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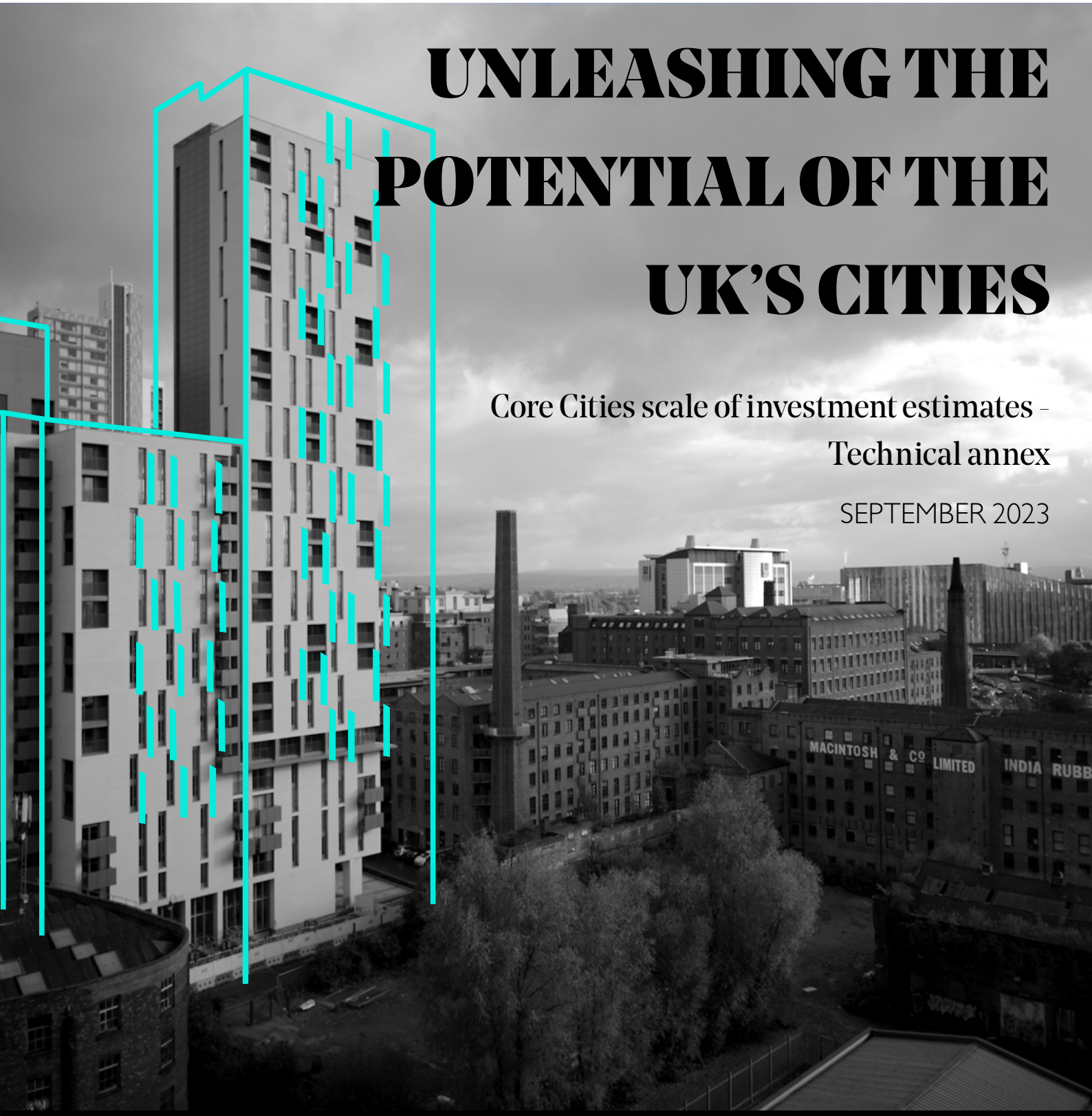


# UNLEASHING THE POTENTIAL OF THE UK'S CITIES

## Core Cities scale of investment estimates - Technical annex

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# Core Cities scale of investment estimates - Technical annex

