The Home Building Skills project is a collaboration between:

**NHBC**

NHBC is the standard setting body and leading warranty and insurance provider for new and newly converted homes in the UK.

Started in 1936 as the National House-Builders Registration Council, NHBC has worked consistently to raise the construction standards of new homes and provide protection for new homebuyers.

[www.nhbc.co.uk](http://www.nhbc.co.uk)

**Zero Carbon Hub**

The Zero Carbon Hub was established in response to the Calicutt Review of housebuilding delivery. It is a public and private partnership responsible for galvanising action and working with Government, councils and industry to overcome barriers to ensure mainstream zero carbon homes are delivered from 2016.

[www.zerocarbonhub.org](http://www.zerocarbonhub.org)

**ConstructionSkills**

ConstructionSkills is the Sector Skills Council for construction. It represents every part of the construction industry, from architects to bricklayers, in every part of the UK. It covers every part of the skills agenda - from grants to college places. It understands what the industry wants and needs; it tells that directly to Government, and it has the power to get things done.

[www.cskills.org](http://www.cskills.org)

If you would like to contribute to the Home Building Skills project, please contact Rob Lockey at rlockey@nhbc.co.uk

This report and other documents associated with the research are available as PDF downloads from [www.homebuilding-skills.com](http://www.homebuilding-skills.com)

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Foreword

By Imtiaz Farookhi, Mark Farrar, Neil Jefferson

The UK home building industry is no stranger to frequent change. For decades it has adapted its plans, products and processes to deal with new technologies and build methods, new design requirements, new market demands and regularly updated quality standards.

More recently home builders and their professional advisers and supply chains have engaged particularly positively with the issue of sustainability. There are already many examples of good practice in the design and development of low and zero carbon new homes. There are many thousands of happy consumers who will pay tribute to how home builders and developers in both the public and private sectors have understood and met their families’ changing needs.

However there still needs to be a quantum leap in the industry’s response to what is probably the biggest change management programme the industry has faced since Victorian times.

What is clear is that there will be a growing and enduring need for a general upskilling of all parts of the construction industry and its supply chains to address the location, planning, design, construction and operation of low carbon, highly energy efficient buildings, and the way they fit into the larger scale of neighbourhoods and towns. The issue stretches along the whole delivery chain.

That is why our organisations came together in a unique collaboration to facilitate a very broad discussion about the needs of the future.

This work gives clarity to the skills and knowledge needed for the next 10 years in home building. It gives a roadmap for the people in the business, and for the many new recruits who will join the industry as the market recovers.

We are very grateful to everyone who has already participated in the Home Building Skills initiative. We urge you to continue helping us in whatever way you can to achieve the recommendations and to update and adapt the collective wisdom we have gathered here. It will be much needed in the years to come.

“This work gives clarity to the skills and knowledge needed for the next 10 years in home building. It gives a roadmap for the people in the business, and for the many new recruits who will join the industry as the market recovers.”

Mark Farrar
Chief Executive ConstructionSkills

Imtiaz Farookhi
Chief Executive NHBC

Neil Jefferson
Chief Executive Zero Carbon Hub
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Executive summary and recommendations

• In June 2009 NHBC, ConstructionSkills and the Zero Carbon Hub, with support from the Home Builders Federation, started a project to help the UK home building industry understand the likely future changes to home building and how these changes will impact on the skills and knowledge needed within the industry and its whole supply chain.

• It was a unique collaboration between organisations that had not been so closely linked before, but all of whom are concerned to see improved home building skills and knowledge as a way to raise standards, reduce risk and ensure effective consumer protection.

• The UK home building industry is facing a decade of huge changes. One of these will be the introduction of zero carbon homes, which if poorly managed carries significant risks for the industry and the consumer (regardless of how ‘zero carbon’ is defined). However there are also many other regulatory changes still to come, the impact of which cannot be predicted yet.

• Through a process of research, interviews and consultation, a set of ‘best guess’ scenarios have been developed to paint a picture of home building in the milestone years of 2010, 2013, 2016 and 2020. These cannot yet offer a detailed route map but they do provide a collective view on the likely direction of travel of the industry. The scenarios will be regularly reviewed and updated as greater clarity emerges in future.

• Based on these scenarios, checklists have been drafted for eight key roles in the home building supply chain, providing an indication of the core skills and knowledge that each role will need, and their likely Continuing Professional Development (CPD) needs for the future. The skills checklists will be updated and published online later in 2010.

• NHBC, Zero Carbon Hub and ConstructionSkills are continuing to consult on what else should be included in the skills checklists. We welcome further input from any organisation with an interest in any of the job roles:
  - Designers and Architects
  - Planners
  - Specifiers, Quantity Surveyors and Buyers
  - Product Supply Chain (manufacturers, suppliers and distributors)
  - Site Managers
  - On-Site Trades (bricklayers, joiners and other fabric trades, as well as specialist trades such as roofers, floorers etc)
  - Other Trades (M&E, heating and ventilation, electrical etc)
  - Building Control and Site Inspection
Interestingly, the consensus is that most of today’s core skills for home building will be very similar in the future. Bricklayers will still need the skill to lay bricks. What will be different is the context in which those skills are applied. Traditionally there has been some recognition and focus on the CPD needs of professionals. In future it will be equally important at trade and technician level. In an age where a home’s design and technical specification has to operate in a much more sophisticated way, updating everyone’s knowledge and their understanding about how their work impacts on others will be vital to ensuring the integrity of the ‘system’ as a whole.

