site can simply not match. This is how just about all other manufacturing industries operate.

Constructing components, assemblies and even complete modules in a factory ensures the consistent delivery of a number of performance characteristics:

Characteristics of Offsite Product Supply

- Predictable quality
- Predictable performance
- Low waste
- Fast construction
- Good health and safety and better working conditions
- Good sustainability
- New technical skills and multi-skills.

5.4 The Spider Diagram

The traditional house building market delivers product through a diverse mix of organisations.

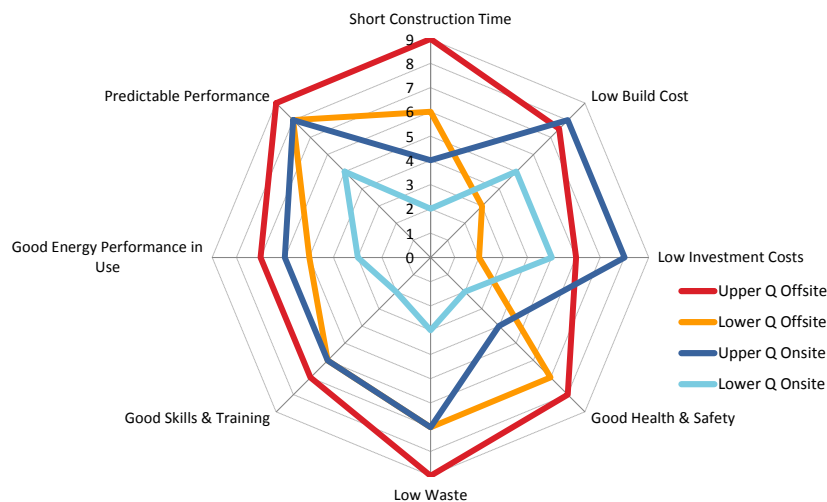
- There are wide extremes of size and competency
- Quality and performance vary considerably

The offsite sector similarly has a mix of products and processes delivered to varying levels of factory completion.

- Most products have quality assurance endorsement.

The diagram shows a subjective assessment of desirable qualities.

The offsite sector generally compares well with the exception of low construction cost.



Offsite vs. Onsite: Current Building Regulations Part L

5.5 Previous use of offsite solutions to deliver housing

Although successfully applied in many sectors of the construction industry the use of offsite systems to deliver significant volumes of new housing has for a variety of reasons not led to a permanent step-change in construction practice. The most substantial application of factory made housing solutions was the programme of Prefab homes built in very large quantities immediately after WW2 to provide a temporary solution to acute housing need. The Government was the client and accordingly the programme operated at scale from the start. Manufactured in factories previously manufacturing military equipment the prefabs were well designed and came with a level of fit out that was significantly higher than traditional homes of the time could offer. Prefabs were relatively expensive to manufacture but could be manufactured at scale to standard designs. At the time there was simply no alternative solution given severe shortages of traditional construction materials and shortages of labour. Assembled quickly on prepared sites prefabs were very popular with residents and offered a standard of accommodation that relatively few had previously aspired to. Although prefabs had a design life of only 10 years some still exist and many were demolished only to make way for higher density development. By any measure prefab homes should be regarded as a success story for factory manufactured housing.



Prefabricated homes after WW2 designed to high performance standards but for a short design life



Slum clearance replacement homes to Parker Morris space standards

During the late 50s and 60s slum clearance programmes led to the construction of high-rise and flatted estates to deliver significant numbers of homes quickly. Originally very popular with residents who had often been rehoused by Local Authorities from very poor quality homes the new housing built to Parker Morris space standards provided good sized living rooms, bedrooms, bathrooms and kitchens. However, some systems suffered from design and construction defects leading to cold-bridging, damp penetration and mould growth. Space heating was sometimes deficient, unreliable and expensive exacerbating poor levels of comfort. However, the most significant cause of failure of system built developments was poor estate and housing and tenancy management practices. Media reporting often erroneously gave the impression that the main reason estates were failing was as a consequence of defective forms of construction

Around the Millennium a mini-boom in private house-building led to an increase in the use of factory made walling, flooring and roofing systems. The Design for Manufacture competition supported by Government demonstrated the range of innovative systems that were available to meet the need for sustainable housing at a fixed maximum price for the works of £60K.

A number of house-builders invested in new construction methods but when the market demand for homes began to slip house-builders mostly reverted to traditional forms of construction which can be turned on and turned off to deliver low volumes of new homes to meet immediate market need. A number of these offsite systems are still in use but are most cost effective when applied to deliver larger build programmes.

Learning Point

We believe that there is evidence to suggest that the use of offsite has been reasonably successful when applied to meet the needs of significant housing developments at scale with consequential opportunities for standardisation of design details – particularly to meet the need of Government led programmes but have been more difficult to justify and to sustain in a shrinking market operating at low volumes.

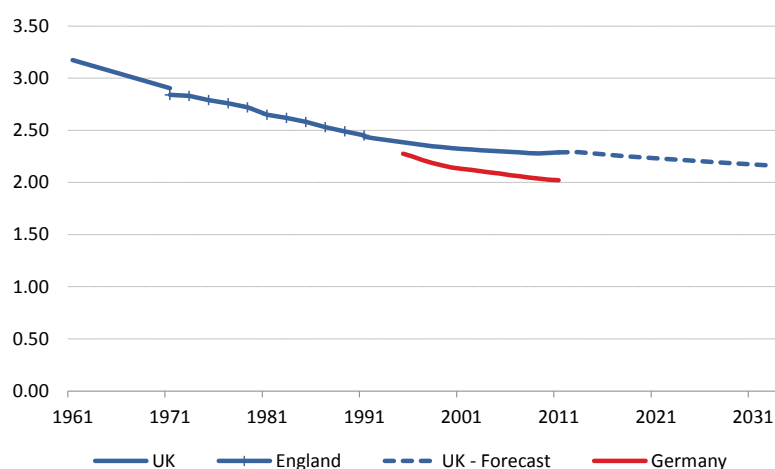
6 Where can Offsite make a difference

6.1 The Future Shape of the Market

If we are to examine the role which Offsite Construction might play in future, we must first consider what the nature of the future housing market might be. The existing market is characterised by the total rate of build, and the segmentation of demand into build for sale, build for self, build for private rent, and build for social rent. How might that market change over the period from now to 2030?

6.1.1 Volume

As discussed in Chapter 4, there is currently a shortfall in the national housing stock. Expectations are that the population will increase and this shortfall will get worse. If we take the projected increase in population and make a projection for the occupancy rate in 2030 (see diagram below), it is a simple matter to estimate the required future housing stock. This has been done in the table below.



