The Case for
Home
Performance
Labelling

**Final report of The Housing Forum
Home Performance Labelling Pilot**
January 2015

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PREFACE

The purpose of The Housing Forum Home Performance Labelling Pilot was to test the presentation of relevant information to future home seekers.

The information can be supplied to them in the form of an infographic when they are making choices. The graphic is derived from digital information already available.

The reaction to the pilot has been positive and the partners to the pilot (The Housing Forum, BLP Insurance and HTA Design LLP) now plan to move ahead in 2015 to make available a benchmarking scheme for homebuilders, housing associations, local authorities and consumers enabling them to check the compliance of homes with the forthcoming National Housing Standards. We also propose to enhance this with information comparing the predicted running costs of new and existing homes which we believe will be of particular interest to consumers.

We are indebted to the many who have contributed to the pilot, both members of The Housing Forum and others. A full list of participants is given at the back of this publication.

Ben Derbyshire
Chair, The Housing Forum
Managing Partner, HTA Design LLP

FOREWORD

As an industry we need radical change to meet the challenges we face - to increase production substantially, to continue to drive up the quality of what's delivered and to improve still further customer perceptions of the homes we design and build. Whilst inevitably regulatory standards will play their part, that is not the only answer. We have to provide much better information to buyers so they can make more informed decisions when taking on, what can often be the largest financial commitment they will ever make, buying a new home. To do this well it must be simple to understand, cover those things that buyers are really concerned about and make comparison easy and engaging.

I find it difficult to understand why, when the reduced running costs of new homes are so overwhelming, we are not delivering this sort of comparison today. If we can know the salt and calorie content of a bowl of soup, why can't we know more about the performance of a new home? Of course there are complications and it's not as straightforward as it sounds. But the pilot study has been a success with valuable lessons learnt and this report sets out the next steps of a journey we have to take. It also highlights the need to involve new partners and adopt an open approach along the way.

We live in an information age - we now need to apply the power of technology, not only to the way we build, but to the way we describe what we build, and where we can, how it will perform.

Mark Clare
Group Chief Executive, Barratt Developments

After a decade in which the biggest improvements in the sustainability and quality of new homes have been driven by government policy and regulation, we are increasingly looking to consumers – alongside other key stakeholders such as investors, employees and land owners - to provide the biggest 'pull' for progress over the coming decade. Customers for new homes will undoubtedly want user-friendly, readily accessible information to compare homes and make an informed choice on factors beyond location and price. The Housing Forum Home Performance Labelling Pilot is a very helpful contribution to the debate and could provide the basis of an effective tool to empower ordinary people to choose more sustainable and affordable homes.

Paul King
Chief Executive, Green Building Council

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SUMMARY

It is now widely accepted that the housing market would be greatly improved by the availability of accredited information on the quality and performance of homes. Now consumers have access to instantly available information in just about every other walk of life on their smart phones. The question is how best to introduce information to the marketplace, what information would be best made available, and how to overcome the various obstacles involved?

The Housing Forum has brought together a wide range of contributions from across the industry seeking answers to these questions over recent years. This work has culminated in the Home Performance Labelling Pilot which has engaged designers, homebuilders and suppliers in a forward looking exercise. By creating a comparison website (homeperformancelabelling.co.uk) we have anticipated a time when customers might make choices about their next home, fully informed about standards and running costs, as well as price and location.

Now that consumers have access to instantly available information in just about every other walk of life the focus of debate has changed for housing.

This exercise has provided invaluable experience of the processes and techniques that might be involved, as well as providing a signpost to the first step towards the introduction of a system that could ultimately offer consumers all the information to which they are properly entitled, when making choices about the most expensive purchase they will ever make.

In this report on our pilot, we summarise the immediate history leading up to the study, acknowledging diverse contributions to the development of thinking and techniques. We note the emerging context of housing standards and the quality agenda established by recent reviews of planning, housing standards and regulations.

We consider the range of parameters for assessment, the reasons behind the choice for our pilot and possible other measures. We assess the obstacles to implementation and consider the wide range of applications for the information in the future.

The outcome of the pilot exercise amply justifies the premise that more information should be conveyed to home seekers than is currently the case. The range of running costs even amongst new homes built to contemporary standards is almost £3,000 per annum.

