Article

Infrastructure in the UK, investment and net stocks: May 2022

Update of existing estimates of investment and net stocks of infrastructure in the UK economy.

Notice

18 May 2022

A small error has been detected in the labelling of the base year of constant price market sector net stocks estimates. Figures 1 and 2 have now been corrected to reflect a base year of 2019. We apologise for any inconvenience.

Table of contents

1 . Main points

- The total net stock of infrastructure in the market sector was estimated at £342.6 billion in constant prices in 2020, having increased by 0.9% since 2019.

- Total market sector investment in infrastructure in 2020 was £14.1 billion in constant prices, declining by 16.9% compared with 2019, largely driven by reduced investment in the mining and quarrying sector.

- Total general government investment in infrastructure was approximately £20.6 billion in 2020, of which £13.9 billion was allocated to central government and £6.7 billion in local government, in current prices; this marks an annual decrease of 2.7% compared with 2019.

2 . Overview

Measuring infrastructure is necessary to understand changes in productivity and how inclusive a society and economy is. This need becomes particularly important when considering equal access to goods, services and opportunities for citizens and businesses, that can lead to improvements in quality of life for all and economic growth.

This article presents updated experimental estimates of investment and net stocks of infrastructure in the UK covering the period from 1997 to 2020 for the market sector, while for the other components the data time series is less extended. Our previous article on developing new statistics for infrastructure estimated investment in infrastructure up to 2016, with an initial look at infrastructure stocks, and a case study on the available data for the water industry. The present release updates these estimates to reveal a richer picture of changes in infrastructure in the UK and in Great Britain for construction. In line with the previous publication, we present regional breakdowns for new construction work, and repair and maintenance construction.

The methods, assumptions and definitions remain the same as in the previous article for consistency. Because of the complex nature of infrastructure, we follow a functional definition, in line with the National Infrastructure Commission guidelines. As such, we focus predominantly on narrowly defined economic infrastructure, namely transport, energy, water and waste handling assets, digital communications, mining and quarrying, and "other" (which includes all assets not in these categories). Neither housing nor social infrastructure (such as the education, health and care systems) are included, although there may be scope to extend our definition in the future.

There is currently no universally agreed upon definition of infrastructure in either the UK's National Accounts, or the international guidance embodied in the System of National Accounts: SNA 2008 and the European System of Accounts: ESA 2010.

Expenditure on the creation of new infrastructure assets, as well as expenditure to repair and maintain existing infrastructure assets are categorised as investment in the national accounts. The accumulation over time of these investments forms a stock of assets in the economy.

Infrastructure assets are fixed capital assets, with economic lives longer than one year, while the asset stock is determined by investments made in the current and previous periods. Many infrastructure assets tend to have very long economic lives. Consequently, it is necessary to construct a lengthy data time series of investment flows to fully measure the value of the infrastructure stock. The existing stock is also affected by depreciation - the decrease in value because of wear and tear or obsolescence. For this reason, we also present our findings in terms of new construction as well as repair and maintenance of infrastructure.

Section 3 presents findings on market sector infrastructure investment and net stocks. Section 4 shows the changes in infrastructure in the public sector, while in Section 5 there is an analysis of construction infrastructure. Section 6 presents opportunities and challenges for further work, including understanding and measuring low carbon and climate-resilient infrastructure, digital infrastructure, forthcoming case studies and improvements to the estimates. Finally, Sections 7 to 9 provide information on the data sources and terminology adopted in the article, alongside strengths and limitations.

This update was informed by engagement with stakeholders. We welcome user feedback to nfa-development@ons.gov.uk

3 . Market sector

The market sector is defined as the whole economy excluding government and the non-profit institutions serving households (NPISH) sector. It consists of seven sectors as presented in this article, in line with the 2018 publication.

The sectors are:

- energy (Division 35, UK Standard Industrial Classification)

- mining and quarrying (Divisions 05 to 09)

- water supply (Division 36)

- sewerage and waste (Divisions 37 to 39)

- warehousing and support activities for transportation (Division 52)

- telecommunications (Division 61)

- with "other" representing the remaining divisions

Net stocks

Our experimental estimates for the market sector show a general slowdown in growth rates over recent years, indicating that market sector infrastructure is not growing as fast as before for some industries. The range of our data for the market sector is from 1997 to 2020 for the UK.