Source: DCLG, ONS, Statistisches Bundesamt Deutschland

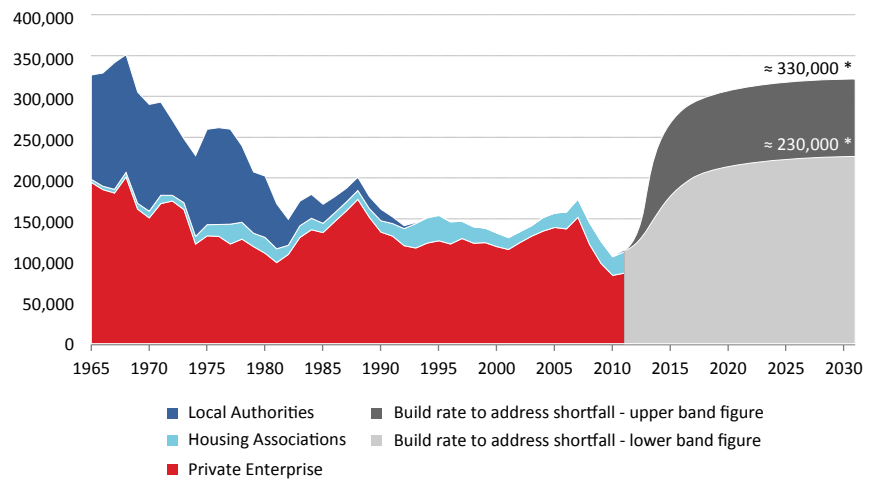
Year	Population	Dwellings	People per Dwelling
1961	43,500,000	14,000,000	3.11
1981	47,000,000	18,000,000	2.61
2001	49,500,000	21,000,000	2.36
2011	53,000,000	23,000,000	2.30
2031	62,000,000 ?	27,500,000 ?	2.25 ? *
2031	62,000,000 ?	29,500,000 ?	2.1 ? *

* This range of figures is obtained by extrapolating the trend line for England (2.25) or, alternatively, extrapolating the trend line for the UK and assuming that England converges to that line (2.1)

Source: ONS, 2011; DCLG 2012; own calculations

Forecasting housing need in England

Based on these trends, it is not unreasonable to suggest that the current build rate of around 100,000 units per annum needs to be more than doubled. To remove expectations of a very serious stock shortfall by 2030, a figure in the range 230,000 – 330,000 units per annum would need to be achieved. This is a dramatic increase, which is set into context by the following diagram. This assessed level of build is substantially the same figure identified in the Report of the Future Homes Commission by Sir John Banham.



Source: DCLG, own calculations

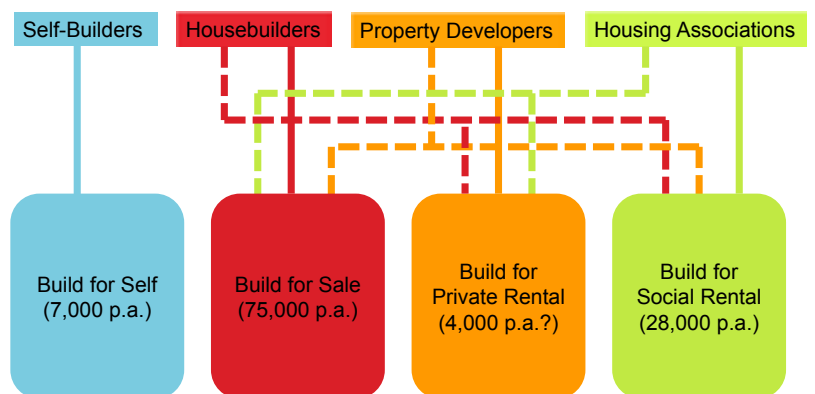
* These upper and lower band figures are based on different assumptions about the future convergence of occupancy trends for England and the UK as explained in the preceding table

Required build rate to make up for dwellings shortfall (England)

6.1.2 Market Segmentation and Delivery Mechanisms

In addition to the dramatic increase in the volume of dwellings required, it is likely that the distribution of dwelling types, and their mechanisms for delivery, will also change quite markedly. If we consider the segmentation and delivery mechanisms for the current housing market, it is clear that 'Build for Sale' is, by far, the most dominant segment. The other segments are relatively small in comparison to this.

Correspondingly, the delivery mechanism for new dwellings is equally dominated by house-builders, who develop sites and build houses to suit the needs of their own business models. This predominantly self-serving model is laced with opportunistic collaborations which take place between housebuilders, Housing Associations, land-owners, and property developers, when mutual benefits are on offer. This situation is reproduced below for convenience. (Note: In this diagram, 'self-serving' delivery is indicated by solid lines, and 'opportunistic collaborations' are indicated by dotted lines)



Who provides our houses?

Looking towards 2030, we may examine each market segment in turn, with the following conclusions:

Build for Sale: The performance of the private housebuilders has been remarkably flat over the past 50 years, as may be seen from Fig above. During that period, output in England has averaged around 130,000 units per year, with relatively small fluctuations either side of that level. Even in the period 2005-2007, when mortgage lending was as loose as has ever been known, the output level only reached about 145,000 units per year. The reasons for this apparent lack of flexibility spring from

the long gestation periods associated with gaining planning permissions for the housebuilders' land-banks, and a 'natural rate of demand' which exists in the private sales market. (Housebuilders have very specific expectations of the rate of sales which can be generated on any development site). Based on these observations, it is considered quite unlikely that the private housebuilders will raise their output significantly beyond 130,000-150,000 units per year once they have returned to their norm output levels in the aftermath of the financial crash and subsequent recession. This is far below the 230,000-300,000 units per year which is projected above, and suggests that the principal growth will have to come from the other market segments if the national need is to be met.

Build for Social Rent: Inspection of Fig above shows that the output of the Housing Associations over the past 50 years has been relatively small in total market terms. If present trends continue, this segment is unlikely to increase its market share by 2020. (Indeed, if the anticipated reductions in government grant are enacted, the output of this segment will be significantly reduced). A logical estimate for production in England by 2020 might be 15,000 units per year, but this logic will be re-visited in Section 6.1.3 below.

Build for Private Rent: This segment has, historically, been very small. However, it has attracted a lot of interest recently and, if the government stimulus package recommended by the Montague Report has the desired effect, it could expand significantly over the next decade. An optimistic assessment would be that, by 2020, some 40,000 units per year will be produced in this segment, and that this level of performance will be maintained thereafter.

Build for Self: This segment is currently quite small, but has the potential to grow. The fraction of self-build homes in the UK is far below that of our continental peers (7% in the UK compared to European averages around 50%), so it is reasonable to expect that the segment could expand significantly if the right stimuli are applied by government. An output of 25,000 homes is postulated for 2020 and beyond.

6.1.3 The Future Importance of the Social Rental Segment

Aggregating the above yields a postulated annual output which rises to the order of 210,000-230,000 units per year by around 2020 and is maintained at that level thereafter. This is well short of the postulated need for 230,000-330,000 units per year and suggests that a shortfall of around 120,000 units needs to be made good. The data on overcrowding and waiting lists presented in Chapter 4 suggests that the greatest pressure on housing currently exists in the social rental segment. This, in turn, suggests that the Build for Social Rental segment must be expanded well beyond that level which has been suggested above, and must climb to an output level in the order of 45,000-75,000 units per year by 2020 and maintain that level thereafter.

6.1.4 Codes and Regulations

Encouraging the housebuilders to grow in the manner suggested above requires confidence to be instilled in the market. Uncertainties must be minimised, but the area of building codes and standards is one of the worst culprits for creating uncertainty amongst both private builders and the Housing Associations. Builders need long-range clarity on issues which affect build costs in order to make proper allowance for those costs when buying development plots several years in advance. In this regard, it is probably more important that the builders have a predictable regulatory environment than that they have a minimum cost environment. (Arguably, the additional cost of construction associated with higher standards of building has no effect on the final price of housing for the reasons described in the sidebar to Section 4.11)

There are two key areas in which the Government might act which would help bring confidence to the market and provide a basis for future growth:

- Harmonisation of national and local requirements. The Housing Standards Review is a welcome step in this direction.
- Energy conservation changes to Building Regulations, Part L. The Government is urged to take a firm line on sustainability, and maintain the declared intention to subsume the energy-related provisions of the Code for Sustainable Homes within Part L of the Building Regulations. A formal timetable for this process should be declared and adhered to.

6.1.5 The Possible Characteristics of the Future Housing Market

For a potential provider of offsite products to enter the housing market, a reasonable definition of likely volumes, desirable products, and routes to market must be available. Each of the market segments has its own distinct characteristics and an attempt to summarise the possible nature of the future market is presented in the table below.

