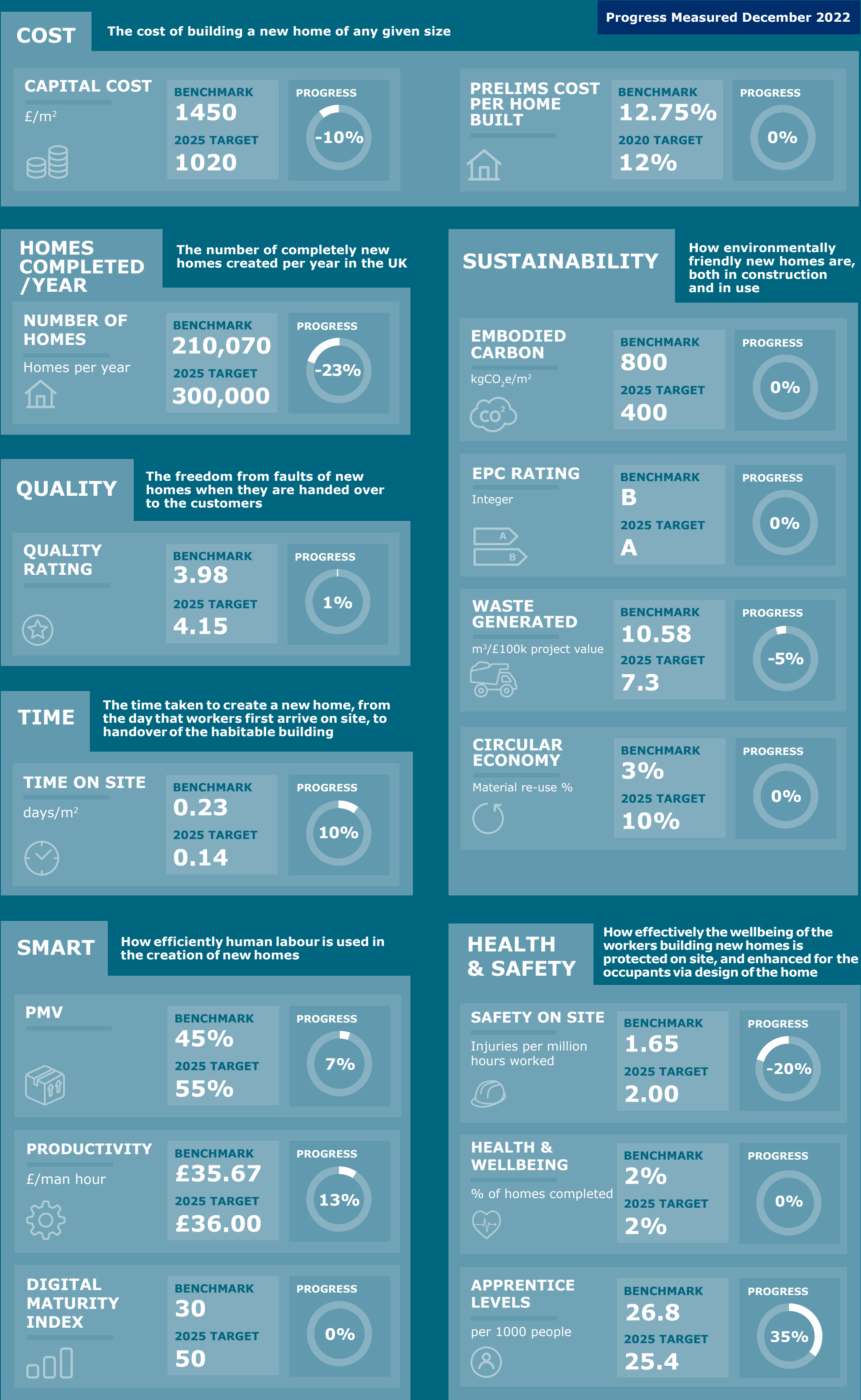


HOUSING

SMART CONSTRUCTION DASHBOARD



# CLC Housing Dashboard – 2022 Report

## Introduction

Previous reports published in 2018, 2019, 2020 and 2021 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.

## 2022 report publication – basis

This report is based upon metrics data which has been gathered and which applied during the course of 2022, such that the 'progress measurement date' that appears in the top right-hand corner of the Dashboard ('Progress Measured December 2022').