Finally, on the basis of the understanding obtained through the pilot, we have concluded with a recommendation for the first move to introduce Home Performance Labelling to the housing market. This is based on the presumption that Government will not legislate any time soon for the introduction of mandatory labelling. Instead, we intend to offer a product for use, initially by homebuilders, housing associations and local authorities, that will verify the compliance (or otherwise) of homes with the space standards set out in the forthcoming National Standards that should emerge from the Housing Standards Review.

Following this initial offering, we would like to enhance the service with information of primary interest to consumers, particularly annual energy and in due course maintenance costs.

In the last chapter of the report we map out how we believe this initiative will lay the foundations of a framework for more and more consumer information about housing of all sorts. To achieve this outcome we recognise that we will need partners and we hope this publication will encourage potential collaborators to make contact and begin the necessary dialogue.

THE BACKGROUND

Early development with 4HousingArchitects
4HousingArchitects (4HA) is a group comprising the principals of four of the UKs leading design practices specialising in housing; HTA Design LLP, Levitt Bernstein, PRP and Pollard Thomas Edwards, all members of The Housing Forum.

The 4HA group have a long standing concern with raising quality and standards in the housing industry. This concern with the lack of consumer information led to the launch of an enquiry in 2009, on what information is available to consumers in other countries and in the UK, particularly by Estate Agents. This work was presented at a focus group at The Royal Society of Arts at a seminar held by The Housing Forum.

The work came to a number of powerful conclusions. Firstly, information made available to consumers of housing in the UK is patchy, inconsistent and a great deal less comprehensive than in other countries, notably North America and Northern Europe. There is little or nothing in the way of customer feedback mechanisms such as JD Power* which is available in the United States. Despite this, there was no appetite from homebuilders or agents to provide comparable information, largely on the pretext that lack of awareness of the metrics amongst customers rendered the information useless.

The Red Tape Challenge
In its early years, the Coalition Government launched one of those periodic attempts to rid the economy of needless bureaucracy. Called The Red Tape Challenge, launched in 2012 and led by The Cabinet Office, this initiative tackled different sectors of the economy in sequence, including housing. It attracted a host of responses, including submissions from 4HA and The Housing Forum, pointing out that there were huge opportunities for improving quality and efficiency in the delivery of housing, if only

the multitude of overlapping and sometimes contradictory bureaucracies of compliance that had sprung up over the years could be rationalised.

The Housing Forum report: Rationalising Regulations for Growth & Innovation
As a direct result, The Housing Forum established a working group under the chairmanship of Andy von Bradsky to draft a definitive report making specific recommendations as to how standards and regulation might be rationalised to good effect. The report, Rationalising Regulation for Growth & Innovation, co-authored by Andy von Bradsky and Ben Derbyshire, made a number of proposals for consolidating standards into the Building Regulations. The report also recommended the introduction of information to be made available to customers on space, fabric energy efficiency and water consumption wherever property is advertised. The report was extremely well received in Government circles and elsewhere.

The Housing Forum report: Housing for the Information Age
As a follow up, and with a view in particular to advancing the case for innovation, The Housing Forum convened a working group under the chairmanship of Ben Derbyshire to look at the opportunity for adoption of information technologies and digital media in the housing industry. The resulting report, Housing for the Information Age, (*housingfortheinformationage.co.uk*) concluded that conservatism and fragmentation of the supply chain was holding back the adoption of integrating IT, depriving the housing market of benefits available to almost all others in the developed world. The report recommended work to accelerate the adoption of Building Information Modelling (BIM), and further work on the implementation of Home Performance Labelling, speculating that the resulting informative comparison websites would be of benefit to consumers and concluding that:

* JD Power: A US based company specialising in owner verified ratings of quality, performance and reliability of cars and homes.

"Government, house builders and estate agents need to come together to draw up and then mandate the use of Home Performance Labels, which would appear on all advertisements, detailing property size and energy consumption, in a standard, at-a-glance. Home Performance Labels would allow consumers to compare quickly the size of a house, in terms of floor space as opposed to the number of bedrooms, and the energy performance with other properties."

The RIBA Future Homes Commission
In 2013 The Royal Institute of British Architects began research into public attitudes to the design and quality of new housing in the UK. This gave rise to the 'Home Wise' campaign and to a commission chaired by Sir John Banham investigating what might be done to increase the supply and improve the quality of housing. Following representations by 4HA, The Housing Forum and others, the RIBA Future Homes Commission included the following key recommendation:

The valuation of properties should reflect design quality so that there is an incentive for developers to invest in it."