Sector	Product	Price-point (£/sq.ft.)	Desired Characteristics	Current Volumes (2013: units p.a.)	Projected Volumes (2020: units p.a.)
Self-Build	Single family homes	£100-150/sq.ft.	Low construction risk; speedy construction	7,000	15,000 - 25,000
Build for Sale	Predominantly single family homes, with a significant minority of flats/apartments	£40-60/sq.ft.	Low cost, low construction risk, flexible construction programme	75,000	140,000 - 170,000
Build for Private Rental	Flats and apartments – predominantly medium-rise.	£100-150/sq.ft.	High quality, low construction risk, speedy construction	4,000(?)	30,000 - 60,000
Build for Social Rental	Predominantly low-rise flats & apartments, with a significant minority of single family homes	£80-100/sq.ft.	Durable, low maintenance dwellings; speedy construction.	28,000	45,000 - 75,000

Future market characteristics (2020)

6.2 Where Might Offsite Construction Fit-in?

6.2.1 The Attributes of Offsite Construction

Offsite manufacture and associated onsite assembly can deliver the following attributes:

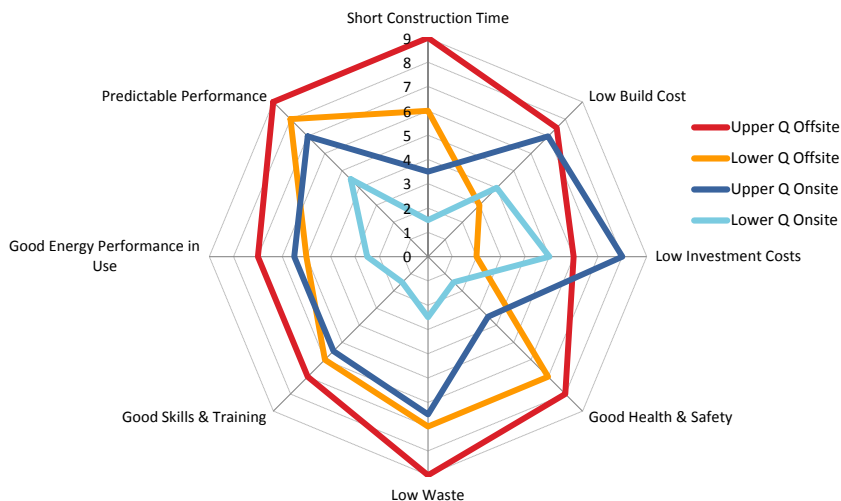
- predictable performance of the homes in use
- improved sustainability of the completed homes
- reduced construction time on site
- improved working environment
- need for fewer sub-contractors on site
- reduction in vehicle movements on site
- reduced impact of poor weather
- fewer construction defects and a reduction in waste of materials

All of these benefits are desirable, but the business case for entering the market needs to put some value on them and identify the key benefits. This requires an examination of the nature of the market and the possible routes to the customer.

The future housing market has a number of characteristics which neatly match the attributes of offsite technology. Namely:

- We seek a marked increase in the rate of build whilst, at the same time, demanding a marked increase in build standards (Part L).
- We require that accidents and incidents at site continue to reduce, despite a significant increase in activity.
- We require that more houses are built, regardless of the diminishing pool of skilled tradesmen.

A particular attribute of offsite construction is the ability to deliver homes to very high standards of thermal insulation and air tightness without corresponding increases in delivery costs. If we re-draw the spider diagram introduced in Section 5, to represent the attributes of offsite construction when building to the equivalent of Code Level 5 (fabric only), then the advantages of offsite become even more apparent.



Offsite vs. Onsite: Passive house fabric performance

There are further opportunities for offsite products which are related to the changes in business model which factory built systems could enable.

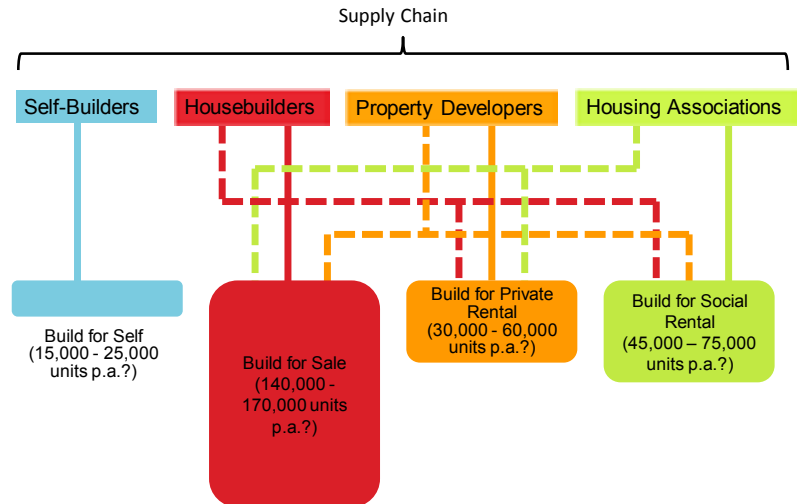
- **Financing costs:** The site-time required to build homes using offsite construction methods is a small fraction of that required for conventional building processes, and this reflects directly in the cost of financing construction. This is a great attraction for those who build multi-occupancy dwellings where the first rental can only be realised once the last dwelling has been finished. This benefit is accentuated for buildings that are multi-occupancy and multi-storey with a high capital cost.
- **Working Capital:** If housebuilders were given an infinite supply of 'oven ready' plots for development, and an infinite queue of purchaser/tenants, the limiting constraint on their output would be the working capital required to build-out all those plots. This is a particular constraint in the social housing sector, where most RSL's have limited balance sheets and small cash resources. The standard business model of the factory-built product is that the customer pays for the product once it has been delivered (and, even, commissioned). In this model, the working capital requirement passes to the supplier, thus relieving the builder of that burden.

6.2.2 Routes to Market and Opportunities for Business Innovation

The route to market in future is likely to become more complex than the arrangements of convenience which dominate the business today. In particular, if the build for social rental segment is to double in size over the next decade, a substantial change in the delivery mechanism for that segment will need to be engineered. The Housing Associations, as they are currently defined, are not capable of delivering this degree of change. They are too fragmented; they lack scale and influence; and the majority of them do not have the expertise required to develop land-holdings and deliver housing in large quantities.

New delivery mechanisms must be encouraged to appear, possibly involving some combination of the larger RSL's, private property developers, large housebuilders, and (maybe) the larger players in the construction supply-chain. The Local Authorities could also be encouraged to re-enter this space. The removal of the restriction on LA's borrowing in the bond markets to finance housing would make a huge difference to their ability to raise funds for social rental programmes. A root-and-branch re-design of this area would present tremendous opportunities for housing innovation and, as such, it represents a special challenge and area of interest for the would-be developers of offsite systems.

The offsite industry is therefore faced with the exciting prospect of a market that is likely to grow and that is likely to demand products which the industry can provide. But new product suppliers will need to find their place in a supply chain which has complex routes to market and distinct customer segments as is shown in the diagram below.



Future shape of the market?

6.3 Impact on Jobs

If as suggested by this report there is a demand for a rapid increase in the delivery of dwellings beyond the current capacity of house-builders, offsite supply would have desirable impact on jobs and skills. New skills will be needed progressively but these would be in addition to the current traditional skills and trades. The increased activity would encourage technical training and skills appropriate for a modern manufacturing environment. It is likely that as the refurbishment of the older poorly insulated housing stock takes place there will be further demands on the traditional skills, so the negative effect of offsite technology on site labour is likely to be compensated for provided government remains committed to the stated policy of reducing energy losses in the existing housing stock.

