

CLC Housing Dashboard – 2021 Report

HOUSING SMART CONSTRUCTION DASHBOARD

Progress Measured December 2021

COST

The cost of building a new home of any given size

CAPITAL COST

£/m²



BENCHMARK

1315

2025 TARGET

1020

PROGRESS

-6%

PRELIMS COST PER HOME BUILT



BENCHMARK

13%

2020 TARGET

12.75%

PROGRESS

0%

HOMES COMPLETED /YEAR

The number of completely new homes created per year in the UK

NUMBER OF HOMES

Homes per year



BENCHMARK

194,060

2025 TARGET

300,000

PROGRESS

-12%

SUSTAINABILITY

How environmentally friendly new homes are, both in construction and in use

EMBODIED CARBON

kgCO₂e/m²



BENCHMARK

800

2025 TARGET

400

PROGRESS

0%

EPC RATING

Integer



BENCHMARK

B

2025 TARGET

A

PROGRESS

0%

WASTE GENERATED

m³/£100k project value



BENCHMARK

10.06

2025 TARGET

7.3

PROGRESS

-10%

QUALITY

The freedom from faults of new homes when they are handed over to the customers

QUALITY RATING



BENCHMARK

3.92

2025 TARGET

4.15

PROGRESS

1%

TIME

The time taken to create a new home, from the day that workers first arrive on site, to handover of the habitable building

TIME ON SITE

days/m²



BENCHMARK

0.21

2025 TARGET

0.14

PROGRESS

-5%

CIRCULAR ECONOMY

Material re-use %



BENCHMARK

3%

2025 TARGET

10%

PROGRESS

0%

SMART

How efficiently human labour is used in the creation of new homes

PMV



BENCHMARK

42%

2025 TARGET

55%

PROGRESS

1%

PRODUCTIVITY

£/man hour



BENCHMARK

£31.52

2025 TARGET

£36

PROGRESS

5%

DIGITAL MATURITY INDEX



BENCHMARK

30

2025 TARGET

50

PROGRESS

36%

HEALTH & SAFETY

How effectively the wellbeing of the workers building new homes is protected on site, and enhanced for the occupants via design of the home

SAFETY ON SITE

Injuries per million hours worked



BENCHMARK

1.37

2025 TARGET

1.54

PROGRESS

20%

HEALTH & WELLBEING

% of homes completed



BENCHMARK

2%

2025 TARGET

2%

PROGRESS

285%

APPRENTICE LEVELS

per 1000 people



BENCHMARK

19.9

2025 TARGET

25.4

PROGRESS

-13%



Construction
Leadership
Council

BENCHMARK SOURCES

Sources of data are from the following organisations: BCIS, RICS, BRE, DLJHC (formerly MHCLG), ONS, Mark Farmer at Cost, UK Government EPC data, NHBC, Mott MacDonald, HSE, Bidst and CTB. For a more detailed commentary on the basis of each source data, please see attached report.

CLC Housing Dashboard – 2021 Report

Introduction

Previous reports published in 2018, 2019 and 2020 have provided a 'snapshot' of the state of housing performance in relation to a dashboard consisting of a number of metrics, all of which have been developed under the direction of the Construction Leadership Council (CLC) 'Innovations in Buildings' workstream. The key 'driver' for the completion of the dashboard on an annual basis was to unpin the *Construction 2025* report (published in July 2013) as target outcomes to be achieved by 2025.

Those headline targets were (and still are):

- **33%** lower costs
- **50%** faster delivery
- **50%** lower emissions
- **50%** improvement in exports

The dashboard was therefore created to seek to measure progress against three of the four target figures (not exports) and over those twelve years (2013-2025) – in essence, answering the question, 'how are we doing currently against the three targets?'

It should be noted that this Dashboard only seeks to capture the 'state of play' in respect of **housing** – clearly, a similar dashboard **could** be created for every construction and infrastructure industry functional type of building and/or structure and, indeed, for an aggregate dashboard measure across all functional types. It was thought best to start somewhere and perhaps the 'easiest' functional type was considered to be housing.