The net stocks of infrastructure in the market sector have been increasing in absolute value, in constant prices. In 2020, the total net stock of infrastructure was £342.6 billion, having increased by 0.9% since 2019. Infrastructure investment by the mining and quarrying sector remains the highest contributor to the net stock value of infrastructure. In 2020, it accounted for nearly a third (29.6%) of the total market sector net stock, followed by the energy sector, that accounted for 24.0% and water supply infrastructure accounting for 16.2%.

Figure 1: Market sector net stocks of infrastructure

Constant prices (2019=base), UK, 1997 to 2020

Figure 1: Market sector net stocks of infrastructure

Constant prices (2019=base), UK, 1997 to 2020
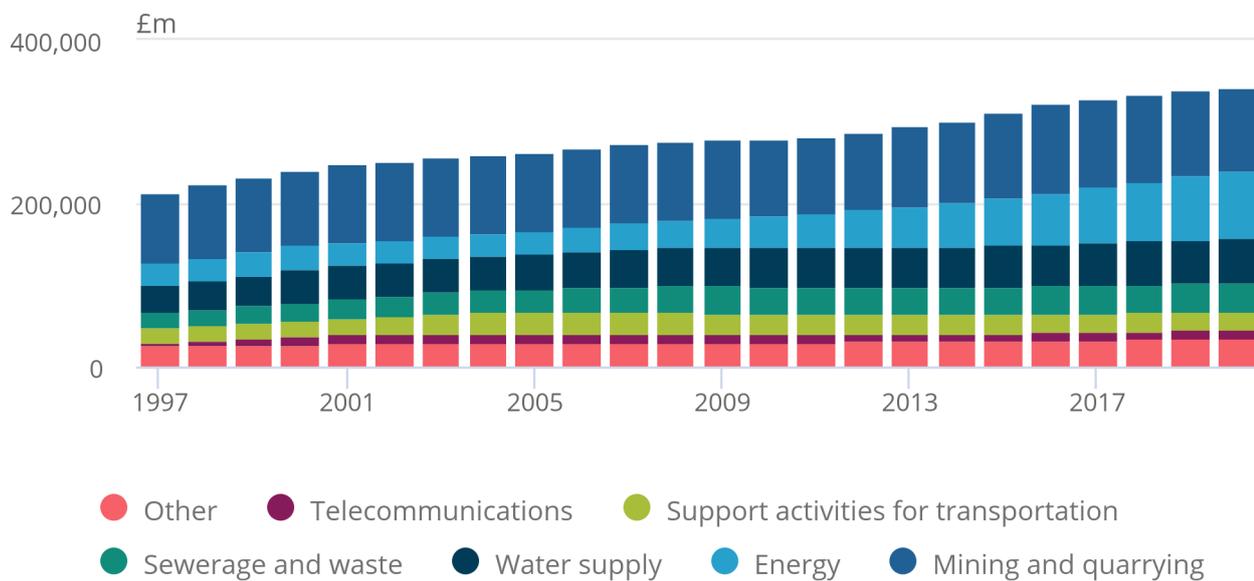
Source: Office for National Statistics

Notes:

1. Energy (Division 35, UK Standard Industrial Classification); Mining and Quarrying (Divisions 05 to 09); Water Supply (Division 36); Sewerage and Waste (Divisions 37 to 39); Warehousing and Support activities for transportation (Division 52); Telecommunications (Division 61); Other (remaining Divisions)

Constant prices for net stocks and investments are derived by the Office for National Statistics (ONS) according to the methodology outlined in the chain-linking methods used within the UK National Accounts.

In terms of growth performance of sectors, the net stocks of mining and quarrying infrastructure fell 3.4% between 2019 and 2020. Since 2009, the net stock of support activities for transportation had a negative rate of change. In 2020, it stood at negative 2.1%.

The net stock of telecommunications infrastructure (activities of transmitting voice, data, text, sound and video) increased in the late 1990s (with a 29.3% growth in 2000), to decline sharply after the dot com bubble burst. In 2004, telecommunication infrastructure net stocks increased temporarily, but its annual rate of growth remained negative until 2014, when the rate became positive, albeit with volatile growth.

A possible explanation may be the quick decline of physical telecommunication infrastructure as technologies rapidly become obsolete because of continuous technological progress, coupled with a simultaneous and systematic shift towards intangible telecommunication and software solutions (not captured by these data), such as cloud infrastructure. Its annual rate of growth in 2020 was almost 1% in constant prices.