7 Conclusions

7.1 Advantages

Offsite construction offers a route to delivering homes that can be built to higher sustainability standards, with potential advantages in terms of build quality, speed of delivery, construction health and safety, energy-in-use, whole-life carbon footprint, and reduced transport pollution (congestion and emissions). Of these advantages, the ones which are most easily quantified are the financial benefits to the housebuilder associated with increased speed of construction and reduced working capital requirements, the ease of achieving higher quality construction (driven by the need to increase energy performance), and the savings to the householder which arise from reduced energy-in-use.

7.2 Build Rates and Energy Performance Targets

A 'perfect combination' of key drivers for greater take-up of offsite construction in home building is beginning to emerge in the UK – build rates need to increase significantly to meet rising demand for housing, and quality (performance) standards are set to rise as the Government pursues reduced carbon emissions.

A rise in the annual rate of build, from around 100,000 homes p.a. to a level nearer 230,000 homes p.a., is required to remedy a projected shortfall of more than 2million units in the housing stock by 2030. Concurrently, the Government has declared that all new-build homes will be required to meet the demands of Code Level 4 beginning in 2016 with standards rising to Code Levels 5 at some stage thereafter.

7.3 The Role of Offsite

Adopting offsite methods can help to meet these demands. It is (relatively speaking) easier to deliver homes to higher quality standards using factory made and assembled products than it is using traditional construction techniques. The cost penalty of delivering higher build-standards is therefore reduced. Offsite construction offers other benefits, too. In a market where demand is rising, offsite methods offer housebuilders higher quality finishes, cheaper construction financing, and reduced working capital requirements.

7.5 Government Action

The future importance of offsite methods in the UK depends, fundamentally, on a desire to build faster and, concurrently, to higher energy performance standards. If the Government wishes to deliver this outcome, it must stimulate growth in build rates and encourage investors to develop new offsite construction products. In particular, the Government must act now to encourage the development of a world-class offsite construction industry, in order to ensure that an appropriate stream of products is available as the rate of build increases.

7.6 Industry Action

Whilst the government might create the climate for new products, it is the role of industry to respond with suitable market offerings. Industry must therefore be aware of the market that is likely to develop between now and 2020, and must be ready to explore new ways of delivering more homes. There is plenty of room for technological and business model innovation and, with new players potentially interested in entering the market, there could be rapid change in the dynamics of delivery. The interest of the large, vertically integrated, organisations found in the construction materials supply chain, the wider construction markets, and beyond offers the possibility that truly innovative ideas could be brought to the market within the next decade.

7.7 Other considerations

Some additional points that have been identified en-route to producing the above conclusions include:

- There are no significant regulatory or other barriers from the housing sector for offsite construction methods. However, the speculative house-building sector is very competitive, efficient and challenging for off-site to compete in the traditional market.

Conclusions

- No evidence of any fundamental objection from home-builders to the increased use of offsite solutions, but limited need to change and innovate for several reasons including the absence of any incentive to reduce on-site construction time (however, the ability to deliver finished units and bring homes to market quicker for higher density developments involving social housing, private rented apartments and apartments for sale is a driver for the take up of offsite methods)
- In terms of market capacity traditional home builders in England can cope with build rates of about 130-150,000 homes p.a. using conventional construction techniques. Given the need to build at higher rates there are significant opportunities for investment in off-site construction techniques
- Increasing use of offsite will lead to more manufacturing based jobs but will to some extent displace a need for significantly greater number of low-skilled jobs in traditional construction. Skills development is however needed.
- Government Housing Strategy and wider regulatory reforms are important drivers, particularly housing demand and supply side stimulation measures but, on their own, are not enough to encourage take up of off-site solutions.
- Housing affordability challenge and investment in the private rented and affordable housing sectors and to some extent the growing demand and investment in the self-build housing sector present the offsite sector with significant opportunities for growth and investment.
- But leaving to market forces won't achieve change. Push (or 'nudge') measures need to be considered – communication and branding will be important drivers for change
- A joint Government and Industry implementation programme is recommended to take forward recommendations under three themes as set out in the next Section.

8 Recommendations for Industry and for Government

Our recommendations fall under three key themes of intervention:

- INCENTIVISATION (Taking Fiscal and Taxation Measures)
- PROVIDING CONFIDENCE IN THE MARKET PLACE (Strengthening the Delivery Framework)
- SECURING THE FUTURE (Setting Policy and Making Investments)

Recommended interventions are shown diagrammatically in the matrix below. In this matrix, the desired outcome is shown in the top row (Accelerated Delivery), which can be achieved by working through the four market sub-sectors (Social Rental, Private Rental, etc). The recommended interventions are shown in the left-hand columns, grouped into sub-sets defined as 'Create Market Confidence', 'Incentivise', and 'Secure the Future'.

		Accelerated Delivery			
		Social Rental	Private Rental	Private Sale	Self-Build
Interventions	Create Market Confidence	Stable and Predictable Framework for Regulations and Standards			
		Release 'Oven Ready' Plots from Government and Local Authority Land-Banks			
		Communications Programme			
	Incentivise	Introduce tax and other incentives designed to encourage the development of new products and the establishment of new manufacturing/assembly facilities.			
	Secure the Future	Raise awareness and capability in BIM			
		Establish an Institute for Future Housing Research			
		Develop a New Financial and Delivery Model for Housing			

8.1 Incentivisation (Introducing Fiscal measures)

If the UK is to benefit from an increase in manufacturing capacity to produce offsite components and assemblies and at the same time to create jobs in an expanding manufacturing sector, capital investments must take place in the UK. The Government must therefore incentivise investment in the development of offsite construction systems. We recommend a joint Treasury/Industry working group be established to make recommendations on how best this might be done, paying particular attention to the following suggestions:

1(a) Consider the case for capital investment in the design and development of new offsite production systems to be subject to substantial tax breaks. Also consider the case for tax breaks in respect of profits attributable to the manufacture and sale of offsite components.

1(b) Government, in collaboration with the National Self-Build Association and other industry organisations, to consider the case for additional fiscal incentives to grow the self-build sector. This could include incentives to encourage house-builders, landowners and others to offer for sale construction-ready plots for self-build customers.

1(c) Government and industry to examine the case for the introduction of a stimulus fund to encourage new housing schemes involving a significant percentage (by value) of offsite construction methods.

8.2 Providing Confidence in the Market Place (Strengthening the Delivery Framework)

Actions are required to create an atmosphere of confidence in which new market entrants and existing players are willing to invest in house-building. We recommend that a joint industry/government working group is established to examine the following issues.

2(a) A secure and reliable stream of land that is suitable for house-building is a fundamental requirement for a healthy house-building industry. Bring forward Government and Local Authority land-disposals and address current concerns about the suitability of those sites for housing development and introduce a mechanism which delivers 'oven ready' plots for house-builders to develop with short lead-times.

2(b) Monitor the operation of changes to the planning system to ensure that land for house-building is coming available at a rate that is sufficient to support local demand for new homes and to create demand pull for innovation in the delivery of housing including the increased use of offsite construction solutions.

2(c) Progress the Garden City Programme and encourage the offsite supply side to actively seek opportunities to contribute to the development of a national programme. To encourage the offsite industry to make the case for the use of offsite solutions as a mechanism to ensure speed and quality of delivery of new homes

2(d) Affirm the Government's commitment to upgrade Part L of the Building Regulations as part of the campaign to meet the UK's carbon reduction targets. This commitment will provide investor confidence in the increased role of innovative offsite solutions, drive up performance standards of new homes and help make offsite methods of construction more competitive with traditional construction methods

2(e) Review the professional and vocational skills needs required to support the effective use of offsite construction methods in house-building and the mechanisms to ensure the delivery of those skills. This will include offsite suppliers identifying the particular skills that will be needed by those designing and constructing new homes to ensure the correct installation of offsite solutions including the correct detailing at the interfaces between traditional forms of construction and offsite elements.