The key 'movements' seeking to be measured and reported are therefore as follows:

- **Increase** the number of homes completed per year
- **Reduce** the time on site to build houses
- **Reduce** the capital cost and Preliminaries cost of building
- **Improve** safety in construction
- **Reduce** waste
- **Reduce** defects
- **Reduce** carbon emissions
- **Improve** productivity

Historic work on previous reports

Previous reports (as noted above) and published at that time under the 'BRE' banner set out much of the detail that sits behind the 'headline' metrics that appear on the front page of the Dashboard itself together with the process that was originally undertaken to decide upon which metrics to select and to formulate the basis of measurement and generally the thought process overall.

It is therefore not intended to repeat these sections within the body of this report, but merely to provide a simple overview as to 'how to read' the Dashboard data and to provide the basis of the following for each metric set out in the Dashboard:

- Unit (of measurement)
- Definition of the metric itself
- The information required to 'build' the metric
- A benchmark figure
- The source of any data quoted, with suitable commentary

Dashboard data understanding

In each case, when reading the Dashboard itself, there are three key pieces of data within each metric 'box' or 'section', as follows:

- The '2025 target' figure, this being a figure that has been set originally with a view to achieving the overall 2025 target improvement, when compared with a notional 'starting point' of 2013
- The (current) 'benchmark' figure, this being a calculated current in-year figure for where the industry is believed to be in relation to that particular metric, at the relevant year-end.
- The 'progress' percentage, being a simple measure of the extent of the improvement from the previous report (and where the metric has been in existence in previous years).

In respect of this last point, it should be noted that additional metrics have been added into the Dashboard since it was originally launched, all as set out in the attached report commentary.

2021 report publication – basis

This report is based upon metrics data which has been gathered and which applied during the course of 2021, such that the 'progress measurement date' that appears in the top right-hand corner of the Dashboard ('Progress Measured December 2021').

The reasons for the delay in the publication of this 2021 report and dashboard until now (the middle of 2023) are many, but not least of which is the serious impact of Covid-19 on everything that we do.

It is hoped that the 2022 report and dashboard, with the capture of metrics data up to the end of last year (2022) will be soon.

Metrics tables

As noted above, the following pages contain a table for each of the metrics and which captures the following information:

- **Unit of measurement** – the basis upon which the metric is calculated and expressed as a rate, number or percentage, dependent upon the nature of the item and the historically understood manner and form in which the metric is measured.
- **Definition** – the descriptor of the metric under consideration – 'what are we considering as a "thing", and seeking to use plain, rather than technical language.
- **Information required** – a fuller description of the basis upon which the metric value is being calculated – and the input data that is going to be required to enable the output figure to be calculated.
- **Benchmark figure** – the calculated figure for the year under consideration, with suitable observations and qualifications over the 'quality' of the figure quoted.
- **Source** – the location of where the foregoing columns are obtained from, with particular reference to the 'benchmark figure'.

In addition to the metrics table in each case, there is a '2021 commentary' section which provides an overview of the changes that have occurred since the last report.

What insight can we gain from this?

Our fourth dashboard and data is aimed at showing evidence of the sectors performance. We continually aim to create knowledge and evidence to assist financial, operational, technical functions to enable better decisions to be made when designing, contracting, and delivering new housing stock. We aim to create connections between the different data and produce insight that will improve the sector performance.

This 2021 data Dashboard has been developed with data developed by BCIS, RICS, BRE, Cast, NHBC, CITB, LC Journey, Mott MacDonald and Ekkist and builds on the previous knowledge of the sector and performance.

The connections between the data, suggest that the sector became less efficient in 2021, despite the increase in material usage per home, and the speed of delivery of homes being marginally increased. The reasons for this are unclear, but perhaps the constraints on skills and materials, from a disrupted supply base had an impact on time and performance.

Volumes of homes were down in year – market volumes decreased by 12%, disrupted by the pandemic impact on sales and supply of material in the first quarter of 2021. The supply chain material costs increased, and this further impacted supply of homes.

Healthy new homes expanded at a great rate - our stringent health and wellbeing measure, whilst low 0.5% of the volume of new homes, in 2020 accelerated to 2% of the new homes in 2021. This measure, representing a high health comfort as a proportion of new homes is encouraging and represents a step forward in the conditions for people, and the future of our housing.