Net stock for energy infrastructure shows a different pattern compared with telecommunications. After an initial low level of growth, there was an increase between 2003 and 2007, followed by moderate fluctuations until 2018. Since 2018, the annual rate of change is almost constant, reaching 6.1% in 2020.

The net stocks of infrastructure by the sewerage and waste industries have also been showing declining annual growth, at negative 0.8% in 2020. The mixed category "other" that contains industries that are not in the industries listed previously, in 2020 had 2.6% annual growth.

Figure 2: Annual percentage change in the market sector infrastructure net stocks in constant prices

Constant prices (2019=base), UK, 1997 to 2020

Figure 2: Annual percentage change in the market sector infrastructure net stocks in constant prices

Constant prices (2019=base), UK, 1997 to 2020
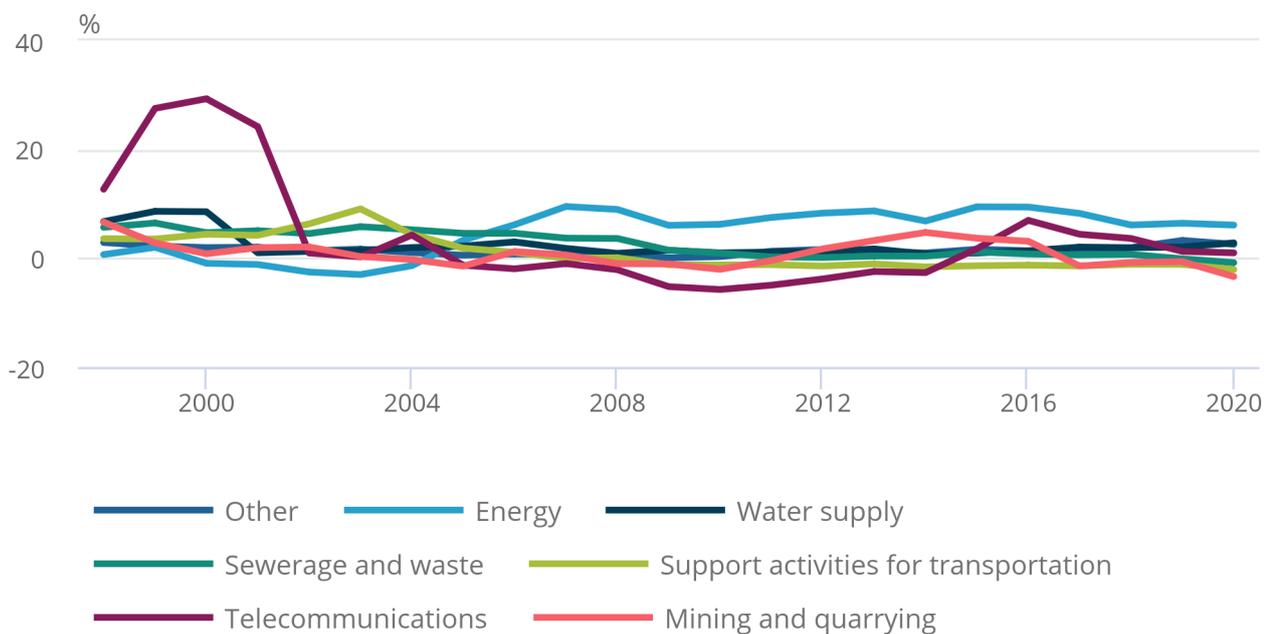
Source: Office for National Statistics

Notes:

1. Energy (Division 35, UK Standard Industrial Classification); Mining and Quarrying (Divisions 05 to 09); Water Supply (Division 36); Sewerage and Waste (Divisions 37 to 39); Warehousing and Support activities for transportation (Division 52); Telecommunications (Division 61); Other (remaining Divisions).

Investment

Total market sector investment in infrastructure in 2020 was £14.1 billion in constant prices, having declined by 16.9% compared with 2019.