This annex explains the methodology used to estimate the additional future investment required to build a regenerative economy in the Core Cities. It is based on assessing the additional investment needed to achieve six objectives that are viewed by the Commission as essential to achieving long-term, sustainable and regenerative growth in the Core Cities. The annex is divided into two parts:

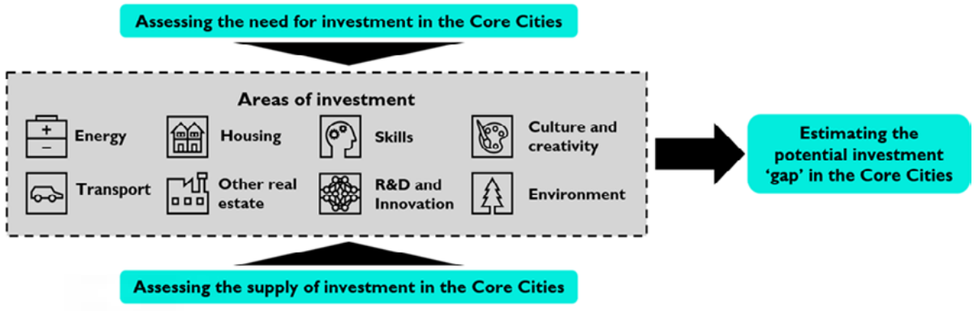
1. An overview of the framework used to assess the additional investment required in the Core Cities, and the key assumptions which underpin it.
2. More detailed descriptions of the methodologies used to estimate the additional investment needed to achieve each objective and the data sources relied upon.

## Overview

Figure 1 sets out the scope of the additional investment areas that have been assessed. These eight investment areas were chosen so that they span the nested systems and contribute to restoring and maintaining economic, social and environmental capital of the Core Cities in the future.

The estimates for each investment area are based on a review of publicly available literature on what additional investment might be needed in the Core Cities. A SMART objective[1] was defined drawing on various key sources and analysis so that the estimated scale of additional investment in the Core Cities was as specific as possible.

**Figure 1:** Framework for estimating the additional investment needed in the Core Cities.




1 These are objectives that are Specific, Measurable, Achievable, Relevant, and Time-bound.



Four key principles have guided the approach:

1. **Only the incremental investment has been considered:** where public and private sector commitments to invest already exist, these are excluded from the analysis; for example, this includes long-term funding for improvements to intercity transport, such as public sector commitments to HS2, National Highways and Network Rail and likewise underlying trends in (private) investment are assumed to continue.
2. **Additional investment in the Core Cities will not displace other areas of investment within the Core Cities (or outside):** where the need for additional investment is identified in one sector, eg decarbonising transport, it is assumed that this will not lead to a reduction in investment in other sectors, eg decarbonising homes.
3. **National estimates of additional investment can be apportioned to the Core Cities:** where estimates of the additional investment required exist at the UK level, a share of this investment is attributed to the Core Cities based on an appropriate metric which drives the investment need (see objectives below for examples).
4. **The availability of funding from either public/private sector has not been considered:** for each objective included in this analysis, no consideration has been given to the potential; sources of finance for the investment, whether that be public or private sector. For some of the objectives, the potential split is clearer: for example, affordable housing will require a mix of both public and private sector investment to achieve the objective. However for other objectives, this potential split is less clear, but is likely to again require a mix of public and private sector investment.

## Limitations of the approach

It has not been possible to estimate the additional investment required across all eight areas within the framework for three main reasons:

1. SMART objectives could not be defined for the investment area;
2. A lack of robust, existing data and analyses to support assessment of the additional investment needed in a specific area; and
3. A risk of double counting because some of the additional investment may contribute to multiple objectives: this is a particular issue when considering the additional investment needed to narrow the productivity gap between the Core Cities and the benchmarks used. It is assumed that for the investment areas that are not specifically mentioned in an investment objective (eg culture and creativity), they are included in the investment needs in other objectives.