Whilst the previous 2021 report was only published very recently (end-November 2023), and therefore delayed well beyond the relevant date, this 2022 report is published quite soon after the 2021 report and whilst still later than we had hoped, this 2022 report is now published more closely to the target date than previously.

## 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 '2022 commentary' section which provides an overview of the changes that have occurred since the last report.

## What insight can we gain from this?

Our fifth 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 2022 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.

Despite the increase in material usage per home the speed of delivery of homes has marginally decreased over the course of the year. 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 built were up in year** - market volumes increased by some 8%, and is no doubt due to the 'bounce-back' from the previous year, which will have been adversely impacted by the pandemic.

**Healthy new homes expanded at a great rate** - our stringent health and wellbeing measure shows no further movement from the 2% target achieved in 2021, which itself is at the overall 2025 target that we set originally. Whether we need to consider re-setting a different target going forward is worthy of further debate.

**Cost** - costs continue to rise with the impact of construction inflation, linked as it is to material and labour costs, increasing in year by some 6%. The increase in the proportion of off-site materials used within the construction process does not necessarily provide us with any real evidence of substantive impact on reducing cost, as has hoped to be the case over the longer term. It may well be the case, but such impact as there might have been could have been more than compensated by the rise in general construction inflation across the sector as a whole.

**Waste generated increased by 5%** - this would suggest that the sector continues to be less efficient in practice, and this may well be due to the volume increase following the pandemic, although the percentage increase in waste is lower than last year.

**Digital maturity** – has not shown any improvement since last year, which is disappointing and continues to be well below our target percentage.

**MMC policies** – continue to make an impact with the PMV percentage (as assessed) increase again and up to 45%, although still some way below the target of 55%.

**Safety on site** – has become worse over the course of this year by some 20%, and this may be a reflection of greater activity, and it should be noted that this is still within the already achieved 2025 target.

**Quality** – continues to improve with a further 1% movement, using the NHBC Quality index. Focus on quality and customer satisfaction appears to have had an impact on the finished product.

**Apprenticeships** – an improvement from the previous year and with the 2025 target having been achieved. This is a very encouraging development as one of the minor measures of greater social value within the sector.

## Capital Cost / m<sup>2</sup>

Capital cost/m <sup>2</sup>				
Unit	Definition	Information required	Benchmark figure	Source
£/m <sup>2</sup>	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.	£1,450/m <sup>2</sup>	BCIS
		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.		

### 2022 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 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 BCIS which applied as at December 2022 and it showed an increase of some 10% on the previous year. However, it should be remembered that this percentage increase is common to all industry sectors and does not necessarily 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 BCIS. This lack of fresh data, whilst disappointing, is assumed to be a reflection of the fact that housebuilders (in particular) are reluctant to share such sensitive cost data. 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 and merely reflects construction inflation over the course of the year, which itself mirrors the economy as a whole.

## Embodied Carbon

Embodied carbon				
Unit	Definition	Information required	Benchmark figure	Source
KgCO <sub>2</sub> e/m <sup>2</sup>	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 <sub>2</sub> e/m <sup>2</sup> (embodied carbon of products only)	RICS, Methodology to calculate embodied (and operational) carbon – the 2 <sup>nd</sup> edition was published in September 2023 and becomes operative from 1 July 2024 (and therefore sits outside the timeframe for this report). This 2022 report therefore still uses the 1 <sup>st</sup> edition methodology for calculation purposes. See RICS website for further details.

### 2022 commentary

This metric continues to be 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 (1<sup>st</sup> edition – published in 2017) of the RICS methodology. A 2<sup>nd</sup> edition was published in September 2023 and will be used as the basis of the methodology for calculation purposes going forward. However, it should be noted that any figures noted are still 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 the BCIS database (known as the Built Environment Carbon Database (BECD)) becomes populated with project data - this will take some time, given that the BECD was only launched by BCIS in October 2023.

## Days on site

Days on site/m <sup>2</sup>				
Unit	Definition	Information required	Benchmark figure	Source
Days/m <sup>2</sup>	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.	0.23	BRE SmartWaste data source

### 2022 commentary

2021 figure – 0.21 (c 10% improvement)

There has been an encouraging improvement since last year (c. 10%) which builds on the 5% improvement from the year before and which continues to be encouraging, but it will not be sufficient of a movement to achieve the 2025 target (0.14) within the time available.