Cost - costs continued to be linked to material and labour costs, increasing in year by 6%, linked to material inflation price increases. The increase in materials used (higher use of assembled systems offsite) appeared to not have a substantive impact on cost.

Waste generated increased by 15% suggesting that the sector became less efficient in practice, perhaps due to the significant volume increase, this correlates broadly to the slow delivery of homes taking longer to deliver homes per m2.

Digital maturity was significantly improved across the sector, improving by over 30%. Whilst digital maturity is improving across the construction sector, something to be celebrated, this housing data suggests that we are not seeing sufficient efficiency benefits, yet.

MMC policies started to make an impact– We started to see PMV specified as a requirement, at 55% - Pre-manufactured value (PMV) was estimated to move from 40% to 42% representing increased material fabrication of site, as a proportion of the overall cost of delivering new homes.

Safety improved markedly achieving the 2025 target in 2021, and an improved of 20% on 2020. The sector learnt a lot about safety during the pandemic period, and it is hoped that this is a lasting operational and cultural changes for the sector.

Quality of homes marginally improved, 1%, using the new NHBC Quality index. Focus on quality and customer satisfaction appears to have had an impact on the finished product.

Apprenticeships - a measure of project based social value, reduced by 13%. Perhaps a long-term impact of the attractiveness of the housing market to encourage new skills. This is of concern, and points towards a need to continually focus on productivity of the sector.

Capital Cost / m²

Capital cost/m ²				
Unit	Definition	Information required	Benchmark figure	Source
£/m ²	Cost associated with construction of the superstructure of a building per metre square of gross internal floor space	Capital cost - cost in £ associated with construction of the superstructure of the building excluding non-construction costs such as marketing etc.	£1,315/m ²	BCIS/RICS
		Gross internal floor space - space of a building measured to the internal face of the perimeter walls at each floor level according to RCIS NRM.		

2021 commentary

The cost data noted under this section is a nationally averaged figure and therefore does not relate to any geographically based projects. It is also an average of different types of housing stock combined together.

Given the previous decision to make use of RICS/BCIS cost data as the benchmark figure, each year BCIS are consulted on the movement in the 'headline' figure based upon a combination of incoming housing cost data and the movement with the Building Cost Index. This dashboard contains the cost data from RICS/BCIS which applied as at December 2021 and it showed an increase of some 6% on the previous year. However, it should be remembered that this percentage increase is common to all industry sectors and does not relate to housing in particular.

None of the contribution to the increase this year has been derived from the growth in the cost database for housing projects – this is because the modest number of pieces of data that had been received by RICS/BCIS made a statistically insignificant contribution to the mass of the database. Accordingly, all of the increase relates to construction inflation over the year.

The percentage increase is disappointing over the course of the year in question, but is merely a reflection of the general state of the construction economy, rather than any specific trends within the housing sector.

Embodied Carbon

Embodied carbon				
Unit	Definition	Information required	Benchmark figure	Source
KgCO ₂ e/m ²	Amount of embodied carbon associated with the production and transport of materials used in the construction of homes per metre square of gross internal floor space	Embodied carbon – embodied carbon covers greenhouse gas (GHG) emissions that arise from the energy and industrial processes used in the processing, manufacture and delivery of the materials, products and components required to construct a building.	800 kgCO ₂ e/m ² (embodied carbon of products only)	RICS, Methodology to calculate embodied carbon – 1 st edition was published in 2017, and an updated and expanded 2nd edition was published in September 2023. See RICS website for further details.

2021 commentary

This metric continues to difficult to update due to the lack of 'real time' carbon assessment data and for this reason the benchmark figure remains unchanged from the previous year.

The basis of calculation of the benchmark noted above was undertaken using the current RICS methodology (1st edition – published in 2017) of the RICS methodology. However, it should be noted that any figures noted are notional, based upon the carbon 'properties' of typical building components (generally) and therefore do not relate to housing alone.

Real 'live' and consistent carbon data will only start to become available once BCIS publish their database, expected in Autumn 2023.