Home builders have always managed to adapt their workforce to industry changes. But never before has it become so important that site teams are trained and really understand what they’re building. Manufacturers have always taken a big role in that training – it’s going to be even more important in future.

Recommendations

1. This work must not stop with this report. The organisations involved in this initiative, led by NHBC, Zero Carbon Hub and ConstructionSkills, will continue developing and revising scenarios, analysing impacts and advising on how this will lead to new skills and knowledge for a decade of change in home building.

2. We propose establishing a new online portal to publish the skills checklists for each job role and to help signpost people and organisations to the training providers, colleges and universities that offer courses and qualifications to meet future skills and knowledge needs. We estimate there may be 10,000 training providers to the UK home building industry. It is a complex and confusing market for home builders - research tells us that many employers and employees do not know where best to turn to get the skills and knowledge they need. There has been overwhelming support to our early ideas for an online portal. We will develop the proposal further, with the aim of launching the site in 2011 (see page 28).

3. Training providers should, wherever possible, ensure any training provision is accredited on the Qualifications Credit Framework. This accreditation will give confidence to employers and appropriate recognition of employees’ achievements.

4. Another message to the learning providers is that qualifications and curricula must respond swiftly to the needs of the home building industry. In addition, the quality of the training must be kept high - further and higher education centres need to focus on their lecturers’ own CPD so that they, in turn, can keep the industry up-to-date with everything that is changing.

5. Formal training will play an increasingly important role in UK home building. But the industry also learns a huge amount from itself. Support must be given to the communication of case studies, exemplars of best practice and practical solutions offered by peers within each professional and trade group.

6. In the meantime, the single most important thing that home builders and their advisers and supply chain can do to prepare for the future is to ensure adequate awareness of the challenges at the highest levels. It is now less an issue about worrying where the labour will come from. The key question for the future will be how well the entire team understands which building methods, technologies and combinations of choices are available and how to build homes in a way that minimises risk - to themselves and future owners and occupiers.

“History has shown that as the industry emerges from recession there is likely to be a surge in building levels, which puts strain on an already depleted workforce. As we come out of this latest recession, the challenge of increasing supply will be amplified by the pressures of building homes that meet tough sustainability targets. It is crucial, therefore, that the industry is united in defining and confronting the knowledge gap that may otherwise hinder its progress towards the challenging targets of the next 10 years.” Imtiaz Farookhi, Chief Executive, NHBC
Over the last year we have researched and collected expert opinion to map out what is needed.

This work has included:

- A review of existing research and published commentary covering the zero carbon homes agenda and home building more generally.
- In-depth interviews with key opinion formers within or with an interest in the home building industry, including people already building low carbon homes.
- Input from expert groups within the Zero Carbon Hub’s Skills and Training Workstream.
- A two-day workshop in November 2009 to gather more views from home builders, specialist and pan-industry organisations, professional institutions, Government officials, learning providers and other stakeholders.
- An online consultation which was read by unique visitors from 1 March to 31 May 2010 and which resulted in detailed consultation responses, all of whom were supportive of the accuracy of the content.
- Presentations to delegates and exhibition visitors at Ecobuild 2010.
- Presentations to 12 industry groups, trade associations and professional institutes, which have also resulted in useful contributions to our consultation.

“Many companies are unable to articulate what they specifically need but they definitely know their needs are changing. This means that training providers and assessment centres are also unable to determine specific needs and develop tailored solutions in response – this work will help clarify needs and inform the skills and training response.”

Alistair Collin, Head of Future Skills, ConstructionSkills
About this work

In 2009 NHBC, Zero Carbon Hub and ConstructionSkills came together to establish the Home Building Skills initiative.

Our aim was to identify the most likely changes that would affect the UK housebuilding industry in the next 10 years, and the potential impacts of these changes on the skills and knowledge required by the main groups of professionals involved in this industry. We wanted to identify the skills and knowledge needed by the whole home building supply chain to cope with, and thrive in, an intensive period of change.

There are several critical reasons why this work is so important:

It is about managing risk. NHBC’s long experience tells us that as we emerge from a recession, new home quality can suffer. Previous recoveries in the new build market have also coincided with increased delays, faults and costly claims. This is largely due to the fact that experience has been lost during the recession and the industry struggles to recruit enough of the right people with the right skills to meet rising demand. Add to this the introduction of a new product - the zero carbon home. Homes will be built differently, to more exacting specifications and levels of precision, and using different materials and technologies. This creates a doubly complex situation which, if not anticipated and managed, will impact negatively on customer satisfaction, consumer protection and the reputation of companies and the industry as a whole.