## Objective methodologies

**Objective:** *What additional investment is needed in the Core Cities to increase the Core Cities productivity to narrow the gap to London by x percent in each city by 2050?*

The assessment of the additional investment required in the Core Cities is based on the analysis undertaken as part of the Bridging the Gap report (Brandily et al, 2022), part of the Economy 2030 Inquiry by the Resolution Foundation and the Centre for Economic Performance at the London School of Economics. This report explained differences in productivity between 43 UK cities over the period 2002 to 2019 based on three key determinants:

1. Size of the economy (measured as employment) - with a one percent increase in size found to increase productivity by 0.05 percent;
2. Human capital (measured as the share of working-age population with

NVQ4+ qualifications) - with a one percent increase in graduate share found to increase productivity by 0.56 percent; and

3. Capital stock (measured as the level of physical and intangible capital per worker) - with a one percent increase in capital stock found to increase productivity by 0.38 percent.

Using the underlying capital stock data estimated for the Bridging the Gap report, it is possible to estimate the additional investment needed in the Core Cities to increase the capital stock available to each worker to narrow the productivity gap relative to that of London (or other benchmarks) by a specified amount.

It should be noted that:

- The capital stock divides into five groups of assets: building capital (accounts for an average of 84 percent of capital in the Core Cities), intangible (7 percent), other tangible (6 percent), transport (2 percent), and ICT (1 percent). The current split of capital across the five assets groups is assumed to remain constant in each Core City to 2050.
- The 'size' variable (employment) has been adjusted for the Core Cities to use travel to work area (TTWA) employment, as opposed to the 'metro area' definition as used in the Bridging the Gap dataset for consistency with the other analysis throughout the Commission. It is assumed that the size variable of the Core Cities stays constant, due to the negligible impact of the variable on productivity as highlighted previously.
- The level of capital per worker variable for the metro area is assumed to be the same for the equivalent Core City TTWA.
- The additional investment needed in the Core Cities to increase productivity and narrow the gap with London has been estimated over and above a baseline level of investment needed to maintain the capital stock in each Core City at its current level (ie the depreciated capital is replaced to maintain stock at the existing level in real terms).

Table 1 below shows the additional investment needed in each Core City to narrow the productivity gap with London by varying proportions between 10 percent and 100 percent, assuming a 5 percent increase in graduate share in the Core Cities by 2050.

**Table 1:** Additional investment needed to narrow the productivity gap between each Core City and London by 2050. Note: All figures £bn. Column headers refer to the respective narrowing of the productivity gap in percentage terms.

| City | Target % reduction in productivity gap compared to London | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
| Belfast | 6 | 19 | 33 | 47 | 60 | 74 | 87 | 101 | 115 | 128 |
| Birmingham | 10 | 34 | 57 | 81 | 104 | 127 | 151 | 174 | 198 | 221 |
| Bristol | 4 | 17 | 31 | 44 | 57 | 70 | 83 | 96 | 110 | 123 |
| Cardiff | 5 | 15 | 26 | 36 | 47 | 57 | 68 | 78 | 89 | 99 |
| Glasgow | 6 | 22 | 39 | 56 | 73 | 90 | 107 | 124 | 141 | 157 |
| Leeds | 5 | 18 | 31 | 43 | 56 | 69 | 82 | 94 | 107 | 120 |
| Liverpool | 8 | 23 | 38 | 54 | 69 | 84 | 100 | 115 | 130 | 146 |
| Manchester | 11 | 44 | 77 | 110 | 142 | 175 | 208 | 241 | 273 | 306 |
| Newcastle | 9 | 25 | 40 | 56 | 72 | 87 | 103 | 119 | 135 | 150 |
| Nottingham | 4 | 13 | 22 | 30 | 39 | 48 | 57 | 66 | 74 | 83 |
| Sheffield | 7 | 19 | 32 | 44 | 57 | 69 | 81 | 94 | 106 | 118 |
| **Core Cities** | **76** | **251** | **426** | **601** | **776** | **951** | **1,126** | **1,302** | **1,477** | **1,652** |



Reducing the productivity gap between each Core City and London will require varying levels of investment due to the differing productivity gaps that currently exist and the existing stock of capital in each city. For instance, halving the productivity gap between Bristol and London would require £57bn of investment (representing £116,000 of investment per job in Bristol). This is very similar to Belfast, which would require £60bn of investment, but this would represent a larger figure of £140,000 of investment per job due to the lower productivity of Belfast currently and therefore a wider gap with London.