Days on site

Days on site/m ²				
Unit	Definition	Information required	Benchmark figure	Source
Days/m ²	Elapsed time spent on site per metre square of gross internal floor space	Days – From the first day the first man hour on site was registered with HSE to the last man hour being the last day. This excludes on site surveying, pre-inspecting before construction takes place and demolition. This does not include factory time, or time spent on groundworks or remedial works.	0.21	BRE SmartWaste data source

2021 commentary

There has been a slight improvement since last year (c. 5%) which is encouraging, but is not sufficient of a movement to achieve the 2025 target within the time available.

Homes completed

Homes completed				
Unit	Definition	Information required	Benchmark figure	Source
Number of homes	Number of homes completed per year	Number of homes completed – Number of permanent dwellings completed	194,060 (2019-20, UK)	DLUHC (formerly MHCLG), house building: new build dwellings statistics *see below for further commentary on these statistics

2021 commentary

The only changes made to this metric were the benchmarks. They were updated using data from the same sources as previously used. Clearly, the 2021 figure is a drop on the previous year and it remains well below the target set by Government.

***It should be noted that the benchmark figure quoted above (194,060) is the pure 'new build' figure and in addition to this are the following additional elements:**

Change of use to residential: 23,790

Conversions between houses and flats: 3,870

Other gains (caravans, house boats etc): 530

Offset by

Demolitions: 5,760

This results in an overall figure a total figure of 220,600

Productivity

Productivity				
Unit	Definition	Information required	Benchmark figure	Source
£/man hour	Productivity is the efficiency at which a building is being constructed looking at the ratio of gross value added to man hours recorded on site. It is calculated as GVA (Gross value added)/MH (man hours) reflected as £ / man hour.	<p>Gross Value Added –</p> <p>The value generated by any unit engaged in the production of goods and services</p> <p>Man hours –</p> <p>Number of hours worked.</p>	£31.52/hour (for 2021)	Based on ONS data for output and hours worked

2021 commentary

This benchmark figure continues to be taken from the relevant ONS spreadsheet - Labour productivity: Breakdown of contributions, whole economy and sectors, Whole economy (detailed breakdown): output per hour (current price).

The 2021 figure is an improvement on that for the previous year and appears to be an improvement of some 5%. This shows an encouraging trend improvement towards the target of £36, but this could be due to a 'turn-up' against the Covid-related year of 2020 performance.

Pre-Manufactured Value

Pre-manufactured value (PMV)			
Definition	Information required	Benchmark figure	Source
<p>Pre-manufactured value captures the value that is created as a result of completing work away from the site.</p> <p>It is calculated by taking the gross construction cost of the project and deducting the prelims - sometimes referred to as site overhead costs - and the total site labour costs. The result of this is then divided by the gross construction cost and is reflected as a percentage.</p>	<p>Gross construction cost -</p> <p>The total construction cost of a project excluding associated design and other consultancy fees but including an allocated main contractor overhead and profit margin or integration fee (even if delivered within a developer / contractor model which returns a combined development gross margin)</p> <p>Preliminary cost (Site overhead cost) -</p> <p>Generally, all site-based overheads and as defined in Group element 9 of RICS New Rules of Measurement NRM1. This should include a pro rata allocation of overhead and profit margin or integration fee as above.</p> <p>Site labour costs -</p> <p>The total cost of site labour expended on the construction site. This is the summation of all labour only sub-contract packages plus the labour & plant cost component (when plant, temporary works etc not included in preliminaries as defined above) of combined labour and material sub-contract prices. This is to include general labour, tradesmen, supervision and any management not recovered through central overhead.</p>	42%	Information from Mark Farmer, Cast

2021 commentary

The definitions used in this metric were updated, following the publication of the Mark Farmer definition and methodology for the calculation of PMV. However, the benchmark figure included remains only an assessment of progress made in the previous year, and in the case of 2021 it is believed that an improvement has been achieved of some 5%.

Until a database of PMV figures are kept and are readily available, this benchmark figure can only remain an assessment against a target to be achieved by 2025.

EPC rating

EPC rating			
Definition	Information required	Benchmark figure	Source
Energy Performance Certificates record how energy efficient a property is and what its environmental impact is, using A-G ratings (A – being the most efficient/environmentally friendly and G – the least).	Average EPC rating for houses built	B (SAP rating 81-91)	Using Government data on EPCs lodged, Table NB1 – Number of New Dwelling Energy Performance Certificates lodged on the Register in England & Wales by Energy Efficiency Rating. Average value calculated by giving a value 1-7 to A-G ratings respectively, calculating an average score from these and rounding to the nearest whole figure

2021 commentary

The content of this metric remains unchanged, including the benchmark. This is because a rating 'B' is still the most common rating by far and we have no better data to be able to provide any different figure.