Figure 3: Market sector infrastructure investment in constant prices

Constant prices (base=2018), UK, 1997 to 2020

Figure 3: Market sector infrastructure investment in constant prices

Constant prices (base=2018), UK, 1997 to 2020
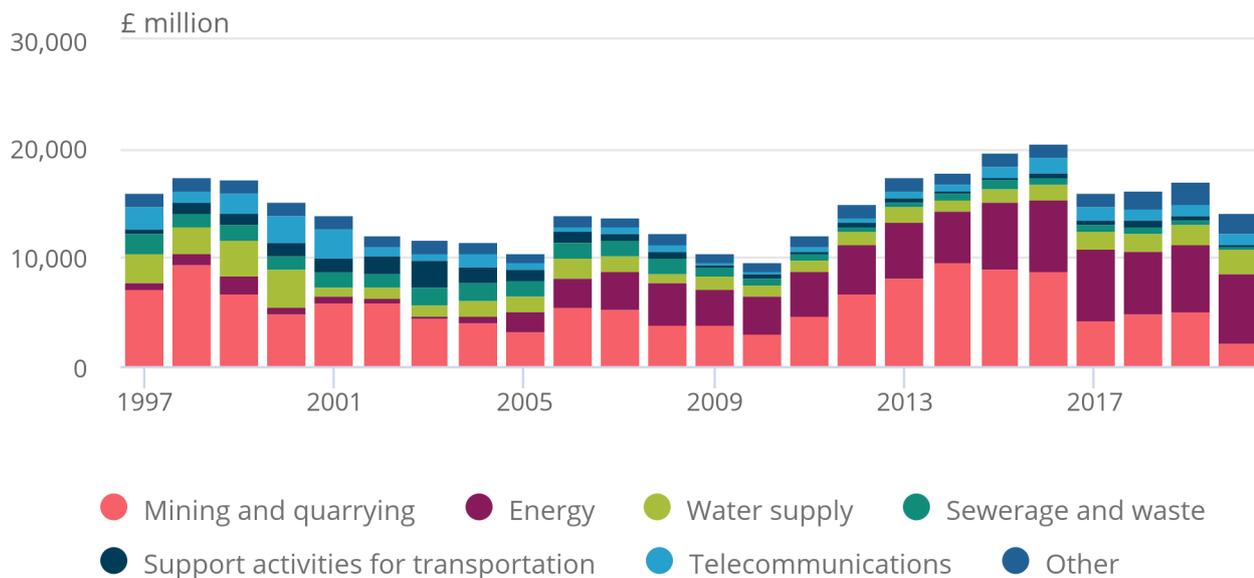
Source: Office for National Statistics

Notes:

1. Energy (Division 35, UK Standard Industrial Classification); Mining and Quarrying (Divisions 05 to 09); Water Supply (Division 36); Sewerage and Waste (Divisions 37 to 39); Warehousing and Support activities for transportation (Division 52); Telecommunications (Division 61); Other (remaining Divisions).

The decline was driven by a reduction in investment in the mining and quarrying and in the sewerage and waste sectors.

Mining and quarrying infrastructure investment nearly halved, falling by 54.9%, as did sewerage and waste infrastructure investment, with a decline of 51.5%. Investment in infrastructure for support activities for transportation in 2020 was lower than 2019, by 41.5%. Other infrastructure investment and telecommunications investment also decreased, by 9.4% and 2.6% respectively. There was an increase in water supply infrastructure investment by 23.5%, and a moderate increase (2.3%) in energy infrastructure investment.

Overall, the largest decline occurred in 2017, when investment in infrastructure fell by one-fifth (22.0%), again driven mostly by a reduction in mining and quarrying. All sectors of infrastructure move roughly cyclically from 2008 onwards, with the exception of water supply investment. The peak in 2004 for the energy sector refers to the decommissioning of the UK's nuclear industry facilities by the government, with change of institutional ownership.

Figure 4: Annual percentage change in the market sector infrastructure investment in constant prices

Constant prices (base=2018), UK, 1997 to 2020

Source: Office for National Statistics

Notes:

1. Energy (Division 35, UK Standard Industrial Classification); Mining and Quarrying (Divisions 05 to 09); Water Supply (Division 36); Sewerage and Waste (Divisions 37 to 39); Warehousing and Support activities for transportation (Division 52); Telecommunications (Division 61); Other (remaining Divisions).

4 . Government spending on infrastructure

In this section we discuss infrastructure investment by the general government (GG), which is made up of totals for local government (LG) and for central government (CG), from 2006 to 2020 for the UK.

In 2020, total GG investment in infrastructure was approximately £20.6 billion, of which £13.9 billion was allocated to CG and £6.7 billion in LG, in current prices. This is an annual decrease of 2.7% compared with 2019.