There is insufficient data to establish whether this year-on-year improvement is as a result of the increase in the use of MMC (as might be expected) or is a more general improvement in the speed of construction.

## 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	210,070 (2021-22, UK)	DLUHC (formerly MHCLG), house building: new build dwellings statistics  *see below for further commentary on these statistics

### 2022 commentary

The only changes made to this metric were the benchmarks. They were updated using data from the same sources as previously used. The 2022 figure shows a modest increase (some 8%) from the previous year, and it remains well below the target set by Government, and that gap is growing. However, the Government seem to have withdrawn during the year under consideration from a formal policy measure of 300,000 new homes.

\*It should be noted that the benchmark figure quoted above (210,070) is the pure 'new build' figure and in addition to this are the following further elements:

Change of use to residential: 22,770

Conversions between houses and flats: 4,870

Other gains (caravans, house boats etc): 780

Offset by

Demolitions: 5,680

This results in an overall figure a total figure of 232,820.



## 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.	Gross Value Added –  The value generated by any unit engaged in the production of goods and services  Man hours –  Number of hours worked.	£35.67/hour (for 2022)	Based on ONS data for output and hours worked

### 2022 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 2022 figure is a considerable improvement on that for the previous year and is at some 13% uplift, which takes it very close to the 2025 target of £36/hour. It is hoped that this target can be achieved and met by the end of the 2023 reporting period.

## 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 &amp; 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>	45%	Information from Mark Farmer, Cast

### 2022 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 2022 it is believed that an improvement has been achieved of some 7%.

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 (that target being 55%).

## 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

## 2022 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 continues to be 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	3.98	NHBC survey data

### 2022 commentary

As noted in previous reports, 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 2022 has shown a further modest improvement from last year (1%) which itself was an improvement from the year before that, which continues to be an encouraging movement towards the 2025 target of 4.15.

## 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

### 2022 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.

There is no change for the 2022 benchmark which remains at 30, which is disappointing, given the 2025 target previously set of 50. This has been set for the sector to reflect 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 <sup>3</sup> ) 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	<p>Total volume of construction phase waste produced in m<sup>3</sup></p> <ul style="list-style-type: none"> <li>- This includes waste from construction phase only</li> </ul> <p>Capital cost –</p> <ul style="list-style-type: none"> <li>- cost in £ associated with construction of the building excluding non-construction costs such as marketing etc</li> </ul>	10.58	BRE SmartWaste data based on median value for new build residential projects completed during 2021.

## 2022 commentary

The updated figure from SmartWaste is 10.58 (compared to 10.06 previously), which represents a further 5% negative move, in that the measure means that the volume of waste generated is moving even further away for the 2025 target of 7.3.

## ISO 9001 accreditation

Now dropped

### 2022 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	1.65	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

### 2022 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 a negative move of some 20% in this reporting year, but it still remains the right side of 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"> <li>- As defined in RICS NRM1 for Main Contractors</li> </ul> Capital cost – <ul style="list-style-type: none"> <li>- cost in £ associated with construction of the building excluding non-construction costs such as marketing etc</li> </ul>	12.75%	RICS/BCIS

### 2022 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 continues to remain the same as last year and the year before that, 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"> <li>1. WELL Building Standard</li> <li>2. Fitwel</li> <li>3. HQM</li> <li>4. Passivhaus</li> <li>5. Airscore</li> <li>6. Immune Standard</li> </ol>	Survey feedback data and then a combination of data sources aggregated to the current benchmark figure	2%	Ekkist

### 2022 Commentary

#### PENDING CONFIRMATION

*The 2025 target figure of 2% has been achieved this year but there has been no change from the previous year. As noted previously, 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

### 2022 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 and from the reporting year before that. 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.

## Apprentice levels (previously 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	26.8%	CITB

### 2022 Commentary

2021 figure – 19.9% (improvement of c. 35%)

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, the 2025 target is 25.4/1,000 people and the benchmark figure for this year has achieved that at a figure of 26.8%, showing that the hoped for trend movement has been successful.