"Home-buyers and communities have too little power to influence the design of future homes. They suffer from limited choice and the marketing of new homes often lacks the transparent, comprehensive information that consumers are entitled to expect before making one of the most important financial decisions of their lives. The valuation of properties should reflect design quality so that there is an incentive for developers to invest in it."

The DCLG Housing Standards Review
The technical Housing Standards Review was launched in October 2012 following the Red Tape Challenge. It was a fundamental review of the building regulations framework and voluntary housing standards which aimed to rationalise the large number of codes, standards, rules, regulations and guidance that add unnecessary cost and complexity to the house building process. The Review included a consultation with questions on the possibility of national minimum standards and the application of space labelling.

Following this, Government announced "the first ever national cross-tenure space standard". In the biggest change to housing standards for decades, water efficiency, accessibility and security will now be nationally defined and assessed under Building Control, and a national space standard established to be applied by Local Planning Authorities able to justify its use in terms of viability.

The Government now intends to issue a 'statement of policy' in early 2015 (subject to Parliamentary approval of amendments to legislation). This statement will be tabled at the same time as proposed amendments to the Building Regulations, which will come into force six months later in Autumn, 2015. The statement of policy will set out how these standards should be applied in Local Plans and in considering planning applications.

In interim arrangements, local authorities will be permitted to opt in to the National Space Standard. However, the Review does not clarify how compliance should be checked. We believe that Space Labelling is the solution to the problem of delivering compliance checking in an affordable and transparent way and that compliance checking should be extended to all tenures.

Space Labelling is the answer to the problem of ensuring compliance at low cost but as the consultation only refers to this operating at "the point of sale" it should be extended to all tenures.

To all intents and purposes, the proposed National Space Standard will be equivalent to the Mayor's Housing Design Guide used as a basis for this pilot project.

THE CURRENT CONTEXT - RELATED INITIATIVES

National Planning Policy Framework (NPPF) on Quality and Design

Sections 6 (Delivering a range of high quality homes) and 7 (Requiring good design) of the NPPF constitute 5 pages out of a total of 50 or so in the new streamlined approach to national planning policy that sets the tone for achieving quality in new development. Increasingly, it is apparent that homebuilders (especially those who seek to differentiate their product on the basis of quality) are responding to this call by seeking ways to compare their product against accredited measures of quality.

Building for Life 12

An example of such quality benchmarks is the relaunch of Building for Life 12 – essentially a checklist of features that can be used to assess the design quality of housing layouts (but not the quality or performance of the homes themselves). This joint initiative by Design for Homes, The Design Council/CABE and The Home Builders Federation attracted 100 local planning authorities to support its relaunch and leading housebuilders support it because of the potential that 'Built for Life' status affords in terms of faster approvals and improved marketing.

The BRE - Performance Indicators

The BRE's new domestic sustainability standard is likely to include consumer friendly information that will highlight the benefits of living in a more sustainable dwelling. Ideally this will bring into the public domain some of the information on sustainable homes that have already been built and also make available information on future dwellings. We anticipate this data being useful to a number of providers of home information in the future to help inform consumers and building owners of the quality of the buildings that they are buying or occupying.

The EU – Rationalisation

The EU is funding a number of research projects aiming to rationalise the network of different sustainability assessment tools across the continent and to enable better information to be provided to building users and occupiers. The intention is to introduce common ways of measuring energy performance, daylight, space and lifecycle impacts so that product manufacturers, contractors, purchasers and tenants of buildings have a common set of standards to compare across the EU. This will also aid testing of products, insofar as a product certified against an energy standard in one country ought to be compliant in others.

The RICS – Valuations

A major opportunity to bring this performance information to the fore lies with valuers. If valuers are unable to appreciate the financial benefits of higher quality and more sustainable buildings, they cannot allow them to affect their pricing mechanisms. The RICS and other EU based partners are working on a project called RenoValue, which aims to provide training material to enable building valuers to better understand the sustainable benefits of energy efficiency and renewable energy technologies. The Home Performance Labelling Pilot is the first step in this direction. This performance information will enable mortgage providers, for example, to appreciate the benefit to residents of buildings that save money on energy bills and maintenance, and thus present less financial risk to the lender. This should be a positive driver in the UK of better performing homes as it has been elsewhere, particularly in Germany where higher performing homes are offered a lower percentage rate on their mortgage.