It is about reducing costs. Private investment in skills must be optimised in accordance with benefits, and to allow increasingly limited public money to be used most effectively where it is most needed. Individuals and employers need to know where best to spend their money, and how to target their budgets where it will lead to faster, higher quality and more efficient home building practices. Correctly-focused investment in the right trade skills will also help to reduce the risk of skills shortages that push up build costs.

It is about adding value. Understanding what the industry really needs is essential to colleges, universities, training organisations and other learning providers so that they can become more accountable, respond to those needs and prioritise training that adds real economic value. Investing in the people in our businesses, equipping them with relevant skills and knowledge - not just training for the sake of training - also adds value and establishes a competitive advantage in the market.

“To build low and zero carbon homes, we must ensure that we transform people’s skills at the same time as we are expanding our knowledge and technical expertise in sustainable development. Housebuilders have made great progress towards the zero carbon target, but it is now vital that we work together to identify the skills gaps and work to fill them at the same rapid pace the industry is changing the way it designs and builds our new homes.” Neil Jefferson, Chief Executive, Zero Carbon Hub
As part of the thought process we went through in order to develop the scenarios for home building in 2010, 2013, 2016 and 2020, we looked at the many external factors which are pushing future change.

These drivers for change impact on many areas of home building - not just skills issues, but also things like the industry’s business models of the future, the manufacture of new products, investment in research and development and the financial viability of the industry.

The 10 most frequently identified political, economic, social, technological, legal and environmental drivers were as follows:

1. **Zero carbon** and the standards required by the Code for Sustainable Homes (England and Wales), the Homes and Communities Agency (England), and similar organisations.
2. **Legislation and regulation**, including changes to Building Regulations and employment, health and safety and transport regulations.
3. **Energy infrastructure** and the balance between local, regional and national energy generation, including the de-carbonisation of the national grid and the policies surrounding renewable energy.
4. **Land availability, use and planning**, including the current uncertainties over the likely impact of localism and recent abolition of Regional Spatial Strategies.
5. **Building methods and materials**, including the emergence of new build systems that suit particular planning regimes, scales and types of development, site conditions and quality performance criteria.
6. **Design approaches**, including the need for inbuilt sustainability and flexibility in the design of individual homes, developments and whole communities.
7. **Workforce availability**, including dealing with the pressures caused by the recession and an ageing workforce, and the need for multi-skilled workers and more young people in the industry.
8. **Products and technology**, including issues about cost, the pace of innovation, product knowledge, quality control, installation and maintenance.
9. **The economy and finance**, including the future of publicly funded housing and the availability of mortgage finance, bank loans for manufacturing and the fiscal support provided to business.
10. **Consumer attitudes** to new homes and the sorts of developments that support modern living, as well as rising public awareness of issues such as quality standards, environmental issues and energy costs.

Other factors are likely to emerge over time.
The zero carbon context

One of the most influential of the drivers for change is the continued emphasis on reducing carbon emissions from new homes and reaching a ‘zero carbon’ target as quickly as possible. There are related policies and timetables for this in England, Wales, Scotland and Northern Ireland. As at September 2010 these are as follows:

**England** The Government has maintained its target to reach zero carbon by 2016. However, the definition of zero carbon (currently approximately equivalent to Code for Sustainable Homes Level 6) is under review. The final solution is likely to include the establishment of a community energy fund that developers may pay into for sites where onsite renewable energy options are restricted.

**Wales** The Welsh Assembly Government has an aspiration to achieve zero carbon emissions from new buildings by 2011. Currently in Wales ‘zero carbon’ is defined as Code Level 5 for domestic properties.


**Northern Ireland** Northern Ireland is working to a similar timetable and definition of zero carbon as England. However, it is also incentivising the building of low and zero carbon homes through its Low Carbon Homes scheme, a tax relief scheme which came into effect in April 2010.
Emerging themes

During our work, certain views were repeated consistently by all groups in the home building supply chain.

Some new skills, but lots of new knowledge required

- It is clear that some new skills, and even new roles (professions and trades), will emerge to meet the needs of changing build methods and materials/technologies, particularly in the medium to longer term.

- However, skills should not be confused with knowledge. While a great deal of knowledge may be required (especially relating to new design approaches, new materials and technologies, systems build/offsite manufacture etc), much of this knowledge will be applied using existing or slightly modified core skills in any particular profession or trade.

- What will matter most will be people’s awareness and detailed understanding of the application of their knowledge and the context in which their skills are being applied. As an example, a site manager supervising the construction of proprietary offsite-manufactured systems will use many of the same management skills, but will need different knowledge and understanding than if the homes are built using traditional construction techniques.

- Skills sets for particular job roles may change over time depending upon how quickly certain approaches are adopted within mainstream building. The market for ‘traditional’ building skills will remain strong in the repair and maintenance sector.

- There are likely to be more operatives with specialist skills (rather than traditional trades) in the future as a direct result of the innovation agenda - occupations might morph together initially and then develop specialist skills.