## What is the appropriate level of ambition with regards to 'narrowing the productivity gap'?

Within the Bridging the Gap report, the authors discuss the need to be realistic with ambitions for increasing productivity, with the figures above estimating that closing the productivity gap entirely with London would cost over £1.6trn. These figures also assume an increase in the share of employees with NVQ4+ qualifications (ie a university degree or equivalent) across all of the Core Cities by 5 percent.

When compared to Spain, Germany, Italy and France, the productivity gap in the UK between the 'second cities' and the capital city is much more significant. Analysis in the Bridging the Gap report identifies the gap between the second cities and the capital city in France as the most achievable benchmark for the Core Cities to reach in the next 20-30 years, which would represent a closing of the gap from approximately 50 percent currently to 20 percent (the current gap between Lyon and Paris). This would represent a narrowing of the gap that currently exists by almost 60 percent, costing approximately £951bn.

**Objective:** *What additional investment is needed in the Core Cities to reach net zero by 2050?*

The UK government has committed to achieving net zero by 2050. Various sources have estimated the cost for the UK, or part of it, of achieving this target. Due to the different scope and timescale of each report, the cost estimates of reaching net zero vary. Table 2 below highlights some of the differing estimates that exist.

The most applicable of these to the work of the Commission are the studies by UKRI and PwC, and UK Cities Climate Investment Commission - both of which estimate the cost for a UK sub-geography to reach net zero with investment in specific low-carbon areas. The other estimates of the cost of reaching net zero are much broader in scope, with the CCC Sixth Carbon Budget including a wider list of low-carbon investment areas, however there is much less clarity on where this investment will be needed within the UK.

For the purposes of the Commission, the Accelerating Net Zero Delivery report by UKRI and PwC has been used to estimate the costs for the Core Cities of reaching net zero. This report, released in 2022, estimated the cost for UK city-regions (representing 46 million people) of reaching net zero by 2050. The report contrasts two approaches for achieving the target:

1. Place-specific approach whereby the most socially cost-effective combination of low carbon measures are implemented (£58bn total cost).
2. Place-agnostic approach assumes uniform measures are implemented across the UK city-regions (£195bn total cost).

The analysis focuses around three key areas for the net zero transition, with investment costs estimated to decarbonise each area:

1. Transport.
2. Domestic buildings.
3. Public and commercial buildings.

For each area, the investment estimates have been apportioned to the Core Cities by their share of the most applicable metric to each

of the three investment areas (ie investment needed in domestic building decarbonisation apportioned to the Core Cities by their share of housing stock in the UK city-regions included in the analysis).

**Table 2:** Comparison of different sources of estimating the cost of reaching net zero.

| Source | Accelerating Net Zero Delivery, UKRI and PwC (2022) | City Investment Analysis Report, UK 3Ci (2021) | The Sixth Carbon Budget, Climate Change Committee (2020) | The Green Prosperity Plan, The Labour Party (2023) |
|---|---|---|---|---|
| **Scope of report** | Geography:<br>• Non-London Urban UK representing 70% of the UK population<br>Investment areas:<br>• Commercial building decarbonisation (22%)<br>• Domestic building decarbonisation (58%)<br>• Transport (20%) | Geography:<br>• 11 Core Cities and London<br>Investment areas:<br>• Commercial building decarbonisation (23%)<br>• Domestic building decarbonisation (44%)<br>• Transport (23%)<br>• Renewable energy generation (8%)<br>• Waste (2%) | Geography:<br>• UK<br>Investment areas (not exhaustive):<br>• Domestic building decarbonisation (~10%)<br>• Commercial building decarbonisation (~5%)<br>• Transport (~20%)<br>• Waste (~5%)<br>• Electricity supply (~15%)<br>• Manufacturing and construction (~5%)<br>• Aviation and shipping (~5%) | Geography:<br>• UK<br>Investment areas:<br>• Domestic building decarbonisation<br>• Renewable energy generation (GB Energy)<br>• National Wealth Fund<br>• British Job Bonus |
| **Headline costs** | £68-£230bn by 2050 (2023 prices) across the three investment areas. | £131-389bn by 2050 (2023 prices) across the five investment areas. | Current levels of capital investment in the UK increase from £10bn in 2020 to around £50bn in 2030, maintained to 2050. | Investment annually to 2030, reaching "a total of £28bn a year in the second half of the parliament".<br>Estimated total cost:<br>Approximately £140bn (5 years of £28bn investment) |
| **Estimated costs for the Core Cities** | £23-70bn by 2050 (2023 prices) across the three investment areas.<br>Apportioned by the Core Cities share of population, housing stock, and commercial floorspace. | £79-235bn by 2050 (2023 prices) across the five investment areas (£71-214bn across the three investment areas used in UKRI report).<br>Apportioned by the Core Cities share of population, housing stock, and commercial floorspace. | Approximately £200bn by 2050.<br>Apportioned to the Core Cities by share of UK population (20%) to provide an estimated figure. | Approximately £28bn by 2030.<br>Apportioned to the Core Cities by share of UK population (20%) to provide an estimated figure. |