THE METHODOLOGY

The Assessment Process
Members of The Housing Forum and their collaborators were invited to submit designs for single dwellings; houses or apartments, of any size, using Building Information Modelling (BIM) software. All dwellings were compared against the same metrics and then benchmarked.

The data was presented in the format of a comparison website, a traffic light system revealing performance in relation to benchmark standards with 'hover over' explainers to convey the means of calculation and parameters of compliance.

The Parameters that we measured
The pilot project carried out the assessment of 15 BIM based dwelling designs for the following performance parameters:

Price: £
Net floor area: m²
Price per square meter/foot: £/m² £/ft²
Storage area: m²
Average daylight level: % Daylight Factor
Broadband speed: MB
Estimated annual energy costs: £/year
Estimated annual maintenance costs: £/year
Volume: m³

Benchmarking
In addition we used the Mayor's Housing Design Guide, the DECC average household energy costs and the BRE Daylight Design Guidance to calculate the performance under these headings that consumers should expect from compliant newly constructed homes to act as a comparator. Where homes exceeded the standards we gave them a green traffic light, where they were close to the score we gave them an amber traffic light and when below the score by a significant amount we gave them a red traffic light.

BLP's Butterfly software was developed with funding support from the Technology Strategy Board and can measure life cycle performance and operational and embodied energy performance.

We used the BIM files to extract spatial information for each project as well as all the output schedules that hold information like the window and door types, the wall, floor and roof construction. The output schedules were then analysed by the Butterfly tool, generating results on the planned maintenance and component replacement cost of the dwellings for a life cycle period of 60 years.

The operational cost was calculated using the output from the Standard Assessment Procedure (SAP) calculation methodology and energy figures accounting for both regulated and unregulated energy consumption.

The water consumption was measured based on an average usage per household-person and all fuel tariffs and standing charges were based on a typical currently available offer from an energy company. We modelled the daylight availability based on a consistent surrounding context. The software used was the IES FlucsDL tool.

The Measureables
The measureables we chose for the pilot were intended to be simple and to link information about homes to both National and International standards of space & energy efficiency. The aim was to use currently established norms of measurement of floor areas and to use kilowatt hours/year and £/year as the basic metrics that consumers are familiar with from estate agent plans, Energy Performance Certificates and energy bills.

- Design Quality - Space Volume and Daylight
  We calculated these from the BIM data and presented them in easily understood terms.

- Space
The Net Floor Area of the dwelling is measured for all properties. The London Housing Design Guide has determined the minimum space standards, depending on the storeys, the occupancy and the number of bedrooms, as follows:

Space (Housing Guidance)		
Single Storey dwelling	1B2P	50m²
	2B3P	61m²
	2B4P	70m²
	3B4P	74m²
	3B5P	86m²
	3B6P	95m²
	4B5P	90m²
	4B6P	99m²
Two Storey dwelling	2B4P	83m²
	3B4P	87m²
	3B5P	96m²
	4B5P	100m²
	4B6P	107m²
Three Storey dwelling	3B5P	102m²
	4B5P	106m²
	4B6P	113m²
	10m² per person added	

London Housing Design Guide, Space Standards

- Storage Space
Built-in internal storage space is defined in the London Housing Design Guide as space free of hot water cylinders and other obstructions, with a minimum internal height of 2m and a minimum area of 1.5m2 provided for 2 person dwellings, in addition to storage provided by furniture in habitable rooms. For each additional occupant an additional 0.5m² of storage space is required.

- Volume
Calculated from average floor to ceiling heights. According to the Mayor's Housing Design Guide the minimum floor to ceiling height in habitable rooms is 2.5m between finished floor level and finished ceiling, whilst a height of 2.6m in habitable rooms is considered desirable.

- Average Daylight Factor
Daylight is calculated as a weighted average for the kitchens, living rooms and bedrooms of the property. It is benchmarked against the BRE Daylight guidance that suggests 2% for the kitchen, 1.5% for the living room and 1% for the bedrooms.

- Broadband Speed
This is a metric that everyone is familiar with and will need no explanation. Information is sourced by property postcode.

- Consumer Oriented Measurables - Annualised Running Costs
Operational and maintenance costs were expressed in £/year to enable purchasers to predict the likely annual cost of their purchase, information that is currently not easily available to them.