Infrastructure investment remains a significant component of total GG investment, accounting for 31.7% in 2020, having declined slightly from a high plateau during 2015 and 2018. The period of high growth between 2010 and 2015 saw a number of government policies and initiatives ranging from community and neighbourhood infrastructure to climate change adaptation infrastructure across the UK.

Figure 5: Infrastructure share of general government investment
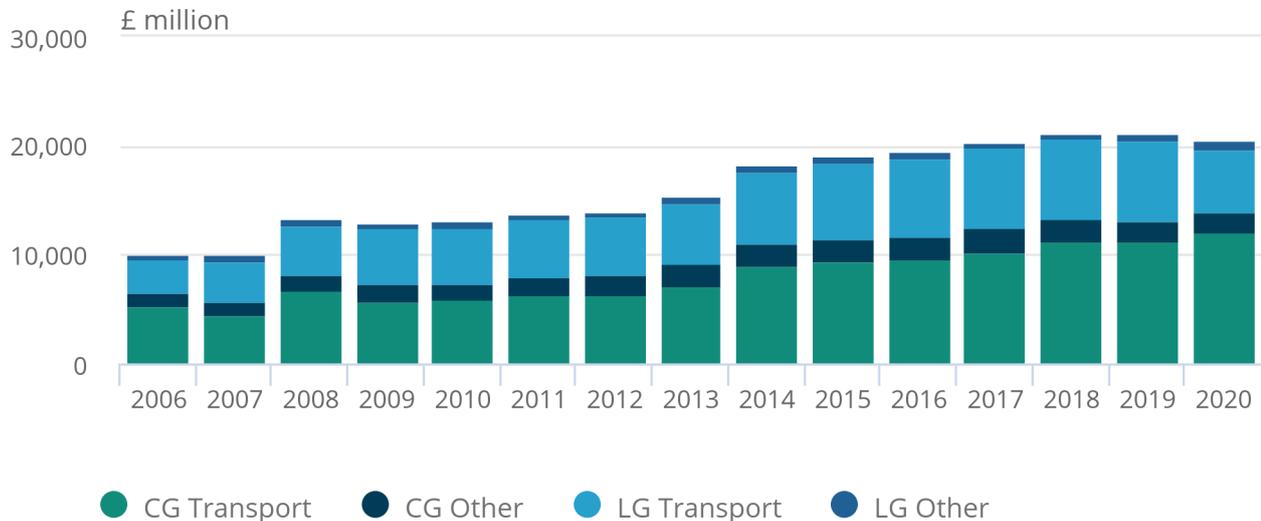
Current prices, UK, 2006 to 2020

Source: Office for National Statistics

Figure 6: Government infrastructure investment by type of investment

Current prices, UK, 2006 to 2020

Figure 6: Government infrastructure investment by type of investment

Current prices, UK, 2006 to 2020

£ million

CG Transport   CG Other   LG Transport   LG Other

Source: Office for National Statistics

5 . Infrastructure construction

Construction is an essential component in the creation of infrastructure. We present findings here that cover part of the period that we examine (2010 to 2020), for illustrative purposes only, for Great Britain (data available for England, Scotland, Wales), in current prices. This is because construction data available do not map directly to the industries in the definition of infrastructure used here, but to specific fixed capital assets: water infrastructure assets, sewerage infrastructure assets, electricity infrastructure assets, roads, railways, harbours and other infrastructure assets. The latter group includes gas, communications and air transport assets.

Similarly, the distinction between public and private infrastructure does not correspond exactly to the market sector and government categories presented in Sections 3 and 4. This is because of differences in data collection for infrastructure between this article and the [Construction output in Great Britain: February 2022 bulletin](#) publication, where more detail about the methodology can be found.