- While employers may have been prepared to invest in CPD for some professionals, there now needs to be a longer-term assessment of all employees’ training needs - the skills and knowledge required for the future won’t just be available to be picked up informally on the job.

- An integrated and holistic approach to building low and zero carbon homes is required as you cannot effectively develop skills for individual roles in isolation.

- Throughout the supply chain, skills are needed to achieve airtightness and avoid thermal bridging.

- There is likely to be a need for more widespread understanding and expertise in the selection and installation of low and zero carbon energy technologies.

- Many respondents think that new technology, or better use onsite of existing web-based technologies such as webcams, could also play a useful part in supply chain or site management. They are interested in learning more about the opportunities.

- Learning providers will need to be aware of, and respond to, the different starting points and adoption curve of those across the sector.
Uncertainty breeds inaction

- The recession and reduced access to finance by both home builders and home buyers (especially first time buyers) has created frustration and some stagnation in the market.

- This year’s Election and subsequent changes to Government, its policies and funding regimes are adding to the ‘wait and see’ philosophy and the reluctance in some parts of the industry to invest much in change planning, particularly in relation to skills and training.

- Some clarity is emerging surrounding the low and zero carbon agenda, but the amount of proposed change and the short timescales within which it is planned is a natural cause for concern for many home builders.

- Will customers buy the low and zero carbon homes at the premium price that is anticipated? Will energy prices have changed consumer attitudes sufficiently for them to be willing to pay a premium price for more efficient homes? Or will suitable incentives be introduced to make these homes more affordable? This uncertainty makes some parts of the industry cautious about planning for change.

The stakes are higher

- In the past it may not have mattered so much whether home builders did not upskill. Training was sometimes seen as optional or risky as it may lead to good employees being poached.

- The stakes are higher now. There are more tests to be passed (eg. air leakage tests and other tests increasingly carried out post-completion) and consequently the costs of getting it wrong have grown. Fixing defects in the early years now carries a greater penalty in terms of customer satisfaction, reputation and even ease of future planning permissions.

- Compliance will also become a political issue. As any perceived performance gap between what was designed and what was built potentially becomes wider, the pressure and scrutiny on the home building supply chain will increase. To help it achieve the standards required, the industry will need a properly resourced compliance regime that provides a transparent, accountable service - a building control system with public service ethos but private sector efficiency.
The pace of change will not be the same for everyone

- Those who are involved in the building of social housing for housing associations and Registered Social Landlords (RSLs) have been required to build to higher standards since 2008. Carbon reduction standards become a requirement for all new homes built from 2010.
- The pace setters (mainly but not exclusively within social home building) have a great deal of experience and knowledge to pass on to others. They often know what works in design and onsite and what options are available, as there is no ‘one size fits all’ solution.
- Given that housing associations and RSLs use a contracted onsite workforce, much as private sector builders do, there is an opportunity for transferring knowledge and skills.
- Those builders who do not have land banks will almost certainly be required to meet the more stringent energy efficiency (Part L) standards earlier than those with land banks who will continue to build to earlier regulatory requirements (ie. consents applied relating to earlier regulations).

Successful home building depends upon a team effort

- The ‘upstream’ roles in the supply chain that operate largely offsite have the greatest opportunity to influence what is built, how and where. The decisions made collectively or individually by designers, architects, specifiers, planners and product manufacturers/suppliers will determine what others build onsite, and how.
- The ‘downstream’ roles, operating largely onsite, have much less influence in terms of the design and building materials and methods. However, the success or failure of the end product rests largely with onsite professions and trades - the site managers, inspectors and trades.

- Working in integrated teams, with close liaison between upstream and downstream roles within the supply chain, has been an aspiration for many years. Some have achieved this successfully and to great effect. It is clear that greater understanding and knowledge of each other’s roles and practices, and the importance of ‘right first time’ quality and timing, will be required.
- Site managers have traditionally been the people who find fixes to unbuildable design and problems during construction. However, individual site solutions to what have previously been considered ‘design faults’ can’t happen in the future. In order to maintain the integrity of building systems and to achieve the more precise tolerances required on house types, feedback from site to design office must work effectively and designers must assist buildability and respond to issues very quickly so that production schedules can still be met.

Zero carbon homes are only part of the sustainability story

- Carbon reduction targets and the role that homes and home building must play in achieving them are gaining wider acceptance. However, tackling climate change is only part of the sustainable development story.
- The environmental footprint of future developments and the ability of the local area to support the growing population will be increasingly important in determining what is permitted.
- In particular, water - both too much of it in terms of flood risk, and too little in terms of potable supply - is already presenting challenges to home builders. Water use in areas where the resource is in high demand and low supply (eg. SE England) and where the flood risk is known to be a problem is increasingly dictating what is built, where and how.
Scenarios -
What will be the most important home building skills and knowledge needs for the future?

That depends on what sort of future we are talking about. And while crystal ball gazing is very tricky during such a time of rapid change, we need to make some educated guesses about how things might be.