- Annual Operational cost
The cost for utilities including space heating, domestic hot water, electricity, water supply and broadband has been calculated based on the SAP assessments and average water usage. The prices are based on current tariffs available from energy, water and broadband companies. The results are benchmarked against the average operational costs of households of the same size, as provided by the Department of Energy and Climate Change (DECC).

Assumptions used for operational cost calculations
- Regulated energy costs (SAP)
- Unregulated energy costs (cooking, wet, cold and consumer appliances, ICT and other)
- Broadband (based on a representative current tariff ignoring year 1 reductions, discounts or inducements)
- Water (based on average usage per household-person and current tariffs)
- SAP energy usage figures used where available to reflect differences in energy efficiency
- Fuel tariffs and standing charges based on a typical currently available offer from an energy company
- CHP tariffs based on SAP apportioned gas tariff to reflect current rates
- Unregulated energy based on SAP L14 and L16 calculation using actual occupancy figures
- 100% of PV generated displacing mains electricity at standard tariff
- Cooking 50% split between gas and electric where both fuels are supplied

Annual Maintenance cost
The annual cost calculation includes the cost of maintaining, replacing and installing the services and other building elements, across a 60 year lifecycle. We added a notional service charge for flats in the pilot.

Assumptions used for maintenance cost calculations
- Life cycle period 60 years
- All costs at current prices: 0% inflation, 0% discount rate
- Life cycle costs include installation costs for new build, component replacement and planned maintenance items
- Life cycle cost data: BLP in-house costs, service lives and maintenance default data
- Modelling based on assembly and component descriptions and quantities from BIM schedules. These include:
  - Ground floor, upper floors and roofs
  - Balconies where applicable
  - External and internal walls, internal partitions
  - Windows, external and internal doors
 - Floor, wall and ceiling finishes.

In addition our pilot expressed value in terms of £/m² and £/ft² - vital information not normally displayed on a comparable basis.

Future Possibilities
As the market becomes more familiar with the data it may become possible to expand the range of parameters to include the size of gardens, parking spaces, local air quality, embodied energy and potential flood risk; all suggestions that were made to us in the course of the pilot.

WEBSITE ILLUSTRATIONS

The site has been built with the full functionality of a comparison website and illustrates the use of search criteria very much on the model of typical sites of this kind. Users enter their requirements in terms of location, price range and number of bedrooms. Most commercial comparison sites use a Map, List and Grid View. *www.homeperformancelabelling.co.uk* has the additional functionality of a Data View, showing the metrics we have measured in the pilot.
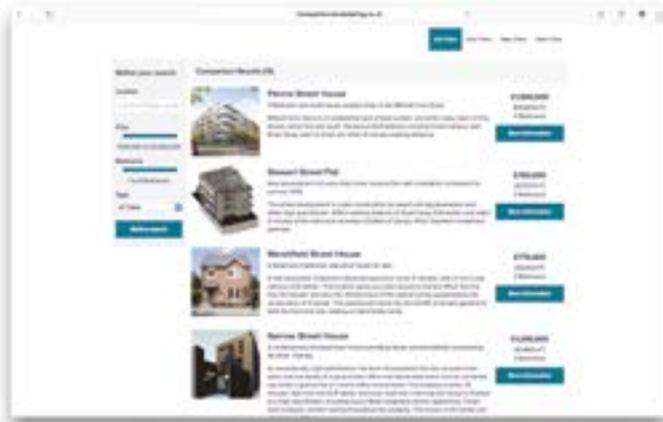
The List View
The List View presents an image of each home, the estate agents' description and a calculation of the price per square foot, generated from the data available as perhaps the most obviously straightforward measure of value.
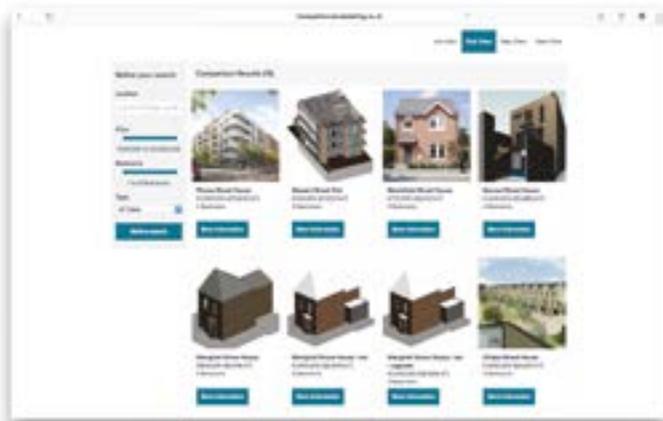