2(f) Encourage the offsite supply side to become better informed and more active in engaging with and promoting the business case for the increased use of offsite solutions by housing clients (including RSLs, house-builders, developers of schemes for private rent and self-build clients).

8.3 Securing the Future (Setting Policy and Making Investments)

It is our view that the housing market, as it currently stands, is not capable of delivering sufficient houses to prevent a serious stock shortfall from developing over the coming decade. If this proves to be the case, the motivation for businesses to invest in new offsite construction products will begin to evaporate. We therefore recommend that a government/industry working group is established to look at this issue and develop recommendations designed to remedy this problem. In particular, the working group should pay attention to the following suggestions:

3(a) Develop new models for the delivery of housing. These models should encourage the engagement of the best possible capabilities and expertise from across all segments of the industry including, in particular, those that can best influence the contribution that offsite solutions can make to process efficiency, quality and value. This exercise should extend to the examination of new delivery models for industrial and commercial collaboration, and the development of new financing models for future build programmes (including removal of the LA loan caps and the engagement of more open-market sources of finance).

3(b) Encourage the major supply side organisations to consider how best they might directly support the increased use of offsite housing solutions to deliver new homes.

3(c) Promote the case for third party assurance/insurance schemes such as BOPAS to de-risk the use of innovative offsite solutions in new housing projects

3(d) Consider the case for establishing an Institute for Future Housing Research. Identify the priority requirements for an initial work programme and the options for funding the Institute.

3(e) Raise awareness and support the training and integration of BIM across all segments of the market, providing support and encouragement to the self-builder, the small to medium size house builder, the largest private house-builders, RSLs, LAs and other client organisations.

3(f) Encourage the manufacturers of offsite construction components and assemblies to take full advantage of existing arrangements for Research and Development Tax Credits in respect of developing new products and systems.

8.4 Additional Recommendations

In order to progress the above recommendations for action The Review Panel recommends that DCLG should establish a Programme Board to provide a focal point for action to implementation.

Finally, during the course of this Review we have identified a number of topics which we consider to be worthy of further examination. These include:

- i) Factors which might be significant in driving efficiencies and increased value for money in the house-building sector. These are listed in Annex E.
- ii) Comparisons between the UK house-building industry and those in peer countries in North America, Europe, Scandinavia, East Asia, and Australasia.
- iii) Further development of the assessment tool referred to in Section 4.10

In the time available to us these matters could not be taken any further. However, we consider them to be important and recommend that they should be the subject of further investigation by the Review Team.

We strongly recommend that Government and Industry should jointly work together to develop an implementation programme to drive forward the recommendations that we have identified and to capitalise on the expertise and enthusiasm for this task that has been engendered during the preparation of this report.

9 Annexes

Annex A

Offsite Housing Review Contributors

Membership of the Review Panel:

Prof John Miles	Cambridge University (Joint Chair)
Prof Nick Whitehouse	Oxford Brookes University (Joint Chair)
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Turlogh O'Brien	London & Quadrant
Stephen Stone	Crest Nicholson
Steven Boyes	Barratt Developments
Rab Bennetts	Bennetts Associates
Murray Bean	TATA Steel
Elliott Lipton	First Base
David Gilchrist	Council of Mortgage Lenders
Mark Bew	Department for Business
Graham Watts	Construction Industry Council
Ian Pannell	Project Coordinator
Daniela Krug	Building Intellect (Project Researcher)

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 Building Intellect
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 Council of Mortgage Lenders
 Crest Nicholson
 Department for Business, Innovation & Skills
 Department for Communities and Local Government
 Design Council
 Devon & Cornwall Housing Group
 East Riding of Yorkshire Council
 First Base
 Great Places Housing Group
 Green Oak Housing Authority
 Green Square
 Guinness Partnership Ltd
 HM Treasury
 Home Builders Federation
 Home Group
 Homes & Communities Agency
 Housing 21
 Idp Solutions Ltd
 KGX Technologies Ltd
 Kingspan
 L&Q Group
 Laing O'Rourke
 National House-Building Council
 National Housing Federation
 Northumberland County Council
 Orbit Group
 Oxford Brookes Enterprises Ltd
 Persimmon Homes Group
 Plus Dane Group
 Prestoplan
 Radian
 Sanctuary Housing Association
 Savills
 SCI Light Steel Framing Group
 St Gobain Distribution
 Stewart Milne Group
 TATA Steel
 UKTFA
 Wakefield & District Housing
 York Housing Association

Annex B

Workshop sessions with Special Interest Groups:

Note of RSL/LA Special Interest Group Workshop –9 January 2013

Purpose: To provide client input into the Offsite Housing Review project commissioned by DCLG and the Department for Business

Venue: Department of Communities and Local Government, Eland House

Delegates: A list of participating workshop delegates is attached

Workshop Chair: The Workshop was chaired by Turloch O'Brien of London & Quadrant

Scene Setting: Prof John Miles and Prof Nick Whitehouse outlined the remit provided by Ministers and gave a brief overview of the work to date and the emerging findings. Before finalising the Report it was essential that the Review Panel had the expert advice and opinion of RSLs and LAs on a number of the key demand side questions that the Report would need to address to ensure that the recommendations for action were evidence based.

Similar but separate Workshops would be taking place with Manufacturers and with House-builders.

The Final Report: the Final Report of the Housing Review Panel is a Report for Government and Industry. It will be published on the Construction Industry Council's website – probably in late March or early April 2013.

The Workshop Discussions

The delegates were organised into three groups to consider and advise on a number of questions relevant to the themes of:

- Demand Scenarios – Group1
- Finance and Policy – Group 2
- Construction methods – Group 3

The Delegates were also invited to comment on a number of general questions as well as offering specific comments relating to the use of offsite solutions and the performance of the offsite supply side.

To note that in the time available for discussion at the Workshop it was not possible to examine the points being made in great detail.

Group1

Demand for homes:

- Confirmed that there was a considerable and rapid increase in the demand for social housing across the board. There was no reason to suppose that levels of demand would slacken given anticipated growth in overall population, increase in household formation and sluggish growth in the economy. Unless there was a sustained increase in the number of new homes being built an overall shortage of 2million homes by 2020 was entirely possible.
- There was considerable unsatisfied demand for low-rise homes (including bungalows) but these were not generally affordable in the social sector
- It was possible that levels of potential demand for homes was even greater than estimated by the Review as there was evidence that some people were not bothering to register on waiting lists
- In some parts of the country the extent of overcrowding was considerable and indeed very possibly understated
- Without doubt there was considerable under-occupation of dwellings with single people now living alone in the former family home. In theory there was some potential to free up these family homes for occupation by families if alternative attractive single person homes were available for existing tenants

Potential to raise annual social house building to c80,000 by 2020

- RSLs believe that they have the capacity to build out at a rate of 80,000 new homes a year if land, finance and other pediments can be addressed.
- A sense that it was more likely to think in terms of an annual figure of 40,000 new homes a year as an achievable annual figure. This would represent an additional 12,000 social homes each year.

Why weren't more homes built during the boom years up to 2007?

- The boom was in the private sector not the social sector
- The boom in demand in the private housing sector served to increase prices in the second hand and new market. It also served to increase the cost of construction and therefore made it more difficult for RSLs to bring forward viable schemes

What are the trends in housing development for RSLs?