As part of the Home Building Skills initiative, scenarios were developed, redefined and considered by hundreds of consultees during the year.

These now provide a ‘best guess’ snapshot of what home building will be like in the UK for the milestone years of 2010, 2013, 2016 and 2020.

The picture obviously changes or gets clearer over time. So we will keep exploring these scenarios and update them at regular intervals.

2010: The home building ‘drought’ continues...

...but new ideas begin to emerge

The scenarios for this year (2010) were developed up to a year ago, so have already been revised to reflect the influence of the continued economic downturn and the new Coalition Government.

Interestingly though, even last year our respondents had a good feel for the way things might go. They felt that 2010 would still be likely to be characterised by low numbers of new home starts, a fall in the price premium commanded by new over old properties, and continued restraints on buy-to-let investors and first time buyers by increasingly risk-averse mortgage lenders. These factors, plus the falling value of land banks and slow-moving stock, have reduced builders’ ability to borrow capital for new developments and have kept new build housing at a very depressed level for some time. This is what they told us:

In 2010 we will see

Economy, finance and market demand

• Continued constraints on first time buyers getting mortgage finance to enter the housing market.

• Home builders promote new finance packages to encourage people to buy new homes.

• Smaller contractors focus on delivering bespoke housing to customers requiring low LTV mortgages.

• Reduced level of Government investment in new homes, as public spending is slashed.

• The need to produce housing with less direct finance means new business models start to form, encouraged by organisations like the HCA.

• Trading is tough, so reducing build costs is a priority.

Consumer attitudes

• Consumers still placing location and value ahead of energy efficiency, and there is low awareness of the importance of the built environment in cutting carbon emissions.

• No enthusiasm among consumers for off-site manufacture apart from perhaps in the social housing sector - private buyers still gravitating towards second hand traditional homes.
“We will need to build a workforce that can adapt to change. They will need to understand systems - homes as systems, as well as the interrelationship with community and society level systems.” University of Leeds

Legislation and standards

- The regulatory burden is not very different from 2009. There is more legislation - for example new Building Regulations taking effect from 1 October 2010 - but this will have relatively little impact yet because of low volumes of new build homes and builders using existing permissions under previous Building Regulations.

- Code for Sustainable Homes - private new homes in England and Wales to be designed to Level 3 from late 2010.

Land and planning

- Ready-to-build plots in desirable areas command a premium.

- Many planning consents are at risk as a result of changing planning guidance from Government.

- Land continues to be in short supply as private land owners have little incentive to sell land and face planning issues.

- Local Government starts to intervene by entering risk-sharing partnerships with developers to build on redundant plots owned by councils and other public bodies.

- Major home builders shift their emphasis from investment plots to social housing and seek to build to the standards required by RSLs.

- Uncertainty continues about the possibility of major new developments or sites which are dependent upon large infrastructure investment.

- Developers re-negotiate Section 106 agreements.

Zero carbon

- Some home builders trial marketing of low and zero carbon homes to develop clear models that work with consumers.

- Marketing staff start to prepare for marketing low and zero carbon homes and provision of advice and guidance to consumers.

- Interest grows in exemplars - monitoring, testing and feeding back into the industry.

Design approaches, building methods and products

- Greater emphasis by home builders on fabric improvement, insulation and ventilation to achieve energy savings, reducing interest in low and zero carbon energy technologies.

- Continued investment by home builders on technology that helps sell homes (eg. better heating systems, data systems inside homes etc).

- Little change in design and build methods unless they help to reduce costs.

- Builders re-trench to building methods they know and understand.

- No particular shift towards off-site manufacturing yet.

- Field data starts to become available (eg. EST data on air and ground source heat pumps and solid wall insulation), with resulting re-evaluation of some of these products.

Workforce

- Smaller builders start leaving the home building sector and shift their focus to repair and maintenance.
By 2013 the strong desire to fix the problems of missing investment and unmet housing demand will generate new models for funding home building. We will begin to see the emergence of investment companies who replicate the work of RSLs but in the private rented sector. The public sector (which will have little cash for investment) will use land in lieu of funding as its contribution to new development.

While many respondents believe the current home building business model will continue, others think developers may become more like contractors managing the supply chain. Legislation around zero carbon will begin to have an impact, forcing planners, architects and builders to achieve a better mutual understanding of how housing developments will meet the required target emissions reduction. Product companies who have invested in low carbon technology products will begin to see a return on that investment.
In addition, in 2013 we will see:

Economy, finance and market demand
• Shortage of enough homes in the right places is forcing up house prices again, but increasing frustration at lack of development finance.
• Mortgage finance most readily available to second and third time buyers as they offer less risk.
• Rationalisation of high street banking in the UK will begin to settle and competition for new mortgage business will bring more capital into the market.
• Alternative approaches to large scale, investor-driven development are emerging.
• Small numbers of up-market homes being built, but affordable housing numbers could be very low.

Consumer attitudes
• Consumer attitudes are changing, but not wholeheartedly - they are in line with legislative requirements.