It has been suggested previously that this metric should be broken up into different property types, and broken down into refurbishment and new build projects, although nothing has been done this year in that respect.

Quality rating

Quality rating				
Unit	Definition	Information required	Benchmark figure	Source
%	Quality of homes is captured by looking at the cost of post-completion defects of a building as set out by the NHBC over the total capital cost. In short it is calculated as 1 (one) minus the cost of post-completion defects over the total build cost, reflected as a percentage	Capital cost - cost in £ associated with construction of the building excluding non-construction costs such as marketing etc. Cost of post-completion defects -	3.92	NHBC survey data

2021 commentary

As noted previously, this metric has limitations because any measure of the number of defects present in a completed house does not necessarily take account of the following factors, amongst others:

- Post completion defects do not necessarily become apparent until sometime after completion and occupation, and the gathering of such data is more 'suspect', the longer the passage of time.
- The data on the extent of defects present at the point of completion does not necessarily include those defects that have already been rectified by the Developer or Builder as part of the 'snagging' process (and therefore the existence of the defect not becoming 'public knowledge')
- The severity of the defect is not captured and/or the impact on the occupier of the property.

For the foregoing reasons, we have moved away from the initial data source and have moved to the NHBC construction quality review (CQR). The CQR is calculated as an average taken from statistics on items identified during construction, the quality of construction and customer feedback.

The benchmark for 2021 has shown a modest improvement from last year (1%) which is encouraging.

Digital maturity index

Digital maturity index				
Unit	Definition	Information required	Benchmark figure	Source
Score based on self-assessment out of 100	The Index considers maturity across a range of factors	Self-assessment against factors within index	30	Mott MacDonald Smart Infrastructure Index for residential properties

2021 commentary

This metric was originally labelled as 'BIM Level 2' but the feeling in the working group was that this may reflect certification rather than maturity. Maturity however is hard to measure, and the tool that was decided upon to understand maturity better was the residential element of the Mott MacDonald Smart Infrastructure Index. The benchmark of 30 was set in 2021 as this reflected a score in the upper tier of the residential self-assessments being completed at that time.

A 2025 target of 50 has been set for the sector reflecting the need to keep pushing and encouraging the digital transformation, given its role at critical stages of construction, such as design, and the wider opportunities it creates to drive productivity and quality improvements, and understand performance.

Waste generated

Waste generated				
Unit	Definition	Information required	Benchmark figure	Source
Volume (m ³) construction waste/£100K project value	This measure looks at the ratio of volume of construction phase waste that has been generated in the construction of the home represented for every £100k of the capital cost	Total volume of construction phase waste produced in m ³ <ul style="list-style-type: none"> - This includes waste from construction phase only Capital cost – <ul style="list-style-type: none"> - cost in £ associated with construction of the building excluding non-construction costs such as marketing etc 	10.06	BRE SmartWaste data based on median value for new build residential projects completed during 2021.

2021 commentary

The updated figure from SmartWaste is 10.06 (compared to 9.15 previously). The SmartWaste figure already only includes data from the new build housing sector, but unfortunately shows an increase in the volume of waste when compared with the previous year and is therefore moving even further away for the 2025 target of 7.3.

ISO 9001 accreditation

Now dropped

2021 commentary

Given that the relevance and value of this metric has previously been questioned and that ISO 9001 is a measure of productivity and quality, it has been suggested that there is considerable overlap with other existing metrics.

In addition, it should be noted that the housing sector does not follow ISO 9001 as much as other industry sectors.

For these reasons, this metric has been dropped.