- A strong sense that RSLs build the type of dwellings that they are told to build in areas where they are told to build. This may well not align with their assessment of local need in terms of either location or type of property
- Outside of the Metropolitan areas there was a sense that RSLs will be encouraged to concentrate on developing low-rise developments on former brownfield sites. In Metropolitan areas with high levels of housing demand the focus was likely to be on medium rise developments of flats.

Group 2

Sources of finance:

- A strong sense that for most RSLs new financial vehicles such as bonds would represent an alternative to traditional bank borrowing. Not clear that this will add much, if anything, to the ability of RSLs to generate additional funds for investment in social housing
- There are limits to the amount of debt that RSLs are “allowed” to take on.
- The key impediment for RSLs in seeking to invest in social housing is access to public grant

Additional measures to support investment in new homes:

- To increase rent levels closer to market rents but this would have only limited overall impact as a significant percentage (c70%) of social tenants were already in receipt of housing benefit
- Access to low-cost land to subsidise overall development costs
- Joint ventures with private developers to reduce risk and so to some extent reduce costs
- Additional use of S106 to generate receipts – although this mechanism was dependent on an active private housing market
- Access to tax breaks

Group 3

Price Points for the cost of construction:

- The price point of £80 - £100 per square foot for new social housing was thought to be about right although there would be Regional differences.
- RSLs seemed to recognise the considerably lower costs being achieved by house-builders. Mixed views as to why this factor of X2 should exist. A strong sense that house-builders were exceptionally efficient at driving value through their supply chains which RSLs simply could not match. A number of RSLs were looking to work more closely with house-builders to obtain improved value. Also some sense that RSLs were simply not very good at negotiating best value.
- Noted that HCA had a substantial database on building costs which reflected Regional differences
- Some concern that shortages of skills was impacting on the cost of construction

Ranking RSL requirements for new homes

- All the factors identified were recognised as being important to RSL landlords
- However, as long term landlords RSLs had a particular interest in the overall cost of ownership issues such as performance in use and the proper maintenance of complex systems
- Lifetime energy costs also very important
- However, the judgement was not always clear cut and for some RSLs seeking to deal with considerable housing need regard achieving lowest price as being the paramount consideration in order to provide as many new homes as possible
- Faster construction using offsite components not necessarily important unless the contractor had the ability to bring forward the overall supply chain to complete the project with the minimum of delay

Impact of increased environmental standards

- Inevitably increasing the thermal requirements of new homes was more expensive and would increase costs. However, evidence that the level of increase would not be as significant as first forecast.
- Agreed that reducing heating costs was a very significant consideration for RSLs and for their tenants and gave rise to collateral considerations such as health and well-being.
- Generally RSLs were not keen on the requirement to fit renewable energy technologies. Maintenance and early replacement was causing procurement problems and leading to unforeseen additional costs. There was a strong preference for a Fabric First approach which provided greater certainty regarding cost in use
- There was potential value in research to support a Fabric First approach such as the AIM4C project but this was only at small scale and the arrangements for the dissemination and incorporation into standard practice of the learning points was unclear. A concern that Government had apparently decided not to support additional collaborative research in this area

Other matters discussed in open forum:

- Planning – some concerns over the impact of local planning for example on choice of construction materials, spatial issues, and visual appearance. These were valid considerations but inevitably their implementation impacted on the cost of housing
- Code for Sustainable Homes and Part L – RSLs were thoroughly confused regarding Government ambitions to require the introduction of higher levels of thermal performance. Confusion leads to uncertainty. RSLs need clarity regarding future requirements for higher performance standards. Achieving higher levels of the Code will certainly increase construction costs but probably by not as much as had initially been estimated.

Comments relating to the increased use of offsite solutions

Noted that most if not all the RSLs/LAs attending had some experience of the use of offsite construction methods – usually based on timber frame construction. These experiences had included both domestically supplied solutions and also imported solutions.

- Offsite generally had a cost disadvantage over traditional methods of low-rise house-building
- It was difficult to achieve the size of low-rise development that would be necessary in order to take full advantage of the economies of scale that offsite solutions enabled
- The business case might be more compelling for offsite if RSLs and possibly private developers worked more closely together to carry out new build development at a significant scale.
- At 5 storeys and above experience suggested that the use of offsite systems was competitive with traditional onsite methods. The price point was also much higher than for low-rise construction
- Difficult to see that offsite suppliers would be prepared to invest in additional manufacturing capacity unless there was some certainty of sales at a scale to justify the investment

- There was a catch 22 situation regarding the lack of skills among constructors in the use of offsite systems and the lack of current demand for new homes built using offsite solutions.
- Constructors often did not understand how to build low-rise homes through optimising the use of offsite methods. For example the structural frames would be assembled and the dwellings made weatherproof but would then stay unfinished until the constructor brought in the fit-out trades. Knowledge of how to go about integrating the construction process when offsite systems were specified was poor.
- Some constructors were prepared to construct homes only through the use of traditional methods
- Some evidence that claims regarding the need for thermal mass were being cited as an argument against the use of lightweight construction (including frame solutions). There was a lack of knowledge regarding achieving effective design and the need for adequate ventilation. Evidence that lack of knowledge was being exploited for commercial advantage.
- Generally RSLs had only limited contact with offsite suppliers. There had been more contact when the Government had previously adopted a policy to support the use of MMC
- Some RSLs had direct experience of offsite solution providers going bust mid contract. Some concerns over the financial viability of some suppliers

Summing Up

Turlogh, John and Nick thanked everyone for participating in the Workshop. A note of the learning points would be circulated. If individuals would like to make additional comments these should be emailed to Eve Farraud of the Construction Industry Council (efarraud@cic.org.uk)

Note of House-Builders Special Interest Group Workshop – 16/1/13

Purpose: To provide house-builder input into The Offsite Housing Review project commissioned by DCLG and the Department for Business

Venue: The Building Centre

Delegates: A list of participating workshop delegates is attached

Workshop Chairs: The workshop was chaired by Prof John Miles and Prof Nick Whitehouse

Scene setting: Prof John Miles and Prof Nick Whitehouse outlined the remit for the Review, the method of working, the findings to date and the emerging conclusions and recommendations (for Government and for Industry. The programme of workshops provided opportunities for the Review Team to present and test the emerging findings.

In the context of house-building a number of key messages had emerged:

- Absolute clarity that house-builders existed to make money for themselves and their shareholders. They did not exist to deliver public housing policy.
- There was a direct relationship between the cost of new homes and the cost of land. Other than in times of exceptional demand measures that increased construction costs would reduce land prices. Reducing construction costs would conversely increase land prices. The selling price would for the most part be unaffected and would itself be determined by the market.
- The house-building industry had over time developed incredibly efficient procurement practices to arrive at lowest cost solutions. Arguably the most efficient that existed within the UK construction industry. The industry's practices had been fine-tuned to precisely match the ways in which the domestic housing market operated. It was also clear that house-builders had been working hard to further reduce the cost of construction (materials and labour) through active engagement with their value chains whilst delivering to required standards.
- House-builders were generally agnostic as to the means of construction. Their role was essentially that of a highly informed and highly intelligent developer. There were generally no obstacles to the increased use or even to the exclusive use of offsite solutions if this made commercial and project sense. For house-builders the means of delivering new homes was an operational issue, not a policy matter
- There was no doubt that Government could if it so wished drive a major expansion in house-building. This had been done a number of times before in order to deliver on policy imperatives and each example had been accompanied by the increased use of offsite methods in order to deliver the required economies of scale and product quality. If Government required a major increase in house-building or wished there to be a major increase in the use of offsite solutions then Government could and indeed would need to act. The market alone could not and would have no ambition to deliver on these ambitions.

The Final Report: The Review Team is now working on the draft of the Final Report. This will be presented to Ministers shortly and will contain recommendations for Government and for industry. The Review Team will be endeavouring to identify a limited number of key recommendations. Other points noted in discussions will be identified for subsequent detailed scrutiny.