Legislation and standards
• The 2013 Building Regulations are introduced requiring carbon emissions for new homes to be 44% less than the 2006 standard. Code for Sustainable Homes Level 4 (which mirrors the emissions reduction in the 2013 Building Regulations) is the standard required for new homes registered against the Code.

Energy
• Costs will have risen significantly and will start to impact on the behaviour of some consumers. However, they will not be significantly high enough yet to create a tipping point towards zero carbon.

Zero carbon
• More exemplars on larger developments.
• Some home building companies doing good marketing of low and zero carbon homes - clear models that work as part of the mainstream - and getting better feedback on what low and zero carbon technologies are best received by consumers.
• Home builders aiming to have well-trained marketing support to help them sell low and zero carbon homes.

Design approaches, building methods and products
• Greater attention to ‘place making’ and the development of successful communities, driven by social housing and the localism agenda.
• Designs and building methods will vary depending on which sector of the market is being served. Those for RSLs will be to a more advanced specification than the private market.
• Continued emphasis on building physics to understand flow of heat and efficient use of energy.
• Continued emphasis on achieving airtightness and avoiding thermal bridging.
• Changes to heating systems in homes, largely influenced by 2013 Building Regulations.
• Lots of new product and design ideas starting to come through, but still continued preference for brick and block or framed construction methods for building structures.
• Manufacturers increasingly responsible for installing and maintaining products. Greater partnerships between developers, contractors and manufacturers.
• Drive to find new ways to innovate that do not add cost.

Workforce
• Lack of sufficient apprenticeship placements still continuing to cause concern.
• Some pressures on workforce availability and rising prices for specialist labour.
By 2016 it will be common to see new investment models where land is contributed by local government and the building is financed by large scale investors. As well as the normal business model for speculative house building, developers with large land banks will enter partnerships with venture capital companies, develop sites for rental and then, at an appropriate time, re-sell their equity shares in these developments. Investors will be focused on yield rather than capital growth so cost of ownership will be an important performance indicator. This will drive up build quality and, with high energy prices, put the focus on energy efficient homes with lower running costs.

This will help to reduce the carbon emissions from new homes - although whether the emissions fall to zero is dependent on developments in electricity generation, the expansion of low and zero carbon technologies and nuclear energy.

While build systems may be largely the same as before, there will be different heating systems and some community heating and power generation systems. Microgeneration will be seen as a niche market in newbuild.
In addition, in 2016 we will see:

**Consumer attitudes**
- Consumers better informed and attitudes changing significantly towards low and zero carbon homes, as effective information and advice allays public concerns about changes to home building.
- Increasing focus on value, thermal performance and energy efficiency in the home.
- Consumer choices affected by fiscal measures - eg. carbon tax alongside council tax.
- New homes being actively marketed on benefits of low energy consumption and lower cost of ownership.

**Legislation and standards**
- The 2016 Building Regulations require homes to be built to zero carbon standards - effectively 150% (approximately) less emissions than 2006 standards. The Code for Sustainable Homes will reflect the zero carbon requirements of the 2016 Building Regulations alongside its other sustainability requirements.
- Stricter but more consistent implementation of zero carbon legislation.

**Land and planning**
- Continued focus on ‘place making’ in large scale developments, facilitated by partnerships of investors, land owners, builders and facilities managers.
- Larger scale developments of sufficient size to justify community heating and power generation.
- More community building, self-sustaining in terms of employment, housing etc.

**Energy**
- Shortage of power, brought about by the decommissioning of older nuclear power stations, and the need to reduce carbon from the grid will impact on energy prices.
- Energy costs are set to be significantly higher.
- High energy prices will enable home builders to differentiate their product on energy efficiency. However, this will still remain secondary to location and value.

**Zero carbon**
- ‘Zero carbon’ Building Regulations introduced.
- Many more homes built to Code for Sustainable Homes Level 4, 5 and 6 featuring use of solar panels, biofuel boilers, wind turbines or site-wide/district energy solutions in order (at Level 6) to replace entirely the energy taken from the grid.
- Linked to the achievement of Code for Sustainable Homes Level 6, homes will feature more energy efficient appliances and reduced surface water run-off.
- Not all homes will be able to reach these standards - Government and planning authorities may need to offer some relaxation of the standards.

**Design approaches, building methods and products**
- Products that don’t use peak-time electricity will dominate the power area.

**Workforce**
- Lots of new technologies and techniques will be mass produced and mainstream - this will de-skill large parts of construction (following similar examples in IT and automotive industries).
- For example, specialist M&E skills likely to expand, but less requirement for traditional skills like bricklaying.
- Higher costs of getting skilled workers will increasingly determine building methods.
By 2020 the market for new homes will have split into three:

• The traditional market will still remain - personal investors using traditional mortgage finance which by 2020 will be back as a viable and large scale source of finance particularly for existing home owners.

• Public sector investors who invest in place-making will integrate employment and education with living.