The Grid View
The Grid View provides a more condensed and therefore rapidly scan-able array for browsers to be able to draw comparisons between homes on offer.
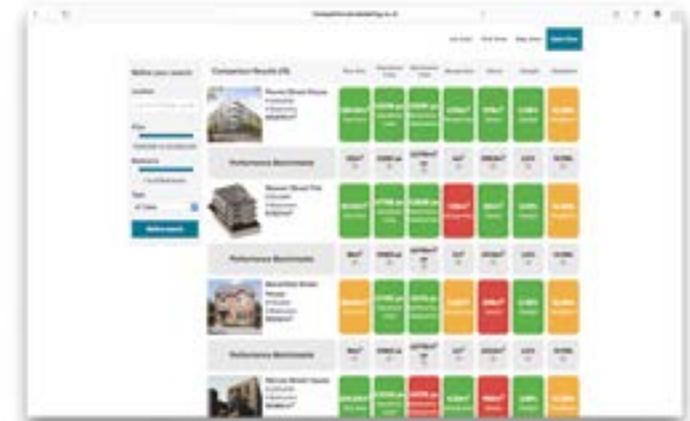
The Map View
We valued the designs on the hypothetical basis that they were all located on the Isle of Dogs in London's East End. We chose this location on the basis that there is a great deal of development activity and already a very diverse range of housing typologies available to prospective purchasers in the area.
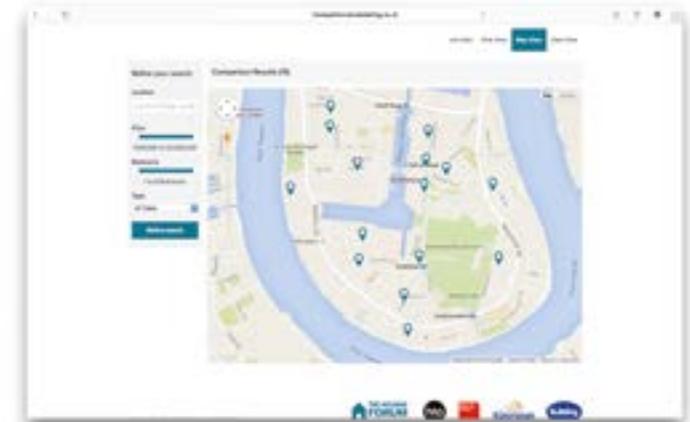
The Data View
The Data View provides the opportunity to compare homes in terms of the parameters we have selected for the pilot. As well as indicating whether each home performs in accordance (amber), better (green) or below (red) benchmark standards, the user can rank the selection under each performance parameter by clicking at the head of each column. No attempt is made at an overall ranking in recognition that consumers have widely different priorities for making their choice.

Our experience with the pilot suggests a much simplified version of the data view presentation whereby users would be able to judge at a glance whether homes meet or exceed benchmarks set by the National Housing Standard and the 2016 revisions to Building Regulation standards of energy efficiency. Allied to this, we would be able to present predicted annual energy and maintenance costs, albeit qualified by suitable disclaimers as to the predictability of actual performance in use.

HURDLES

The use of BIM in housebuilding
The pilot was designed around the use of BIM models of the submitted schemes as the basis for assessment.
It was thought that the data in the models would enable rapid and straightforward assessment of the submitted designs. It was believed that the use of BIM models in the pilot would be a good way to promote the use of BIM to homebuilders.

In fact, the models proved to be more complicated than was necessary for the task at hand and contained far more data than was necessary for the purposes of assessment. The time taken to configure the models and the extraction of data exceeded our estimates. Moreover, the use of BIM models undermined the case for labelling, attracting the criticism that most housing is not designed using BIM.

Alternative Modelling Applications
For labelling to become widespread alternative applications will need to be assessed. These would include graphics programmes normally used in the production of marketing and sales information, CAD programmes used for design and production information of new homes and laser surveying devices producing digital 'point clouds' from which 3D models are derived for use with existing property.