The Workshop Session

John and Nick suggested that there were two fundamental factors which suggested that we were in the run up to another substantial period of house-building and why once again this would probably be accompanied by a substantial increase in the need to use offsite solutions.

Growth in Demand: It is undeniable that the population was growing at an (almost) unprecedented rate with the prospect of growth continuing for many years. This was taking place at a time of a steep increase in the growth of new households. Putting the figures together suggested that by 2030 the UK would require 32million homes. At current rates of build this suggested that there would be a shortage of 2million homes. This figure was endorsed by the house-builders

Reducing Carbon: Increasing the thermal requirements of Building Regulations had over many years been shown to be a highly effective mechanism to reduce the carbon in use of new buildings. Constructing new homes to meet the new standards that Government was planning to introduce would inevitably increase the cost of construction although it was difficult to be precise as to the % increase. The increased quality and accuracy required to meet more demanding standards for fabric performance required at Code for Sustainable Homes Level 4 and above was easier to achieve with the use of factory made assemblies and often came at no significant increase in cost.

Price Points: Nick and John identified a set of construction price points for the four primary housing market sectors comprising:

- Private sales
- RSL/LA build for social rent
- Self-Build
- Build for Private Rent

At a construction cost only of between £40psf and £60psf building for private sales was cheaper than all the other market sectors by a factor of at least 2. This price point was recognised by the house-builders. In discussion a number of house-builders confirmed their interest in collaborating with the other housing market sectors to bring their commercial expertise into play.

Discussion Points:

- House-builders endorsed the scale of the emerging shortfall in the number of new homes being provided
- They would welcome a significant increase in the size of the private for sale market. The long term trend of around 140,000 a year was noted. Recovery in this sector was wholly dependent on the state of the overall economy
- Tax: reducing stamp duty on new home sales would encourage activity in the new homes market
- The house-builders considered it highly unlikely that there would be an expansion in the scale of the social housing programme at anything like the level proposed by the Review Team in order to better match emerging demand
- The self-build sector and also the build for private rent sector would almost certainly continue to grow but house-builders were doubtful that we would see step-change increases
- House-builders were anxious that Government addressed the administrative burdens that applied to the house-building process but which delivered little if any gain
- Concern that there were barriers that impeded new providers of homes entering the UK market. Major international contractors had been exploring the prospects of entering the market but to date none had been successful. The reasons why needed to be understood.
- There was no opposition to the use of offsite solutions although house-builder experience indicated that it was more commercially realistic for the supply side to think in terms of offering offsite components in place of traditional site based construction. Delivering new homes through the exclusive use of offsite solutions was likely to be some way off – an ambition too far at this stage. Experience had identified problems in protecting modules and large structural components on site prior to final assembly. Important that offsite suppliers worked harder to better understand the requirements of house-builders including flexibility of supply, product mix and speed of delivery – current service deemed not good enough to meet the requirements of house-builders in many cases.
- Need for builders to better understand how to get the best from offsite solutions. Too many experiences of rapid construction and weather-proofing structures but then substantial delays in delivering the follow on trades. Educational and skills issues need to be considered for designers and constructors. Offsite suppliers need to better understand the house-building process on site
- Claimed that there is no (evident) consumer demand for higher performance standards and alongside this a concern that surveyors did not recognise (in terms of higher valuations) better performing homes. Values were set by prevailing prices for broadly comparable second hand homes. Need here for discussion with RICS and Lenders. Financial incentives for enhanced thermal standards might serve to encourage consumer demand
- Noted that some developer builders were developing new market opportunities through selling individual plots to purchasers and offering a range of offsite housing types. This along with the traditional self-build market was seen as an expanding market sector which was quality focused rather than focused on lowest price.
- Planning: House-builders welcomed the action taken by Government to change planning rules to facilitate development where there was a clear need for more housing. However, it was too early to gauge the effect of the new procedures
- Financial and operational Obstacles: Variation and complexity in the setting of S106 and CIL along with the imposition of local Design Standards was adding cost and uncertainty to the house-building process as well as imposing obstacles to new entrants wishing to enter the market. The application of local design standards served to frustrate the use of more cost effective standard construction solutions and also impeded the increased use of offsite solutions. This was an area that Government needed to review. The house-builders were awaiting the outcome of the Housing Standards Review.
- Section 104 and the unstructured practices of Utilities in connecting new homes were creating major difficulties for developers wishing to bring forward schemes and needed to be addressed. Action as above
- Working Capital: A significant issue in the current market. In many areas house-builders need to build homes in order to attract buyers. Selling off plan is not viable in most areas. Unless demand picks up the advantage of faster build through the use of offsite methods will not deliver a tangible benefit to house-builders.
- Land Banks: House-builders managed their land banks to meet emerging market needs. Acquiring options on new site, purchasing sites and obtaining outline and then detailed planning permissions was a time consuming, costly and potentially risky process that had to be supported as an overhead. If house-builders were to substantially increase their output of new homes it could only be in response to clarity regarding sustained market confidence and a certainty that additional land (in the right place and at the right price) would become. Land banks were an essential component of a viable and healthy housing supply.

Vox Pop on attributes of offsite solutions

The identified attributes were rated as follows (No1 is most popular):

- 1 Reduced Construction Costs
- 2 Reduced Construction Time
- 3 Increased Quality of Finish
- 4 Increased Flexibility of Construction Programme
- 5 Lower Energy in Use Costs
- 6 Lower Life-time Maintenance Costs
- 7 Increased Lifetime Flexibility

Note of meeting with Product Manufacturers

Note of Manufacturers and Suppliers Special Interest Group Workshop – 23 January 2013

Purpose: To provide supplier input into the Offsite Housing Review commissioned by DCLG and the Department for Business

Venue: The Building Centre, Store Street

Workshop Chairs: The Workshop was chaired by Prof John Miles and Prof Nick Whitehouse

Scene setting: Prof Miles and Prof Whitehouse set out the background to the Review, the remit provided by the Departments, the main planks of the work to date and an outline of the emerging findings including levels of demand for new homes and the lever of increased sustainability. The purpose of the Workshop was to take specific advice from the supply side.

The Final Report: The final Report will be published on the CIC website in late March or early April. The Report would be addressed both to Industry and to Government.