• A market for large scale investors who invest firstly to create a return on investment and secondly to create a place to live. These are likely to be high value, high quality developments with strong potential for long-term yield. If the UK follows the US model, the development will integrate housing and leisure in gated communities. Investors will be focused on exclusivity, quality and manageable cost of ownership.

Volumes will return as stakeholders take concerted action to ensure the housing shortage does not constrain society. Zero carbon new homes will be the norm in all sectors. The technology, products and methods for low and zero carbon homes will be well proven. High energy costs will ensure that energy efficient new homes command a premium over older, less efficient housing stock.
In addition, in 2020 we will see:

Economy, finance and market demand

- More private/public partnerships with a contracting rather than a developing culture.
- Huge increase in demand for rented/RSL accommodation.
- More infrastructure expenditure to protect communities from environmental risk.

Consumer attitudes

- Consumer choice driven by carbon and fuel efficiency - new homes are more attractive than existing stock, but still many people are not yet as ‘green’ as we might expect.
- Potential for a ‘scare’ story about a defective new system build to affect consumer confidence in new technologies.
- Consumer increasingly concerned about water efficiency now (particularly in South East England).
- Home owners are trained to run homes efficiently (eg. grey water systems, building management systems). Most of the operating problems have been resolved, although some problems will still be expected.

Legislation and standards

- Very much more regulated and expensive environment in which to build and work generally.
- Legislation continues to focus on tackling impacts of global warming and standards pushing for better build quality.
- Government will also use legislation to maximise housing output, including affordable housing options.
- New water standards varying per region.

Energy

- Move towards cleaner, more expensive energy - high energy costs ensure that energy efficient new homes command a premium over older, less efficient stock.
- End of gas as a domestic fuel in new home building.
- More mixed energy supply, increasingly localised with lessening importance of the grid.
- Growing concerns about energy security.
- Energy shortages quieten opposition to nuclear and major renewable energy generation projects.

Design approaches, building methods and products

- Industry gears up to meet demand through productivity gains, tight supply chain management and alternative methods of construction.
- More offsite construction and system building, including continental systems - traditional building methods facing increasing competition.
- Embodied carbon is more of an issue - manufacturing impact, waste, transport of materials etc. will be measured more closely.
- Builders using a wide range of low and zero carbon energy technologies for power and heating.
- Potentially dramatic developments in energy-producing technologies.
- Technology, products and methods are well proven - however, some failures can be expected before the best can be identified for volume use.
- Building Regulations and Code for Sustainable Homes Level 6 strongly influencing home design and interior layouts - eg. more living rooms are south-facing, bedrooms north-facing etc. as influenced by need for solar gains and shading.
- Homes will be very different in the way they are insulated and heated, and in their use of water compared to 2010.
- Building methods also influenced by local energy availability.

Workforce

- Increased emphasis on accreditation of skills and certification schemes.
- Previous building system failings and insurance claims will impact on skills development going forward.
- New sets of skilled people experienced at working with different technologies, particularly solar, heat pumps and district heating systems.
- Existing trades with enhanced skills to deal with different building methods.
- More people requiring skills in project management, logistics, assembly, innovation, site preparation and planning.
- Skills shortages will force product change - need to take labour out of the process.
- Some polarisation of workforce - less reliance on craft skills in newbuild and more on assembly of materials produced offsite.
- Amount of labour needed in the industry will decrease and productivity will increase.
- Due to the move away from traditional construction, some small building firms will leave the newbuild sector.
Skills and knowledge checklists

One of the most important parts of the work to date has been our focus on future skills and knowledge required by the main professional groups, trades and technical disciplines involved in home building. From the research, we have summarised the core knowledge and skills for each group and started the process of identifying future CPD requirements.

The example overleaf for site managers takes exactly this approach. But we know there is much more to do. Over the next few months we will be fleshing out these checklists and publishing them online. We continue to welcome contributions to this work.

Of course, they will always remain work in progress, flexible to the needs of each market, and will need to be reviewed and updated as things change over the next 10 years.

The value of this checklist approach is:

- They provide employers, employees and their training advisors with a simple mechanism to feed into a training needs analysis.

- They give a good indication to new entrants and careers advisers about what sort of skills and knowledge will be needed for a successful career in home building design, construction or inspection.

- They help training and qualification providers to identify the content of courses and qualifications that might be needed and would be most attractive to the market.

- They help Government see where the industry has identified its priorities for learning provision, and where it could offer support. They also help Government and employers to control cost, focusing their attention on the areas that matter most.
Site managers - Core knowledge and skills for 2010 and beyond:

Knowledge of:

✓ Impacts of current legislation, Building Regulations and standards on what they are building.
✓ New products and systems being specified and used on site, and impact on programming, processes and site workforce.
✓ Increasing importance of effective supply chain management.
✓ Accreditation requirements for workers and systems.
✓ Inspection regimes and standards.
✓ Outline principles of sustainability (economic, social and environmental) and implications for build methods and materials.
✓ How a building operates as an integrated system.
✓ What is required to achieve highly thermally efficient and airtight fabric.
✓ Installation requirements for M&E, including low and zero carbon technologies.