Cost Efficient Measurement of Existing Property in formats that can be readily assessed is clearly an important next step if comparable data on new and second hand homes is ever to be made readily available.

Roomscan by Locometric (http://locometric.com) is an example of the type of device available for this purpose.

Variables in Predicted Performance
A common criticism of the concept of Home Performance Labelling is that actual outcomes, especially relating to energy performance and costs in use, are so susceptible to the behaviours of occupants that attempts at predicted performance or costs are futile.

In fact, many products are advertised with estimated performance and it is widely understood that achieving the advertised performance is dependent upon certain behaviours. This does not prevent purchasers making choices on the basis of potential performance, so long as the method of calculation is both transparent and consistent.

Indeed a powerful argument in favour of labelling is that gaps between predicted and actual performance will reduce as a consequence of producers' awareness of public scrutiny will result in more careful calculation and suitably cautious prediction. Meanwhile, consumer awareness of the costs of profligate operation should bring about a reduction in wasteful behaviour.

Legal Disclaimers
It is recognised that any scheme for labelling of predicted performance would require a properly constituted transparent basis including the methodology, estimated margin of error, exclusions and the provenance of the assessing entity.

Market Awareness of Measures and Standards
Not until awareness of the significance of measures of performance has spread significantly through the marketplace will the impact of labelling begin to be felt in differential sales performance or in the valuation of property influenced by market sentiment based on performance information. It is therefore recognised that the evidence base for the impact of labelling on value will be some time coming.

Web design
The web-based demonstration comparison site constructed for the pilot, shows outputs for each housetype assessed to date, with data able to be reordered by user preference. The back end of the site is constructed using a database of algorithims generating consumer ready content. With more housetypes available for assessment, a richer range of results will become available. The website is proposed to be translated to an app in the coming months, enabling wider access.

POSSIBLE APPLICATIONS

An Analytical Tool for Designers, Constructors and Developers
An immediate application of the processes we have devised for the pilot is the extraction of performance data by designers and developers of new build homes for use as the basis for performance comparisons between different dwelling types, designs and forms of construction.

We have already received enquiries for this service from homebuilders interested to see how their standard types compare with each other, with the competition and with the emerging national standard.

The Basis for Feedback - Post Occupancy Evaluation
The existence of readily available data on predicted performance invites the collection of post-occupancy evaluation data, not only of quantitative performance information but also consumer feedback on qualitative responses to their environment.

A Guide for Consumers - Raising Awareness of Typical Performance Dimensions
A useful tool would be the publication of assessments of a range of housetypes commonly found in the market. These would be used as a guide to home seekers and as comparators against which to measure the performance of new build or retrofit design alternatives.

A Promotional Tool for Home Builders
An assessment of the performance of homes built to current, or 2016 standards especially, set against typical performance of the existing product could be of considerable promotional benefit to housebuilders and developers.

CONCLUSIONS AND FURTHER WORK

15 homes of different types and sizes were submitted by Housing Forum collaborators for assessment. They included houses and flats from one to four bedrooms ranging in size from 50-200m^2 and included a Victorian 3 bed semi in unimproved condition and two states of retrofitted improvements. Overall, the assessments amply demonstrated the value of labelling, illustrating the following significant points:

- Despite being newly designed to current Building Regulations or better, only one of the newbuild designs obtained a satisfactory or better rating in all categories.
- No other unit type scores well in all respects, and none scores badly in all respects, nor is there a correlation between the biggest and the most expensive, or the least expensive and lower quality.
- The amount of storage provided in the designs was generally strikingly poor, with one scheme failing to provide any storage at all to the standard required by the Mayor's Housing Design Guide.
- The £/m^2 figure reveals that the smallest unit is not the best value for money using that indicator.
- Differences in the aggregated annual running costs were very significant across the range, between £3600-£6500 per annum. Although unsurprising in light of the range of sizes, the predicted cost in use performance could become a significant differentiator in decision-making for families on median household incomes of £360 per week (ONS figures for 2010/11)
- Rather more surprising was the differences of predicted performance even within newly designed homes in the range of 3 bedroom types assessed, between £3878 and £5643 per annum. This can only partly be explained by the range of sizes concealed by the 3 bed description, 86m^2 – 133m^2. Further analysis would be useful.