The data at regional level as well as asset level are based on modelling with specific assumptions on how new orders are converted to new work output (outlined in detail in the article noted previously). These are not designated National Statistics and caution is needed when interpreting them. As such, they are being constantly revised as new data become available, with the next update to these expected on 12 May 2022, with revisions throughout the data time series reflecting revisions to valuations, start dates and end dates from time of new order.
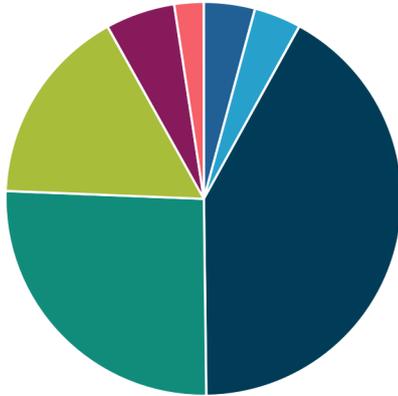
Electricity accounted for 41.8% of new infrastructure construction work in current prices in 2020. Almost a quarter of new work was on roads (25.8%), followed by railways at 16.3%, harbours at 5.7%, water at 4.2% and sewerage at 3.8%. The category with the lowest share of new work was "other", with 2.4%.

Figure 7: Infrastructure construction (new work) by sub-sector

Current prices, Great Britain, 2020

Source: Office for National Statistics

Notes:

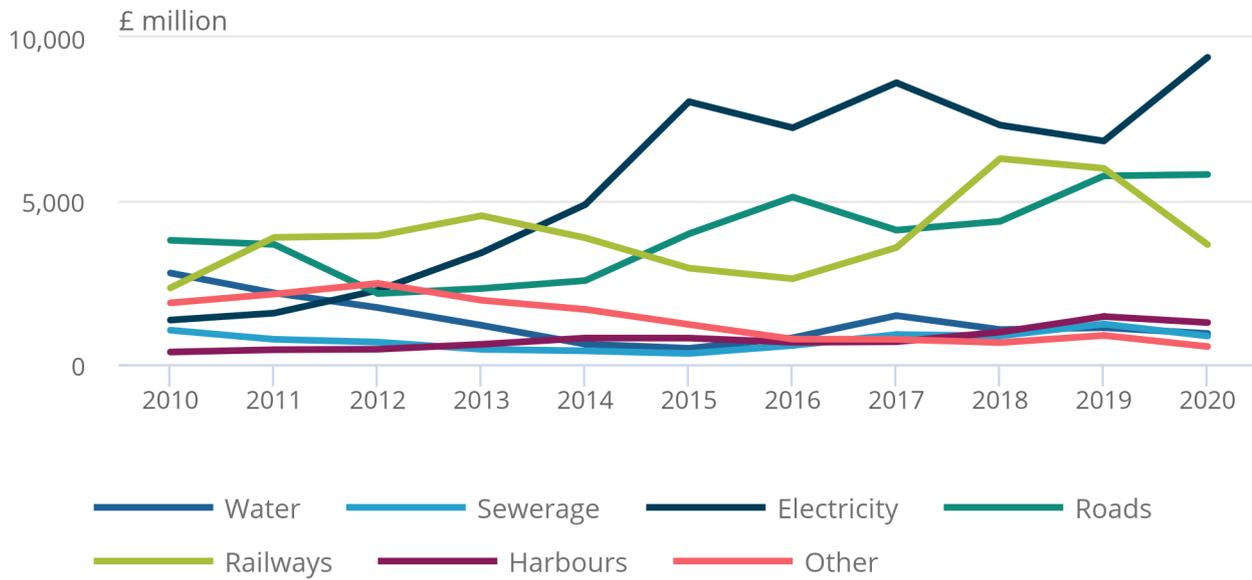1. "Other" includes gas, communications and air transport as per construction data.

Since 2014, electricity has accounted for the majority of new work infrastructure construction, while from 2011 to 2013 most new work was for railways. For the first year of data (2010) roads accounted for most new work.