Ability to:

✓ Interpret and implement current legislation, Building Regulations and standards.
✓ Manage programmes and processes.
✓ Communicate new requirements to site workforce.
✓ Manage sub-contractors and site staff.
✓ Manage supply chain, including logistics and service providers.
✓ Manage quality control on site.
✓ Communicate feedback on construction effectively to designers and architects.
✓ Understand skills levels of operatives and their training needs.
✓ Deal with customers effectively.
✓ Demonstrate and handover properties to home buyers.

Examples of forthcoming Continuing Professional Development (CPD):

✓ Knowledge to avoid cold bridging and achieving design airtightness
✓ Knowledge of impact of Code for Sustainable Homes requirements for all sites
✓ Knowledge of manufacture and installation of modern methods of construction
✓ Knowledge of more complex M&E installations, including micro-renewables
✓ Knowledge of off-site manufactured systems, modular systems etc.

Example of a skills checklist
A skills portal for the home building industry

One of the recommendations arising the findings of this project is the proposed development of an online portal to provide anyone involved in home building - be they site managers, architects, bricklayers or others - with a one-stop-shop where they can establish what training support they need, and where to find it.

The portal will be established by NHBC, Zero Carbon Hub and ConstructionSkills for launch early next year.

Employers will use it as a route to learning provision for their staff, new entrants will use it to source the best courses and qualifications for long-term career security, and learning providers will use it as a marketing route direct to the home building industry.

It is intended that the portal will hold details of suppliers including information on what they offer:

- Target audience - which functions would benefit most from the provision, and which level within the function - tradesman, manager etc.
- Type of learning provision - training course, onsite briefing, e-learning package etc.
- Description of learning content
- Area(s) of the country covered (for events etc)

Everyone we have spoken to has been overwhelmingly positive about the idea of the portal, and we already have organisations interested in trialing it.

Home builders in particular feel that information about training and learning is difficult and time consuming to access. Current information was described as “fragmented” and generally not specific enough to meet their requirements. The portal was felt to address the need for easily accessible and targeted information.

“*It has good reputable organisations behind it which makes support more likely.*”
Trade association

“It is a good idea in principle because when you come to look for all kinds of training, there are so many courses out there, it’s hard to sort them out or compare them”
Housebuilder, 51-200 per year

“We are definitely interested. To have a single source of all the information available would be extremely valuable”
Housebuilder, 301-1000 per year

“A very good idea.”
Training provider

“Good, because for any particular training problem, it’s hard to know where to start”
Housebuilder, 51-200 per year

“This seems very straightforward. Great to get to know the locations so you know where the trainers are. Great to have everything under one hat”
Housebuilder, 301-1000 per year

“To have a single source of all the information available would be extremely valuable”
Housebuilder, 301-1000 per year

Calling all learning providers:

If you are interested in being involved in the portal, please contact Rob Lockey at rlockey@nhbc.co.uk
After 12 months of detailed research and consultation, we have gathered together a great deal of knowledge and a growing community of interest around the home building skills agenda.

Everyone agrees that inadequate numbers of knowledgeable, multi-skilled people could be a major limiting factor to the future capacity of the industry, and a serious risk to the success of zero carbon policies in the UK.

But we have a clear view where we need to go next, and how to make it easier for employers, employees, new entrants and learning providers to find the information and support they need. The development of the skills portal will help enormously, and we expect other new ideas will also emerge from our future discussions.

You are very welcome to join in this work. To participate in the Home Building Skills initiative, please contact rlockey@nhbc.co.uk
We are grateful for the involvement of many individuals and organisations in this work so far, including:

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Caradon
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Chartered Institute of Building
Churchill Retirement Group
College of Estate Management
Construction Industry Council
Construction Products Association
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Department for Communities and Local Government
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EC Harris LLP
Edward Cullinan Architects
Energy Saving Trust
Federation of Master Builders
Federation of Plastering and Drywall Contractors
Gleeson
Hartlepool College
Hill Partnerships Ltd
Home Builders Federation
Homes and Communities Agency
House Builders Association
Housing Forum
Huber Dixon Insurance Services Ltd
Inbuilt Ltd
IPUR
Jelson Ltd
KB Benfield Group Holdings Ltd
Keepsake Construction Ltd
Kellan Developments
King Shaw Associates
Knauf
Lacey Simmons Ltd
Lagan Homes
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Local Authority Building Control
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Lovell
Martin Sewell Builders Ltd
Midas Construction
Miller Homes
National Energy Foundation
National Energy Services
National Federation of Roofing Contactors
Next Generation
Oaklands College
P J Carey (Contractors) Ltd
Pembrokeshire County Council
Persimmon Homes (South Midlands)
Proheat
Red Admiral Homes Ltd
RIBA
RICS
Rowlinson Constructions Ltd
RTPI
Rydon Construction Ltd
Saint Gobain
Stewart Milne Homes
Strata Homes Ltd
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