- Also surprising was that the three bed Victorian semi appeared not to be hugely more expensive to run than the most expensive of the three bed new build types, at £4,600 per annum.
- The amount of daylight in the new homes varied a lot, between 1.18% (well below the BRE minimum) and 4.8%. Interestingly the Victorian semi did not outperform the best newbuild in terms of daylight and volume (measures chosen in an attempt to capture spatial qualities often associated with 'period' homes).

We continue to refine the graphics and presentation of the assessment data to improve comprehension and legibility. Overall, we believe the method communicated the data meaningfully and commentators agreed it could be an aid to decision-making for consumers. Particular issues were:

- Average ceiling height may be a more meaningful indicator of the loftiness of space, rather than volume which is of course greatly affected by difference in area.
- The graphics need enhancing to assist navigation within the selected range of properties in 'data view' so to avoid confusion.

HPL occupancy and life cycle cost data from BLP Butterfly model									
	Value (£)	Cost (£/m²)	Space (m²)	Operating Costs (£/yr)	Maintenance Costs (£/yr)	Storage (m²)	Volume (m³)	Daylight Factor (%)	Bedrooms
Plevna Street House	£1,500,000	£10,869	138	£2,316	£3,341	4.9	379	4.58	4B7P
Stewart Street Flat	£700,000	£7,526	93	£1,798	£2,638	1	251	2.01	3B5P
Marshfield Street House	£775,000	£9,011	86	£1,765	£2,113	2.3	206	3.26	3B5P
Narrow Street House	£1,200,000	£5,882	204	£2,326	£4,176	4.2	490	3.18	4B7P
Glenghall Grove House	£850,000	£8,415	101	£3,502	£2,141	1	333	2.52	3B5P
Glenghall Grove House / Extens	£1,000,000	£8,928	112	£3,115	£2,313	1	352	3.78	3B5P
Glenghall Grove House / Extens / Upgrade	£1,000,000	£8,928	112	£1,638	£3,015	1	352	3.78	3B5P
Chipka Street House	£1,100,000	£9,401	117	£1,878	£2,881	3.5	292	3.92	3B6P
Roserton Street Flat	£450,000	£6,250	72	£2,047	£2,893	1.8	179	4.80	2B4P
Launch Street House	£500,000	£9,615	52	£1,400	£2,750	0	132	3.28	2B4P
Kingfield Street House	£1,500,000	£11,235	133.5	£2,030	£3,410	3.5	385	4.30	3B6P
Parsonage Street Flat	£400,000	£8,000	50	£1,196	£2,433	1.6	122.5	2.30	1B2P
Chapel House Street House	£1,200,000	£10,380	115.6	£2,022	£3,272	2.4	300.3	2.95	4B6P
Cahir Street Flat	£450,000	£5,717	78.7	£1,583	£2,981	1.7	193	2.35	2B4P
Copeland Drive Flat	£500,000	£6,958	71.85	£1,563	£2,563	2.4	180	1.18	2B4P

This is the table of data shown on the Home Performance Labelling website, reproduced here for the sake of clarity. It highlights the highest and lowest scoring plots in each category.

Principal Parties:
The Housing Forum
HTA Design LLP
BLP Insurance (BLP)

Sponsors:
Kingspan
BLP Insurance (BLP)
Barratt Developments

Media Partners:
Building Magazine

Estate Agent and Valuers:
Hurford Salvi Carr

The Housing Forum
The Housing Forum is a membership organisation and a non-profit distributing Company limited by guarantee whose purpose is to bring together parties in a movement for change and innovation in construction and renovation and management of housing.

HTA Design and BLP Insurance
HTA Design LLP is a design consultancy and member of The Housing Forum. BLP provides building defects insurance. Together they have carried out the development work to create the assessment tools to enable the pilot.

Sponsors
We are grateful to Kingspan, BLP Insurance and Barratt Developments for their sponsorship to help cover the costs of the project.

Estate Agent and Valuers
Hurford Salvi Carr, a London based estate agent, have valued the properties submitted as BIM designs by participating contributors and provided imaginary estate agent descriptions on the basis of a hypothetical location. Valuations have been carried out using current RICS approved methodology and are for demonstration purposes only.

Participants contributing BIM models for assessment
Aggregate Industries
Alison Brooks Architects
Home Group
HTA Design LLP
Kingspan
Levitt Bernstein
PRP Architects
PS Sustainability Ltd
Pollard Thomas Edwards
Simon Foote Architects
Wates Living Space

Media Partner
Building Magazine

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