Current prices, Great Britain, 2010 to 2020

Figure 8: Infrastructure construction (new work) by sub-sector

Current prices, Great Britain, 2010 to 2020

Source: Office for National Statistics
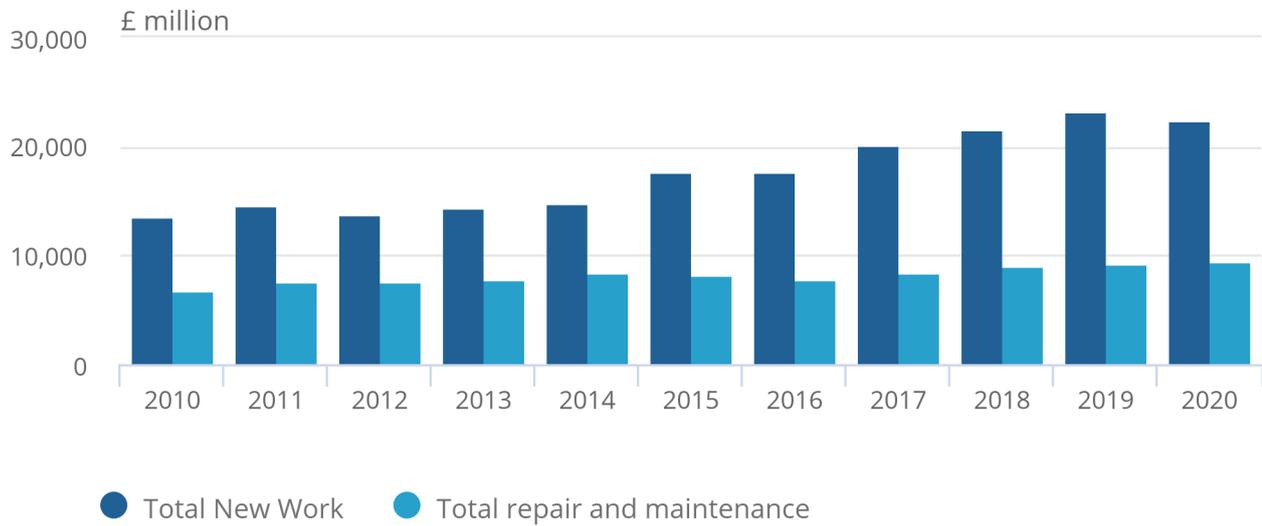
Notes:

1. "Other" includes gas, communications and air transport.

Figure 9: Total new work versus total repair and maintenance (of infrastructure)

Current prices, Great Britain, 2010 to 2020

Figure 9: Total new work versus total repair and maintenance (of infrastructure)

Current prices, Great Britain, 2010 to 2020

Source: Office for National Statistics

Regional infrastructure construction

In the following charts we present the regional breakdown on new work infrastructure construction in Great Britain from 2010 to 2020, based on modelled estimates.

In terms of the value of new construction work on infrastructure assets in 2020, in the North West it was £5.1 billion in current prices, followed by London at almost £3.5 billion. An interesting find is the spectacular increase (by 174.8%) of new construction work for infrastructure in Yorkshire and The Humber in 2020, in current prices, because of significant investment in renewable and other energy infrastructure.

The highest level of repair and maintenance construction of infrastructure was in the South East (£1.3 billion), followed by the East of England (£1.1 billion) in current prices.

Table 1: Construction by region in 2020 (new work, repair and maintenance) in current prices, Great Britain, £ million

Region	New work value, £m	Repair and maintenance value £m
North East	819	969
North West	5077	1023
Yorkshire and the Humber	2861	1060
East Midlands	1802	591
West Midlands	1282	694
East	954	1106
London	3449	1060
South East	1536	1306
South West	1511	539
Wales	305	251
Scotland	2862	945

Source: Office for National Statistics

6 . Future developments

Future developments need to ensure that infrastructure meets its economic, environmental, social and development objectives. We aim to continue working on improving the conceptual approach, implement technical improvements and introduce new case studies.

Currently there is an international effort to develop a definition of infrastructure for statistical measurement to ensure international comparability. In parallel, attempts are being made to understand how to best measure climate resilient or low carbon infrastructure, which would include assets such as land improvements and building adjustments to reduce the carbon footprint of infrastructure and mitigate the impact of climate change. However, it is challenging as a radical transformation takes place in the energy sector.

Similarly, because of the multiple use potential of infrastructure assets, it is not possible currently to provide estimates for investment in climate-resilient infrastructure specifically. In the future, we are interested in developing ways to account for these more accurately.

Besides this type of infrastructure, the outbreak of the coronavirus (COVID) pandemic in 2020 emphasised the need to measure social infrastructure: healthcare, education and care (adult and children) infrastructure. Likewise, with the migration of a large part of economic activity online over the last two years, it became clear that a better way to measure digital infrastructure is necessary. This could include a variety of new additions, from platform infrastructure assets to financial infrastructure assets. Visualising the types of systems included in these augmented definitions of infrastructure, encompassing assets in the whole of the economy, indicates that the tasks can be quite challenging.

Improving definitions would allow us to refine the types of assets included in the estimates. As a result, this will help us use new and improved deflators, especially for infrastructure.