**Objective:** *What additional investment is needed in the Core Cities to contribute their share of 394,000 new homes in the UK annually by 2030?*

Research by Crisis and the National Housing Federation (2019) identified a need for the rate of new housebuilding in the UK to increase from 190,000 to 394,000 homes annually; of these, 168,000 need to be affordable. This target compares with the Conservative Party's manifesto pledge in 2019 to increase housebuilding in England to 300,000 homes annually by 2030.

The additional investment required in the Core Cities is estimated based on the following assumptions:

- The baseline rate of new housebuilding in the UK will be 190,000 new homes per annum of which 55,000 will be affordable: this reflects the five year pre-pandemic average based on data from ONS.
- The housebuilding target will be achieved through a constant increase in the rate of UK housebuilding from 190,000 new homes in 2023 to 394,000 in 2030: this implies that 816,000 additional homes would be provided between 2023 and 2030 (over and above the assumed baseline).
- The average cost of each new home is £208,000: this is based on the average housebuilding cost per square metre in the UK of £2,388 (Checkatrade, 2023) and the median home size in the UK of 87 metres-squared (ONS, 2019). For the purposes of this analysis, the cost of land has not been included in estimating the cost of house-building. This is due to the vast differences in land cost between local authorities in the UK and the scope of the Commission's analysis.

On this basis, the total additional investment required to deliver 816,000 new homes across the UK up to 2030 would be £170bn. Of this, £35bn is the estimated investment required in the Core Cities (based on the Core Cities' forecast share of UK population in 2030).

As outlined above in the research by Crisis and the National Housing Federation (2019), 168,000 of these 394,000 new homes will need to be affordable to meet future demand. A sub-component of the estimated total cost of housebuilding in the Core Cities presented above will therefore be grants and subsidies provided by the public sector to subsidise affordable housebuilding for developers and local housing authorities.

- The National Housing Federation estimates that the government will need to provide a grant of approximately £105,000 (2023 prices) for each new affordable home. This figure is based on the total estimated annual grant of £12.8bn (£15.3bn in 2023 prices) needed to deliver 145,000 new affordable homes in England.
- A baseline of affordable housebuilding has been assumed with 55,000 new homes built annually as outlined above, based on the five year pre-pandemic UK average.
- The housebuilding target set above assumes a constant increase in affordable housebuilding from 55,000 new homes in the UK in 2023, up to 168,000 in 2030, providing an overall figure of 451,000 additional affordable homes needed in the UK from 2023-2030 (above the assumed baseline).
- This results in an overall estimated cost of providing grants for affordable housebuilding in the UK by 2030 of £48bn (based on the assumed figure of £105,000 needed as a grant per affordable home).
- Estimated overall cost to the public sector of providing grants for affordable housing in the Core Cities (apportioned by Core Cities forecast population share of the UK in 2030): £10bn.