The Workshop Discussion

- A clear recognition that house-builders were expert at assembling highly cost effective supply chains. With market demand still significantly depressed prices were highly competitive and in almost all cases house-builders would deliver their house-building through the use of traditional construction methods. In this environment it would be very difficult for offsite suppliers to compete on price.
- The potential benefits of offsite construction methods was recognised but as things stood these were unlikely to win over house-builders. The potential for house-building to be delivered much faster by using offsite methods was unlikely to be of interest to house-builders unless there was strong demand for volume.
- A recognition that although in theory the arguments for a substantial increase in the rate of house-building was merited it was felt highly unlikely that Government would quickly agree to make the necessary capital and revenue investments to support an expanded social programme.
- Agreed that an increasingly demanding Part L would serve to skew the house-building market to be more receptive to the use of offsite solutions. However, Government was currently issuing mixed messages as to the direction of travel and this was giving rise to confusion and uncertainty in the market place. It was felt that house-builders would be very keen to see a moratorium on any further increase in the requirements set out under Part L as this would serve to hold back increases in the cost of building.
- It was considered that there was unlikely to be a simple, authoritative and consistently interpreted definition of "offsite construction". However, this would become an issue only if the use of the term became linked to tax or other advantages
- In terms of action that Government could take to encourage offsite construction it was agreed that the primary move would be for Government to invest in new housing – probably through an expanded role for RSLs and possibly LAs and to deliberately drive providers to become more efficient and to adopt innovative construction practices. Reliance on the private for sale market to adopt offsite methods was unlikely to be effective.
- Suggested that the requirements of Building Regulations should be restructured to focus on "as built" performance. The suggestion being that currently conformity was being demonstrated in design terms but was not being achieved in practice. A move in this direction would tend to favour a shift towards the increased use of offsite solutions which ensured a more predictable level of performance.
- Concerns that house-builders were unduly benefiting from transitional arrangements applicable to existing approved developments even if no substantive construction work was likely to take place for some years. Building new homes to historic standards was highly undesirable.
- The operation of S106 was seen as being counter-productive in obtaining best value from private sector investment in public housing. The arrangements served to enable the public sector to compete when private demand was high and therefore construction prices similarly high but as soon as private demand was dampened the S106 income dried up – just at a time when best value could be achieved
- Seen as important that additional land releases should be shared around to enable self-build and other forms of construction. It would be a mistake for house-builders to be given preference.
- Agreed that the impact on cash flow was particularly important for house-builders. Invariably the challenge of managing cash flow was passed down the supply chain to small contractors who were often poorly placed to manage the liability. Offsite manufacturers were more likely to have access to capital as this was a standard component of manufacturing activity. In this sense a shift in favour of offsite solutions could stand to benefit contractors.
- Targetting the self-build market might well be a sensible strategy for offsite suppliers as customers were more likely to associate with the wider benefits of offsite solutions. However, on the down side it was felt that self-builders were often keen to seek out bespoke solutions that would be challenging for the offsite sector to deliver.

Suggested Actions

The workshop agreed that in order to support the increased use of offsite solutions the top priority was to create confidence and growth in the market place and to sustain that confidence over time. It was also important that Government should stick with its declared plans to increase the requirements of Part L. Currently the Government was creating confusion in the market place. Unless Government was going to dictate forms of construction (which was considered both unlikely and undesirable) the route to increase the use of offsite solutions would be to require offsite suppliers to compete in the open market against a background of more demanding standards. The market would adopt offsite solutions when this made economic sense.

It was seen as important that Government should take urgent steps to increase the rate of build within the social housing sector as this had clearly been severely reduced over many years. Evident that demand was most acute within this sector.

It was suggested that the Review should seek to avoid coming up with a long list of recommendations but rather should seek to identify a limited number of key recommendations that would make a real difference.

Annex C

Key Messages from Previous Housing Reports

The Review Panel has reviewed a number of previous housing reports (Barker, Callcutt, Ball, Banham and Montague) to identify recommendations that are relevant to the consideration of measures to increase the use of offsite solutions in new housing:

Support for a significantly increased supply of quality new homes – strong support for a substantial increase in the number of new homes. Up to 300,000 new homes a year are needed to meet growth in the number of new households.

Capacity constraint – limits to the capacity of house-builders to deliver the required numbers of new homes without recruiting additional labour (probably from overseas) and also investing in new technology.

Consequence of a decline in house-building – house-builders claim not to be certain of generating sufficient returns to justify investment in new construction techniques and technologies.

Weak demand – to increase the rate of house-building requires a return to strong demand including, in particular, demand from first time buyers.

Access to mortgage finance – access to loan finance is essential to drive a healthy private market. Current LTVs prevent many potential buyers from entering the market. A strong private sector generates essential support for social housing.

Private house-building – the house-building industry does not exist to support Government housing policy. It exists to make money for shareholders

Private rental sector – a rapidly expanding role for the private rental sector involving institutional investors with a business proposition based on charging market rents for high quality, energy efficient and sustainable homes, excellent and predictable build quality and assured levels of management, maintenance and refurbishment.

Access to land – an adequate supply of land with planning consent is vital to enable new housing regardless of the tenure type.

Quality is lacking – quality of finish and design of new homes is often poor. House-builders claim that there are insufficient incentives to justify investing in improved quality. No attempt to market new homes on the basis of quality branding. No pressure from purchasers/consumers to demand higher levels of build quality.

Government to set demanding standards – Right for Government to set standards to drive up the performance standards of new homes to improve sustainability and to reduce energy in use. However, the supply side says that it is not for Government to dictate how homes should be built or to force faster build out of land banks.

Support for offsite construction solutions – recognition of the increasing role of offsite solutions but the supply side needs to offer better value and more flexible products in order to compete on price/value. The quality benefits of offsite solutions are widely recognised as is the certainty of faster build on site. However, house-builders do not attach value to the latter unless demanded by clients (usually social housing providers or private rental providers).

Annex D

The BOPAS Insurance/assurance Scheme



BOPAS - The Buildoffsite Property Assurance Scheme incorporates assurance and insurance as a means of mitigating many of the perceived risks to which the lending community and other key stakeholders in the residential market are exposed, in relation to offsite construction systems and techniques. The scheme incorporates an assessment against best practice of manufacturing and construction systems, construction system integrity and durability, supported by a national data base of residential properties assured under the scheme, which may be readily accessed by valuers to support informed and accurate valuations.

The use of offsite manufactured systems and other innovative construction techniques in the residential sector has been held back by the fact that, although developers, builders and clients are keen to adopt and use them, mortgages were often hard to secure. In addition the future access to mortgages after the first purchase was uncertain.

This has been changed by the availability of the Buildoffsite Property Assurance Scheme.

The scheme is a Buildoffsite industry initiative supported by one of the world's leading risk management organisations who will hold a database of the accredited manufacturers, developers and contractors. Insurance is provided by an experienced organisation that has long term data on durability and maintenance performance.

The UK's four largest mortgage lenders have agreed to support the scheme with mortgage security for 60 years. The scheme also has support from the surveyor's professional institution for the standard process which will enable valuers, surveyors and lenders to identify and have confidence in the products that they are evaluating or financing.

Annex E

Collateral issues for examination

The following points have been raised during the course of the Review and although not central to the tasks defined by the Terms of Reference impact on the efficiency of housing supply and merit examination by the Departments

- 1 The impact on S104 on progressing housing schemes – a requirement for the prior approval of domestic drainage- and said to be causing delay and adding cost to new housing schemes
- 2 To undertake a review of the performance of Utilities in connecting services to new homes. To assess the financial and housing consequences and to make recommendations
- 3 To consider what has been described as an effective moratorium on Government supported housing research. To consider if current arrangements are inhibiting innovation and knowledge transfer in the house-building sector.
- 4 A review of value for money being achieved by RSLs in developing new homes compared to comparable procurement by volume house-builders supplying to the private for sale market - including in those cases where house-builders are acting on behalf of RSLs. Is the assertion that the construction cost for new properties for of RSLs is twice as expensive accurate and, if accurate, in any way justifiable
- 5 To examine the justification for the blanket application of the Lifetime Homes standard to RSLs build programmes. This has been described to the Review Team as an expensive requirement that may not be merited in all cases
- 6 To examine the financial and other implications of real world experience (including financial implications) associated with the maintenance and replacement costs associated with installed renewables and mechanical air handling installations. The Review Team has been advised that early failure of installations coupled with difficulties in sourcing replacement parts and considerable user issues which together have created considerable difficulties for RSLs along with additional costs for uncertain carbon gain.
- 7 To consider how to influence building contractors who do not see a need to change from the use of traditional methods to build new homes
- 8 To consider the merit of current practice that enables house-builders to benefit from a transition period allowing a lock in to satisfy only the requirements of current Building Regulations even if substantive construction of the new homes is to be delayed for a number of years

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The report is based on information sourced from third parties (which may include public data sources). Whilst we have used all reasonable care in the collection and collation of this information we cannot warrant or guarantee the accuracy of the output.