Another area of interest for further development is improving regional estimates for infrastructure. The main issue is determining economic ownership of the asset, and there are a number of methods under consideration by the Office for National Statistics.

Creating international comparisons for infrastructure investment and net stocks is a further ambition.

Finally, we aim to introduce new case studies on different sectors of infrastructure, such as on transport infrastructure and energy.

7 . Infrastructure data

[Output in the construction industry](#)
Dataset | Released 11 April 2022
Monthly construction output for Great Britain at current price and chained volume measures, seasonally adjusted by public and private sector.

[Output in the construction industry: sub-national and sub-sector](#)
Dataset | Released 11 February 2022
Quarterly non-seasonally adjusted type of work and regional data at current prices, Great Britain.

[Central government annual expenditure: ESA Table 11](#)
Dataset | Released 22 February 2022
Annual UK government expenditure for central government only, broken down by function using the classification of functions of government.

[Local government annual expenditure: ESA Table 11](#)
Dataset | Released 22 February 2022
Annual UK government expenditure for local government only, broken down by function using the classification of functions of government.

[General government annual expenditure: ESA Table 11](#)
Dataset | Released 22 February 2022
Annual UK government expenditure for general government only, broken down by function using the classification of functions of government.

[Capital stocks and fixed capital consumption](#)
Dataset | Released on 25 November 2021
Annual estimates of gross and net capital stocks and consumption of fixed capital in the UK, in current prices and chained volume measures

[Business investment by industry and asset](#)
Dataset | Released on 31 March 2022
Detailed breakdown of business investment by industry and asset, in current prices and chained volume measures, non-seasonally adjusted and seasonally adjusted, UK.

8 . Glossary

Central government

Central government (CG) consists of all administrative departments of the state and other central agencies whose responsibilities cover the whole economic territory of a country, except for the administration of social security funds.

[Glossary: Central government - Statistics Explained (europa.eu)](#)

Local government

Local government (LG) consists of all types of public administration whose responsibility covers only a local part of the economic territory, apart from local agencies of social security funds.

[Glossary: Local government - Statistics Explained (europa.eu)](#)

General government

In the European System of Accounts (ESA2010), paragraph 2.111 the general government (GG) sector (S.13) is defined as consisting "of institutional units which are non-market producers whose output is intended for individual and collective consumption and are financed by compulsory payments made by units belonging to other sectors, and institutional units principally engaged in the redistribution of national income and wealth."

Glossary: General government sector - Statistics Explained (europa.eu)

Net stocks

The net stock is the gross capital stock (defined as the value of all fixed assets still in use at a point in time), less the consumption of fixed capital accrued up to that point. It takes into account the depreciation of assets over time as a result of physical deterioration, foreseeable obsolescence or normal accidental damage.

9 . Data sources and quality

Data sources

- investment (gross fixed capital formation) and capital stocks - definition by asset (other structures) and industries

- government - definition by "Classification Of the Functions Of Government" (COFOG)

- construction - definition by "type of work"; the sub-national and sub-sector construction output estimates are no longer badged as National Statistics (as of Mar 2019)

Strengths

The first strength of this article is that calculation methodology and data categorisation are the same as in the previous article, following the same functional definitions. The benefit of this is that the present article and accompanying dataset are consistent with previous work, consequently allowing these experimental data to be used to inform policy.

The second strength of this article is that data time series includes four more years, while updating figures that have been revised for previous years, making the changes and update consistent across publications.

Limitations

Measuring infrastructure comes with numerous challenges, some of which are outlined in the previous sections. The main conceptual challenge is the need for a clear definition. We also faced a lack of data sources, especially when trying to source data from private companies because of market sensitivity.

When it comes to government data, one issue is the lag between the latest data available and the current period, preventing us from bringing the data any further than 2020. A further challenge is identifying suitable price indices to produce the constant prices data time series for government investment and for infrastructure construction findings.

Other limitations in this case include the lack of mechanisms that monitor performance of infrastructure (for better asset life estimates) and economic ownership of infrastructure assets complexities.

10 . Related links

Developing new statistics of infrastructure: August 2018
Article | Released 21 August 2018
The second in a series of articles on infrastructure statistics, updating measures of infrastructure investment and introducing measures of infrastructure stocks.

Developing new measures of infrastructure investment: July 2017
Article | Released 5 July 2017
The first in a series of articles on infrastructure statistics, focusing on definitional and data challenges in measuring infrastructure investment.