Safety on site (stated in previous reports as 'RIDDOR')

Safety on site (stated in previous reports as 'RIDDOR')				
Unit	Definition	Information required	Benchmark figure	Source
Injuries per million hours worked	The frequency rate is the number of people injured over a year for each million hours worked by a group of employees or workers	Number of injuries per year (as reported as per RIDDOR) Total hours worked per year OR Average weekly hours worked	1.37	Calculated as per Injury Frequency Rates guidance from HSE using injury rates from RIDIND: Reported injuries by detailed industry for 2017/18 and mean paid hours worked for Construction of Buildings from ASHE Table 4.9a for 2021P

2021 commentary

The basis of the benchmark data has been set for some time and is commonly used within the industry. However, one problem has been highlighted with this metric in that it does not apply to all incidents as it only applies to those with RIDDOR criteria.

Notwithstanding this 'flaw' the benchmark data shows an improvement from the previous year (by some 20%) which takes the benchmark past the 2025 target.

Prelims cost per home built

Prelims cost per home built				
Unit	Definition	Information required	Benchmark figure	Source
%	This looks at the costs attached to prelims in construction which can be sometimes referred to as 'site overhead' divided by the total cost per home built reflected as a percentage	Preliminaries costs (£) <ul style="list-style-type: none"> - As defined in RICS NRM1 for Main Contractors Capital cost – <ul style="list-style-type: none"> - cost in £ associated with construction of the building excluding non-construction costs such as marketing etc 	12.75%	RICS/BCIS

2021 Commentary

Information on preliminaries as a percentage of capital cost is available from the cost data base held by BCIS although this would have to be a considerable manual exercise as the Preliminaries cost data is not available digitally. Accordingly, the benchmark percentage quoted has taken a very small sample of housing projects and averaged the results to arrive at a very 'crude' benchmark.

The figure remains the same as last year, as there is very little movement in the size of housing cost data, which would serve to impact the figure.

As noted elsewhere in this report, this metric is linked to that for Pre-Manufactured Value (PMV) in that any increase in that metric should serve to reduce the percentage of cost incurred on site-based Preliminaries. However, there is no meaningful data available to demonstrate that potential correlation.

Health and well-being

Health and well-being				
Unit	Definition	Information required	Benchmark figure	Source
%	<p>This looks at the percentage of new homes completed where the workforce (during construction) and the occupants of the home subsequently have indicated that they feel that this aspect has been adequately addressed and achieved.</p> <p>This is a certification process and includes 2021 data from:</p> <ol style="list-style-type: none"> 1. WELL Building Standard 2. Fitwel 3. HQM 4. Passivhaus 5. Airscore 6. Immune Standard 	Survey feedback data and then a combination of data sources aggregated to the current benchmark figure	2%	Ekkist

2021 Commentary

The 2025 target figure of 2% has been achieved this year and with a considerable improvement since last year (285% increase from 0.52%) but a word of caution needs to be made given that the source data is no longer able to be filtered for residential projects. This may serve to explain some of the reason for the apparent (and considerable) improvement this year.

Circular economy (material reuse)

Circular economy (material reuse)				
Unit	Definition	Information required	Benchmark figure	Source
%	This looks at the percentage of the value of new properties where the materials have been able to be reused or designed with that intention in mind, both at the end of life of the property reflected as a percentage	Actual or assessed percentage of materials that have or could be reused at the end of life	3%	Green Thinking Limited

2021 Commentary

Information on this element is generated as an assessment of potential reuse proportion against a 2025 target of 10%, but the current benchmark of 3% remains unchanged from last year. This metric is at best an estimate of what might have been achieved in this area.

Currently, there are two formal methods of assessing the benchmark figure: either by value or by mass and the favoured method is by value, although this approach disregards the (perhaps) more logical method of using the mass of the items, given that this might encourage the reuse of heavier items.

Social value

Social value				
Unit	Definition	Information required	Benchmark figure	Source
Per 1,000 people	This looks at the number of apprentices generated across projects expressed as a proportion against 1,000 regular workers	Feedback and data received from project work sites in respect of the number of apprentices retained on any particular project site	19.9%	CITB

2021 Commentary

Clearly, the measurement of the number of apprentices generated in any one year is only one possible and minor aspect of social value that could be measured. Given that this metric revolves around the need to demonstrate the 'give back' to society as a whole, it is suggested that this has limited traction in the wider context.

However, 2025 target is 25.4/1,000 people and the benchmark figure for this year shows a reduction in performance – down by some 13%, driven by the adverse impact of Covid. The overall trend is placed well towards achieving the target in 2022.