**Objective:** *What additional investment is needed in the Core Cities to upskill/reskill the workforce by 2030 to benefit from automation?*

According to analysis by the CBI and McKinsey in 2020, the adoption of new technologies in the workplace and the resulting change in demand for skills due to automation mean that nine out of 10 workers in the UK will require additional training by 2030 if they are to be well-equipped for their jobs. On this basis, it is estimated that 26 million workers in the UK will require upskilling by 2030, and a further five million will require retraining for new occupations. The total additional investment is estimated to be £13bn annually across the UK. This is apportioned to the Core Cities based on their forecast share of the UK's working-age population in 2030 based on the ONS' population projections. On this basis, the estimated additional annual investment in human capital in the Core Cities is £3.1bn (£3.6bn in 2023 prices). This investment will need to be invested through to 2030 and, as a result, the total investment required between 2023 and 2030 is £29.2bn (2023 prices).

**Objective:** *What additional investment is needed in the Core Cities to reduce the risk of surface water flooding and drought linked to climate change?*

The NIC has estimated the additional investment needed across the UK to mitigate against two threats posed by climate change - surface water flooding and drought.

*Surface water flooding*

The NIC estimates that additional investment of £3.6bn (£4.1bn in 2023 prices) will be needed in the UK to reduce the number of properties at high risk of surface water flooding in the UK by 2055 by around 60 percent.

The NIC's analysis estimates the number of properties at high risk of flooding by settlement type. Several settlement categories can be approximated to cities: 'urban major conurbation', 'urban minor conurbation' and 'urban city and town'. On this basis, the number of high-risk properties in cities is estimated to be 279,000 (representing 86 percent of the total properties at high-risk).

To apportion the share of this investment in high-risk properties in cities and towns that are in the Core Cities, the Core Cities share of housing stock in UK cities and towns has been used, using data provided by the ONS. This results in an estimated £1.2bn (2023 prices) needed in investment in the Core Cities to reduce the number of properties at high-risk of surface water flooding by around 60 percent.

*Drought resilience*

The NIC estimates that additional investment of £21.0bn (£25.3bn in 2023 prices) is needed to implement measures to improve drought resilience in England by 2048. This investment is apportioned to the areas across the UK that are most at risk of experiencing extreme drought by 2048 based on analysis by Atkins (predominantly areas in the Midlands and south of England).[2.]

This investment has been apportioned to the Core Cities based on their land area share within the regions with the highest risk of drought. The Core Cities included in these areas are Bristol, Birmingham, and Nottingham. The share of land area of these cities results in an estimated investment need of £4.6bn (2023 prices).

2 Atkins (2018) Analysis of the cost of emergency response options during a drought. Available at: nic.org.uk/app/uploads/Atkins-2018-Analysis-of-the-cost-of-drought.pdf



# Source list

| **Objective: What additional investment is needed in the Core Cities to…** | **Sources used** |
|---|---|
| …increase the Core Cities productivity to narrow the gap to London' by x percent in each city by 2050? | Brandily, P et al (2022) Bridging the gap. The Resolution Foundation. Available at: economy2030.resolutionfoundation.org/reports/bridging-the-gap/ |
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| …contribute their share of 394,000 new homes in the UK annually by 2030? | Crisis and the National Housing Federation (2019) Housing supply requirements across Great Britain. Available at: www.crisis.org.uk/media/239700/crisis_housing_supply_requirements_across_great_britain |
| …improve intra-city connectivity? | National Infrastructure Commission (2018) National Infrastructure Assessment 1. Available at: nic.org.uk/studies-reports/national-infrastructure-assessment/national-infrastructure-assessment-1/ |
| …upskill / reskill the workforce by 2030 to benefit from automation? | CBI and McKinsey (2020) Learning for Life: Funding a world-class adult education system. Available at: www.cbi.org.uk/articles/learning-for-life-funding-a-world-class-adult-education-system/ |
| …reduce the risk of surface water flooding and drought linked to climate change? | National Infrastructure Commission (2022) Reducing the risk of surface water flooding. Available at: nic.org.uk/app/uploads/NIC-Reducing-the-Risk-of-Surface-Water-Flooding-Final-28-Nov-2022.pdf<br>National Infrastructure Commission (2018) Preparing for a drier future. Available at: nic.org.uk/app/uploads/NIC-Preparing-for-a-Drier-Future-26-April-2018.pdf |

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